Current knowledge on stroke

Incidence of stroke

There are no directly measured national data on the incidence of stroke in Australia. The best estimates available come from local registers that have been run for limited periods only. First-ever stroke incidence rates (age- and sex-adjusted to the world population) range from 76 per 100,000 population in Perth during 1995–96 to 100 per 100,000 population in Melbourne during 1996–97 (Jamrozik et al. 1999, Thrift et al. 2000).

Survival, disability and quality of life after stroke

Of those having a first-ever stroke, 80% are alive at 28 days and 63% are alive 1 year after their stroke (Thrift et al. 2000). About one in six survivors of a first-ever stroke have a recurrent stroke over the next 5 years (Hankey et al. 1998). Recurrent strokes have a similar 28-day survival rate to that of first-ever strokes.

Nearly all patients are disabled at the time of the stroke. There may be permanent paralysis of one side of the body, speech or swallowing difficulties, problems with memory, personality changes or a range of other difficulties. Depression and anxiety are common after stroke and many survivors have difficulty returning to their previous leisure activities (Burvill et al. 1995a, Burvill et al. 1995b). Recovery is most rapid in the early weeks and nearly complete, if it is to be so, within 6 months of the stroke. By the end of the first year, about half of all survivors of stroke remain dependent on others for activities of daily living (Hankey et al. 2002).

Among 30-day survivors of first-ever stroke, about half survive 5 years (Hankey et al. 2002). Of those who survive to 5 years, one-third have a disability and one in seven are in ongoing institutional care.

The majority of survivors are disabled at 3 and 12 months after stroke (Sturm et al. 2002). Although physical independence and occupation are most severely affected, stroke survivors are disabled over a wide range of areas. These include mobility, social functioning, orientation and economic self-sufficiency. Stroke also carries emotional and behavioural consequences that can influence the effectiveness of rehabilitation, and have a severe impact on life satisfaction (Hochstenbach 2000). These psychological problems need to be treated too (White & Johnstone 2000).

Although problems in orientation are unlikely to be modifiable in most cases, much of post-stroke disability may be improved. Care in a stroke unit for acute stroke will reduce impairment and disability. Rehabilitation services may reduce disability in the areas of mobility, physical independence and social relationships by providing mobility and communication aids and modifying the environment. Occupational therapy can reduce limitations to occupational participation.

Stroke has a marked impact on quality of life. When assessing outcomes, it is important to measure quality of life in addition to death and disability, as people who have had a stroke may rate their quality of life as low even when they are able to perform activities of daily living (Teasell 2003).

Cost of stroke

Stroke has been estimated to account for about 4% of the total costs of disease in Australia (AIHW & CHPE 1995).

The total first-year costs of all first-ever strokes in Australia during 1997 were estimated at $555 million and the lifetime costs at $1.3 billion (Dewey et al. 2001). This included direct service use, care-giver time, out-of-pocket payments, and production losses. The definition of stroke used does not include subarachnoid haemorrhage or transient ischaemic attack. The average cost per case in the first year of a first-ever stroke was $18,956; over a lifetime it was $44,428. In contrast, the average cost per case during the first year after recurrent stroke was $21,786. The average cost per rehabilitation admission was estimated to be $13,627.

Rehabilitation (inpatient and outpatient) was the largest component of total cost during the first year after a first-ever stroke, amounting to $156 million (28%). In addition, community rehabilitation cost a further $10 million. Acute hospitalisation cost almost as much ($154 million, 28%), followed by nursing home care ($63 million, 11%).

Risk factors for stroke

The risk of stroke increases with:

- age
- previous transient ischaemic attack or stroke
- high blood pressure
- tobacco smoking
- diabetes
- high blood cholesterol
- atrial fibrillation
- narrowing of the carotid arteries (carotid stenosis).

How common are risk factors for heart disease and stroke?

- 43% of Australians aged 18–75 years (around 5.7 million) did not undertake sufficient physical activity to achieve health benefits in 2000 (AIHW 2002).
- 19% of Australians aged 14 years and over (about 3.1 million) smoked regularly in 2001 (AIHW 2002). A further 3.6% smoked occasionally.
- 29% of Australians aged 25 years and over (about 3.6 million) had high blood pressure or were on blood-pressure-lowering medication in 1999–00 (AIHW 2002).
- 50% of Australians aged 25 years and over (over 6 million) had high blood cholesterol levels in 1999–00 (AIHW 2002).
- 60% of Australians aged 25 years and over (about 7.5 million) were overweight or obese in 1999–00 (AIHW 2002). Of these, 21% (2.6 million) were obese.
- 7.5% of Australians aged 25 years and over (an estimated 938,700) had diabetes in 1999–00 (AIHW 2002).

The high prevalence of risk factors suggests that many patients could benefit from interventions to prevent stroke and coronary events.

Strategies for reducing stroke recurrence

There is wide variation in the care given to people with stroke. This is due to resource availability, cost, access to services, preferences of patients and differences in medical practitioners, hospitals and governments, as well as poor evidence on the effectiveness of many aspects of stroke care (Hankey & Warlow 1999).

Effective interventions to treat stroke in the acute phase and to prevent the occurrence of subsequent stroke events are summarised below. There are some components of stroke care, such as physiotherapy, occupational therapy and other forms of rehabilitation, for which there is limited conclusive evidence; however, this does not mean they are ineffective.

Treatments to manage acute stroke include:

- organised care in a stroke unit by a multidisciplinary team (level 1 evidence)
- aspirin for acute ischaemic stroke (level 1 evidence)
- tissue plasminogen activator (tPA) given within 3 hours of onset of acute ischaemic stroke (level 1 evidence).

Measures for preventing recurrent stroke in patients with transient ischaemic attack (TIA) or stroke include:

- lowering of blood pressure (level 1 evidence)
- smoking cessation
- regular exercise
- antiplatelet drugs (aspirin, aspirin + dipyridamole, or clopidogrel) long-term for patients with normal heart rhythm (level 1 evidence)
- anticoagulation (warfarin) long-term for patients with atrial fibrillation (level 1 evidence)
- lowering of blood cholesterol with drugs (statins) in patients with established CHD (level 1 evidence)
- carotid endarterectomy for patients with severe narrowing of the internal carotid artery on the symptomatic side and who are fit for surgery
- tight control of diabetes
- weight control, if appropriate
- a healthy diet.

Effective prevention is the most powerful strategy to reduce the burden of stroke. Rehabilitation and secondary prevention of recurrent stroke should begin on day 1 after stroke, as the risk of recurrent stroke is highest in the first 6 months after the event (Hankey et al. 1998, Hankey 2000).

The most important modifiable predictors of poor long-term outcomes (death, institutionalisation or disability) are low levels of physical activity before the stroke and subsequent recurrent stroke (Hankey et al. 2002).

Although the effectiveness of certain measures is well established, they are currently underused. Stroke units provide organised care with a multidisciplinary team including professionals such as neurologists, other doctors, nurses, physiotherapists, occupational therapists, speech pathologists, dietitians and social workers. This care is appropriate for all patients, but it is not currently widely available in Australia. Similarly, only about 1 in 4 patients with transient ischaemic attack or stroke in whom long-term anticoagulant drugs

are indicated actually receive this treatment (Hankey & Warlow 1999). Aspirin is likewise underused for secondary prevention of vascular disease (Mollison et al. 1999).

However, there is evidence that the care of people with heart disease and stroke problems improved during the 1990s, with more effort being directed to prevention (AIHW: Henderson et al. 2002). There have been significant rises in the prescription of blood-pressure-lowering drugs, aspirin, anticoagulants and blood-cholesterol-lowering drugs. General practitioners are also more likely than in the past to do check-ups and to provide counselling and advice to their patients with a history of heart disease or stroke. It is reasonable to assume that this involved discussions about the patients' lifestyle and suggestions to change risk behaviours if indicated.

Stroke rehabilitation

What is stroke rehabilitation and who provides it?

Rehabilitation is an integral part of the acute and long-term care of those who have had a stroke. It has a role in:

- helping stroke survivors maximise their potential for recovery and providing practical ways of dealing with ongoing disability
- supporting and training family members and friends to assist with the ongoing care of stroke survivors in the community
- preventing recurrent stroke through medication and behavioural modification.

Most people who have suffered a stroke can benefit from rehabilitation, from the most mildly affected people to those severely disabled. Rehabilitation begins in the acute hospital environment as soon as possible after the stroke and, depending on each individual's needs, may continue in a specialised inpatient rehabilitation unit or be provided through hospital outpatient services, in the patient's home or at a community rehabilitation facility. Rehabilitation services may also be provided in hostels and nursing homes. The nature of rehabilitation services available for stroke patients varies across Australia (AIHW 2001).

Rehabilitation includes setting mutually agreed goals tailored to the individual. Progress is monitored regularly. Retraining and practice in performing everyday tasks are important activities. Specialised equipment and aids may be used. Medications may also be prescribed. Rehabilitation also involves providing psychological support, education and advice on a healthy lifestyle to stroke survivors and to their family and friends. A successful return home and resumption of previous activities may require the support of community services, e.g. Meals on Wheels or home-nursing services. The duration of formal rehabilitation varies according to individual needs, from 1 or 2 weeks to several months (Pollack & Disler 2002).

A multidisciplinary team approach is used, involving doctors, nurses, physiotherapists, occupational therapists, speech pathologists, social workers, neuropsychologists, orthotists and leisure therapists. Informal carers (family members, neighbours, friends and volunteers) play an important part in the lives of disabled stroke survivors. Carers provide assistance with a wide range of daily activities including mobility outside the home, managing money, organising appointments and services, housekeeping and house maintenance. Some carers help with personal-care tasks such as bathing and dressing. Carers themselves face considerable psychological strain and require both emotional and practical support.

Use of programs

It is not known what proportion of stroke patients in Australia participate in a rehabilitation program (inpatient or outpatient).

It has been estimated that in Perth during 1989–90, about 25% of hospitalised stroke patients underwent a period of inpatient rehabilitation in a specialised rehabilitation unit. In north-east Melbourne during 1996–97, it is estimated that about 39% of hospitalised stroke patients were admitted for a period of inpatient rehabilitation. This latter estimate excludes cases of subarachnoid haemorrhage.

Health outcomes of patients attending stroke rehabilitation

Most of the evidence in favour of rehabilitation after stroke is based on evaluation of a multidisciplinary program as a whole, or a particular discipline (such as speech therapy), rather than on the individual components of rehabilitation (Pollack & Disler 2002).

Patients treated in a stroke unit, which can offer prolonged rehabilitation if needed, are more likely to survive, regain independence, and return home than those receiving conventional care in a general hospital ward. These improved outcomes are also seen for those units that admit patients more than 1 week after the stroke event. The benefits of stroke units are not restricted to patients of any particular sex, age or stroke severity, or to a specific model of stroke unit care. The important factors of stroke unit care are the provision of coordinated multidisciplinary rehabilitation, staff specialisation in stroke or rehabilitation, and improved education and training of staff, patients and carers (Stroke Unit Trialists' Collaboration 1997, Stroke Unit Trialists' Collaboration Cochrane Review 2003).

Outpatient rehabilitation, whether provided in a community rehabilitation centre (day hospital), a hospital outpatient clinic or in the patient's home, is also effective in reducing the risk of death, dependency, institutionalisation or deterioration (Outpatient Service Trialists. Cochrane Review 2003). Providing home rehabilitation services for stroke patients can reduce the total length of hospital stay and produce similar outcomes for death and disability, compared with continuing inpatient rehabilitation (Early Supported Discharge Trialists. Cochrane Review 2003). Home rehabilitation has also been shown to be cost-effective when compared with continued inpatient rehabilitation (Anderson et al. 2002).

Assessment of specific techniques used in rehabilitation therapy is under way in some areas but in many cases good quality research is not available. Greater intensity speech therapy produces better outcomes than less intense therapy, which appears to give little or no benefit (Teasell 2003). Combining different motor recovery treatments improves motor outcomes after stroke. Physiotherapy can still improve mobility and reduce disability years after a stroke (Wade et al. 1992). There is also strong evidence that good social support improves outcomes (Teasell 2003).