



Life after stroke

New Zealand guideline
for management of stroke

Best practice
evidence-based guideline

November 2003

Additional information on management of
stroke in New Zealand is available at
www.stroke.org.nz

Any updates to this guideline are available
at www.nzgg.org.nz



Application of the guideline

Best-practice evidence-based clinical practice guidelines are produced to help health professionals and consumers make decisions about healthcare in specific clinical circumstances. Research has shown that if properly developed, communicated and implemented, guidelines can improve care.

While this guideline represents a statement of best practice in management of stroke based on the latest available evidence (at the time of publishing), it is not intended to replace the health professional's judgement in each individual case.

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Where guidelines are modified for local circumstances, significant departures from the national guidelines should be fully documented and the reasons for the differences explicitly detailed.

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Summary

Stroke is a major health problem in New Zealand. Stroke management includes stroke prevention, acute care, rehabilitation and long-term support for people with stroke and their caregivers, family members/whānau and others involved in their lives.

The critical areas of stroke management where a change in practice would make an important difference to outcomes for people with stroke are:

- 1. All District Health Boards should provide organised stroke services.**
- 2. All people admitted to hospital with stroke should expect to be managed in a stroke unit by a team of health professionals with expertise in stroke and rehabilitation.**

The above key messages were present in the first edition of the New Zealand stroke guidelines (1996) [1] and were largely ignored [2–4].

All patients with stroke should receive:

- ▶ *Care in a stroke unit by a team of health professionals with expertise in stroke and rehabilitation*
- ▶ *Aspirin 150–300 mg within 48 hours if CT rules out intracerebral haemorrhage and no other contraindications exist*
- ▶ *Attention to secondary prevention issues, preferably with a written plan on discharge*
- ▶ *Information about stroke that will usually include appropriate advice regarding sexuality, mood, employment and driving. Information about stroke should also be provided to the person's family/whānau.*
- ▶ *Assessment for ongoing support and rehabilitation needs.*

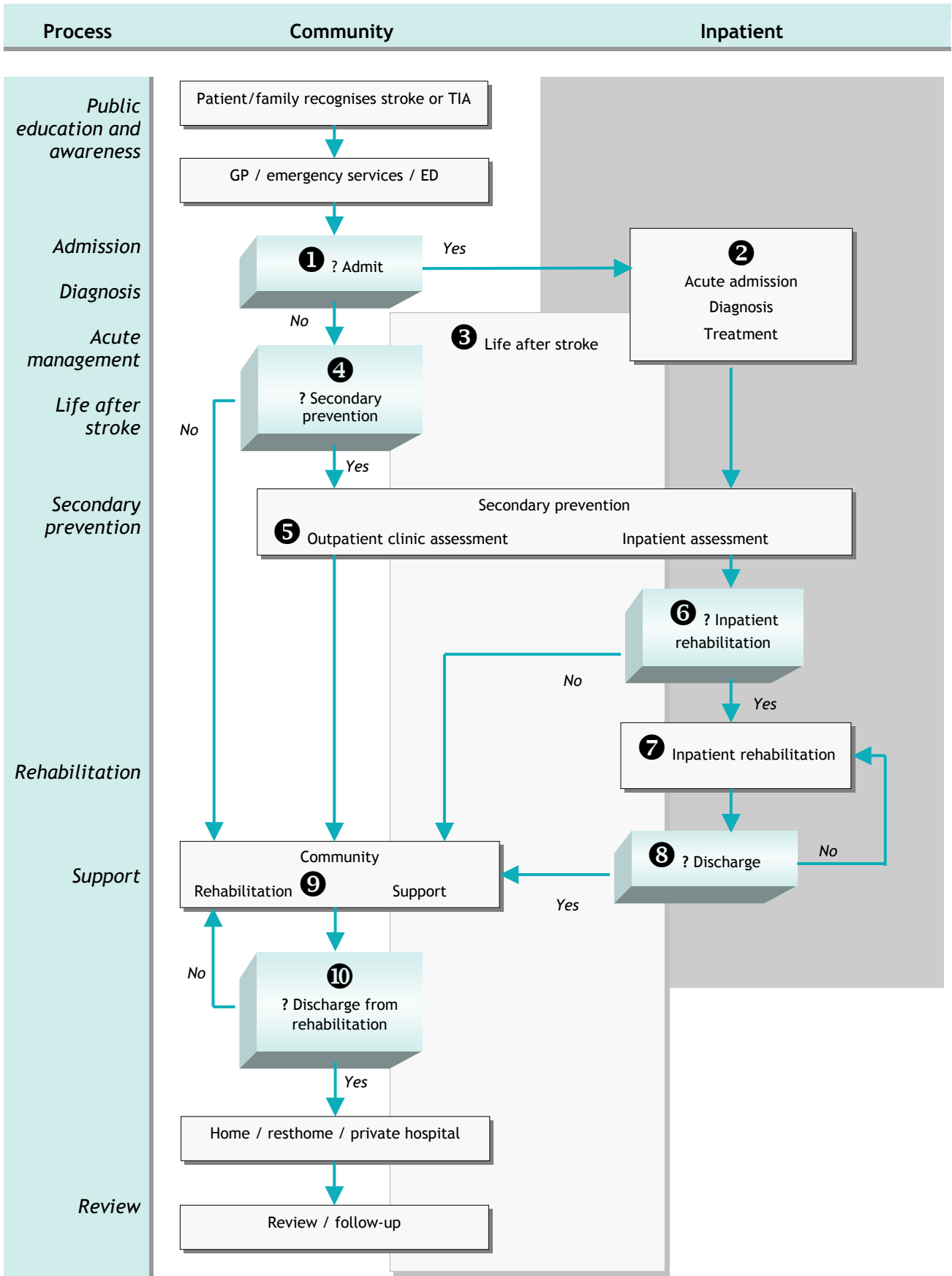
Selected patients with stroke may receive:

- ▶ *Treatment with intravenous thrombolysis (special criteria apply)*
- ▶ *Management in an early supported discharge programme.*

There is overwhelming evidence that the most important intervention that can improve outcomes for all people with stroke is the provision of organised stroke services, a vital component of which is a stroke unit. Without an organised stroke service, adherence to recommendations about specific interventions is likely to have little impact on outcomes for people with stroke. The main priority for all health funders and providers of stroke services is that people with stroke have access to organised stroke services. The priority for the consumers of that region should be to ensure that organised stroke services are available and accessible.

Management of stroke

See key on next page



KEY TO ALGORITHM

1 Is admission required for this person?

All people with stroke should expect to be admitted unless:

- ▶ No significant disability affecting functioning and
- ▶ Urgent outpatient assessment by specialist stroke service available or
- ▶ Already in appropriate institutional care or
- ▶ Person/family prefer home care despite explanation of benefits of hospital care

If not admitted must consider diagnosis, secondary prevention, home support and rehabilitation needs.

2 Acute admission

- ▶ Admission to stroke unit or care of stroke team
- ▶ CT within 48 h
- ▶ Swallowing assessment within 24 h
- ▶ Multidisciplinary team (MDT) assessment within 48 h
- ▶ Aspirin initiation (if appropriate) within 48 h

3 Life after stroke

- ▶ Person has contact information for Stroke Foundation field officers or other support
- ▶ Caregiver support
- ▶ Cultural issues
- ▶ Ongoing education about stroke
- ▶ Appropriate advice and information on sexuality, mood, employment, driving

4 Is diagnosis and secondary prevention an issue for this person?

Typically appropriate if:

- ▶ Further stroke would have important clinical consequences and
- ▶ Person can cooperate and comply with investigations or antiplatelet drugs and
- ▶ If for carotid ultrasound, has significant functional recovery from an anterior circulation stroke and fit for surgery

Typically not appropriate if terminal illness, severe dementia/disability e.g. in hospital-level care

5 Outpatient clinic / review

To confirm diagnosis, assess vascular risk factors and address secondary prevention

- ▶ Urgent outpatient assessment by clinicians knowledgeable about stroke
- ▶ ECG and bloods at GP or ED presentation
- ▶ Access within 1–2 weeks
- ▶ Review by physician with special interest or expertise in stroke management

6 Is inpatient rehabilitation required?

All people with stroke should expect inpatient rehabilitation by an MDT with expertise in stroke unless:

- ▶ No significant residual disability interfering with function on MDT assessment or
- ▶ Moderate disability (e.g. transfer with 1 person) and early supported discharge service available or
- ▶ Already in institutional care and community rehabilitation service available

7 Inpatient rehabilitation

- ▶ Admission to stroke unit or care by stroke team within a rehabilitation unit
- ▶ Stroke-expert MDT responsible for care
- ▶ Person-orientated goal setting
- ▶ Daily therapy input (Mon–Fri)
- ▶ Family and caregivers involved in rehabilitation
- ▶ Appropriate information and support available to person and family

8 Is person ready for discharge to the community?

Typically appropriate if:

- ▶ Medically stable and
- ▶ MDT has completed assessments of home situation and post-discharge requirements and
- ▶ An appropriate place for discharge has been identified and
- ▶ An appropriate plan has been agreed between MDT, person, caregivers and other agencies and
- ▶ All necessary equipment has been provided and
- ▶ All follow-up arrangements are in place (rehabilitation, social and GP/primary care)

9 Community rehabilitation

Can be provided with equal effectiveness in the community or a day hospital

10 Is person ready for discharge from rehabilitation?

Typically appropriate if:

- ▶ Person has achieved agreed therapy goals and
- ▶ No new goals are identified and agreed and
- ▶ Appropriate supports are in place

Abbreviations:

ECG = electrocardiogram

ED = emergency department

GP = general practitioner

MDT = multidisciplinary team

TIA = transient ischaemic attack



The Stroke Foundation of New Zealand website as a resource

By late 2003 the Stroke Foundation website (www.stroke.org.nz) will be the national centre for information on international and local resources, local initiatives in stroke management, standardisation of protocols, and audit.

The website will function as an interface for consumers, health professionals with an interest in stroke, community support and the public sector.

It is planned to develop multilanguage material for downloading, including material in Māori and Pacific languages.

Purpose

This guideline is written principally for the use of:

- ◆ health professionals involved in the care of people with stroke
- ◆ people with stroke and their caregivers/families/whānau
- ◆ managers and funders of New Zealand health services

The purpose of the guideline is:

- ▶ to facilitate better and more equitable outcomes for people with a stroke in New Zealand, and their families/whānau, by presenting the evidence currently available for the most effective management of specific problems after stroke
- ▶ to add to an existing knowledge base for evidence-based, cost-effective and equitable management of stroke
- ▶ to provide a commentary on the most effective way to manage stroke in the New Zealand setting, including approaches to cultural issues
- ▶ to assist people with a stroke and their families/whānau to make informed decisions
- ▶ to highlight the need for significant changes in current practice in New Zealand
- ▶ to ensure access to resources for stroke management.

Definition of stroke

This guideline uses the World Health Organization (WHO) definition of stroke: *'a clinical syndrome typified by rapidly developing signs of focal or global disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than of vascular origin'* [5].

Subarachnoid haemorrhage is included in the WHO definition of stroke. The acute management of subarachnoid haemorrhage is not dealt with in this guideline, but many of the issues arising from the neurological disability following subarachnoid haemorrhage are covered in the guideline.

Definition of transient ischaemic attack (TIA)

Stroke syndrome but with full recovery in less than 24 hours.

About the guideline

Foreword

The first New Zealand stroke guidelines, *Life after stroke: New Zealand guidelines for best practice in rehabilitation after stroke*, were published by the Stroke Foundation of New Zealand in 1996 [1]. At that time there were no 'Guidelines for Guidelines', and the New Zealand Guidelines Group was not yet in existence. This first edition was an ambitious attempt to try to improve all aspects of management of stroke in New Zealand. It took an all-inclusive approach, attempting to cover stroke from birth to old age, from primary prevention to long-term care.

The Stroke Foundation of New Zealand and the funding bodies, the four regional health authorities, were committed to updating the guidelines in 1998. However changes within the health funding agency led to delays until 2001, when the Ministry of Health contracted the Stroke Foundation to organise the writing of this new edition.

The new edition of the stroke guideline has been jointly sponsored by the Ministry of Health, the New Zealand Guidelines Group, and the Stroke Foundation of New Zealand. The National Heart Foundation of New Zealand is a partner in the development of the cardiovascular guidelines.

Both the New Zealand Stroke Foundation and the New Zealand Guidelines Group are not-for-profit organisations set up to promote effective health and disability services, in this case for people who have been affected by stroke.

Why the first edition of the guidelines needed updating

In November 2001 a set-up committee reviewed the 1996 stroke guidelines and agreed that an update was required for the following reasons:

- ▶ Some of the information in the first edition was out of date.
- ▶ Some excellent stroke guidelines recently published in other countries could be used as a resource in a new edition.
- ▶ Despite the high quality of guidelines available from other countries, it was necessary to establish that their recommendations were appropriate in the New Zealand setting.
- ▶ Not all overseas guidelines are fully up to date or complete in every aspect, and gaps needed to be addressed.
- ▶ Local cultural issues, for example those of Māori and Pacific peoples, needed to be covered.
- ▶ Changes which may have occurred in local regulations (e.g. driving) and local demographics may influence the way generic stroke guidelines are implemented in New Zealand.

- ▶ Updating the guideline was identified as a priority by the National Cardiovascular Disease Advisory Group set up to provide advice on the most effective way to reduce the impact and incidence of cardiovascular disease.

The guideline development process

The stroke guideline development team was convened by the Stroke Foundation of New Zealand (SFNZ) and the New Zealand Guidelines Group (NZGG). Five members of the original 1996 stroke guideline team, including the project editor, were involved in the development of the 2003 edition. Other team members were nominated by a variety of stakeholders including the SFNZ, the Royal New Zealand College of General Practitioners, the Māori Cardiovascular Working Group, Te Ohu Rata o Aotearoa, the Pasifika Medical Association, the NZGG, and the Ministry of Health.

The team was divided into subgroups and carried out work on designated areas: epidemiology and costs of stroke, organisation and evaluation of stroke services in New Zealand, acute management, rehabilitation, and longer-term issues. Māori, Pacific, and general practice representatives advised on appropriate content throughout. Drafts were commented upon by the entire team and redrafted by the project editor. Agreement was by consensus; if agreement could not be reached, the co-editors were authorised to make a final recommendation, and any such instances are indicated in the guideline. The guideline was edited by Dr Jonathan Baskett and Dr Harry McNaughton. Members of the guideline development team are listed on page 66.

Three face-to-face meetings were held by the group and one by the rehabilitation subgroup, as well as five telephone conferences. Minutes were kept of all meetings. Throughout the guideline development process the team were in regular communication by email and telephone.

Concurrently with the stroke guideline work a series of cardiovascular guidelines was developed under the auspices of the NZGG and the National Heart Foundation of New Zealand. Some members of the stroke guideline group were also involved in writing these, which include primary and secondary prevention, cardiac rehabilitation, management of type 2 diabetes, acute coronary syndrome, cardiac failure and atrial fibrillation. Further information on these cardiovascular guidelines is available at www.nzgg.org.nz.

At their first meeting the group decided to review existing stroke guidelines, and if suitable adapt these to local New Zealand needs. Subsequently the NZGG approached the American Heart Association (AHA), the American Stroke Association (ASA), the Royal College of Physicians (RCP) and the Scottish Intercollegiate Guidelines Network (SIGN) for permission to adapt their guidelines to the New Zealand situation, and permission has been generously granted.

A comprehensive search of the published literature on stroke management and rehabilitation was undertaken by New Zealand Health Technology Assessment (NZHTA) Clearing House, using as a basis search strategies provided by SIGN. The scope of the search included existing guidelines and systematic reviews gathered from review databases, bibliographic databases, and selected major website resources according to the NZHTA protocol <http://nzhta.chmeds.ac.nz/nzhtainfo/protocol.htm>. A final search was undertaken in April 2003 to include any new and relevant publications to that date

In summary, this guideline is an adaptation of the AHA (Stroke Council), ASA, RCP and SIGN stroke guidelines, with the evidence updated and expanded where thought appropriate. Māori, Pacific and general practice perspectives have been included together with guides to local regulations and other issues. The guideline includes all available evidence to April 2003.

Grading systems used in the guideline

Recommendations

The guideline uses the following New Zealand Guidelines Group grading of recommendations. For details of this grading system see www.nzgg.org.nz

A The recommendation is supported by good evidence.

B The recommendation is supported by fair evidence.

C The recommendation is supported by expert opinion only and/or limited evidence.

I No recommendation can be made because the evidence is insufficient. Evidence is lacking, of poor quality or conflicting and the balance of benefits and harms cannot be determined.

Recommended good practice based on the clinical experience of the guideline development group and where guidance is needed.

Recommendations adopted from other guidelines are indicated as such by the following references:

- AHA American Heart Association (Stroke Council) [6–8]
www.americanheart.org/presenter.jhtml?identifier=3004546
- ASA American Stroke Association [9]
www.strokeassociation.org/presenter.jhtml?identifier=1200037
- RCP Royal College of Physicians (UK) [10] www.rcplondon.ac.uk/pubs/books/stroke
- SIGN Scottish Intercollegiate Guidelines Network [11]
www.sign.ac.uk/guidelines/published/index.html

Levels of evidence

In the evidence tables appended to the guideline, evidence is graded according to the Scottish Intercollegiate Guidelines Network (SIGN) system.

1++	High-quality meta-analyses, systematic reviews of randomised controlled trials (RCTs) or RCTs with a very low risk of bias
1+	Well conducted meta-analyses, systematic reviews or RCTs with a low risk of bias
1–	Meta-analyses, systematic reviews or RCTs with a high risk of bias
2++	High-quality systematic reviews of case-control or cohort studies High-quality case-control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
2+	Well conducted case-control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
2–	Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
3	Non-analytic studies, e.g. case reports, case series
4	Expert opinion

What the guideline covers

Stroke is a huge subject, too large for any comprehensive guideline to cover. It is not the intention of the guideline development group to provide a textbook of stroke management, but rather to address issues of critical importance to the management of people with stroke and their families in New Zealand. This guideline addresses in detail the issues around stroke management at a 'macro' level, i.e. the different components of stroke services, how stroke services should be organised, how they should be evaluated, how to ensure that appropriate services are provided throughout New Zealand, for all New Zealanders.

The guideline also indicates important issues at the next level, i.e. assessment and management of individual persons with stroke and families (acute care, rehabilitation, longer-term care), providing sources for appropriate information where it is known to exist. Some issues are dealt with in more detail, particularly where it is believed that current management is at variance with best management or that the evidence needs translation into practice in New Zealand.

Although it is of central importance in the management of stroke and TIA, secondary prevention of future vascular events is dealt with only briefly in this guideline. A separate guideline, combining information for patients with cardiac and cerebrovascular disease, will be published by the New Zealand Guidelines Group in late 2003 (see www.nzgg.org.nz).

What the guideline does not cover

- ▶ Subarachnoid haemorrhage
- ▶ Primary prevention of stroke (this will be covered in a guideline to be published by the New Zealand Guidelines Group in late 2003; see www.nzgg.org.nz)
- ▶ Stroke in infants, children and youth.

Consultation and peer review

For details of consumer involvement in the development of the guideline and the peer review process, see pages 67–68.

Acknowledgements

The generous voluntary contribution of time and expertise by editors, writers, consumers and commentators in the preparation of this guideline is acknowledged with gratitude.

Updating the guideline

It is intended that this guideline be reviewed in 2006, with interim modifications to the online version when needed (for details see page 69).

The process for updating or revision will be in accordance with New Zealand Guidelines Group policy and practice at that time, as detailed on the website at www.nzgg.org.nz or contact strokenz@stroke.org.nz

Stroke in New Zealand

4.1 The burden of stroke

The burden of stroke in the New Zealand community depends on a number of factors: the incidence (number of new strokes per 100,000 population per year), the prevalence (number of people with the condition per 100,000 population) and the impact of the stroke on all aspects of health for the survivors of stroke.

Some of the best international information about stroke incidence, prevalence and health impact comes from Auckland, New Zealand, in the form of the 1981–82 and 1991–92 Auckland Stroke Studies (ARCOS 1 and 2). This section draws heavily on that information, applying the 1991–92 incidence figure (about 190 new strokes per 100,000 population) [12] to the current New Zealand population (about 4 million).

The third Auckland Stroke Study (ARCOS 3) was carried out in 2002–03 and first results will be available in early 2004. This information will very likely change the material presented in this section, and readers are encouraged to visit the Stroke Foundation website (www.stroke.org.nz) to view new information from around April 2004.

Number of strokes per year

- ▶ Each year in New Zealand approximately 7600 people have a stroke.
- ▶ 5640 of these people suffer a first-ever acute stroke.
- ▶ 1960 have a second or recurrent stroke.

Age at first stroke [12]

- ▶ 76% of first strokes happen in people aged over 65 years.
- ▶ 5% of first strokes happen in people under 45 years.
- ▶ The average age for first stroke is around 75 years

Stroke and ethnicity

The burden of the disease is greatest among Māori and Pacific peoples.

- ▶ The average age of stroke is around 10 years lower for Māori and Pacific peoples than for Europeans [12, 13].
- ▶ Pacific peoples have the highest hospital discharge rate for stroke: 139.6 per 100,000 compared with 89.1 and 86.1 per 100,000 for Māori and European/other, respectively [14].
- ▶ The chance of being dependent at 12 months post stroke is 3 times higher among Māori and Pacific peoples than among Europeans [13].

Risk factors

Risk factors for stroke are well documented [15]. Stroke incidence can be reduced by:

- ▶ modification of lifestyle risk factors (diet high in saturated fat, diet high in salt, diet low in fresh fruit and vegetables, heavy alcohol consumption, physical inactivity, cigarette consumption, obesity)
- ▶ management of medical risk factors (raised blood pressure, atrial fibrillation, dyslipidaemia)

Non-modifiable risk factors are older age, male gender, ethnicity, previous history of stroke, diabetes, previous history of heart disease and congenital heart disease.

Modification of just one risk factor can make an important difference to the impact of stroke. Studies show that reducing the use of salt as a food additive by 4% a year would, within little more than a decade, prevent approximately 435 deaths from cardiovascular disease in New Zealand each year [16]. Guidelines for modification of risk factors to prevent cardiovascular events are under development (www.nzgg.org.nz).

Predicting the burden of stroke

The prevalence of stroke is the most useful figure for planning stroke services. Based on data from the 1991–1992 Auckland Stroke Study [12], the estimated prevalence of stroke in 2001 was 32,690, estimated to rise to 40,514 in 2011. Estimated deaths from stroke in 2001 were 3694. Modelling data [16] forecast that, unless steps are taken to improve stroke services, 4608 people aged ≥ 25 years may die from a stroke in 2011 – 57% more than in 1991.

The cost of stroke

Costs in 1 year for people hospitalised with stroke

	Mean cost per patient (\$NZ)	Total cost (\$NZ)
The estimated costs for people admitted to hospital with first-ever stroke in New Zealand in 2002 (n=6000), based on a 2001 study in Melbourne [17], were:		
Inpatient acute care	6500	39m
Inpatient rehabilitation	6500	39m
Outpatient rehabilitation/indirect	~10,000	~60m
Total	~23,000	~138m

A Wellington study of 181 people hospitalised with stroke in 2002 [13] measured costs as:

Inpatient acute care and rehabilitation	~10,000
Outpatient rehabilitation/indirect	~10,000
Total	~20,000

Costs for people with stroke not admitted to hospital

The Auckland Stroke Study [12] found ~30% of people with stroke were not admitted to hospital (compared with ~12% in the Melbourne study [17]). The costs for these people are uncertain. Some will require institutionalisation or change from resthome to private hospital care. Some will receive outpatient rehabilitation and new or increased home support.

Lifetime costs

The lifetime costs of stroke have been variously estimated as ~\$NZ50,000 (based on the Melbourne study [17]), ~\$US100,000 in the United States [18] and \$US79,000 in Sweden (assuming mean survival 3 years) [19].

Main cost factor

The main contributor to both non-hospital 1-year cost and lifetime cost of stroke is new institutionalisation. The proportion of people in New Zealand discharged from hospital to institutional care is currently ~20%; a small decrease in this figure, even with a substantial amount of extra support provided for these people in the community, would have a significant impact on overall costs.

Beds needed for stroke inpatients in 1 year for a population of 100,000

The table below shows the beds required for inpatient management of stroke in New Zealand over 1 year for a population of 100,000, based on data from the 1991–1992 Auckland Stroke Study [12]. To work out the number of beds needed for individual District Health Boards or hospitals, see www.stroke.org.nz.

Length of stay (if LOS = n days)**	Total number of new strokes 190		
	If admission rate 78% *		If occupancy rate 0.85
	Bed days used	Beds required (bed days/year)	Beds required (bed days/year)
21 (e.g. if early discharge service available)	3112	9	10
28 (New Zealand average †)	4150	11	13
39 (Auckland Stroke Study average 1991–1992)	5780	16	19

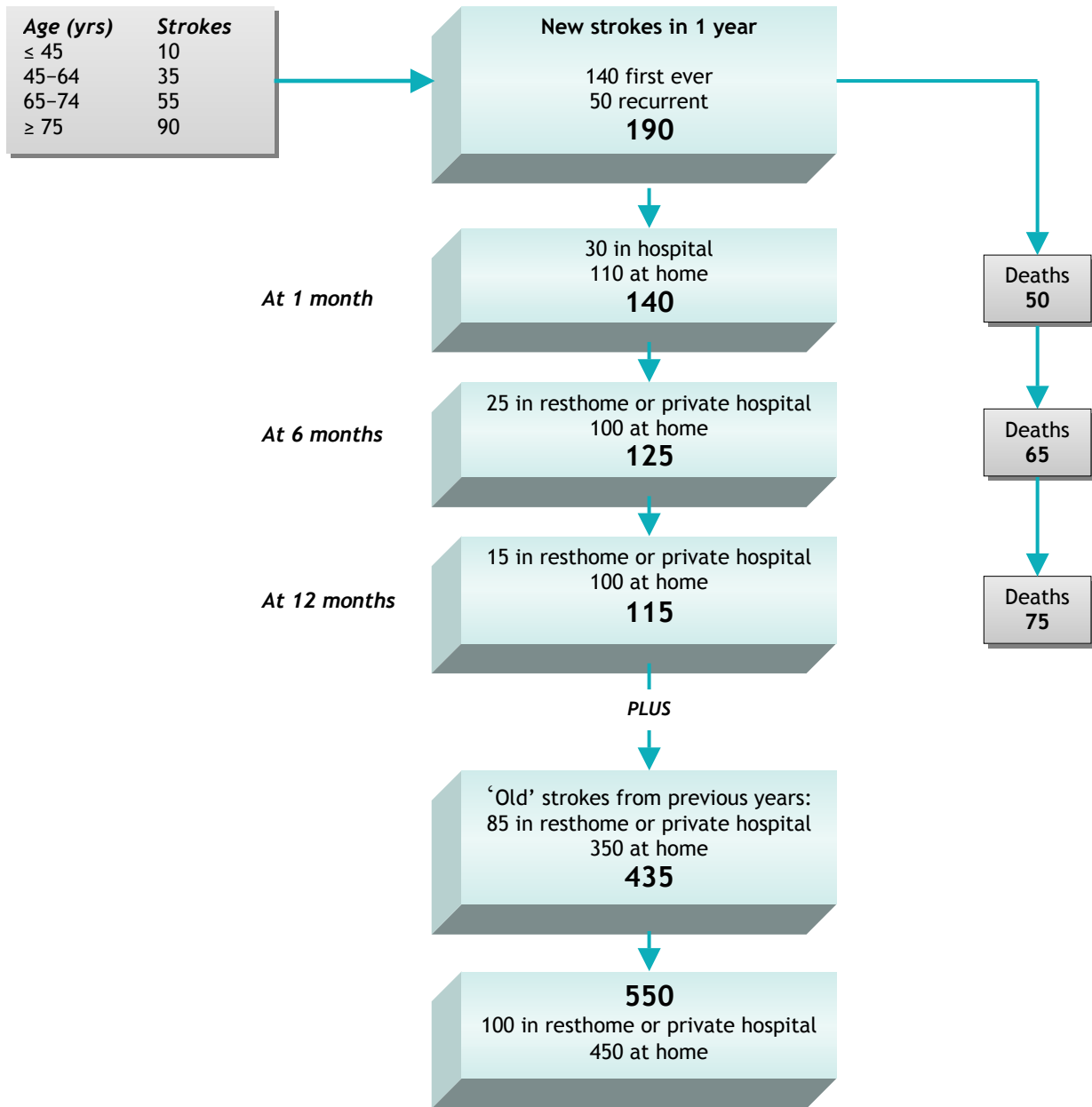
* The trend is for an increase in the proportion of acute strokes admitted. This will increase bed requirements.

** The trend is for a reduction in length of stay. This will decrease bed requirements.

† This figure is based on an informal survey of stroke services in New Zealand.

Planning stroke services for a population of 100,000

(based on data from the Auckland Stroke Study, 1991–1992 [12])



A profile of people with stroke

Before the stroke

Stroke often occurs in people who are already frail and elderly and who have a number of other medical conditions. For example, among the 190 new strokes expected each year in a population of 100,000:

- ▶ 35 people will be in an institution at the time of the stroke
- ▶ 50 will already require assistance for self-care tasks

After the stroke

At 1 month

- ▶ 90 of 140 people (64%) who survive one month will still have a motor deficit

At 6 months

100 of 125 survivors will be living at home, and of these:

- ▶ 34 will have a 'good' outcome (needing no assistance, fully recovered)
- ▶ 46 will have an 'intermediate' outcome (needing no assistance, but not fully recovered)
- ▶ 20 will have a 'poor' outcome (needing assistance)
- ▶ 20 will still have some difficulty with speech and language

At 12 months

58 of 115 people (50%) who survive 1 year will still have a motor deficit.

Risk of further stroke

All people who have had a stroke are at increased risk of another stroke event (approximately 10% chance the first year and 5% thereafter).

4.2 Gaps between current practice and evidence

Organised stroke management

The guideline development team considers that the single most effective change to the management of stroke would be to adopt a programme of organised stroke management (see section 5) for all people admitted with a stroke. The team considers that if this happened, other improvements in stroke management would follow.

The 1996 guidelines *Life after stroke: New Zealand guidelines for best practice in rehabilitation after stroke* (pages 59–69) [1] argued vigorously for a change to organised care, pointing out that meta-analysis of several randomised controlled trials indicated that organised care contributed to significant improvement in mortality and morbidity, and reduced costs (e.g. length of stay in hospital). *The importance of an organised programme of stroke management is highlighted in all international guidelines.*

In November 1997 a survey of 368 New Zealand physicians (80% response) found that only 57% considered acute stroke units were beneficial [2]. In 2001 a survey of all 41 hospitals in New Zealand that admit stroke patients found that only five had organised inpatient care [3].

A 2001 repeat of a 1996 audit of stroke care in a major urban hospital (Auckland Hospital) showed organised care resulted in an increase in the attention given to the 'process' of stroke care and use of therapies shown to be of benefit in randomised controlled trials [20].

A survey of all District Health Board services in New Zealand in 2002 found that only one provided a dedicated inpatient stroke rehabilitation facility [4].

Comprehensive secondary prevention measures

A number of new, high-quality studies have addressed secondary prevention measures for stroke [21-23]. Other studies have highlighted the gap between guideline recommendations and usual practice, particularly around the prescription of warfarin for people with atrial fibrillation [24].

Māori and Pacific people

Since 1996 further evidence has confirmed lack of equity of outcome for Māori and Pacific people with stroke [13], although there is not yet clear evidence to indicate how best to reduce this gap.

Stroke workforce

Surveys [3, 20] and anecdote continue to indicate gaps in the stroke workforce across multiple disciplines. Without development of this workforce it will be very difficult to implement the changes recommended in this guideline.

Stroke research

The results of an enormous amount of research on stroke are published every year. However, there remains a need for research specific to New Zealand and its diverse population.

In summary, some aspects of current practice in New Zealand are not supported by our review of the evidence. Changes in patterns in management of stroke after the publication of this guideline can be measured and provide a partial basis for the evaluation of implementation of the guideline.

4.3 Closing the gaps

How much effort will it take to close the gaps?

The effort required to close the gaps is well within the reaches of existing resources. Planning and modest funding will be required to:

- ▶ implement the guideline (see page 63)
- ▶ train, or create offshore training opportunities for stroke clinicians (e.g. physicians, therapists, nurses)
- ▶ plan and implement stroke prevention strategies targeted at those most at risk e.g. Māori and Pacific peoples, lower socioeconomic groups, older people
- ▶ support District Health Boards in their efforts to provide suitable facilities for stroke management
- ▶ collect demographic, epidemiological and clinical outcome data to identify disadvantaged subgroups of the stroke population.

Is there reasonable likelihood that changes could be implemented?

Yes – the implementation strategies outlined in the guideline require only modest resources and funding, and financial incentives vs disincentives to be resolved between the District Health Boards and the Ministry of Health and other agencies, e.g. Māori and Pacific health providers, Independent Practitioner Associations and Primary Health Organisations.

Can the proposed changes be measured?

- ▶ Although audit tools for stroke services exist, uncertainty remains about how useful these tools are for evaluating change in performance of stroke services [25] (see 5.2).
- ▶ The cost of stroke has been estimated (page 16) and can be monitored.
- ▶ Tools exist to evaluate consumer and caregiver satisfaction, and can be used to monitor consumer outcomes.

Would the proposed changes result in sufficient change in outcome to justify the effort?

The two most important changes are:

1. commitment to an organised programme of stroke management
2. commitment to an individualised programme of secondary risk prevention.

Both changes require reorganisation of current practice. Extra costs might ensue with the recruitment or training of lead physicians for stroke in each District Health Board area.

The effort in implementing the proposed changes would be justified by proven benefits: decreased morbidity, mortality, length of stay in hospital, and cost of stroke [26].

The size of the clinical effect of management in stroke units versus management in general medical wards is considerable. For every 14 patients managed in a stroke unit, one death is prevented, and for every 20 patients one less person is discharged to institutional care [26].



Life after stroke

When more than a hundred people with stroke and their caregivers/whānau were asked by the Stroke Foundation of New Zealand what they would like a stroke service to help them to achieve, their essentially unanimous responses were:

- ◆ A good life
- ◆ The opportunity to participate in a high-quality rehabilitation programme
- ◆ Opportunities to learn about stroke
- ◆ Return to a chosen living environment
- ◆ Opportunities to resume work and preferred lifestyle
- ◆ Knowledge of available support in the community
- ◆ Understanding and commitment from the community
- ◆ Self-confidence and dignity
- ◆ Resolution of family/whānau concerns

5

Organisation and evaluation of stroke services in New Zealand

Key points

All District Health Boards must provide organised stroke services which:

- ◆ specialise in stroke and rehabilitation
- ◆ have a multidisciplinary team coordinated under a 'lead clinician'
- ◆ provide prompt assessment, treatment, secondary prevention, rehabilitation and education.

All people with stroke admitted to hospital should expect to be managed in a stroke unit which:

- ◆ is a separate geographical area (larger centres) or a designated area within a general unit (smaller centres)
- ◆ has staff with specialist or good knowledge of stroke
- ◆ provides ongoing education about stroke for staff, patients and caregivers
- ◆ has written protocols for assessment and management.

All people with stroke or transient ischaemic attack not admitted to hospital should have:

- ◆ urgent outpatient assessment by clinicians knowledgeable about stroke
- ◆ appropriate and timely investigations
- ◆ immediate initiation of secondary prevention, support, education and rehabilitation delivered by a coordinated multidisciplinary team who will achieve good liaison with the appropriate community providers.

5.1 Organised stroke services

FURTHER INFORMATION

AHA: www.americanheart.org/presenter.jhtml?identifier=3004546
 ASA: www.strokeassociation.org/presenter.jhtml?identifier=1200037
 RCP: www.rcplondon.ac.uk/pubs/books/stroke
 SIGN: www.sign.ac.uk/guidelines/published/index.html

A **All District Health Boards must provide organised stroke services.**

There is overwhelming evidence that the most important intervention which can improve outcomes for all people with stroke is the provision of organised stroke services (meta-analysis of 23 randomised controlled trials by Cochrane Collaboration Stroke Unit Trialists [26]). Without an organised stroke service, adherence to recommendations about specific interventions is likely to have little impact on

outcomes for people with stroke. Furthermore, the organisation of stroke services, as set out below, would likely result in compliance with many of the specific recommendations for 'best practice' in stroke care.

'I had two minor strokes that weren't diagnosed at the time. Perhaps if I'd gone into hospital this could have prevented the serious stroke I had four months later.'

The main priority for all health funders and providers of stroke services is that people with stroke should have access to organised stroke services. The priority for the consumers of that region should be to ensure that organised stroke services are available and accessible.

What are 'organised stroke services'?

For the purposes of this guideline the term 'organised stroke services' covers the following:

- ▶ All people with acute stroke are the responsibility of, and are managed by, services specialising in stroke and rehabilitation
- ▶ The organisation has a 'lead clinician' for stroke services
- ▶ Care (see 5.1.1) is provided and coordinated by a multidisciplinary team skilled in stroke and rehabilitation
- ▶ All people with stroke or transient ischaemic attack (TIA) have a comprehensive assessment and appropriate secondary prevention measures are provided
- ▶ Systems exist to identify people with stroke and TIA not admitted to hospital and ensure that they receive all necessary services, particularly prompt assessment, treatment and secondary prevention.



All people with stroke should have the same degree of access to appropriate stroke services irrespective of where they live, their age, gender, or ethnicity.

5.1.1 Stroke unit care

RCP **A** *All people admitted to hospital with stroke should expect to be managed in an area of the hospital designated for people with stroke (i.e. a stroke unit) [10].*

ASA **A** *The use of a specialised stroke unit, incorporating comprehensive rehabilitation, is recommended. [9].*

If the hospital's size and the number of admissions for stroke make a stroke unit impracticable, the person should be the responsibility of a designated stroke clinician and team, and be located in a bed in an appropriate setting (see 5.1.2).

The evidence in favour of stroke units means that for a District Health Board with a catchment population of 100,000 which does **not** provide a stroke unit, approximately 6 extra patients a year will die, and approximately 10 extra will be dead or dependent at 6 months [26]. This means an extra 230 deaths and a further 380 people dead or dependent 6 months after the stroke every year in New Zealand.

There are few interventions that combine known efficacy, substantial clinical effect and applicability which translate into this number of adverse events potentially avoided. For every 20 patients managed in a stroke unit rather than a general medical ward, 1 person less is discharged to institutional care. This translates into annual savings over \$250,000 per 100,000 catchment population [26].

What is a 'stroke unit'?

A 'stroke unit' as defined here:

- ▶ is a geographically located area where people with stroke are managed
- ▶ has staff organised into a coordinated multidisciplinary team
- ▶ has staff who are knowledgeable and enthusiastic about the management of stroke
- ▶ provides ongoing education about stroke for staff, people with stroke and caregivers
- ▶ has written protocols for the assessment and management of common problems related to stroke.

The great majority of trials looking at the efficacy of stroke unit care involved stroke units which provided rehabilitation [26]. A 'stroke unit' that provided only acute care (i.e. care for the first few days of stroke) without provision for ongoing coordinated stroke rehabilitation would not be consistent with best-practice, evidence-based stroke care. This means that the skill-mix of the staff in the stroke unit should be focused around acute care and rehabilitation directed at the management of stroke-related disability and handicap.

5.1.2 Inpatient organisation for different-sized District Health Boards

The level of organisation of stroke services in a particular region will depend partly on the number of people with stroke admitted per year.

The following recommendations are based on the evidence for effectiveness combined with practical considerations in District Health Boards of different sizes.

Large District Health Boards

(population serviced $\geq 180,000$; expected number of strokes per year ≥ 340 ; expected stroke admissions per year > 260 , i.e. > 5 per week on average)



- ◆ *All people with stroke should be admitted under the care of a designated stroke clinician, in a separate stroke unit or a designated area within a general unit.*
- ◆ *The ongoing rehabilitation of all people with stroke should occur in a geographically designated area (i.e. a stroke unit) under the care of a coordinated multidisciplinary team involving stroke specialist clinicians.*
- ◆ *If at all possible, the acute AND rehabilitation management should be in the same area (i.e. an integrated acute and rehabilitation stroke unit)*
- ◆ *The multidisciplinary team should use written protocols for the management of common problems following stroke and have an ongoing programme of education about stroke for staff, people with stroke and families.*

Medium-sized District Health Boards

(population serviced 80,000–180,000; expected number of strokes per year 150–340; expected stroke admissions per year 120–260, i.e. 2–5 per week on average)

- ✓ ◆ *All people with stroke should be admitted to a defined area for acute management, in a separate area or a designated area within a general unit. The acute care of all people with stroke should occur in consultation with the hospital's designated stroke clinician(s).*
- ◆ *The ongoing rehabilitation of all people with stroke should occur in a geographically designated area (i.e. a stroke unit) under the care of a coordinated multidisciplinary team involving stroke specialist clinicians. It is possible that people with stroke will not be the only patients managed by this team.*
- ◆ *The multidisciplinary team should use written protocols for the management of common problems following stroke and have a programme of regular education about stroke for staff, people with stroke and families.*

Small District Health Boards

(population serviced < 80,000; expected number of strokes per year < 150; expected stroke admissions per year <120, i.e. < 2–3 per week on average)

- ✓ ◆ *The acute care of all people with stroke should occur in consultation with the hospital's designated stroke clinician(s).*
- ◆ *The ongoing rehabilitation of all people with stroke should occur under the care of a coordinated multidisciplinary team involving people knowledgeable and enthusiastic about stroke. People with stroke will not be the only patients managed by this team.*
- ◆ *The multidisciplinary team should use written protocols for the management of common problems following stroke and have a programme of regular education about stroke for staff, people with stroke and families.*

5.1.3 Scope of community services (diagnostic, secondary prevention and rehabilitation)

- RCP **B** *All District Health Boards should provide a full range of community services to complement inpatient stroke services [10].*

Some people with stroke and TIA will not be admitted to hospital (see 5.1.5). All District Health Boards should provide the following services to complement inpatient stroke services:

- ▶ Urgent assessment of people with stroke or transient ischaemic attack who are not admitted to hospital, in either a 'neurovascular clinic' or conventional outpatient services staffed by people knowledgeable about stroke. 'Urgent' implies as soon as possible, as evidence indicates a high early recurrence rate, even within the first 2–3 days following transient ischaemic attack [27]. Services should aim to assess 100% of referrals within 14 days of an acute event.
- ▶ Access to radiology services for appropriate and timely investigations for people with stroke not admitted to hospital
- ▶ Community rehabilitation and home support services which can be activated immediately for people with stroke not admitted to hospital who need them ('immediate' implies same day for support and next working day for rehabilitation services).

'I was discharged Friday, no care was available till Monday. By then I'd fallen out of bed, fallen in the shower and broken a window! I live alone.'

These services should also be part of the continuum of care for people discharged from hospital. They should be sufficiently resourced to avoid any interruption in ongoing rehabilitation. Community rehabilitation can be delivered in the person's home, in a day hospital or hospital outpatient setting.

Community rehabilitation should be delivered by a coordinated multidisciplinary team and include educational programmes similar to those recommended for the inpatient stroke unit (see 5.1.1).

- ▶ Good liaison with providers of primary care
- ▶ Good liaison with providers of institutional care for people with stroke
- ▶ Good liaison with providers of support and information for people and their families following stroke, such as the Stroke Foundation of New Zealand
- ▶ Good liaison with providers of culturally appropriate services for Māori and Pacific peoples.

5.1.4 Organisation of community rehabilitation services

General principles

C All people with stroke who are managed at home, or discharged from hospital with residual disability, should be managed by a team of health professionals knowledgeable in stroke.

RCP **A** Community rehabilitation can be provided with equal effectiveness from a day hospital or community (i.e. home-based) setting [10].

C There must be a high level of coordination between inpatient and community stroke services within each District Health Board, aiming for seamless management of the person with stroke wherever they are managed.

Specific recommendations for different-sized areas

Large District Health Boards

A specialist multidisciplinary rehabilitation community team with expertise in the management of stroke should manage all people discharged from hospital following acute stroke and any people with stroke managed at home without hospital admission. Some team members may be 'stroke dedicated' (e.g. nurse) while others may have an additional non-stroke caseload (e.g. physician, speech and language therapist).

Medium- and small-sized District Health Boards

Rehabilitation should be managed as described above for large District Health Boards, but it is likely that most team members will also have a non-stroke caseload.

Rural communities

The lead stroke clinician should have input on a regular basis to ensure advice and support to all facilities and services involved in stroke care. Local solutions to issues of coordination of community services may be required. These may include inpatient staff having a role in the community and relationships with private providers and general practitioners. The solutions should focus on maintaining and enhancing stroke expertise among available staff to provide the best possible service to people with stroke.

5.1.5 Special considerations for the very old and very young

For some very old or already very frail people, issues relating to a stroke may be of less importance than those of accumulated comorbidities so that management in an environment appropriate for these needs (such as a specialised geriatric service) may be preferable to a stroke unit. This will be a clinical decision.

C Younger people with stroke should be managed primarily in a stroke unit rather than in an age-restricted unit with patients with other disabilities (such as head injury).

'The ward he was in didn't cater for people with stroke. A lot of the time he was left to cope on his own. Mealtimes were the worst as he needed help to eat.'

Although stroke affects mainly an older population, 25% of strokes occur in people aged ≤ 65 years and 5% in people aged ≤ 45 years. Specialist stroke services need to recognise the needs of younger people, in particular with regard to relationships, family (including dependent children), sexuality, work (and return to work), study and emotional needs.

Further information on stroke in younger people is available from the Stroke Foundation of New Zealand (www.stroke.org.nz).

5.1.6 Services responsive to Māori

Stroke services must strive to eliminate the current disparities in stroke outcomes that exist for Māori (see 4.1). Although Māori are not a homogeneous group, the following issues are common to Māori following stroke.

Whānau

For Māori with stroke, whānau wellbeing is the desired outcome. Whānau must be involved in all aspects of stroke management including education, rehabilitation and discharge planning.

Whānau wellbeing is particularly important when it is considered that:

- ▶ Māori with stroke are more likely to live with whānau on discharge from acute care [13].
- ▶ support from whānau includes provision of physical, emotional, spiritual and cultural care [28].

Communication

Communication between Māori with stroke, their whānau and health professionals must be appropriate. Information developed by Māori that is specific to the needs of Māori and their whānau is the ideal.

'I couldn't understand the neurologist, didn't know what was happening. Mainly I felt absolute terror.'

The delivery, content and context of information should aim for optimal understanding, encourage ongoing communication and address issues specific for Māori such as premature stroke onset and risk factors. Kanohi ki te kanohi (face to face) discussion is recommended.

Service providers

Currently, Māori consult both mainstream and Māori providers following stroke. Adequate information and community supports have been identified as gaps in current mainstream stroke services by Māori and their whānau [29].



Responsiveness of mainstream providers to Māori with stroke and their whānau will be improved when:

- ◆ *people with stroke and their whānau are informed and supported in an appropriate manner (examples include access to a Māori liaison service, increased support to sustain lifestyle changes and to access outpatient services, and whānau involvement in making decisions, including setting goals)*
- ◆ *local Māori providers are consulted regularly*
- ◆ *barriers to stroke care, including transport and socioeconomic factors, are addressed.*

5.1.7 Services responsive to Pacific peoples

At present, outcomes for Pacific people with stroke are relatively poor (see 4.1). To achieve more equitable outcomes the following issues need to be addressed.



To improve outcomes for Pacific people with stroke it is necessary to:

- ◆ *recognise the national and cultural diversity within the Pacific community and 'tailor' healthcare for the individual*
- ◆ *appreciate the holistic view of health held by Pacific peoples*
- ◆ *involve caregivers, family members and other members of the community in the management of stroke*
- ◆ *consider the implications of difficult socioeconomic circumstances, especially for compliance*
- ◆ *acknowledge and be open to the use of traditional healing methods*
- ◆ *develop and support Pacific health providers and establish partnerships between these and mainstream health services to ensure streamlined care plans.*

Diversity in Pacific community

Pacific peoples are a diverse group from more than 20 island nations, each with a unique language and culture, and include island- and New Zealand-born subgroups. This leads to greatly varying levels of education, income, English language ability and understanding of the essentially European New Zealand health service. The majority of Pacific peoples have a religious affiliation and their church may have a strong influence on individuals.

Attitudes to health

Most Pacific peoples have a holistic view of health which includes the health of the extended family. It is not unusual for physical ill health to be interpreted as a symptom of stress or disharmony within the extended family and/or community. Many would try to resolve these issues before tackling the physical illness, which may be a reason why Pacific people present later than usual to health workers.

Often the health status and circumstances of an individual are regarded as confidential matters. There may be reluctance to disclose such information to an intermediary, e.g. an interpreter.

Family involvement

Pacific families often want to accept responsibility for the care and rehabilitation of their relative with stroke; it is important that their role be acknowledged and empowered by health professionals. Younger, New Zealand-born family members can be used as interpreters if a medically trained interpreter is not available; others may assist as advocates and in the reinforcement of health

professionals' advice. The naturally supportive, non-threatening environment provided by the family can only improve compliance.

Socioeconomic factors

'I think twice about visiting the doctor. Even the cost of getting there ...'

Pacific peoples are over-represented in the most deprived socioeconomic classes with over two-thirds in deciles 8, 9 and 10 [30]. Difficult socioeconomic circumstances contribute to poor compliance, underlining the need for a patient-tailored approach to care.

5.1.8 General practitioner care



The general practitioner should take primary responsibility for:

- ◆ recognition of stroke syndrome and urgent referral for assessment in hospital or at an outpatient clinic (see pages 6–7)
- ◆ management of primary prevention of cerebrovascular disease
- ◆ management of secondary prevention of cerebrovascular disease
- ◆ awareness of resources for people with stroke (e.g. appropriate outpatient clinic, local Stroke Foundation services, educational literature), and how to refer.

5.1.9 Stroke workforce



At both national and District Health Board levels, measures should be taken to increase the numbers and enhance the training of the stroke workforce.

In New Zealand there is an insufficient number of adequately trained health professionals and support people to manage people with stroke [3]. With projected increases in stroke numbers, this problem will only worsen unless steps are taken to address workforce issues.

- ▶ At a national level, measures should be taken to increase the accessibility and profile of training for health professionals in stroke – training days, courses and stroke fellowships for physician trainees are all ideas that should be explored.
- ▶ At a national level, training opportunities for stroke support workers and funding to support that training should be enhanced.
- ▶ At District Health Board level, inservice training in stroke should be acknowledged as a necessary part of the board's responsibility.
- ▶ At both national and District Health Board levels, measures should be pursued vigorously to develop the capacity of the Māori and Pacific stroke workforce, in community provider organisations as well as mainstream services. Involvement of Māori and Pacific workers at leadership and decision-making levels is essential. Recruitment, advancement and retention through targeted programmes and scholarships are recommended.

5.2 Evaluation of stroke services to improve performance over time

Indicators for stroke services



The key indicators for stroke services should be:

- ◆ Compliance with the recommendations in this section for organised stroke services at a level that matches the volume of people with stroke in the region (Yes/no item)
- ◆ Compliance with the recommendation for a named lead clinician responsible for stroke services within the District Health Board (Yes/no item)
- ◆ Proportion of all people with stroke admitted to a stroke unit (%) (Target = 95%)
- ◆ Proportion of hospital stay spent in a stroke unit (%) (Target = >50%)
- ◆ Compliance with the recommendation for written protocols for problems as outlined in 6.2 (Yes/no item)
- ◆ Breakdown by age, gender, ethnicity of all people admitted to hospital with stroke and those who spent any time in the stroke unit (i.e. equity of access, %)

Individual rehabilitation services should be aware of an Australian initiative to benchmark all Australasian rehabilitation centres (Australasian Rehabilitation Outcomes Centre [AROC]) based at the University of Wollongong in Sydney and the Royal College of Physicians (London, UK) National Sentinel audit (2002) tool, available on CD (www.rcplondon.ac.uk/college/ceeu/ceeu_stroke_audit_package).

6

Assessment and management of stroke

FURTHER INFORMATION

AHA: www.americanheart.org/presenter.jhtml?identifier=3004546
 ASA: www.strokeassociation.org/presenter.jhtml?identifier=1200037
 RCP: www.rcplondon.ac.uk/pubs/books/stroke
 SIGN: www.sign.ac.uk/guidelines/published/index.html

6.1 Assessments

- People with stroke should have the initial assessment completed with minimal delay.*

This will require establishment of local protocols for the management of patients with a definite or presumptive diagnosis of stroke by general practitioners, ambulance staff and emergency departments (see 6.3).

- The assessments listed below should be undertaken for every person with stroke. Clinicians should, where possible, use validated, reliable instruments.*

The need to repeat assessments (and timing of repeat assessments) will depend on whether a problem is identified and its significance in the overall planning for a particular person.

Early assessments (the first 48 hours)

Initial assessment should include the following parameters:

- ▶ Level of consciousness (RCP grade C recommendation)
- ▶ Swallowing (RCP grade B recommendation)
- ▶ Nutrition (RCP grade B recommendation)
- ▶ Continence (RCP grade B recommendation)
- ▶ Risk factors (see page 42)
- ▶ Hydration (☑)
- ▶ Self-care (☑)
- ▶ Communication (RCP grade B recommendation)
- ▶ Appropriate moving and handling of the person with stroke, matched to the level of impairment (RCP grade C recommendation)
- ▶ Risk for falling (☑)

- ▶ Risk for developing pressure areas (RCP grade C recommendation)
- ▶ Risk for deep vein thrombosis/pulmonary embolism (RCP grade A recommendation)

Assessments prior to discharge

To assist rehabilitation planning, information on the following should be obtained as early as possible during the hospital stay.

- ▶ Suitability of likely discharge accommodation
- ▶ Available supports on discharge
- ▶ Mood (see 6.13)
- ▶ Cognitive status
- ▶ Major interests of person with stroke
- ▶ Long-term goals
- ▶ Work/study/leisure situation
- ▶ Cultural/spiritual issues
- ▶ Adequacy of information for person and support people (see 6.14)
- ▶ Driving ability, adequacy of information on driving status on discharge (see 6.17).

Swallowing

RCP **B** *Swallowing should be assessed in all people with stroke as soon as possible (and preferably on admission) by appropriately trained personnel using a simple, validated testing protocol [10].*

There is evidence supporting the validity of simple clinical testing of swallowing, voluntary cough and pharyngeal sensation. Testing of the gag reflex is not a valid test of swallowing. The role of videofluoroscopy is yet to be validated.

RCP **A** *Any person with an abnormal swallow should be seen by a speech and language therapist, who should assess the person further and advise the person and staff on safe swallowing techniques and strategies and the consistency of diet and fluids [10].*

6.2 Written protocols for management of common problems

C *Written protocols should be available for the management of problems that may lead to adverse outcomes, problems that cross professional boundaries, or where consistency of care may be an issue because of changing staff.*

The following require written protocols for management:

- ▶ elevated blood pressure
- ▶ low blood pressure
- ▶ elevated blood glucose
- ▶ fever
- ▶ intracerebral haemorrhage
- ▶ new/worsening deficits in ischaemic stroke

- ▶ thrombolysis (specialist centres only)
- ▶ nutrition (including when unable to eat or drink)
- ▶ prevention of deep vein thrombosis/pulmonary embolism
- ▶ continence (urinary and faecal)
- ▶ constipation
- ▶ catheter management
- ▶ positioning of the hemiplegic patient
- ▶ hemiplegic shoulder pain
- ▶ high risk of falling
- ▶ high risk of developing pressure areas
- ▶ communication

6.3 Admission to hospital

- ☑ All people with a definite or presumptive diagnosis of stroke should be admitted to hospital unless:
- ◆ *their symptoms have fully resolved or are rapidly recovering so that there is minimal interference with activities of daily living AND urgent outpatient assessment by a specialist stroke service is available*
- OR
- ◆ *in the opinion of the treating doctor AND the person, or the person's family, there is unlikely to be any benefit from admission to hospital. This may apply to people who were already severely disabled or suffering a terminal illness prior to the stroke.*

Speed of admission to hospital

- ☑ All people with a definite or presumptive diagnosis of stroke should be transferred to hospital urgently.

- C Where the local hospital offers acute thrombolytic treatment for ischaemic stroke, and time of stroke onset is known, people with stroke should expect to be admitted to hospital and have initial assessments (including CT) completed within 3 hours of stroke onset.

'... later we learned there was additional treatment that could have been tried but it was too late by the time the specialist saw her.'

This will require establishment of local protocols for upgrading the status of stroke to an emergency, on the same level as acute myocardial infarction, for ambulance services and emergency departments. This needs to be combined with an educational programme for the community and general practitioners.

Organised stroke care

See 5.1.1 for details of the recommended structure and organisation of the stroke unit.

In smaller hospitals, it may not be practical to have a geographically based stroke unit, but people with stroke admitted to these hospitals should be the responsibility of, or managed in consultation with, a designated stroke clinician.

6.4 Diagnosis of stroke

RCP **B** *The diagnosis of stroke should always be reviewed by a physician with special expertise in stroke [10].*

Appropriate management of the person with a stroke depends on accurate diagnosis. People with stroke must be distinguished from patients with other causes of rapid neurological deterioration.

Stroke is primarily a clinical diagnosis. Caution in the diagnosis of stroke is required if there is a gradual onset of symptoms over several days or weeks, a poor history (because of impaired level of consciousness or dysphasia and a reliable eye-witness account is not available), absent focal neurological signs, fluctuating neurological signs, coma, unexplained fever, severe headache, or symptoms and signs of raised intracranial pressure.

ASA **A** *Imaging of the brain is required to guide acute intervention [9].*

RCP **C** *Imaging of the brain should be performed as soon as possible and not more than 48 hours after the onset of symptoms, unless there is a good clinical reason for not doing so [10].*

Brain imaging is required in all patients to detect intracerebral haemorrhage and to exclude non-vascular causes of a 'stroke-like' syndrome.

RCP **B** *Brain imaging should be undertaken urgently if:*

- ◆ *there is a deterioration in the person's condition following the onset of symptoms*
- ◆ *subarachnoid haemorrhage is suspected*
- ◆ *hydrocephalus secondary to intracerebral haemorrhage is suspected*
- ◆ *trauma is suspected*
- ◆ *the person is on anticoagulant therapy or has a known bleeding tendency*
- ◆ *the diagnosis is in doubt*
- ◆ *thrombolytic therapy is being considered [10].*

C *Brain imaging should always be undertaken before anticoagulant therapy or thrombolytic therapy is started.*

SIGN **C** *All people with a definite or presumptive diagnosis of stroke should have the following investigations:*

- ◆ *full blood count (including platelet count)*
- ◆ *erythrocyte sedimentation rate*
- ◆ *serum urea, creatinine, electrolytes*
- ◆ *blood glucose*
- ◆ *electrocardiogram [11].*

ASA **B** *Chest x-rays should not be undertaken as a routine investigation unless specifically indicated by the patient's symptoms or signs [9, 10].*

Additional investigations may be required in people with acute ischaemic stroke depending on the clinical situation.

6.5 Nutrition

- RCP **A** Nutritional support should be considered in any malnourished patient [10].
- RCP **C** Every person with nutritional problems, including dysphagia, who requires food of modified consistency should be referred to a dietitian [10].
- RCP **C** The most suitable posture and equipment to facilitate feeding should be determined [10].

6.6 Ischaemic stroke

6.6.1 Acute interventions

Aspirin

- ASA **A** Aspirin 160–300 mg should be given as soon as possible after the onset of a stroke in most patients if a diagnosis of intracerebral haemorrhage has been excluded with brain imaging [9, 10].
- Only aspirin doses of 160–300 mg have been studied at the acute stage. As 160 mg tablets are not available in New Zealand it is reasonable to use doses of 150–300 mg.
- ASA **A** Administration of aspirin within 24 hours of the use of a thrombolytic agent is not recommended [9].

Thrombolysis

- RCP **A** Thrombolytic treatment should be administered only in specialist centres by physicians with expertise in the assessment and management of people with acute stroke and where protocols for the use of thrombolysis are in place [10].

Thrombolysis given outside of specialist centres may be dangerous.

Intravenous thrombolysis

Patients should not receive intravenous tPA if they have any of the exclusion criteria used in the NINDS trial [31].

- ASA **A** Thrombolytic treatment with intravenous tissue plasminogen activator (tPA) 0.9 mg/kg (maximum dose 90 mg) may be given to carefully selected people with acute ischaemic stroke if:
- ◆ there is a clear history of the time of onset of symptoms
 - ◆ treatment is given within 3 hours of the onset of symptoms
 - ◆ intracerebral haemorrhage has been excluded by imaging [9, 32].
- ASA **A** The use of intravenous streptokinase or ancrod as an alternative to tPA is not recommended [9].

Intra-arterial thrombolysis

- C** Carefully selected patients presenting within 0–6 hours after the onset of symptoms who have angiographic evidence of a middle cerebral artery occlusion may be treated with intra-arterial thrombolysis. Immediate access to cerebral angiography and expertise with intra-arterial thrombolysis are required.

Heparin

- ASA **A** *Intravenous heparin, subcutaneous heparin, low-molecular-weight heparin and heparinoids are not routinely recommended for the treatment of people with acute ischaemic stroke [9, 10].*

In carefully selected patients (e.g. evolving basilar artery thrombosis, stroke or transient ischaemic attack associated with carotid artery dissection), treatment with intravenous heparin can be considered, although there is only limited evidence to support its use.

Carotid endarterectomy

- ASA **C** *Carotid endarterectomy is not recommended for people with acute ischaemic stroke. [9]*

Endovascular treatment

- ASA **C** *The use of endovascular treatments, such as angioplasty or stenting, is not recommended for treatment of people with acute ischaemic stroke [9].*

Other treatments

- ASA **A** *No agents with putative neuroprotective effect can be recommended for the treatment of acute ischaemic stroke [9].*
- RCP **B** *Other treatments, including corticosteroids, calcium antagonists, glycerol, volume expansion, vasodilators and induced hypertension should not be used unless as part of a randomised controlled trial [10].*
- RCP **B** *Drugs with a sedative effect should be avoided if possible [10].*

6.6.2 Neurological complications

Brain oedema and increased intracranial pressure

Corticosteroids

- ASA **A** *Corticosteroids are not recommended for the management of cerebral oedema and increased intracranial pressure following an ischaemic stroke [9].*

Osmotherapy

- ASA **B** *Osmotherapy (e.g. intravenous frusemide and intravenous mannitol) and hyperventilation are recommended for selected patients who are deteriorating secondary to increased intracranial pressure [9].*

Drainage of cerebrospinal fluid

- ASA **C** *Drainage of cerebrospinal fluid via a ventricular drain or shunt may be used to treat raised intracranial pressure secondary to hydrocephalus [9].*

Surgical decompression of large cerebellar infarcts

- ASA **C** *Surgical decompression and evacuation of large cerebellar infarcts that are leading to compression of the brainstem and hydrocephalus is recommended. [9]*

Surgical decompression of large cerebral hemisphere infarcts

- ASA **C** *Surgical decompression of a large infarct of the cerebral hemisphere which is associated with cerebral oedema and increased intracranial pressure is not routinely recommended. It can be a life-saving measure, but most survivors have severe residual neurological impairment [9].*

Seizures

- ASA **C** *Anticonvulsants after stroke are not recommended unless the person has had at least one seizure. If a person has had a seizure, treatment with an anticonvulsant to prevent recurrent seizures is strongly recommended [9].*

6.6.3 Medical complications

Blood pressure

There is no evidence from randomised controlled trials to guide management of blood pressure in the first week after a stroke.

- ASA **C** *A cautious approach should be taken toward the treatment of arterial hypertension in the acute stage [9].*
- ASA **C** *Antihypertensive agents should be avoided unless the systolic blood pressure is > 220 mm Hg or the diastolic blood pressure is > 120 mm Hg [9].*
- ASA **C** *Patients with elevated blood pressure who are otherwise eligible for treatment with intravenous tPA can have their blood pressure lowered cautiously so that their systolic blood pressure is \leq 185 mm Hg and the diastolic blood pressure is \leq 110 mm Hg [9].*
- ASA **C** *In the exceptional circumstances where blood pressure lowering is required, agents such as labetalol that have a short duration of action and minimal effect on cerebral blood vessels are preferred in the acute stage. Sublingual nifedipine should be avoided.[9]*

Existing antihypertensive drugs should be continued unless the person has symptomatic postural hypotension.

New antihypertensive treatment for secondary prevention of stroke can be introduced 7–14 days following acute stroke.

Hypotension is a common problem in those hospitalised with stroke and may result in extension of an ischaemic stroke. Hypotension should be avoided and the underlying cause treated.

Blood glucose

- ASA **C** *Until there are more data to guide treatment, management of hyperglycaemia should be similar to that for other persons with an elevated blood glucose [9].*

See also New Zealand guidelines for the management of diabetes at www.nzgg.org.nz

Pyrexia

- ASA **B** *Fever should be controlled with the use of antipyretics such as paracetamol and treatment of the underlying cause [9].*
There is no evidence from randomised controlled trials to support routine use of hypothermia.

Venous thromboembolism

Aspirin

- RCP **A** *Aspirin 160–300 mg/day should be given for the prevention of venous thromboembolism in the absence of any contraindication [10].*

Only aspirin doses of 160–300 mg have been studied. As 160 mg tablets are not available in New Zealand it is reasonable to use doses of 150–300 mg.

Compression stockings

- C** *Compression stockings should be considered in people with stroke who have weak or paralysed legs once the person's peripheral circulation, sensation and the state of the skin have been assessed.*

Trials comparing full-length and below-the-knee compression stockings versus no stockings are being carried out.

The American Stroke Association recommends intermittent external compression stockings, but only for patients who cannot receive antithrombotic drugs (grade B recommendation) [9].

Mobilisation

- ASA **B** *Mobilisation should be encouraged as early as possible after the onset of the stroke [9].*

Prophylactic anticoagulants

The recommendations on the use of prophylactic anticoagulation are controversial. The Royal College of Physicians guidelines [10] state that prophylactic anticoagulation should **not be used routinely** (grade A recommendation). Although subcutaneous heparin and low-molecular-weight heparin prevent venous thromboembolism, this beneficial effect may be counterbalanced by an increased risk of intracranial haemorrhage.

The American Stroke Association [9] and the Scottish Intercollegiate Guidelines Network [11] both **recommend** prophylactic administration of heparin, low-molecular-weight heparin, or heparinoids to prevent venous thromboembolism in **immobilised people** following a stroke (grade A recommendations).

- C** *It is the consensus of the New Zealand stroke guideline development team that prophylactic anticoagulation should not be routinely administered as deep vein thrombosis prophylaxis after stroke. Prophylactic anticoagulation may be considered in immobilised people with stroke who are intolerant of aspirin, are unable to wear compression stockings, or have had a previous venous thrombosis.*

Hypoxia

- ASA **C** *Supplemental oxygen should be given to hypoxic patients, aiming to maintain oxygen saturation at $\geq 95\%$ [9].*
- ASA **C** *Non-hypoxic patients should not be given supplemental oxygen [9].*

6.7 Transient ischaemic attacks (TIAs)

- C** *Patients should be assessed as soon as possible after a TIA has occurred and no later than 7–14 days after an attack.*
- C** *Imaging with CT or magnetic resonance is recommended for patients after a hemispheric TIA, especially if TIAs are recurrent and stereotyped. Brain imaging is not routinely recommended after a vertebrobasilar TIA.*
- Other investigations should be performed as recommended for patients who have had an ischaemic stroke. Depending on the clinical features, these tests may include ultrasound of the neck vessels, magnetic resonance angiography, transcranial doppler imaging, digital subtraction angiography, echocardiography and coagulation studies.*

The causes of ischaemic stroke and transient ischaemic attack are identical. By definition, the symptoms associated with a TIA last less than 24 hours. Many patients present within 24 hours of the onset of symptoms when a stroke may not be distinguishable from a TIA. Most TIAs, however, resolve within the first hour [33]. If neurological symptoms persist for more than 1 hour without improvement, the patient should be managed as if a stroke has occurred.

Recommendations for secondary prevention after an ischaemic stroke also apply to people who have a transient ischaemic attack.

6.8 Intracerebral haemorrhage

Investigations

Coagulation studies

- C** *A full blood count, bleeding time, prothrombin time and activated partial thromboplastin time should be performed.*

Angiography

- AHA **C** *Angiography should be considered for patients with an intracerebral haemorrhage if:

 - ◆ *there is no clear cause for the haemorrhage*
 - ◆ *the patient is a surgical candidate, especially a young, normotensive patient who is clinically stable [6].**
- AHA **C** *Angiography is not required for older, hypertensive patients who have a haemorrhage in the basal ganglia, thalamus, cerebellum, or brainstem and in whom the CT or magnetic resonance imaging does not suggest that the haemorrhage was caused by an underlying vascular lesion [6].*
- AHA **C** *Magnetic resonance angiography or CT angiography may obviate the need for cerebral angiography in selected patients [6].*

Surgical removal of intracerebral haematomas

There is insufficient evidence to make firm recommendations about whether or when to operate on patients with an intracerebral haemorrhage.

- AHA **C** Surgical removal of a haematoma **may** be considered for:
- ◆ patients with a cerebellar haemorrhage > 3 cm in diameter who are deteriorating secondary to brainstem compression or hydrocephalus
 - ◆ patients with an intracerebral haemorrhage associated with a structural lesion such as an aneurysm, arteriovenous malformation, or cavernous angioma, if the patient has a chance of a good outcome and the structural vascular lesion is surgically accessible [6].

C Young patients with a moderate or large lobar haemorrhage who are clinically deteriorating **may** be candidates for surgical removal of a haematoma.

C Surgical removal of a haematoma should **not** be considered for:

- ◆ patients with a small supratentorial haemorrhage (<10 cm³) or a minimal neurological deficit
- ◆ patients with Glasgow Coma Scale scores of ≤ 4, **unless** coma is secondary to cerebellar haemorrhage compressing the brainstem.

Management of raised blood pressure

- AHA **C** In patients who have an intracerebral haemorrhage, if there is a history of raised blood pressure mean arterial pressure (MAP) should be maintained below 130 mm Hg, where
- $$\text{MAP} = \text{diastolic blood pressure} + \frac{1}{3}(\text{systolic blood pressure} - \text{diastolic blood pressure}) [6].$$

6.9 Secondary prevention

At the time of writing, New Zealand guidelines for the secondary prevention of cardiovascular diseases (including stroke) were being prepared. See www.nzgg.org.nz/library.cfm

- RCP **B** All people with stroke or transient ischaemic attack should be assessed for vascular risk factors and be treated appropriately [10].

Lifestyle factors

- RCP **C** All people with stroke or transient ischaemic attack should be given appropriate advice on lifestyle factors such as not smoking, regular exercise, diet, achieving a satisfactory weight, reducing the use of added salt [10].

Cigarette smoking

C Cigarette smoking should be discontinued.

Evidence from randomised controlled trials is lacking, but observational studies suggest that stopping smoking decreases the risk of stroke by at least 1.5 times. Counselling, nicotine replacement therapies and formal smoking cessation programmes may all be helpful [7].

For full details see the National Health Committee Revised Guidelines for Smoking Cessation 2002, at www.nzgg.org.nz/library.cfm

Alcohol consumption

C Excessive alcohol consumption should be discontinued. Mild to moderate use of alcohol (1 or 2 standard drinks per day) is associated with a reduction in stroke rates [7].

Physical activity

A Moderate exercise (30–60 minutes of brisk walking, jogging, cycling, or other aerobic activity at least 3 times per week) is recommended [7, 8]. Medically supervised exercise programmes are recommended for high-risk patients (e.g. those with cardiac diseases) [see www.nzgg.org.nz/library.cfm].

Physical inactivity is associated with an increased risk of stroke.

Bodyweight

B People who have a body mass index (BMI) > 25 (especially those with BMI > 30) should commence graduated lifestyle change aimed at weight reduction [8].

Reduction in blood pressure

A Blood pressure-lowering treatment is recommended for all people after stroke or transient ischaemic attack unless the person has symptomatic hypotension.

For all people presenting with an acute stroke or transient ischaemic attack, lowering blood pressure reduces the risk of a recurrent stroke and other major vascular events, irrespective of the person's baseline blood pressure [21].

The optimal time to start blood pressure-lowering treatment is not known, but it is usually advisable to wait 7–14 days after an acute stroke [34].

The combination of an angiotensin-converting enzyme inhibitor and a diuretic is of proven benefit in preventing recurrent vascular events [21]. This benefit is seen irrespective of the patient's baseline blood pressure, including patients considered to be normotensive. There is insufficient evidence to determine whether a beneficial effect is specific to this combination of antihypertensive drugs or whether other blood pressure-lowering drugs are equally effective.

Treatment of diabetes mellitus

Diet, oral hypoglycaemics and insulin should be prescribed as needed to control diabetes [7].

Intensive treatment of both type 1 and type 2 diabetes mellitus can reduce microvascular complications such as retinopathy, nephropathy and neuropathy, but it has not been conclusively shown to reduce the risk of macrovascular complications including stroke.

See also New Zealand guidelines for the management of diabetes at www.nzgg.org.nz

Lipid-modifying treatment

B Treatment with a 3-hydroxy-3-methyl-glutaryl-coenzyme A (HMG-CoA) reductase inhibitor (statin) is recommended for most people following ischaemic stroke or transient ischaemic attack.

This recommendation is based on the results of a single large randomised controlled trial, the Heart Protection Study, which showed that treatment with simvastatin 40 mg daily is safe and reduces the rate of major vascular events including stroke [22]. The beneficial effect of lipid-modifying treatment was observed in a wide range of high-risk patients, including patients with no history of ischaemic heart disease and those with low or normal cholesterol values. 1820 patients with prior stroke and no history of ischaemic heart disease were included in this trial; the reduction in major vascular events (including stroke) was similar to other subgroups. No conclusion can be reached regarding recurrent stroke rate by itself. Other major trials of statin therapy after ischaemic stroke are ongoing.

Some patients with low HDL, high tryglycerides and clinical features of a metabolic syndrome may be better treated with other therapies for correction of the lipid disorder and require further assessment.

Aspirin

A Aspirin is recommended for secondary prevention for all patients after ischaemic stroke or transient ischaemic attack unless there is an indication for anticoagulation or a contraindication to aspirin [23].

Aspirin doses of 75–150 mg/day appear to be at least as effective as higher daily doses. The effects of doses lower than 75 mg/day are less certain [23].

C CT should be obtained prior to starting aspirin to exclude intracranial haemorrhage.

Clopidogrel

A Clopidogrel is recommended as a safe and effective antiplatelet treatment for the secondary prevention of stroke [35].

Clopidogrel is more expensive than aspirin and currently is not funded for secondary stroke prevention. The combination of clopidogrel with aspirin for patients who have a transient ischaemic attack or ischaemic stroke while treated with aspirin has not been adequately studied [36].

Dipyridamole

I There is insufficient evidence to recommend dipyridamole as a first-line treatment for the secondary prevention of vascular events, either as monotherapy or in combination with aspirin.

B Combination treatment with modified-release dipyridamole and aspirin can be used for prevention of non-fatal stroke for patients at high risk of cerebral ischaemic events, including those who have symptomatic cerebral ischaemia while treated with aspirin alone.

B Monotherapy with modified-release dipyridamole is recommended for prevention of non-fatal stroke if aspirin is contraindicated and clopidogrel is unavailable.

NB: At present specialist authority is required for funding of dipyridamole in New Zealand. Criteria include ischaemic symptoms while treated with aspirin or intolerance to aspirin.

The routine addition of dipyridamole to aspirin reduces the risk of non-fatal stroke but does not further reduce the total number of vascular events compared with aspirin monotherapy [23].

Warfarin

- RCP **A** *Anticoagulation should be started in every person with ischaemic stroke or transient ischaemic attack and atrial fibrillation (paroxysmal or sustained) unless contraindicated [10].*

A target international normalised ratio of 2.5 (range 2.0 to 3.0) is recommended [7]. For patients with contraindications to anticoagulation, aspirin is recommended although it is much less effective than warfarin in secondary prevention for patients with atrial fibrillation [7].

- RCP **C** *Anticoagulation should be considered for all people who have had an ischaemic stroke associated with mitral valve disease, prosthetic heart valves, or myocardial infarction within the preceding 3 months [10].*

- RCP **A** *Anticoagulation should not be started until intracranial haemorrhage has been excluded by brain imaging [10].*

The optimal timing of anticoagulation after stroke is not certain. Anticoagulation usually is started after 14 days. It may be started earlier in people with minor strokes if intracerebral haemorrhage has been excluded and if there is a high risk of early recurrent stroke, such as a recent full-thickness anterior myocardial infarct or prosthetic heart valve.

In general, it is preferable to commence anticoagulation prior to discharge from hospital.

- RCP **A** *Anticoagulation should not be used routinely after transient ischaemic attacks or minor ischaemic strokes unless cardiac embolism is suspected [10].*

Short-term or long-term anticoagulation is not routinely recommended for patients with atherothrombotic cerebrovascular disease causing transient ischaemic attacks or ischaemic stroke.

Some clinicians use anticoagulation for patients with: transient ischaemic attacks or ischaemic stroke occurring while taking an antiplatelet agent; crescendo transient ischaemic attacks; extracranial carotid or vertebral artery dissections; severe carotid stenosis while awaiting carotid endarterectomy; antiphospholipid antibody syndrome; patent foramen ovale or an atrial septal aneurysm. The role of anticoagulation in these patients is not yet clear. [7]

- B** *Anticoagulation following cerebral venous thrombosis appears to be safe and effective, even in the presence of intracerebral haemorrhage [37, 38]*

Carotid endarterectomy

- RCP **A** *Carotid endarterectomy is recommended for patients with symptomatic severe (70–99%) stenosis of the proximal internal carotid artery [10].*

NB: The term 'symptomatic' applies to patients who have had a previous transient ischaemic attack or non-disabling stroke in the territory of that artery. Carotid endarterectomy is not recommended in these patients if the ischaemic event was likely to have been due to cardiogenic embolism, if the stroke resulted in serious disabilities, or if important medical comorbidities exist.

- RCP **A** *Carotid endarterectomy should be performed only by specialist surgeons who can demonstrate a complication rate (stroke or death within 30 days) of $\leq 7\%$ [10].*

A Patients with symptomatic 50–69% stenosis of the internal carotid artery should be selected for carotid endarterectomy on a case-by-case basis. The absolute benefit of carotid endarterectomy for patients with a recent transient ischaemic attack or minor stroke and a moderate (50–69%) carotid stenosis is modest. Risk factors that increase the likelihood of benefit from surgery include male sex, increasing age up to 79 years, hemispheric rather than retinal symptoms, plaque surface irregularity and coexistent intracranial atherosclerotic disease [39].

RCP **A** Carotid endarterectomy is not recommended for patients with symptomatic proximal internal carotid artery stenosis less than 50% severity [10].

B Carotid endarterectomy may be considered without digital subtraction cerebral angiography for optimal surgical candidates when good-quality non-invasive imaging is available and a symptomatic high-grade (>70%) stenosis is confirmed both by doppler ultrasound and by magnetic resonance angiography. Digital subtraction angiography is recommended prior to endarterectomy in all other circumstances, including patients with possible carotid artery occlusion [40-42].

Carotid endarterectomy for asymptomatic internal carotid artery stenosis

There is some evidence favouring carotid endarterectomy for asymptomatic carotid stenosis, but the effect is at best barely significant, and extremely small in terms of absolute risk reduction [43].

A Routine carotid endarterectomy is not recommended for unselected patients with asymptomatic carotid stenosis [43].

A high-risk subgroup cannot be reliably identified among asymptomatic patients, but progressive stenosis may confer greater stroke risk.

RCP **A** Endarterectomy for asymptomatic stenosis must be performed by surgeons with exceptional skill who can demonstrate perioperative complication rates of $\leq 2\%$ [10].

Carotid angioplasty and stenting

The relative risks and benefits of carotid angioplasty with stenting and carotid endarterectomy for patients with symptomatic severe carotid stenosis are not known. One study suggested that carotid angioplasty had similar efficacy and rate of major complications to carotid endarterectomy [44]. However at the present time carotid endarterectomy, and not carotid angioplasty with stenting, is the recommended management for appropriate patients with internal carotid artery stenosis (see above).

There is insufficient evidence to determine whether patients who do not meet eligibility criteria for carotid endarterectomy (patients with age > 80, severe medical comorbidity, unstable neurological examination, surgically inaccessible carotid artery stenosis, previous ipsilateral carotid endarterectomy, non-atherosclerotic carotid stenosis) may benefit more from carotid angioplasty and stenting than medical treatment.

C Carotid angioplasty and stenting should be performed only by an experienced interventionist who can demonstrate a low periprocedural complication rate.

Extracranial-intracranial bypass surgery

AHA **A** Extracranial-intracranial bypass is not recommended for people with transient ischaemic attacks or minor strokes [7].

Extracranial-intracranial bypass is sometimes used in patients with anterior circulation ischaemia and haemodynamic abnormalities unresponsive to medical therapy, and in patients with moyamoya disease, but further studies are required to determine whether surgery is beneficial in these patients [7].

6.10 Early supported discharge

- A** Selected people with stroke can be considered for discharge home as soon as they are able to transfer independently from bed to chair, providing:
- ◆ there is a competent caregiver at home
 - ◆ equivalent rehabilitation input coordinated by a multidisciplinary team can be delivered at home
 - ◆ adequate support services are available in the community
 - ◆ there are no environmental impediments (e.g. access to shower and toilet, wheelchair access to the house) [45].

For people in hospital following stroke who are not fully recovered, a decision must be made at some point about the appropriate timing of discharge. There is strong evidence that, providing the above criteria are met, people discharged home at a stage where they are able to transfer independently from bed to chair achieve outcomes comparable to those achieved with longer inpatient rehabilitation [45].

Early supported discharge programmes have shown significant reductions (approximately 9 days) in length of hospital stay [45] but the overall costs of early supported discharge compared with longer stay in hospital are not significantly different.

'I felt very unsure about being able to cope when he came back home. The practical aspects didn't bother me but I needed psychological support.'

For many people, a longer period of time is required in hospital to ensure discharge home is safe, to maximise functional ability and minimise adverse mental health effects on caregivers. In the trials of early supported discharge, generally less than 50% of people with stroke receiving rehabilitation were enrolled, making it difficult to generalise the results to all people with stroke [45].

6.11 Rehabilitation management

What is rehabilitation after stroke?

Rehabilitation has been described as 'a problem-solving and educational process aimed at reducing the disability and handicap experienced by someone as a result of disease, always within the limitations imposed by both available resources and the underlying disease' [46]. Rehabilitation should be goal focused and occur in an appropriate cultural and environmental context. Although much rehabilitation is undertaken by the person themselves, often with their family and friends, evidence supports the idea that coordinated multidisciplinary teams of rehabilitation clinicians working cooperatively with the individual with stroke and their caregivers produce the best outcomes.

When to start rehabilitation?

- C** All people with acute stroke, whether admitted to hospital or not, should have a rehabilitation assessment within the first 24–48 hours. The appropriateness and type of rehabilitation intervention will be determined by the results of this assessment.

Who will coordinate and carry out rehabilitation?



The rehabilitation team should comprise:

- ◆ health professionals with the combined skills to deal with the common issues following stroke and work in a coordinated way to achieve agreed goals
- ◆ the person with stroke and their caregivers/family/whānau.

'The planning was presented as a "solution" by the team. It wasn't easy to offer our thoughts or alternative input.'

The composition of the rehabilitation team will vary according to the setting and whether the focus is on inpatient or community care. Skilled rehabilitation nurses are essential members of any multidisciplinary stroke rehabilitation team because they have the most interaction with inpatients and are often the only health

professionals involved on a 24-hour, 7 days per week basis.

Whatever the size of hospital or community service, the following issues will be encountered and appropriately skilled personnel should be available to manage them:

- ▶ self-care (nursing/occupational therapy)
- ▶ continence (nursing/ physician)
- ▶ management of hemiparesis (nursing/physiotherapy/occupational therapy/physician)
- ▶ mobility (nursing/physiotherapy)
- ▶ communication (nursing/occupational therapy/speech and language therapy)
- ▶ swallowing problems (nursing/speech and language therapy/dietitian/physician)
- ▶ medical complications (physician/general practitioner)
- ▶ appropriate living environment (occupational therapy/physiotherapy/social worker)
- ▶ financial issues and employment (occupational therapy/social worker)
- ▶ cognitive problems other than communication (nursing/occupational therapy/psychologist/physician)
- ▶ mood and other psychological issues (nursing/psychologist/psychiatrist/physician)

How long should input from a rehabilitation team continue and when should it stop?



Continuous or intermittent input from a rehabilitation team may be appropriate over long periods of time following stroke, depending on the specific goals being addressed. Withdrawal of rehabilitation team management may occur appropriately when:

- ◆ the person with stroke wishes to exit from a formal rehabilitation programme
- ◆ no new achievable goals can be identified by the person with stroke and/or their caregivers.

Although most of the motor recovery after stroke occurs in the first 3 months, the process of adaptation to disability and reintegration into community living may occur over a much longer period.

How intense must rehabilitation be?



Local guidelines need to optimise the use of nursing and other trained staff to ensure that every person with stroke is involved in the maximum daily amount of goal-focused activity they can tolerate.

- ✓ All stroke inpatients should be involved in 7 days per week of goal-focused activity, whether or not this involves a therapist.

The quality, coordination and intensity of rehabilitation may all be important [47]. There is evidence to support the premise that more intensive input from therapists in a rehabilitation setting leads to better functional outcomes [48-52].

Should community and inpatient rehabilitation be treated the same?

- ✓ Every District Health Board should provide comprehensive rehabilitation services for people with stroke whether they are managed in an inpatient or community environment.

Given that many people with acute stroke are not admitted to hospital and that most people with stroke are eventually discharged into the community, often with considerable residual disability, the principles of stroke rehabilitation outlined in this guideline must apply in both the hospital and home setting.

6.12 Community rehabilitation services

- C Local stroke services must decide appropriate types, intensity and duration of ongoing rehabilitation in the community. There should be appropriate processes to allow for reassessment of need for rehabilitation for all people with stroke.

'While I was in hospital the support was intense. When I got home it suddenly stopped – I felt like I'd been dropped in the deep end.'

A relatively small proportion of people recover fully following stroke (see 4.1). For the remainder, a decision has to be made at some point about the type, duration and intensity of rehabilitation that the person receives after discharge from hospital. There is very little good-quality evidence to support decision-making in this area. Local resource availability and the costs involved in providing this input, along with the needs and wishes of the person with stroke and their caregivers, must be considered in the decision-making process.

6.13 Specific rehabilitation issues

FURTHER INFORMATION

AHA: www.americanheart.org/presenter.jhtml?identifier=3004546
 ASA: www.strokeassociation.org/presenter.jhtml?identifier=1200037
 RCP: www.rcplondon.ac.uk/pubs/books/stroke
 SIGN: www.sign.ac.uk/guidelines/published/index.html

Despite the overwhelming evidence for organised inpatient stroke care involving a multidisciplinary team of trained clinicians [26], the evidence to support more specific interventions at the level of a single discipline (e.g. type of physiotherapy approach) or a single problem (e.g. what to do about spasticity following stroke) is much smaller in quantity and generally of lower quality. A recent systematic review of occupational therapy for people with stroke [53] is a step in the right direction but, as an accompanying editorial pointed out, the nature of the information from the various trials does not allow concrete recommendations about specific interventions in specific settings [54]. What evidence exists has been summarised in various systematic reviews on stroke-related subjects within the Cochrane Collaboration (www.update-software.com/cochrane) and/or by the Royal College of Physicians Intercollegiate Working Party on Stroke [10].

Rehabilitation interventions

- Any rehabilitation intervention needs to be considered within the context of an overall rehabilitation plan for the individual with stroke and the resources available.

Aphasia

- SIGN** **B** People with aphasia following stroke should be referred to a speech and language therapist for assessment and appropriate management of their communication difficulty [11].

A systematic review of randomised controlled trials has not been able to show that speech and language therapy is clearly more effective than informal support for people with aphasia [55]. However, many of these trials are outdated and had major methodological problems. Overall, including evidence from non-randomised studies, there is reasonable support for the premise that people with aphasia benefit from speech and language therapy[56].

Care pathways

- A** Routine implementation of care pathways for acute management and stroke rehabilitation is not recommended [57].

Care setting for functionally dependent older people

There is insufficient evidence to estimate the likely benefits, harms and costs of institutional versus at-home care for functionally dependent older people following stroke [58].

Cultural beliefs

- Cultural beliefs may affect rehabilitation of some people whose families may want to 'look after' them, possibly rejecting other therapy. It is important that the need for and process of rehabilitation is fully explained in a suitable language/medium, and that culturally appropriate rehabilitation is offered.

Incontinence and constipation

- RCP** **B** Stroke units should have written assessment and management protocols for both urinary and faecal incontinence, and constipation [10].
- RCP** **C** Active bowel and bladder management should occur from admission [10].
- RCP** **B** Catheters should be used only after full assessment, and as part of a catheter management plan using an agreed protocol [10].
- RCP** **C** If incontinence persists after 3 weeks in spite of an active bowel and bladder management programme, further tests (urodynamics, anorectal physiology tests) should be considered [10].
- RCP** **C** Incontinent inpatients should not be discharged until adequate arrangements for continence aids and services have been arranged at home and the carer has been adequately prepared [10].
- RCP** **C** Continence services should cover both hospital and community, to provide continuity of care [10].

Mood disorders

C *People with stroke should be screened for depression and anxiety within the first month, and their psychological state kept under review. A standardised questionnaire (in those who can respond to it) may be used for screening but clinical diagnosis should be confirmed by clinical interview.*

No screening questionnaires have been trialled specifically for stroke although some research studies have used them for this purpose. The Hospital Anxiety and Depression (HAD) Scale [59] and the Geriatric Depression Scale [60] are examples. Any screening questionnaire needs to be used with awareness of its limitations, including in dysphasic patients and overemphasis on somatic symptoms in the elderly.

B *Any person diagnosed with one form of mood disorder should be assessed for other psychiatric comorbidity.*

C *Mood disorder that is causing persistent distress should be managed by, or with advice from, a clinician experienced in managing mood disorders.*

'Worse than my physical and speech problems was the feeling of hopelessness – utter despair. This is what I needed help with.'

Depression after stroke is common, with prevalence estimated at 10–47% [61–63]. Other mood disorders such as anxiety (19–31%), agoraphobia, adjustment disorder, irritability and apathy are also common, but are less well researched [61, 62, 64, 65]. Diagnosis of these abnormal mood states can be difficult particularly in the presence of speech disturbance and because several different mood disorders may coexist [61, 64, 65]. There is no consistent evidence that the risk of depression is affected by the location of the brain lesion [66].

Common symptoms suggestive of depression after stroke include crying, feeling miserable or hopeless, lack of motivation, reduced appetite, reduced social activities. Grieving following a stroke can cause similar symptoms, but depression symptoms are more pervasive and persistent.

Treatment of depression

A *People with persistently depressed mood (greater than 6 weeks) after stroke should be offered treatment with antidepressant medication.*

Antidepressant treatment for depression persisting at 6 weeks or longer has been shown to be more effective than placebo [67–71]. If a good response is achieved treatment should be continued for at least 6 months although the optimal duration after stroke is not known. Non-pharmacological treatments such as social and activity groups should also be considered [72].

C *Cognitive behavioural psychotherapy should not be routinely offered to people with persistent low mood after stroke.*

A small randomised controlled trial of cognitive behavioural therapy did not show beneficial effects on indices of depression or general level of functioning [73].

(See evidence table, page 70)

Prophylactic antidepressants

I *There is insufficient evidence to recommend administration of prophylactic antidepressant medication after a stroke.*

Because depression is associated with poor functional outcomes [63, 74], some authors have advocated the use of prophylactic antidepressant medication in non-depressed people with stroke to pre-empt adverse outcomes. Small studies have shown some improvements in activities of daily living (ADL) [69,

75] with antidepressants, but larger, more representative studies have shown conflicting results [67, 76, 77, 78].

(See evidence table, page 71.)

Treatment of emotionalism

- RCP **A** *People with severe, persistent or troublesome tearfulness (emotionalism) following stroke should be offered antidepressant drug treatment, with the frequency of crying monitored to check effectiveness [10].*

Movement re-education

- RCP **I** *No recommendation for a particular form of movement re-education can be made [10].*

Post-stroke (central) pain

- RCP **A** *Chronic pain post stroke, especially central pain, may respond to tricyclic antidepressant treatment which should be tried sooner rather than later [10].*
- RCP **C** *People with intractable pain following stroke should be referred to a specialist in the assessment and management of pain [10].*

Shoulder pain

- A** *Functional electrical stimulation and transcutaneous electrical nerve stimulation post stroke are not recommended [79].*

Functional electrical stimulation or transcutaneous electrical nerve stimulation does not influence the report of pain in the painful shoulder following stroke.

- B** *The use of intra-articular corticosteroid injections for treatment of shoulder pain is not recommended [80].*

- B** *Shoulder strapping to prevent shoulder pain following stroke is not recommended [81].*

Spasticity

- RCP **B** *Spasticity in the arm or leg following stroke should not be treated routinely with drugs, either orally or by injection [10].*

Where spasticity is causing significant symptoms and/or interfering with rehabilitation, the first-line treatment should be physical. Depending on response, oral medication (e.g. baclofen) can be considered, but the clinical effect is often disappointing. Local injection with botulinum toxin can be effective [82, 83]; however, the clinical effect is usually small and lasts only 2–3 months, and the drug is expensive.

6.14 Information and education for people with stroke and their caregivers

A *All people with stroke and their caregivers should be given information, advice, and the opportunity to talk about the impact of illness upon their lives.*

A *All stroke services should have educational programmes for people with stroke and their families.*

'The pamphlets were good but I wanted to know more about my own stroke.'

The New Zealand Code of Health and Disability Services Consumers Rights (1996) states that all consumers (patients and their caregivers) have a right to be treated with respect, to have open, honest and effective communication, to be fully informed and to be able to make informed choices. Thus, provision of information and education about stroke and its consequences is a basic expectation. It is also a critical component of any successful stroke service. Information about one's illness is essential to make sense of what is happening and adapt positively. Similarly, self-determination, independence and ability to make choices all depend on having adequate and timely information.

'The discussion should be held in a private place, not in the ward with others listening in.'

Most people with stroke and their caregivers want information on stroke [84–86], yet report dissatisfaction with the information they have been given [85, 87–92] or complain that they have been told very little [85, 86]. Retention of information provided in hospital is poor [93], emphasising that patients are able to absorb only a small part of the information given [94].

Types of information

B *Educational programmes should be flexible enough to accommodate information needs that differ among individuals and between people with stroke and caregivers, and that change over time.*

The complexity of stroke means the information needs are diverse and these needs change. Early in the illness, the emphasis is on physical causes and consequences of stroke. Later there is a need to understand the social and psychological effects [85, 88, 89, 95, 96], that are often hidden until the person is back in the community. Thus education about stroke needs to extend well beyond the hospital phase. Areas to be covered include:

- ▶ The nature of the stroke, including causes, complications, timeframes, and potential outcomes
- ▶ Consequences of stroke such as shoulder pain; personality, cognitive and psychological changes; sexuality; visuospatial disorders; mobility problems; and speech and language disorders.
- ▶ Stroke prevention and a realistic appraisal of risk of recurrence (fear of another stroke is very common)
- ▶ What is involved in the recovery process, their expectations of staff and vice versa, how long recovery will take
- ▶ Processes in hospital such as investigations, roles of different staff and how caregivers can be involved
- ▶ Discharge planning, to address common fears of how they will manage at home
- ▶ Ongoing rehabilitation plans once they leave the hospital
- ▶ The role of family as caregivers and their need for specific training

- ▶ Supports to enable independence at home, together with how to access them, their costs and any benefits available
- ▶ Financial concerns associated with loss of income or additional transport and medical costs
- ▶ The effects on other family members.

Information needs of caregivers

B *The specific needs of the caregivers to be given information, to be communicated with, to be involved in decision making and to be given support should be considered from the outset.*

'The nurse explained to my wife in hospital what had to be done, but not to me. I felt as though I didn't count.'

While both people with stroke and their caregivers may have similar needs for information, some of their needs may be quite different [86, 90, 91]. The caregiver must be educated in addition to the person with stroke. Specific areas in which caregivers have indicated they want improvement include simple information, communication and support, caregiver training and access to staff [84, 91].

Delivering information and education

A *Provision of information alone is insufficient.*

B *Educational programmes should be based on proven adult learning strategies, with active involvement of the person with stroke and caregivers.*

I *There is insufficient evidence to specify how educational needs are best met.*

A recent study of a family stroke support organiser service compared with standard care suggested that patients' and caregivers' information needs were more consistently met in the group receiving family support organiser care [97].

The more successful programmes have involved educational talks combined with opportunity for discussion, networking and problem solving [98-100]. In a small study, education sessions combined with one-to-one counselling were more effective than education alone [100].

'After my husband's stroke my mind was like jelly and I missed one really vital bit of information.'

Provision of a simple leaflet may improve knowledge, but retention of information is poor [93, 101] and does not improve person/caregiver satisfaction [101]. This highlights the difference between information giving and education. Information giving implies a passive recipient, whereas successful adult education requires active involvement of both giver and receiver and a meaningful interaction between learner and teacher.

Family group education sessions are used and have been recommended [102-105], but not adequately evaluated. People with stroke and caregivers appreciate family stroke workers or stroke nurses yet there is only limited evidence that their involvement improves stroke knowledge or functioning, or reduces caregiver stress/anxiety [106-109]. Caregivers, rather than the person, seem to benefit most, with better social activities and quality of life [109].

(See evidence table, page 72.)

FURTHER INFORMATION More detailed information on education for people with a stroke and their caregivers is available at www.stroke.org.nz

6.15 Leisure and social activities after stroke

B People with stroke should be offered advice on, and treatment aimed at, achieving their desired level of social activities.

C All people with stroke should be provided with access to public or private transport to facilitate participation in leisure and social activities.

I There is insufficient evidence to make any recommendations about leisure and social needs of people with stroke in residential care settings.

While leisure can provide stimulation, opportunities to develop new skills, and friendship, the main reason for leisure is enjoyment or fun. Physical recovery after stroke is important, but rehabilitation should also focus on enhancing participation in leisure and socialising. In one study, people with stroke felt there was an overemphasis on physical rehabilitation and most wanted some therapy directed at enabling participation in leisure [94].

'What I wanted was to regain lifestyle, not always be concentrating on what my leg was doing.'

After stroke there is often a marked reduction in both the number of leisure activities enjoyed and the frequency of participation [94, 108, 110, 111-113]. Few are able to redirect their energies into new interests [110]. Passive and less vigorous pastimes are more likely to be continued than active pursuits [110, 114, 115], but even passive activities such as reading are not regained in more than half of people with stroke [112]. Greater

involvement in leisure does occur over time [107], but social functioning remains lower than average for the population [115].

Issues that affect leisure participation negatively include physical dependency on partner [110, 113, 116], depression [113, 114], transport difficulties, self-consciousness, changed roles and for some, reluctance of the caregiver [112, 117].

Approaches to therapy

I There is insufficient evidence to recommend how best to improve the leisure and social needs of people with stroke.

Some smaller studies have suggested a benefit for people with stroke from 'leisure' therapy [118, 119], but this has not been confirmed in larger studies [107-109, 116, 117, 120-124]. These studies used different approaches including leisure therapy delivered by occupational therapist, specialist stroke nurse focusing on reintegration into the community and family care worker in case-managed care. None showed any clear benefit.

Needs of caregivers

B Caregivers should be given advice on how to maintain their own leisure and social activities while in a caring role.

Caregivers' leisure time is also significantly reduced [112]. Family support workers may improve integration/socialising and quality of life for caregivers (as opposed to the people with stroke) [109, 125].

(See evidence table, page 74.)

FURTHER INFORMATION More detailed information on leisure and social activities for people with stroke and their caregivers is available at www.stroke.org.nz

SUGGESTED READING Leisure following stroke. Stroke SA Fact sheet No. 7, available at www.stroke.org.au

6.16 Sexuality after a stroke

Sexuality encompasses not only intercourse, but also intimacy, communication and psychological aspects including sense of self-worth, attractiveness and significance of role. Sexual functioning is important and desirable for the majority of people, including those who have had a stroke [126, 127].

'Discussion should be with each partner separately at first – but only if they want to, not a lecture.'

Information, advice and open discussion can be very beneficial in overcoming sexual problems post stroke, yet very few people receive any help [128]. Help needs to be given early and staff need to take the initiative, thus giving permission to talk about sex [128, 129].

B *The opportunity to discuss issues relating to sexuality should be offered early after a stroke, to both the person and their partner. This should be initiated by the health professionals.*

C *Pamphlets and other information on sexuality after stroke should be available to all people with stroke.*

C *Advice about sexuality should cover both physical aspects (e.g. positioning, sensory deficits, erectile dysfunction, drugs) and psychological aspects (e.g. communication, fears, altered roles and sense of attractiveness).*

'No one ever discussed our personal relationship, except to say it would be different.'

Sexual dysfunction is very common after a stroke [126, 127, 130-136] with abrupt cessation or marked decrease in the frequency of intercourse for up to two-thirds [126, 127, 130-133, 135-138]. Among those who remain sexually active, resumption of intercourse usually occurs early (the first 3 months) [138].

Erectile or lubrication difficulties, or ejaculatory/orgasmic dysfunction are extremely common after stroke and are often complicated by dysfunction from comorbidities such as diabetes mellitus, depression and peripheral vascular disease [126, 127, 132, 133, 135, 136, 138, 139]. Difficulty with positioning during intercourse following a stroke is almost universal [140] hence all need to be counselled to try different positions.

Factors affecting sexual function

Drugs commonly used in stroke and related cardiac and psychological conditions may adversely affect libido or sexual functioning (e.g. erectile/ejaculatory or orgasmic dysfunction). While the side effects of these drugs need to be considered, the limited literature suggests that the drugs are not the major cause of sexual difficulties post stroke – psychological and interpersonal factors have a much greater influence on sexual functioning [139]. A reduction in loving, non-sexual contact and communication, diminished self-esteem and sense of attractiveness, depression, fatigue and fear of erectile/ejaculatory dysfunction are some of the factors influencing the sexual relationship.

Drugs may be used to enhance sexual functioning, either indirectly (e.g. by controlling angina of effort or elevating depressed mood) or directly (e.g. sildenafil or apomorphine for erectile dysfunction).

Risk of further stroke during sex

C People with stroke and their partners should be counselled on the relatively low absolute risk of sexual activity causing a further stroke.

Many people with stroke or their partners fear a further stroke during sexual intercourse [131, 132, 138], but the absolute risk is very low – about the same as the risk of myocardial infarction following sex [141].

FURTHER INFORMATION More detailed information on sexuality after a stroke is available from the Stroke Foundation: www.stroke.org.nz

SUGGESTED READING Conine TA, Evans JH. Sexual reactivation of chronically ill and disabled adults. J Allied Health 1982; Nov: 261-70. [positioning advice]
Farman J, Friedman JD. Sexual function and intimacy. In: Gillen G, Burkhardt A (eds). Stroke rehabilitation: a functional based approach. St Louis, USA: Mosby-Year Book Inc 1998, Ch. 18.
Mc Cormick GP, Riffer DJ, Thompson MM. Coital positioning for stroke afflicted couples. Rehabil Nursing 1986; 11: 17-19.
www.nzgg.org.nz/library/gl_complete/Cardiac_Rehab/appendix8

6.17 Driving after a stroke

C All people who have had a stroke who intend to resume driving should be assessed with regard to their ability to drive safely.

C Evaluation of safe driving skills should include a neurological examination by a specialist physician. If there is doubt about the person's ability to drive safely, assessment by a neuropsychologist or specialist occupational therapist is required. If uncertainty still exists, an on-road test should be undertaken.

The Land Transport Safety Authority (LTSA) guidelines should be adhered to.

(See summary on page 59.)

Adequate training for healthcare workers, resources, technology and a centre for driving assessments should be available in all District Health Board areas.

Assessment and subsidies for on-road assessment should be accessible to all people with a stroke in New Zealand.

All people unable to drive after a stroke should be advised on alternative means of transport and the availability of disability taxi vouchers (available through the Stroke Foundation).

I There is insufficient evidence on which to recommend strategies which might improve driving performance after a stroke.

(See evidence table, page 76.)

'My GP said I could drive after a 3-month stand-down. It was only after I had an accident that I found out I should have been assessed.'

Not only may stroke affect ability to drive safely, but post-stroke driving skills may be overestimated by the person with stroke and even their spouse [142]. Many do not receive advice on driving after a stroke, or evaluation of driving skills [143]. The most discriminating deficits which predict poor on-road performance are homonymous hemianopia (which constitutes an absolute reason for not driving),

visuospatial and attentional deficits, reduced speed of motor processing, motor impairment, and a right cerebral hemisphere lesion [144–146].

Assessment of fitness to drive and the responsibility of medical practitioners

Legislation

The responsibilities of registered medical practitioners under the Transport Act (Vehicle and Driver Registration and Licensing) 1998 are detailed in *Medical aspects of fitness to drive: a guide for medical practitioners* (www.ltsa.govt.nz/publications/docs/ltsa-medical-aspects).

New Zealand law requires medical practitioners to:

- ▶ advise the Director of Land Transport Safety (via the Chief Medical Advisor’s office) of any individual who poses a danger to public safety by continuing to drive when advised not to
- ▶ consider the guidelines in *Medical aspects of fitness to drive* (www.ltsa.govt.nz/publications/docs/ltsa-medical-aspects) when conducting a medical examination to determine whether an individual is fit to drive.

SPECIFIC INFORMATION

The medical examination (www.ltsa.govt.nz/publications/docs/ltsa-medical-aspects, pages 14-16)
Cerebrovascular accidents (strokes) (www.ltsa.govt.nz/publications/docs/ltsa-medical-aspects, pages 36-37)

Transient ischaemic attacks and amaurosis fugax
(www.ltsa.govt.nz/publications/docs/ltsa-medical-aspects, pages 38–39)

Where to get driving assessments in New Zealand
(phone Enable New Zealand, toll-free on 0800-171-981)

Driving licence revocation procedures

The following summarises the guidelines for action to be taken when a medical practitioner considers that a patient is medically unfit to drive.

The options are:

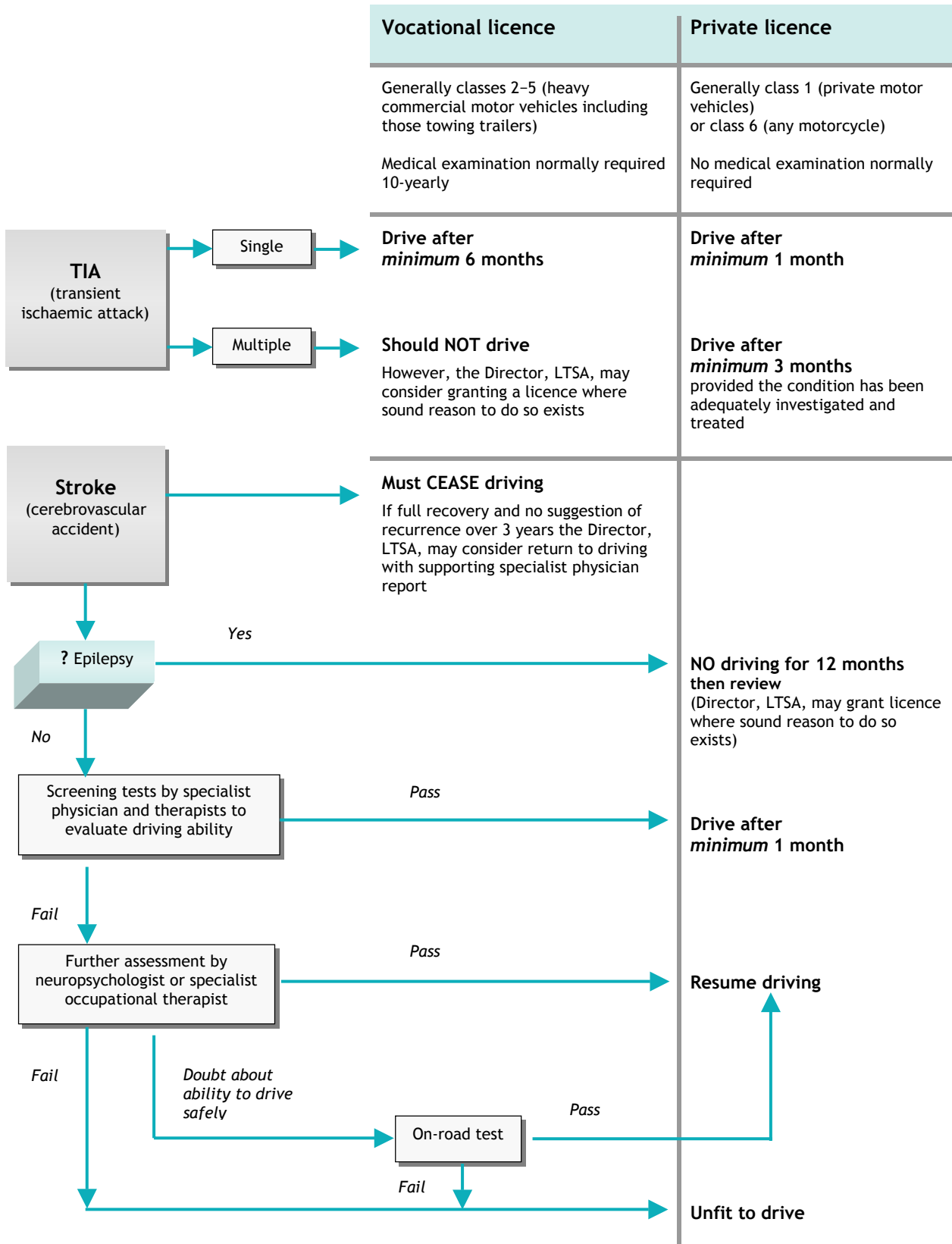
1. voluntary surrender of the licence and discontinuation of driving with no questions asked.
2. compulsory review by the Director, LTSA, which may lead to:
 - ▶ revocation of any class(es) or all classes of licence held;
 - ▶ limitations on the use of any class(es) held; and
 - ▶ the right to have any revocation or limitation reviewed by the District Court.

The doctor’s role is to:

1. advise the person with regard to the above options, if necessary in writing; and
2. advise the person that a second opinion may be obtained, if required; and
3. advise the Director, LTSA, in the event that the doctor’s advice to cease or limit driving is not accepted by the person, and in the opinion of the doctor, the person is likely to continue driving.

For full details see www.ltsa.govt.nz/publications/docs/ltsa-medical-aspects, page 9 (contact details) and pages 17–20.

Driving after a stroke: New Zealand LTSA requirements



Adapted from Medical aspects of fitness to drive: a guide for medical practitioners, Ministry of Transport May 2002. (www.ltsa.govt.nz/publications.docs/ltsa-medical-aspects)

Alternative therapies for stroke

A Acupuncture is not recommended in addition to standard rehabilitation care in the management of stroke [147].

Clinicians should be familiar with the various alternative therapies offered for stroke, and be able to comment on the appropriateness of the approach in the context of the nature of the stroke and any comorbidities.

A brief account of the treatment strategies offered by alternative therapies in New Zealand will be posted on the Stroke Foundation of New Zealand website (www.stroke.org.nz).

Health professionals should be aware that it is common for Māori and Pacific peoples to use massage, by a family member or traditional healer, as a way of 'healing' people with stroke.

I There is insufficient evidence to make any recommendation on the following therapies: conductive education, homoeopathy, herbal medicines, naturopathy, traditional Chinese medicines, music therapy, aromatherapy, snake-venom or remedy for stroke, spider-venom remedy for stroke, hyperbaric oxygen therapy, chelation therapy, magnetic field therapy, reflexology, osteopathy, sound therapy, light therapy.

"The doctors should be open-minded to alternative therapies. Never take away the opportunity to hope."

Many people with lasting disability after a stroke may wish to explore alternative therapies not offered by mainstream medicine. The numbers who do so are not known.

Literature search strategies included the terms 'alternative medicine', 'complementary medicine', 'traditional medicine', as well as specific therapeutic approaches such as acupuncture and conductive education. A great deal of interest was noticeable in a few alternative therapies, particularly acupuncture and some traditional Chinese medicines.

There is no convincing evidence to support the effectiveness of acupuncture as a therapeutic alternative after stroke. Eight randomised controlled trials have been identified, and seven of these are assessed in a Bandolier paper [148(1-)], which concludes that there were major problems with most. While the original authors reported a positive result in six of the seven studies, the reviewers concluded that only two had a positive result, and five negative. All trials included 'electropuncture' which may have confounded the results. A further study [149(1-)] has concluded that traditional Chinese manual acupuncture, given 3–15 days after the stroke in people stratified as having moderate to severe disability, had no additional value to standard motor rehabilitation. A meta-analysis of randomised controlled trials concluded that acupuncture has no additional effect on motor recovery in the presence of standard stroke rehabilitation [147].

Two small case series have been reported for conductive education (CE) and stroke; both report improvement in people with long-term motor disability after stroke, in trials lasting 3 weeks [150(3)], and 9 months [151(3)]. Both of these studies have a high risk of confounding and bias, and further well controlled randomised controlled trials are required.

8

Implementation of the guideline

Driving forces

Driving forces that will assist the implementation of this guideline:

- ▶ Consumer and clinician demand for updated evidence-based information
- ▶ Health funder, health management, and clinician demand for cost-effective and equitable treatment and management
- ▶ Medicolegal consequences of failure to follow evidence-based practice

Restraining forces

Restraining forces which may hinder the implementation of this guideline:

- ▶ Preconceived and entrenched ideas, lack of acceptance by healthcare providers
- ▶ Lack of access to evidence-based information, including this guideline
- ▶ Lack of access to, and training in use of, the electronic media
- ▶ Difficulty in reorganising services, finding dedicated areas and staff for stroke management
- ▶ Difficulty in finding and obtaining the services of suitably trained lead stroke clinicians
- ▶ Lack of funding, and/or difficulty in rationalising resources to stroke management if at the expense of other disease entities
- ▶ Lack of up-to-date standardised training modules on management of stroke at all levels
- ▶ Lack of resources and funding for longer-term support for the stroke community
- ▶ Limited resources for dissemination of the guidelines

Implementation strategies

- ▶ Publication of the guideline on the Stroke Foundation of New Zealand and New Zealand Guidelines Group websites
- ▶ Guideline 'launch' seminars across the country, highlighting the main messages in the guideline, explaining its use
- ▶ Dissemination of electronic versions of the guideline to all District Health Boards to be available on their intranet systems
- ▶ Dissemination of electronic and hard-copy versions of the guideline to academic centres for medicine, nursing, physiotherapy, speech and language therapy, occupational therapy, and corresponding colleges and societies

- ▶ Dissemination of hard copies of the guideline to services and clinicians in contact with people with a stroke
- ▶ Dissemination of relevant sections of the guideline to specialist groups e.g. general practitioners, residential care institutions and private hospitals
- ▶ Review and update of pre-existing information for people with a stroke and their families/whānau
- ▶ Publicity through articles in medical, nursing and therapy journals, lay media, radio interviews, and at a public launch with media coverage
- ▶ Audit and feedback to health providers

Appendices

I Background to the development of the guideline

II Evidence tables

Treatment of depression

Prevention of depression by prophylactic antidepressants

Information giving and education for people with stroke and caregivers

Leisure/recreation after stroke

Predictors of safe driving after stroke

Appendix I: Background to the development of the guideline

The guideline development team

People responsible for the development of this guideline were:

Jonathan Baskett (Co-editor)	MB, ChB, FRACP Honorary Medical Director, Stroke Foundation of New Zealand (1994-2002) Consultant Physician, Waitemata District Health Board, Auckland
Harry McNaughton (Co-editor)	MB, ChB, FRACP, FAFRM, PhD Honorary Medical Director, Stroke Foundation of New Zealand (2003) Rehabilitation Physician, Capital Coast Health DHB, Wellington
Neil Anderson	Bsc, MB, ChB, FRACP Neurologist, Auckland Hospital, Auckland
P Alan Barber	PhD, MB, ChB, FRACP Senior Lecturer, Department of Medicine, University of Auckland Director, Auckland Hospital Stroke Service, Auckland
Tim Cookson	MB, ChB, MRNZCGP General Practitioner, Wellington
Karen Dady	MSc(OT), NZROT Occupational Therapy Section Head, AT&R, Middlemore Hospital, Counties Manukau DHB, Auckland
John Fink	MB, ChB, FRACP Consultant Neurologist, Department of Neurology, Christchurch Hospital Board Senior Lecturer in Medicine, Christchurch School of Medicine and Health Sciences
John Gommans	BHB, MB, ChB, FRACP Honorary Medical Director, Central Region Stroke Foundation Consultant Physician, Hawke's Bay District Health Board, Hastings
Carl Hanger	MB, ChB, FRACP Honorary Medical Director, Southern Region Stroke Foundation Physician/Geriatician, Older Persons Health, Canterbury District Health Board, Christchurch
Matire Harwood	MB, ChB HRC Clinical Research Fellow, Rehabilitation Research and Training Unit, Wellington School of Medicine
Sue Lord	MSc, PhD Candidate Department of Medicine (Rehabilitation), Wellington School of Medicine University of Otago
Catherine Marshall	Chief Executive, New Zealand Guidelines Group
John McArthur	RGON, MHSc(Hons) Clinical Services Manager, Dunedin Hospital Lecturer in Postgraduate Programmes, School of Nursing, Otago Polytechnic
Brian O'Grady	Chief Executive, Stroke Foundation New Zealand Inc.
Katie Price	Analyst, Service Analysis, District Health Board Funding and Performance Directorate, Ministry of Health
Api Talemaitonga	MB, ChB General Practitioner, Christchurch Vice Chairman, Pacific Trust Canterbury Clinical Director, Pacific Health Centre, Christchurch

Helen Williams Project Manager, Project Management/Dunedin, DHB Funding and Performance Directorate, Ministry of Health

Christine Wyles BSLT, Cert Rehab
Professional Leader – Speech Language Therapy, Princess Margaret Hospital, Christchurch

Laura Lambie, Ministry of Health, provided valuable support.

Pat Field was the project editor.

Consumer involvement

A consumer representative was part of the guideline development process from the outset.

Consultation meetings with people with stroke and their caregivers were arranged in Christchurch, Wellington/Hutt Valley, Auckland and New Plymouth. Through the Stroke Foundation field officer network and local hospitals, people in these areas were identified who had experienced stroke services in the previous 12-18 months and who might wish to participate in a consultation meeting. They were sent invitations to attend a meeting, together with a questionnaire seeking their comments on the main issues covered in the guideline (a copy of the questionnaire is available at www.stroke.org.nz), and were given the option of reviewing a draft of the guideline. Some preferred to return the completed questionnaire by mail and not attend a meeting.

The meetings, which lasted 4 hours including lunch, were facilitated by the Stroke Foundation CEO or a field officer. A member of the guideline development group was present at the first meeting to answer clinical questions if they arose. This was not done in other centres and was not counterproductive.

A total of 46 people with stroke and their caregivers attended the meetings, from European New Zealand, Māori, Pacific and Asian ethnic groups. The Christchurch meeting focused on the under-65-years age group. Most participants had completed questionnaires prior to the meetings, and these responses were enlarged on verbally at the meetings from the personal experience of the consultees. A selection of their comments is included in the guideline.

The verbal response and returned questionnaires showed overwhelming support for the recommendations for stroke services outlined in the guideline.

Participating consumers who agreed to acknowledgement in the guideline were:

Shona and Ian Andrell, Christchurch

Barbara J Davidson, Auckland

Barrie Fyfe, Christchurch

DM and YM Hannah, Auckland

Peter J Hastie, Christchurch

Molly A Hay, Auckland

Debbie Mason, Auckland

Joy McDonald, Christchurch

M McDonald, Hawera

Grace Moulton, Wellington

Patricia Ann O'Neill, Christchurch

Whakaoranga Peita, Auckland

Carolyn Penn, New Plymouth

Harry Ruffell, Christchurch

Rita Ann Searle, Auckland

Ian Roy Simpson, Christchurch
 Lolita Thaisen, Christchurch
 Eileen and Rob Whitmore, Christchurch
 Rodney James Windle, Auckland

Peer review

The draft guideline document was sent to 207 organisations and individuals for appraisal using the Appraisal of Guidelines for Research and Evaluation (AGREE) instrument. Comments were received from:

Philip Baker, Neurologist, Hawkes Bay Hospital
 Maxine Bevin, Speech-Language Therapist, Doctoral Candidate, School of Psychology, Massey University
 Ruth Bonita, Director, Surveillance, Noncommunicable Diseases and Mental Health, WHO, Geneva
 Dale Bramley, Waitemata DHB
 Kim Carter, Director Clinical Services, Timaru Hospital and Community Services
 Alison Charleston, Physician in Geriatric Medicine, Auckland Hospital
 Rob Cook, National Heart Foundation
 Fiona Corbin, Pharmacist Facilitator, Progressive Health Inc, Wanganui
 Paul Drury, Medical Director, Auckland Diabetes Centre
 L Du Plessis, Department of Neurology, Dunedin Hospital
 Ali El-Ghorr, SIGN Executive, Royal College of Physicians of Edinburgh, Scotland
 Paul Friedman, Stroke Physician, Tauranga Hospital
 Angus Graham, Locum Consultant, Waikari Hospital
 Keith Grimwood, Professor of Paediatrics and Child Health, Capital Coast Health
 Alastair Haslam, Royal Australian and NZ College of Obstetricians and Gynaecologists
 Mary Hemming, CEO Therapeutic Guidelines Ltd, Australia
 Huang Chen Ya, Hong Kong
 Timothy J Ingall, Cerebrovascular Diseases Center, Mayo Clinic Scottsdale, USA
 Laura Lambie, Clinical Services Directorate, Ministry of Health
 RS MacWalter, Consultant Physician, Tayside University Hospitals, UK
 Sue Mahoney, Physiotherapist, Horowhenua Masonic Village
 Geetha Mylvaganam, Consultant Physician/Geriatician, Waitemata DHB
 P Parkin, Department of Neurology, Christchurch Hospital
 Anthony Rodgers Co-director, Clinical Trials Research Unit, University of Auckland
 S Roeters, Registered Nurse, Horowhenua Masonic Village
 John Scott, Geriatrician, Home and Older Adults Service, Auckland
 Russell Scott, Lipid & Diabetes Physician, Christchurch
 David Spriggs, Older People's Health, Auckland Hospital
 Lorraine Taylor, Geriatrician, Taranaki DHB
 James Te Whare, Te Hotu Manawa Māori, Auckland
 Mike Trow, Pharmacist Facilitator, First Health, Tauranga
 Rosemary Viscovic, Cardiac Nurse Educator, Lakeland Health
 DT Wade, Consultant and Professor in Neurological Disability, Oxford Centre for Enablement, Oxford, UK
 Cathy Webber, Royal NZ College of General Practitioners

Comments were considered by the guideline development team and the New Zealand Guidelines Group and adjustments incorporated.

Endorsements

Organisations and professional societies who would be expected to have an interest in stroke management were sent a draft copy of the guideline for comment. Endorsement was received from the following:

Age Concern New Zealand Inc.
Australasian College for Emergency Medicine
Australasian Faculty of Rehabilitation Medicine, Royal Australasian College of Physicians
Cardiac Society of Australia and New Zealand
Diabetes New Zealand
Ministry of Health
National Heart Foundation of New Zealand
Neurological Foundation of New Zealand
New Zealand Speech-Language Therapy Association
Royal Australasian College of Physicians
Stroke Society of Australasia

Sources of funding and editorial independence

The Ministry of Health commissioned the Stroke Foundation to develop this guideline. Guideline development training was provided by the New Zealand Guidelines Group.

The views and interests of the funding bodies have not influenced the final recommendations of the guideline development team.

Competing interests

No members of the guideline development team reported any competing interests.

Updating the guideline

It is intended that this guideline be reviewed in 2006.

Interim modifications will be made to the on-line version of the guideline when needed. The process for review will be the standard New Zealand Guidelines Group process: a guideline review group will be convened to conduct a brief literature review to evaluate the validity of the content. Following the review, a recommendation will be made to: set a further review date, if the contents are found to be still current; or update the guideline – that is, to modify some details (such as medication details) to bring the contents up to date with minor changes in practice; or fully revise the guideline – if major changes in practice or guideline structure are identified that need to be incorporated or improved.

The process for updating or revision will be in accordance with New Zealand Guidelines Group policy and practice at that time; see details on the website at www.nzgg.org.nz or email strokenz@stroke.org.nz

Appendix II: Evidence tables

EVIDENCE TABLE: Treatment of depression

Author, date, study design	Sample	Interventions	Conclusions
Lipsey et al, 1984 [68] Randomised controlled trial	39 in- or outpatients with stroke and depression	Nortriptyline vs placebo in 6-week trial	8 treated patients withdrawn with complications; reduced level of depression in group tolerating treatment SIGN level of evidence 1+
Andersen et al, 1994 [70] Randomised controlled trial	66 consecutive stroke patients with depression 2-52 weeks after stroke	6 weeks citalopram (10-20 mg/day) vs placebo	Reduced rate of depression in citalopram group SIGN level of evidence 1+
Wiert et al, 2000 [71] Randomised controlled trial	31 depressed patients in rehabilitation unit, within 3 months of stroke	Fluoxetine 20 mg vs placebo for 6 weeks	Greater improvement in depression scored. All measures were similar in both groups SIGN level of evidence 1+
Chemerinski et al, 2001 [152] Randomised controlled trial	23 depressed stroke patients with activities of daily living limitations	Nortriptyline vs placebo	Activities of daily living functioning improved in nortriptyline group SIGN level of evidence 1-
Robinson et al, 2000 [67] Randomised controlled trial	56 depressed/rehabilitation stroke in-patients	Nortriptyline (100 mg/day) vs fluoxetine (40 mg/day) vs placebo for 12 weeks	Nortriptyline had greater response rate than placebo or fluoxetine for depression symptoms SIGN level of evidence 1-
Raffaele et al, 1996 [153] Randomised controlled trial	22 acute stroke patients	Trazodone 300 mg daily or placebo	Barthel activities of daily living index improved with trazodone in patients with abnormal dexamethasone suppression test SIGN level of evidence 1-
Lauritzen et al, 1994 [154] Randomised controlled trial	20 depressed stroke patients	Imipramine and mianserin vs desipramine and mianserin for 6 weeks	Imipramine and mianserin better combination SIGN level of evidence 1-
Fruehwald et al, 2003 [155] Randomised controlled trial with open-label extension	54 consecutive depressed inpatients within 2 weeks of acute stroke	Fluoxetine 20 mg daily vs placebo for 14 weeks, followed by open-label treatment for 18 months	No significant benefit from fluoxetine in randomised controlled trial. Open-label extension showed less depression in fluoxetine group SIGN level of evidence 1- (open-label extension 2-)
Kotila et al, 1998 [72] Cohort controlled trial	594 patients with first-ever stroke	2 districts with active rehabilitation programme after discharge, and social group activities compared with 2 districts without either of the above	Prevalence of depression at 3 and 6 months lower in districts with active rehabilitation programme. Content of programmes not detailed SIGN level of evidence 2-

EVIDENCE TABLE: Prevention of depression by prophylactic antidepressants

Author, date, study design	Sample	Interventions	Conclusions
Palomaki et al, 1999 [76] Randomised controlled trial	100 consecutive acute stroke patients aged < 71 years	Mianserin 60 mg daily, or placebo; to prevent depression. Duration 12 months, seen at 2, 6, 12, 18 months	No difference in depression, or activities of daily living independence; low rate of depression (6–16%). Routine mianserin not included SIGN level of evidence 1+
Dam et al, 1996 [69] Randomised controlled trial	52 patients 1–6 months post stroke; unable to walk	Fluoxetine, maprotiline or placebo for 3 months	Fluoxetine associated with better functional outcome. Depression symptoms in 6 on maprotiline and fluoxetine groups SIGN level of evidence 1–
Reding et al, 1986 [77] Randomised controlled trial	27 inpatients in stroke rehabilitation unit	Trazodone vs placebo; variable treatment duration, average 32 days	Non-significant trend for Barthel activities of daily living scores to improve more on trazodone. Depression outcomes not reported SIGN level of evidence 1–
Robinson et al, 2000 [67] Randomised controlled trial	48 non-depressed stroke rehabilitation inpatients	Nortriptyline (100 mg) vs fluoxetine (40 mg) vs placebo for 12 weeks	Neither active drug improved mood or level of recovery and functioning SIGN level of evidence 1–
Narushima et al, 2002 [75] Randomised controlled trial	48 stroke patients	Nortriptyline vs fluoxetine vs placebo for 12 weeks	Both active groups had lower incidence of depression while on treatment SIGN level of evidence 1–
Grade et al, 1998 [156] Randomised controlled trial	21 consecutive stroke rehabilitation patients	Methylphenidate vs placebo for 3 weeks	Treated group had less depression symptoms and better activities of daily living scores but there were differences in baseline mood and activities of daily living scores SIGN level of evidence 1–

EVIDENCE TABLE: Information giving and education for people with stroke and caregivers

Author, date, study design	Sample	Interventions	Conclusions
Forster & Young 1996 [107] Randomised controlled trial	240 patients at home after stroke	Specialist nurse visits (6+ over 6 months) or normal services alone	No beneficial effect on patients' disability, social activities, or mood; or caregiver stress SIGN level of evidence 1+
Dennis et al, 1997 [108] Randomised controlled trial	417 patients 30 days post stroke	Family care worker or standard care	Family care worker group more satisfied, but possible increase in patient helplessness; no other differences detected SIGN level of evidence 1+
Evans et al, 1988 [100] Randomised controlled trial	206 rehabilitation stroke patients and their caregivers	Nothing, education, or education and counselling sessions for caregivers soon after stroke	Education and counselling resulted in better knowledge, more effective problem solving and adjustment at 12 months SIGN level of evidence 1-
Friedland & McColl, 1992 [157] Randomised controlled trial	88 stroke patients at home after rehabilitation	Special social support intervention, or nil (normal service)	No difference in the type (and extent of use) of supports or in psychosocial function (general health questionnaire, sickness impact profile) SIGN level of evidence 1-
Lomer & McLellan 1987 [93] Randomised controlled trial	48 patients and 44 relatives after admission for stroke	Information leaflet on stroke	Showed increased knowledge about stroke illness, treatment and prognosis. No effect on knowledge of services. Poor recall of receiving information in 33% SIGN level of evidence 1-
Pain & McLellan 1990 [158] Randomised controlled trial	36 recently discharged stroke patients	Personalised information booklet	No difference in social activities or physical functioning SIGN level of evidence 1-
Mant et al, 1998 [101] Randomised controlled trial	71 acute stroke patients and their caregivers	Information pack for patients and caregivers after stroke	Showed better knowledge; no differences in satisfaction with or use of services; no differences in mood or quality of life SIGN level of evidence 1-
Rogers et al, 1999 [99] Randomised controlled trial	204 stroke patients and 176 caregivers	Interactive stroke education programme (6 x 1hr sessions)	No difference in patient or caregiver quality of life (Shortform 36 questionnaire) but patients more satisfied with information received SIGN level of evidence 1-
Mant, 2000 [109] Randomised controlled trial	323 patients and 267 caregivers	Family support worker or standard care (mean of 5 contacts in 6 months)	Family support increased social activities (Frenchay Activity Index) and quality of life for caregivers, but had no benefit for patients SIGN level of evidence 1-
Goldberg et al, 1997 [116] Randomised controlled trial	55 recently discharged stroke patients	Case management focusing on information, psychosocial needs and assistance with problem solving	No significant improvement in psychosocial or quality-of-life outcomes SIGN level of evidence 1-
O'Mahoney et al, 1997 [89] Observational study	76 community stroke patients	Assessment of satisfaction with information and advice given	More advice and/or better means of giving advice and information needed, particularly for psychological and relationship issues SIGN level of evidence 2+

(cont.)

Information giving and education for people with stroke and caregivers (cont.)

Author, date, study design	Sample	Interventions	Conclusions
Van der Smagt-Duijnsteet al, 2001 [84] Observational study	106 relatives of hospitalised stroke patients	Assess the needs of relatives	Relatives' needs are in 3 main areas: information, counselling, and accessibility of staff SIGN level of evidence 2-
Dowswell et al, 2000 [95] Qualitative	101 recently discharged stroke patients	Qualitative assessment of specialist nurse visits	Education needs of patients are complex, diverse and change over time SIGN level of evidence 3+
Hanger & Mulley, 1993 [90] Observational study	1397 people who telephoned stroke advice centres	Assess information needs	Information needs diverse, including basic information about strokes, communication difficulties, rehabilitation and community supports SIGN level of evidence 3
Hanger et al, 1998 [96] Observational study	215 stroke patients and their caregivers	Assess information needs over time	Information needs change over time, with psychological issues more prominent at 6 and 24 months SIGN level of evidence 3
Wellwood et al, 1994 [86] Observational study	164 acute stroke patients	Assess level of knowledge of stroke	Most patients and caregivers want more information/discussion during hospital stay. Needs of patients and caregivers may differ SIGN level of evidence 3
Evans & Held, 1984 [104] Own historical control	43 stroke rehabilitation patients	Stroke education classes (1 hr/wk) with interaction	Patients reported less anxiety and better knowledge immediately after intervention SIGN level of evidence 3
Clark & Smith, 1998 [159] Observational study	60 stroke patients in rehabilitation unit	Multivariate analysis of factors relating to satisfaction with progress	More satisfaction with service associated with more information about stroke and services SIGN level of evidence 3

EVIDENCE TABLE: Leisure/recreation after stroke

Author, date, study design	Sample	Interventions	Conclusions
Forster & Young, 1996 [107] Randomised controlled trial	240 patients at home after stroke	Specialist nurse visits (6+ over 6 months) or normal services alone	No beneficial effect on patients' disability, social activities, or mood; or caregiver stress SIGN level of evidence 1+
Dennis et al, 1997 [108] Randomised controlled trial	417 patients 30 days post stroke	Family care worker or standard care	Family care worker group more satisfied; but possible increase in patient helplessness; no other differences detected SIGN level of evidence 1+
Parker et al, 2001 [120] Multicentre randomised controlled trial	466 recently discharged stroke patients	Occupational therapy for leisure or conventional occupational therapy	No benefit of leisure-based therapy found SIGN level of evidence 1+
Walker et al, 1999, 2001 [118, 160] Randomised controlled trial	185 acute stroke patients not admitted to hospital	Occupational therapy at home to improve personal and extended activities of daily living	Beneficial effect on extended activities of daily living at 6 and 12 months SIGN levels of evidence 1- [118], 1+ [160]
Mant et al, 2000 [109] Randomised controlled trial	323 patients and 267 caregivers	Family support worker or standard care (mean of 5 contacts in 6 months)	Family support increased social activities (Frenchay Activity Index) and quality of life for caregivers, but had no benefit for patients SIGN level of evidence 1-
Goldberg et al, 1997 [116] Randomised controlled trial	55 stroke patients recently discharged	Case management focusing on information, psychosocial needs and assistance with problem solving	No significant improvement in psychosocial or quality-of-life outcomes SIGN level of evidence 1-
Drummond & Walker, 1995 [119] Randomised controlled trial	65 recently discharged stroke patients	Occupational therapy for leisure or conventional occupational therapy vs no additional input	Frequency of leisure participation increased in occupational therapy leisure group SIGN level of evidence 1-
Logan et al, 1997 [122] Randomised controlled trial	111 recently discharged stroke patients	Enhanced occupational therapy vs conventional occupational therapy	Early benefit in extended activities of daily living which did not persist SIGN level of evidence 1-
Jongbloed & Morgan, 1991 [123] Randomised controlled trial	40 recently discharged stroke patients	Leisure-focused occupational therapy vs environmental occupational therapy	No benefit of leisure therapy SIGN level of evidence 1-
Gilbertson et al, 2000 [124] Randomised controlled trial	138 recently discharged stroke patients	Occupational therapy (10 visits) focusing on activities of daily living and leisure vs conventional care (no occupational therapy follow-up)	Improved extended activities of daily living at 8 weeks but did not persist at 6 months SIGN level of evidence 1-
Corr & Bayer, 1995 [117] Randomised controlled trial	110 recently discharged stroke patients	Occupational therapy for 6 months (4 visits) vs no occupational therapy	No significant benefit in leisure or extended activities of daily living found SIGN level of evidence 1-

(cont.)

Leisure/recreation after stroke (cont.)

Author, date, study design	Sample	Interventions	Conclusions
Hackett et al, 2000 [115] Case control	639 stroke survivors at 6 years	Assess long-term impact of stroke on quality of life	Social functioning of survivors was lower than in age/gender-matched population controls, but no different to case controls, despite increased dependency SIGN level of evidence 2++
Anderson et al, 1995 [112] Observational study	241 caregivers of community stroke patients	Assess impact of stroke on leisure, social activities and emotional health	Leisure and social activities severely restricted for caregivers one year after stroke SIGN level of evidence 2+
Feibel & Springer, 1982 [114] Observational study	91 hospitalised stroke patients	Assess relationship of depression to leisure/social activities	Depressed patients had significantly more restricted leisure activities than non-depressed patients SIGN level of evidence 2-
Dijkerman et al, 1996 [111] Own historical controls	57 recently discharged stroke patients	Compare leisure/social activities before and after stroke	Frequency of leisure reduced after stroke. Outdoor activities more severely affected than indoor activities SIGN level of evidence 2-
Greveson & James, 1991 [94] Observational study	62 stroke survivors at 3 years	Assess impact of stroke on leisure and social activities	Leisure and social activities severely restricted. Only 16% had any leisure activities or hobbies SIGN level of evidence 2-

EVIDENCE TABLE: Predictors of safe driving after stroke

Author, date, study design, sample	Interventions	Outcomes	Conclusions
Mazer et al, 2003 [161] Randomised controlled trial 97 people referred for driving evaluation following stroke	Visual attention retraining programme using 'useful field of view' versus traditional visuoperceptual training programme	No difference overall People with right-hemisphere brain lesions had more success with on-road driving test after ?novel intervention	Possible that specific targeting of right-hemisphere lesions could improve on-road results SIGN level of evidence 1-
Akinwuntan et al, 2002 [144] Retrospective study of a 2-year predriving evaluation 104 participants	Predriving assessments: Neurological examination Visual tests Neuropsychological tests Road test Team decision and performance of on-road test	41 (39.4%) found suitable to drive 45 (43.5%) not immediately suitable 18 (17.3%) not suitable Neuropsychological tests (scanning mean reaction time, figure of Rey and visual neglect) most important indicators of road test Road test most important determinant of group decision	Predictive accuracy of team decision limited, road test even lower More real-road-related tests necessary SIGN level of evidence 2+
Klavora et al, 2000 [145] Comparison of two off-road assessment batteries with on-road outcome 56 people aged 44-82 years, 6 months or more after stroke	Dynavision Performance Assessment Battery (DPAD) Cognitive Behavioural Driver's Inventory (CBDI) On-road testing	A 4-minute endurance subtest from the DPAD superior to the CBDI in predicting success/failure of on-road test Those that passed both the endurance test and the CBDI also passed the road test	Age not a predictor These off-road tests provided reasonable prediction for the outcome of the on-road test SIGN level of evidence 2-
Mazer et al, 1998 [146] Evaluation of ability of perceptual tests to predict on-road driving outcome after stroke 84 people approximately 4.5 months post stroke	Battery of perceptual tests (8 in all) then on-road test (occupational therapist plus driving assessor)	The Motor Free Visual Perception Test (MVPT) [162] was the best single predictor, and combination with the Trail Making B test [163] proved the best overall predictor	Off-road screening for perceptual deficit is useful in predicting those not ready for on-road testing after stroke SIGN level of evidence 2-

GLOSSARY

- Activities of daily living (ADL):** This refers to the basic elements of personal care such as eating, washing and showering, grooming, walking, standing up from a chair and using the toilet. Instrumental ADL activities extend to non-personal care items such as shopping, cooking, gardening and driving.
- Amaurosis fugax:** Transient monocular or partial blindness
- Aneurysm:** A weakness in a wall of an artery, vein, or the heart, causing dilatation of that part
- Angiography:** An x-ray technique to visualise the lumen of an artery, using radio-opaque dye
- Aphasia:** Inability to communicate through language, i.e. speech and signals, and at times to comprehend speech (global aphasia)
- Atrial fibrillation:** Rapid, irregular contractions of the heart
- Carotid endarterectomy:** Surgical removal from the walls of the carotid artery of deposits (which have restricted blood flow, or are the source of an embolus)
- Cognitive rehabilitation:** Training procedure to improve cognitive functions, e.g. memory, altered perception, attention
- Conductive education:** An approach to neurological impairment utilising educational and neuropsychological, rather than neurophysiological, principles
- Day hospitals (or Outreach, day wards):** Day clinics where the patient attends for several hours and participates in a programme involving both medical and rehabilitation aspects. May also include a home-based rehabilitation programme.
- Deep vein thrombosis (DVT):** Thrombosis (or a clot of blood) in the deep veins of the leg, arm, or abdomen.
- Disability:** A defect in performing a normal activity or action (e.g. inability to dress or walk)
- Dysphagia:** Difficulty swallowing.
- Dysphasia:** Reduced ability in communication by speech
- Embolus:** A blood clot (or other foreign substance) that travels in the blood stream to occlude an artery or vein.
- Handicap:** The social consequences of disability and / or impairment (e.g. inability to find employment)
- Hemiparesis:** Motor or muscular weakness causing partial paralysis of one side of the body
- Hemiplegia:** Total motor or muscular paralysis of one side of the body
- Home-based therapy:** Therapy delivered in the home, rather than as an outpatient, together with a schedule of agreed exercises to follow with or without the help of a caregiver, family/whānau, or volunteer.
- Homonymous hemianopia:** A defect of vision involving about one half of the visual field
- Impairment:** A defect in organ function or whole body system, which may be temporary or permanent (e.g. hemiplegia)
- Instrumental activities of daily living (IADL):** Activities which are essential if a person is able to live independently, e.g. use of a telephone or public transport, housework, cooking, financial management.
- Ischaemic stroke – classification:** Ischaemic strokes can be classified by arterial distribution: total anterior circulation infarct (TACI), partial anterior circulation infarct (PACI), posterior circulation infarct (POCI) and lacunar infarct (LACI).
- Key worker:** A member of the multidisciplinary team nominated to become the advocate of the patient and caregiver/family/whānau, and who will spend proportionally more time learning of their fears, hopes, and expectations, and in accessing appropriate resources to resolve these.
- Multidisciplinary team (MDT):** The entire rehabilitation team, made up of doctors, nurses, therapists, social workers, psychologists, and extending in the broadest and truest sense to anyone associated with the patient and family/whānau, including orderlies, chaplains, wardsmas in hospital; and, in the community, family doctors, district nurses, therapists, field officers and volunteers. The MDT is trained in and focused on stroke and all aspects of rehabilitation, meets regularly to discuss and review progress, involves the

patient and family in decision making. The function of the MDT is to provide a focused and organised rehabilitation programme for the person with a stroke, and caregivers/ family/ whānau.

Outpatient clinic: A general medical clinic focused on medical rather than rehabilitation problems and outcomes.

Rehabilitation: Restoration of the disabled person to optimal physical and psychological functional independence.

Rehabilitation unit: A section of a hospital dedicated to comprehensive organised programmes of inpatient rehabilitation.

Stroke: A stroke is characterised by rapidly developing symptoms and signs of a focal brain lesion, with symptoms lasting for more than 24 hours or leading to death, with no apparent cause other than of vascular origin [5].

Stroke clinic: A specialised outpatient clinic staffed by a multidisciplinary rehabilitation team (e.g. physician, nurse, occupational therapist, physiotherapist, speech and language therapist, social worker, Stroke Foundation field officer, with access to a clinical psychologist and psychiatrist, neurologist, etc.), offering a focused assessment and rehabilitation programme, education on stroke, and liaison with community-based options (e.g. services, recreational options, voluntary support groups).

Stroke unit: A section of an acute hospital dedicated to assessment of, and comprehensive rehabilitation programmes for, people with a recent stroke.

Thromboembolus: A thrombus, or clot of blood, which has travelled in an artery or vein

Transient ischaemic attacks (TIAs): TIAs (stroke-like symptoms lasting less than 24 hours) are not included in the definition of stroke, although they have a common cause [164]. TIAs may be the precursor of a stroke; therefore patients who have had a TIA require urgent assessment and treatment.

Whānau: The extended family.

ABBREVIATIONS

ADL:	activities of daily living
AHA:	American Heart Association
ASA:	American Stroke Association
BMI:	body mass index
CE:	conductive education
CT:	computed tomography
ECG:	electrocardiogram
ED:	emergency department
GP:	general practitioner
HAD:	Hospital Anxiety and Depression (Scale)
HDL:	high-density lipoprotein
LOS:	length of stay
LTSA:	Land Transport Safety Authority (of New Zealand)
MDT:	multidisciplinary team
NZGG:	New Zealand Guidelines Group
RCP:	Royal College of Physicians
SFNZ:	Stroke Foundation of New Zealand
SIGN:	Scottish Intercollegiate Guidelines Network
TIA:	transient ischaemic attack
tPA:	tissue plasminogen activator
WHO:	World Health Organization

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