Acute Stroke – the Case for Improvement
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### Acute Stroke Clinical Care Standard

1. A person with suspected stroke is immediately assessed at first contact using a validated stroke screening tool, such as the F.A.S.T. (Face, Arm, Speech and Time) test.

2. A patient with ischaemic stroke for whom reperfusion treatment is clinically appropriate, and after brain imaging excludes haemorrhage, is offered a reperfusion treatment in accordance with the settings and time frames recommended in the *Clinical guidelines for stroke management*.\(^1\)

3. A patient with stroke is offered treatment in a stroke unit as defined in the *Acute stroke services framework*.\(^2\)

4. A patient’s rehabilitation needs and goals are assessed by staff trained in rehabilitation within 24–48 hours of admission to the stroke unit. Rehabilitation is started as soon as possible, depending on the patient’s clinical condition and their preferences.

5. A patient with stroke, while in hospital, starts treatment and education to reduce their risk of another stroke.

6. A carer of a patient with stroke is given practical training and support to enable them to provide care, support and assistance to a person with stroke.

7. Before a patient with stroke leaves the hospital, they are involved in the development of an individualised care plan that describes the ongoing care that the patient will require after they leave hospital. The plan includes rehabilitation goals, lifestyle modifications and medicines needed to manage risk factors, any equipment they need, follow-up appointments, and contact details for ongoing support services available in the community. This plan is provided to the patient before they leave hospital, and to their general practitioner or ongoing clinical provider within 48 hours of discharge.
Purpose

This document supports the implementation of the Acute Stroke Clinical Care Standard by highlighting what is known about the evidence, best practice and current practice and the opportunities to bring these closer together.

A Clinical Care Standard is a small number of quality statements that describe the clinical care that a patient should be offered for a specific clinical condition. A Clinical Care Standard supports:

- people to know what care should be offered by their healthcare system and to make informed treatment decisions in partnership with their clinician
- clinicians to make decisions about appropriate care
- health services to examine the performance of their organisation and make improvements in the care they provide.

While there are well-developed guidelines for managing stroke, not all patients are treated consistently, suggesting that there is a gap between knowledge and practice.

The causes for this variation may be as diverse as the possible solutions – and depend on the local and individual circumstances.

This document outlines the following for each quality statement:

- Why is it important?
- What is known about current practice?
- What could be achieved with more consistent application of the aspects of care described?

When possible, examples are provided showing how specific approaches or systems for implementing best practice have demonstrated measurable change.

This document will be of interest to a wide audience, including clinicians and health services, policy makers, health system managers, researchers and the general public, and all those with an interest in the implementation of the Acute Stroke Clinical Care Standard.
Acute stroke – the Case for Improvement

Strokes affect thousands of Australians each year and are a major cause of death and disability. About 37 000 Australians were admitted to hospital with acute stroke in 2012, equating to one stroke every 15 minutes. In 2009, there were an estimated 375 800 survivors of stroke, a third of whom had a disability as a result of their stroke.

The Acute Stroke Clinical Care Standard aims to ensure that a person having a stroke or suspected of having a stroke, receives optimal treatment during the acute phase of their care. It covers recognition of stroke, rapid assessment, early management and early initiation of an individualised rehabilitation plan.

Stroke is a major health burden

Stroke poses a substantial burden on patients, carers and the healthcare system. Stroke caused 8300 deaths in 2010, which was 6% of all deaths, or 23 deaths each day. The past two to three decades have seen a substantial decline in stroke mortality, due, in part, to better risk factor control and improvements in stroke care. However, with the ageing of the population, the total number of people affected by stroke has increased. In 2009, an estimated 131 000 stroke survivors were living with a disability caused by the stroke and an estimated 75 000 co-resident primary carers provided assistance to people with stroke.

In addition to primary prevention strategies, minimising disability caused by stroke and preventing stroke recurrence will be critical for reducing the health burden of stroke in Australia.

Variation in treatments and outcomes

Despite national stroke guidelines and recent improvements in care, not all people with suspected stroke receive timely and appropriate care. Less than half of people with suspected stroke presented to hospital within three hours of symptom onset, in 2013. In 2015, about 8% of patients with ischaemic stroke received intravenous thrombolysis, a time-critical medicine that dissolves blood clots (also known as a reperfusion treatment).

Receiving care in a stroke unit increases a person’s chance of a good outcome following a stroke. In 2015, two-thirds of patients with stroke were treated in a stroke unit, but only 39% spent 90% of their hospital stay in a unit. According to the National Acute Stroke Services Framework 2015, hospitals that see more than 75 patients with stroke per year should have a stroke unit. In the 2015 survey of hospitals that admit patients with stroke, 10% of hospitals with 75 or more admissions for stroke a year reported that they did not have a stroke unit.

There is social and geographical variation in both the incidence and prevalence of stroke. In 2010, Aboriginal and Torres Strait Islander peoples had twice the rate of hospitalisation for stroke, and were 1.6 times more likely to die from stroke, than non-Indigenous Australians. People living in remote and very remote areas had 1.4 times the rate of stroke hospitalisation as people living in major cities. People from the lowest socioeconomic group had 1.3 times the rate of stroke hospitalisation of people from the highest socioeconomic group.
Secondary prevention begins during the admission for acute stroke

About one in ten people who have a stroke will have a recurrence within a year.9 It is likely that some readmissions (and associated costs) could be prevented with more consistent application of guideline recommendations for the secondary prevention of stroke. Starting treatment and education before a patient is discharged from hospital improves the chances that patients will adhere to treatment.10

Systems of care can improve outcomes

Clinical pathways and clinical care networks that cross hospital and health service boundaries have been shown to improve outcomes for people with an acute stroke. Regions with improved coordination of pre-hospital and emergency care have achieved thrombolysis rates three times that of the national rate.11, 12

An integrated, systems-based approach supported by health services and networks of services is therefore central to the delivery of patient-centred care identified in this Clinical Care Standard.

Key elements of this approach include:

- an understanding of the capacity and limitations of each component of the healthcare system across metropolitan, regional and remote settings, including pre-hospital, within and across hospitals, through to community and other support services
- clear lines of communication across components of the healthcare system
- appropriate coordination so that people receive timely access to optimal care regardless of how or where they enter the system.
Quality statement 1 – Early assessment

A person with a suspected stroke is immediately assessed at first contact using a validated stroke screening tool, such as the F.A.S.T. (Face, Arm, Speech and Time) test.

Why is this important?

The care provided in the first 24 to 48 hours after the onset of stroke is crucial for improving patient outcomes. Some therapies must be administered soon after the onset of symptoms to be effective. For example, intravenous thrombolysis, a reperfusion treatment for ischaemic stroke, can only be given within four-and-a-half hours of stroke onset. Therefore, it is crucial that patients with suspected stroke are rapidly transferred to hospital so that they can be assessed for their eligibility to receive this therapy.

People with poor awareness of stroke symptoms may delay seeking medical care, which can reduce their chances of early treatment and likelihood of better outcomes. Educating the public about how to recognise stroke signs and symptoms and the need to act quickly may increase the number of people who can access early treatment. Similarly, better identification of stroke by ambulance services may result in more timely delivery of stroke therapies.

What could be achieved?

Improvements in diagnostic accuracy of stroke by ambulance services are possible. In a study in East Melbourne, an educational intervention on stroke diagnosis was provided to paramedics. This included information on how to use a stroke screening tool (the MASS). Paramedics who received the intervention improved their diagnostic accuracy from 78% (pre-intervention) to 94% (post-intervention), while control paramedics’ diagnostic accuracy remained similar (pre 78%, post 80%).

In a similar study in Newcastle, NSW, ambulance services were trained on how to use a stroke screening tool. In addition, a pre-notification system was established so that ambulance services could immediately inform neurologists if an incoming patient had met the criteria for suspected stroke. As a result of this intervention:

- time from symptom onset to hospital arrival and admission decreased
- more patients with ischaemic stroke were treated with intravenous thrombolysis: 4.7% (pre-intervention) to 21.4% (post-intervention).

While there are limited Australia data, evidence suggests that early arrival to hospital following stroke is associated with better patient outcomes at discharge. There is also evidence that patients may benefit with early admission to stroke units even when they do not receive intravenous thrombolysis. In the United Kingdom, patients admitted to a stroke unit within four hours of arrival spent a greater proportion of inpatient time in a stroke unit, and had significantly shorter lengths of stay.

What is current practice?

Presently, there is no single recommended screening tool for stroke, but a simple screening tool, such as the F.A.S.T. test is likely to be the most useful. This is because the F.A.S.T. test is validated for use by ambulance services and is also used in community awareness campaigns. Other stroke screening tools have been used to improve the recognition of stroke by ambulance services, and many Australian ambulance services currently use a tool approved for their jurisdiction. For example in Victoria, the Melbourne Ambulance Stroke Screen (MASS), which is similar to F.A.S.T., has been used since 2005.

In emergency departments, a validated stroke screening tool was used for 38% of patients admitted to hospital with a final diagnosis of stroke, in 2015.
Quality statement 2 – Time-critical therapy

A patient with ischaemic stroke for whom reperfusion treatment is clinically appropriate, and after brain imaging excludes haemorrhage, is offered a reperfusion treatment in accordance with the settings and time frames recommended in the Clinical guidelines for stroke management.\(^1\)

Why is this important?

Approximately 80% of strokes are caused by a blood clot that blocks a blood vessel in the brain (ischaemic stroke).\(^2\) Some patients with ischaemic stroke can be treated with a medicine that dissolves the blood clot (intravenous thrombolysis with alteplase [rt-PA]). Intravenous thrombolysis is a type of reperfusion treatment as it helps to restore blood flow to an area of the brain deprived of blood flow for a period of time. The major limitations of intravenous thrombolysis are that it:

- is effective only if administered within a short time window after a stroke
- may cause bleeding in the brain, a risk that is minimised by careful screening of a patient’s suitability for the medicine.

The earlier intravenous thrombolysis is given, the greater the chance of a favourable outcome.\(^2\), \(^3\) Compared with patients with ischaemic stroke who do not receive alteplase, those treated:

- within three hours of stroke onset have 75% greater odds of disability-free survival (odds ratio [OR] 1.75, 95% confidence interval [CI] 1.35-2.27)
- between three and four-and-a-half hours of stroke onset have 26% greater odds of disability-free survival (OR 1.26, 95% CI 1.05-1.51).\(^2\)

Despite an absolute increase of about 2% in the risk of early death by intracranial haemorrhage from alteplase, treatment within three hours of stroke onset results in 10% more patients being disability-free at 3-6 months.\(^2\) Alteplase within three and four-and-a-half hours of stroke onset results in 5% more patients being disability-free.\(^2\) Simulation modelling has shown that for each minute of onset-to-treatment time saved, an average of 1.8 extra days of healthy life (95% prediction interval, 0.9-2.7) can be gained.\(^2\)

What is current practice?

It is recommended that intravenous thrombolysis is administered as early as possible, but may be administered up to four-and-a-half hours after the onset of stroke.\(^1\) Not all hospitals have the required personnel, infrastructure and processes necessary to administer this medicine. In the 2015 National Stroke Audit, 76% of Australian hospitals surveyed offered this medicine for stroke care.\(^6\)

Currently, approximately 8% of all patients with ischaemic stroke receive intravenous thrombolysis in Australia.\(^6\) In the 2015 National Stroke Audit:

- 66% of patients with stroke were transported by ambulance to a hospital able to provide thrombolysis
- 24% of patients with ischaemic stroke who arrived within four-and-a-half hours of stroke onset received thrombolysis
- 26% of patients who received thrombolysis did so within 60 minutes of hospital arrival.\(^6\)
What could be achieved?

Patients with ischaemic stroke who receive intravenous thrombolysis can have considerably better outcomes than those who do not receive the medicine. Streamlining the acute treatment of stroke with screening tools and hospital pre-notification can increase access to intravenous thrombolysis – reducing mortality and morbidity from stroke. A new model of pre-notification, patient assessment and delivery of intravenous thrombolysis has been shown to reduce the time between arrival at hospital and administration of intravenous thrombolysis. Some hospitals in Australia have achieved thrombolysis rates of up to 21%.

Intravenous thrombolysis can be provided at a relatively low additional cost over standard care to achieve the extra health benefits. In the first year after stroke, intravenous thrombolysis provided within four-and-a-half hours costs AUD $3639 more per life year saved and AUD$2262 more per quality adjusted life year gained, than standard care. This is far below the commonly used threshold for societal willingness to pay for additional health benefits, of about $50 000 per quality adjusted life year gained.

\( a \) Costs have been adjusted to 2014 equivalents of those originally published, using the health price index, published by the Australian Institute of Health and Welfare. The original costs were from the North East Melbourne Stroke Incidence Study (NEMESIS) in 1997.
Quality statement 3 – Stroke unit care

A patient with stroke is offered treatment in a stroke unit as defined in the 
Acute stroke services framework.²

Why is this important?
The term ‘stroke unit’ refers to a dedicated area within a hospital that ensures specialist, 
multidisciplinary management of people who have experienced a stroke. Patients in a stroke unit are 
cared for by health professionals specially trained in treating patients with stroke. Stroke units have 
evidence-based procedures for assessment, early management and ongoing rehabilitation of patients.³⁰ There is consistent evidence that 
patients with stroke treated in stroke units have better outcomes than patients with stroke not 
treated in stroke units.³¹

All adults with stroke benefit from stroke-unit care, regardless of age or whether the stroke is ischaemic or haemorrhagic.³²

What is current practice?
It is recommended that patients with stroke be treated in a stroke unit.¹ While many patients with 
stroke currently receive stroke unit care, there is still underuse, even when a hospital has this facility. 
Approximately 67% of patients in Australia with a stroke are treated in a stroke unit.⁶ Only 39% of patients with acute stroke spend most of their admission in a stroke unit.⁵

Even in hospitals with stroke units, patients are not always admitted directly to a stroke unit. There is 
some evidence that a lack of capacity is not the reason. The 2015 National Stroke Audit of acute 
services found that 32% of patients with stroke, in hospitals with a stroke unit, were admitted to other 
wards despite the availability of stroke unit beds.⁵

Compared to patients with ischaemic stroke, patients with haemorrhagic stroke are less 
often admitted to stroke units (34% versus 26%, respectively) and are more likely to be admitted to 
tensive care or high dependency units.³³ However, as a consequence, it appears that patients with 
haemorrhagic stroke often have less access to allied health care and other important aspects of 
care.³³

What could be achieved?
Compared with an alternative acute management ward, care provided in a stroke unit provides:

- 13% reduced odds of death (OR=0.87, 95% CI 0.69 to 0.94)
- 22% reduced odds of death or institutionalised care (OR 0.78, 95% CI 0.68 to 0.89)
- 21% reduced odds of death or dependency (OR 0.79, 95% CI 0.68 to 0.90).

There is evidence that stroke units are cost effective when compared to conventional care, where a 
cost-effective intervention is defined as one that provides a quality-adjusted life-year gain at a cost 
of $50 000 or less.²⁸,²⁹ Compared with general ward care, care provided in a stroke unit costs 
about $2128 more³⁴ per disability-adjusted life-year recovered (DALY).³⁴ In other words, every year of life 
free of disability gained by a patient managed in a stroke unit instead of a general medical ward, costs 
an additional $2128.

b Cost has been adjusted to 2014 equivalent of that originally published, using the health price index published by the Australian Institute of Health and Welfare. The original cost was from 1997.
Where health systems have been redesigned to increase access to stroke units in Australia, similar benefits have been reported to those found in controlled clinical trials. Compared with a time period before a system redesign in metropolitan New South Wales, patients who had a stroke after the redesign were more often admitted directly to a stroke unit (71% versus 13%) and more often received care in a stroke unit (81% versus 16%). These patients also had 27% reduced odds (OR 0.73; 95% 0.57 to 0.94) of having a disabling outcome at discharge from hospital.

The redesign also resulted in more patients receiving evidence-based clinical care such as medicines to prevent recurrent strokes, diagnostic imaging, and assessment and rehabilitation with allied health professionals. Similar benefits have also been found in rural locations, with a contributing factor being the employment of dedicated clinical stroke care coordinators to establish clinical pathways and the stroke unit infrastructure.

Further improvements in care provided in stroke units are attainable. In the Quality in acute stroke care study, a new nurse-led protocol for the management of fever, hyperglycaemia and swallowing dysfunction on stroke units reduced the risk of death or dependency at 90 days after admission.
Quality statement 4 – Early rehabilitation

A patient’s rehabilitation needs and goals are assessed by staff trained in rehabilitation within 24-48 hours of admission to the stroke unit. Rehabilitation is started as soon as possible, depending on the patient’s clinical condition and their preferences.

Why is this important?

After a stroke, many patients have impairments in their mobility, vision, swallowing ability, communication, and their ability to think and feel. Stroke rehabilitation therapies improve recovery from these impairments, and help patients regain their ability to perform usual activities of daily living and participate in everyday life. Typically, rehabilitation is provided by a multidisciplinary team that includes doctors, physiotherapists, nurses, speech therapists and occupational therapists. Other health professionals involved in stroke care may include dietitians, psychologists, pharmacists and therapy assistants.

What is current practice?

It is recommended that patients with stroke are mobilised early (e.g. out-of-bed activities, such as sitting, standing and walking) and that therapy for dysphagia is offered as early as tolerated. Despite these recommendations, there is evidence from observational studies across Australia that patients have limited contact with therapists (e.g. physiotherapists, speech therapists, occupational therapists) in the first 14 days after stroke.

According to the 2013 national clinical audit of 124 hospitals, approximately:

- 65% of patients were assessed by a speech pathologist within 48 hours
- 56% had their swallow function checked within 24 hours
- 83% were assessed by an occupational therapist.

The majority of hospitals provide physiotherapist services (97%) and 92% of patients with stroke are assessed by a physiotherapist. While the 2015 audit found that only 68% of patients with stroke were assessed by a physiotherapist within 48 hours of admission, 82% began some form of rehabilitation therapy within 48 hours of the initial assessment.

Early assessment and initiation of mobilisation activities following stroke is important to help minimise the risk of complications. However, the optimal frequency and intensity of mobilisation activities is yet to be established. In a large, randomised, controlled trial, very early and intensive mobilisation resulted in worse outcomes at three months after stroke than usual care, which consisted of early but less intensive mobilisation. Both groups mobilised within a few days, with 98% and 93% of patients in the very early and usual care groups, respectively, starting out-of-bed activities within 48 hours. Rates of serious complications related to immobility were low for both groups (less than 6% in each group). The findings support mobilisation within a few days of stroke, but more research is required to determine optimal ‘dosing’ (type of activity, frequency and intensity) for out-of-bed activity.
What could be achieved?

Assessment and treatment with physiotherapists, speech therapists and occupational therapists are considered clinical best practice, and the National Stroke Audit suggests there is scope to improve the initiation of these. From a practical perspective, the earlier the assessment occurs, the more likely it is that rehabilitation therapy can begin within the hospital stay, when appropriate for the individual patient. In Australia, models of stroke unit care vary and there is some evidence that stroke units with a rehabilitation focus provide more physiotherapy and occupational therapy per day (60 minutes versus five minutes, p<0.001) and have more patients returning directly home, than acute stroke units without a focus on rehabilitation.45

Speech therapy provided during the hospital stay has been shown to reduce the severity of communication problems in patients with speech impairments following stroke.46 However there are few studies that have quantified the benefit of these services for patients with stroke when these services are provided within 24-48 hours.
Quality statement 5 – Minimising risk of another stroke

A patient with stroke, while in hospital, starts treatment and education to reduce their risk of another stroke.

Why is this important?
The risk of stroke recurrence is approximately 11% after one year, 26% after five years and 40% ten years after the first stroke. People who have had a stroke can reduce this risk by taking appropriate preventive medicines and by making lifestyle changes. There is evidence that starting therapies in hospital:

• is associated with better risk factor management in the short term after stroke
• promotes long-term adherence to medicines and better long-term outcomes.

Educating patients about the medicines and lifestyle changes that reduce their risk of stroke recurrence is likely to improve their adherence to recommended therapies.

Assessment of patients is necessary to determine their individual risk factors. The medicines recommended for the prevention of recurrent stroke depend on the type of stroke and whether the patient has atrial fibrillation (a condition causing an irregular heartbeat). Medicines recommended after an ischaemic stroke include those which:

• lower blood pressure (even if blood pressure is not elevated)
• prevent harmful blood clots (for example, aspirin, warfarin or newer oral anticoagulants)
• lower cholesterol.

Generally, patients with haemorrhagic stroke are recommended blood-pressure lowering (antihypertensive) medicines only.

In addition, all patients should be supported to make lifestyle changes that reduce the risk of recurrent stroke, including smoking cessation, reducing alcohol consumption, increasing physical activity levels, reducing weight if they are overweight and improving diet.

What is current practice?
Only 56% of patients receive education on risk factor modification while in hospital.

When discharged from hospital, 66% of eligible patients with haemorrhagic stroke are prescribed antihypertensive medicines, while 64% of eligible patients with ischaemic stroke are prescribed combined therapy with a cholesterol-lowering medicine, an antithrombotic medicine (either an anticoagulant or antiplatelet medicine to prevent blood clots, as appropriate) and an antihypertensive medicine.
What could be achieved?

Antihypertensive medicines reduce the odds of another stroke by 29% (OR 0.71, 95% CI 0.59 to 0.86) and cardiovascular events by approximately 31% (OR 0.69, 95% CI 0.57 to 0.85) in patients with stroke or transient ischaemic attack (TIA) compared with placebo.\textsuperscript{49} Cholesterol-lowering medicines reduce the odds of another cerebrovascular event by 22% (OR 0.78, 95% CI 0.67 to 0.92)\textsuperscript{50}, and antiplatelet medicines reduce the relative risk of vascular events by about 13% (95% CI 6% to 19%) in patients with ischaemic stroke, compared with placebo.\textsuperscript{51} In patients with non-valvular atrial fibrillation and ischaemic stroke, warfarin reduces the relative risk of a major disabling or fatal stroke by 62% (hazard ratio [HR] 0.38, 95% CI 0.18-0.81), compared with placebo.\textsuperscript{52} Newer oral anticoagulants may have further benefits in this regard.\textsuperscript{53}

The cumulative risk reduction from using a combination of these medicines may be substantial. There is limited direct evidence of the benefits of combination therapy in patients with stroke, but for patients with cardiovascular disease it has been estimated that a 75% relative-risk reduction in stroke, heart attack and death could be achieved with lifestyle modification and a combination of secondary prevention medicines.\textsuperscript{54, 55}

Education has also been shown to be effective for improving clinical outcomes in patients with heart disease, and so may be similarly effective for patients who have suffered stroke.\textsuperscript{56} In patients with heart disease, secondary prevention programs that included risk factor education and counselling, reduced the relative risk of all-cause mortality by 15% (relative risk 0.85, 95% CI 0.77 to 0.94), improved risk factor profiles, and improved the use of preventive medicines.\textsuperscript{56}
Quality statement 6 – Carer training and support

A carer of a patient with stroke is given practical training and support to enable them to provide care, support and assistance to a person with stroke.

Why is this important?
Many patients with stroke have carers who assist them with activities of daily living. In Australia, 74% of stroke survivors at three months required assistance with activities of daily living and received care from a family member or friend. A burden is associated with being a caregiver of a person who has had a stroke. Stroke survivor characteristics found to be associated with an increased burden on caregivers include older age, male gender, poor mental health and level of functional disability. A lack of support is also associated with an increased burden on caregivers.

What is current practice?
Guidelines recommend that the caregiver of a person with stroke be provided with practical training on how to provide care, support and assistance for the patient, before they leave hospital. In Australian hospitals in 2015, 59% of carers received a support needs assessment and 48% received training.

What could be achieved?
There is evidence that providing training to caregivers helps. In a UK study, caregivers who were provided training had better quality of life and less often had anxiety or depression compared with caregivers who were not trained. Stroke survivors cared for by trained caregivers were also less often anxious or depressed. Total health and social cost savings from caregiver training was estimated to be GBP4043 at one year after stroke.

Further research on interventions to reduce caregiver burden is needed, particularly in the Australian context. There is some recent evidence that caregiver training does not improve quality of life and mood impacts of caregivers, and is not cost-effective compared with standard care. Investigators should consider the timing of training and individualising training when designing new interventions to support and reduce the impacts of caregivers of stroke survivors.
Quality statement 7 – Transition from hospital care

Before a patient with stroke leaves the hospital, they are involved in the development of an individualised care plan that describes the ongoing care that the patient will require after they leave hospital. The plan includes rehabilitation goals, lifestyle modifications and medicines needed to manage risk factors, any equipment they need, follow-up appointments, and contact details for ongoing support services available in the community. This plan is provided to the patient before they leave hospital, and to their general practitioner or ongoing clinical provider within 48 hours of discharge.

Why is this important?

There is evidence that many patients could be provided better care once they are discharged from hospital. Many patients with stroke are not prescribed medicines that may help to prevent another stroke and often they have poorly controlled risk factors. In addition, many patients report having unmet needs.

An individualised care plan, which is developed with the patient while in hospital, may improve continuity of care once the patient returns to the community. This is different to a discharge letter used to notify a patient’s general practitioner of the stroke event and hospitalisation. It is recommended that patients discuss their individualised care plan with their general practitioner once they are discharged from hospital.

General practitioners and patients are encouraged to review these plans periodically. The plan typically includes information on risk factors, equipment required, and contact details of community support services.

What is current practice?

Guidelines recommend that an individualised care plan be developed in conjunction with the patient and their family or carer. A copy of this is then sent to the patient’s general practitioner. According to the 2015 National Stroke Audit of acute services, approximately 56% of patients with stroke received an individualised care plan.

What could be achieved?

Individualised discharge planning reduces the length of stay by about 9% and the relative risk of readmission by 18%, compared with routine discharge care not tailored to the individual patient.

Organisational interventions to improve secondary prevention of stroke, including individualised care plans, have been tested in only a few clinical trials, which have involved relatively small numbers of patients with stroke. These studies have used varied approaches and have demonstrated benefits for lowering blood pressure and promoting lifestyle change, but not for reducing the risk of cardiovascular disease. However, there is evidence from economic modelling that individualised care for the management of blood pressure and lifestyle risk factors in patients with stroke is cost effective, with the median cost per quality adjusted life year gained between $2258 and $5865.

There is, however, related evidence for patients with heart disease that secondary prevention programs and interventions, including individualised care plans, can increase the use of preventive medicines and reduce risks of recurrent heart attacks, hospitalisations and mortality rates. As patients with stroke have similar risk factors and treatment goals as patients with heart attack, the use of individualised care plans are likely to have similar benefits.
Antihypertensive: A medicine that reduces blood pressure.70

Atrial fibrillation: A condition where the heart beats irregularly. The heartbeat is outside its usual rhythm and is often faster than normal.70

Care plan (individualised): A written agreement between a consumer and health professional (or social services) to help manage day-to-day health.71 This information is identified in a health record.

Carer: A person who provides unpaid care and support to a family member or friend who has a disease, disability, mental illness, chronic condition, terminal illness or general frailty. A carer includes a parent or guardian caring for a child.72

Clinician: A healthcare provider, trained as a health professional. Clinicians include registered and non-registered practitioners, or a team of health professionals providing health care who spend the majority of their time providing direct clinical care.72

Face, Arm, Speech and Time (F.A.S.T.) test: A test used to screen for the diagnosis of stroke or transient ischaemic attack.73

First contact: The time when the person with stroke symptoms first encounters someone who can help. This can be a member of the community, a clinician, or a carer.

Haemorrhagic stroke: A type of stroke caused by bleeding from a ruptured artery (or other blood vessel) in the brain or its surrounding.3

Health record: Information about a patient held on paper or electronically. The health record may be made up of clinical records (such as medical history, treatment notes, observations, correspondence, investigations, test results, photographs, prescription records, medication charts), administrative records (such as contact and demographic information, legal and occupational health and safety records) and financial records (such as invoices, payments and insurance information).72

Health service: A service responsible for the clinical governance, administration and financial management of units providing health care. A service unit involves a grouping of clinicians and others working in a systematic way to deliver health care to patients, and can be in any location or setting, including pharmacies, clinics, outpatient facilities, hospitals, patients’ homes, community settings, practices and clinicians’ rooms.72

Hospital: A licensed facility providing healthcare services to people for short periods of acute illness, injury or recovery.74

Individualised care plan: See care plan.

Ischaemic stroke: A type of stroke due to a reduced or blocked supply of blood in the brain, typically due to a clot.3

Medicine: A chemical substance given with the intention of preventing, diagnosing, curing, controlling or alleviating disease, or otherwise improving the physical or mental welfare of people. Prescription, non-prescription and complementary medicines, irrespective of their administration route, are included.75

Multidisciplinary team: The team of multiple professionals looking after a patient, made up of doctors, nurses, therapists, social workers, psychologists and other health personnel.1

Rehabilitation: Restoration to optimal physical and psychological functional independence of a person with a disability.1

Reperfusion treatments: Treatments that restore blood flow (and therefore oxygen supply) to an area of the brain that has been deprived of blood flow for a period of time. An example is intravenous thrombolysis (a blood clot-dissolving medicine given into a vein).

Risk factor: Any variable (e.g. smoking, obesity) that is associated with a greater risk of a health disorder, or other unwanted condition or event.1
**Stroke:** Sudden and unexpected damage to brain cells that causes symptoms that last for more than 24 hours in the parts of the body controlled by those cells. Stroke happens when the blood supply to a part of the brain is suddenly disrupted, either by blockage of an artery (ischaemic) or by bleeding within the brain (haemorrhagic).

**Stroke unit:** Co-located beds within a geographically defined unit that is staffed by a dedicated, multidisciplinary team who specialise in stroke management, meet once a week to discuss a patient’s care, and receive regular programs of staff education and training related to stroke.

**Transient ischaemic attack:** Stroke-like symptoms that last less than 24 hours. While TIA is not actually a stroke, it has the same cause. A TIA may be the precursor to a stroke, and people who have had a TIA require urgent assessment and intervention to prevent a stroke.

**Thrombolysis:** Emergency blood clot-dissolving (or ‘clot-busting’) medicine for a heart attack or stroke, used to restore blood flow (reperfusion).

**Validated screening tool:** A tool that has been shown to accurately and rapidly help identify people with a certain medical condition. Examples of validated stroke screening tools include the Face, Arm, Speech, Time (F.A.S.T.) test, the Melbourne Ambulance Stroke Screen (MASS) and the Recognition of Stroke in the Emergency Department (ROSIER) tool.
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