ACCESS TO MECHANICAL THROMBECTOMY IN AUSTRALIA

WHITE PAPER
MARCH 2023

This White Paper has been developed in consultation with stakeholders across the health sector, and presents an evidence-based case for improving access for all Australians to mechanical thrombectomy.

Principal partner

This White Paper has been developed in consultation with leading Australian stroke clinicians and researchers, and endorsed by the following organisations:

Acute Stroke Nurses Education Network ltd

Australasian Stroke Academy

Australian College of Nurse Practitioners

Australian Healthcare & Hospitals Association

Australian Stroke Alliance

Medtronic

Neurological Intervention & Imaging Service of Western Australia

Royal Flying Doctor Service

The Australian and New Zealand Society of Neuroradiology

KEY RECOMMENDATION

To improve access to lifesaving stroke treatment, the federal government should establish a **Mechanical Thrombectomy Advisory Committee** to develop a draft **National Strategy for Mechanical Thrombectomy.**

This committee should include representation from all relevant stakeholders including state and territory governments, in collaboration with the Department of Health and Aged Care.

THE ISSUE

38,600
stroke events recorded in 2018

Annual economic cost of stroke:
$6.2 B

8,700
stroke related deaths in 2020

Rural and regional:
double the chance of lifelong disability

MECHANICAL THROMBECTOMY

Cuts mortality by
17%
at 90 days

<7%
of ischaemic strokes treated with MT

Almost half functional at 90 days
(compared to clot-buster meds: 13% functional at 90 days)

2,194 patients treated with MT
saved the health system
$22.5 M
in one year

EXECUTIVE SUMMARY

Acute stroke is a leading cause of death and disability in Australia. Patient outcomes following a stroke are often poor, and carry a heavy burden for individuals, their families and the systems providing ongoing health and social support. Overall, the burden of disease of stroke is estimated to be around A$6,2 billion in direct financial costs and a further A$26 billion in lost wellbeing and premature mortality.[1]

Approximately 80-85 per cent of strokes are caused by clots blocking blood vessels in the brain, these are ischaemic strokes.[2] Early restoration of blood flow to the brain is critical in the treatment of ischaemic stroke to improve outcomes for patients.

Thrombolysis has recently been proven to be beneficial in select patients up to nine hours post onset of stroke and remains an important stroke treatment for eligible patients.[3] However, in some stroke types it has limited effectiveness.

Mechanical thrombectomy[i], a treatment proven effective in 2015 and **pioneered by Australian clinicians**, is changing the landscape of stroke treatment globally. Mechanical thrombectomy is a minimally invasive surgical procedure using specialised retrieval devices, performed under image guidance (angiography), to quickly remove the clot from a patient's artery and restore blood flow to the brain, preventing further tissue damage.

Clinical trials show that it **dramatically improves outcomes for ischaemic stroke patients** with large vessel occlusion and reduces the significant social and economic cost of this condition.[4]

Clinical trials show that mechanical thrombectomy can substantially improve survival rates and functional outcomes following ischaemic stroke. The DAWN trial found that almost half of all stroke patients treated with mechanical thrombectomy were functionally independent at 90 days, compared to 13.1 per cent of the patients receiving standard medical care alone.[5] In fact, in 2018 the trial was terminated early based on these extraordinary results.

Other research has demonstrated that mechanical thrombectomy results in a **significant reduction in length of hospital stay** for stroke patients, **much lower inpatient costs**, and a **dramatically reduced need for ongoing nursing care**. This research is summarised below.

Given the tyranny of distance that we face in Australia, the initial 6-hour time window to perform mechanical thrombectomy meant that patients with stroke who lived in a regional or remote area were disadvantaged, as they had restricted, or no access, to this disability reducing intervention as it required the patient to be transferred to a comprehensive stroke centre, which are all located in metropolitan areas. In 2018 after the DAWN[6] and DEFUSE[7] clinical trials, the treatment window for mechanical thrombectomy was extended to 24 hours which opened up this treatment option to all patients regardless of their postcode in Australia.

The clinical evidence is clear – mechanical thrombectomy can save lives and prevent disability in ischaemic stroke patients with large vessel occlusions. However, **currently less than 7 per cent of ischaemic stroke patients in Australia receive this treatment**, with geographical proximity to a mechanical thrombectomy centre largely determining access.

i *Mechanical thrombectomy is also referred to in literature as endovascular clot retrieval, neurovascular embolectomy, stroke clot retrieval and percutaneous stroke intervention.*

In 2021, the Stroke Foundation reports that 2,194 patients were treated with mechanical thrombectomy. Budget impact analysis shows that treating this many patients with a combination of mechanical thrombectomy and thrombolysis, versus standard care, would have **saved the Australian health system A$22.5 million in the first year alone**; and will generate **A$36.0 million in savings over a five-year period** for the same cohort.[ii]

The issues with improving access are complex and include a number of inter-related barriers operating at individual, service, and systems levels. Overcoming these challenges requires a coordinated approach from all stakeholders, including state governments, peak bodies, clinical groups, consumers and industry, with leadership and support from the federal government.

Currently some states have protocols for the use of mechanical thrombectomy within their jurisdictions[8,9,10] but these are inconsistent and leave gaps in access across the Australian population.

The Australian Government's *National Strategic Action Plan for Heart Disease and Stroke* recommends the development of a national strategy to address this issue. This strategy is urgently needed to increase access to this life-saving treatment and reduce the individual and societal costs of stroke on our community. This White Paper aims to advance the development of a national approach to mechanical thrombectomy and recommend key next steps towards its development.

This white paper should be considered within the context of the broader recommendations of the Action Plan, which provides a comprehensive plan of action for all issues affecting heart and stroke.

The development of a **National Strategy for Mechanical Thrombectomy** would support and supplement the recommendations in this White Paper and can occur alongside the implementation of these broader measures to prevent and treat heart and stroke conditions in Australia.

From The British Medical Journal[5]:

"Everything changed with the publication, in rapid succession, of nine landmark randomised controlled trials, testing new-generation stent retriever devices (between December 2010 and February 2015), which showed the consistently clear superiority of [mechanical thrombectomy] over standard medical care alone in reducing disability at 90 days in patients with ischaemic stroke."

"It's efficacy is unmatched by any previous therapy in stroke medicine, with a number needed to treat of less than 3 for improved functional outcome. With effectiveness shown beyond any reasonable doubt, the key challenge now is how to implement accessible, safe and effective mechanical thrombectomy services."

KEY RECOMMENDATION

To improve access to lifesaving stroke treatment the federal government should establish a **Mechanical Thrombectomy Advisory Committee**, with representation from all relevant stakeholders including state and territory governments, to develop a draft **National Strategy for Mechanical Thrombectomy** in collaboration with the Department of Health.

ii *Based on a Budget Impact Analysis undertaken by the Strokenomics Centre – Health Economics Department of Stryker Neurovascular, using published data from EXTEND-IA, Campbell et al. 2017;, Tanny et al. 2013; and Gloede et al. 2014.*

BACKGROUND

WHAT IS ACUTE STROKE?

A stroke is an interruption of the blood supply to the brain, either due to a vessel blockage (ischaemic stroke) or a bleed (haemorrhagic stroke). In either case, brain tissue is prevented from getting oxygen and nutrients and cells begin to die in minutes.

The condition is both common and can be catastrophic. Stroke is Australia's third leading cause of death, and a leading cause of disability. While there are no national data sources on the annual number of strokes, the Australian Institute of Health and Welfare (AIHW) estimated that there were 38,600 stroke events in 2018 – more than 100 every day. The AIHW also estimate that the proportion of people who have disability resulting from stroke is around 40 per cent.

Recent reports[11] prepared for the Stroke Foundation by Deloitte found that in 2020:

- There were an estimated 8,700 deaths due to stroke in 2020.
- An estimated 27,428 Australians experienced stroke for the first time in their lives (1 every 19 minutes).
- There were an estimated 445,087 survivors of stroke living in the community.
- The economic cost of stroke exceeded $6.2 billion, with a further $26.0 billion in lost wellbeing - due to short and long-term disability, and premature death.
- People living outside of metropolitan areas are 17 percent more likely to suffer a stroke than those living in cities.
- By 2050, it is estimated that there will be 819,900 survivors of stroke in Australia with 50,500 cases and 19,800 deaths.

Acute ischaemic stroke

Ischaemic stroke accounts for the vast majority (80-85 per cent) of all strokes in Australia. Between 24 and 46 per cent of all ischaemic strokes are due to large vessel occlusions (LVO),[12] severe strokes that restrict blood flow to large portions of the brain. Mechanical thrombectomy is now gold standard treatment for these types of strokes.

Based on the above data, there are between 7,411 and 15,092 ischaemic strokes caused by LVO in Australia every year.

The prognosis for patients who suffer an ischaemic stroke due to LVO is poor – LVOs cause a little more than one-third of acutely presenting acute ischaemic stroke (AIS) but are responsible for three-fifths of dependency and more than nine-tenths of mortality after AIS.[13]

Treatment

For every minute an LVO is left untreated, the average patient loses 1.9 million neurons, 13.8 billion synapses, and 12 km of axonal fibers.[14]

Reducing the time between stroke onset and blood flow restoration dramatically improves survivability and reduces the risk and severity of disability. Physical removal of the clot (mechanical thrombectomy) restores blood flow quickly and therefore minimizes the damage to brain tissue.

MECHANICAL THROMBECTOMY

Using minimally invasive surgical techniques under image guidance (angiography), neurointerventionists use specialised equipment to quickly remove the clot from a patient's artery and restore blood flow to the brain, preventing further tissue damage.

Mechanical thrombectomy is a relatively new procedure and has dramatically changed the expectations and possibilities around outcomes for people experiencing stroke.

From the Stroke Foundation, 2019:

"... [mechanical] thrombectomy for large vessel occlusion is one of the most potent therapies in modern medicine, but this intervention is only available at a limited number of [comprehensive stroke centres]. Finely tuned coordination of multiple systems (the ambulance service, medical retrieval service, emergency department (ED), radiology department, stroke and neurointervention teams) is required to improve access to reperfusion therapy and reduce treatment delays."[15]

Clot retrieval

Clinical outcomes

The benefits of mechanical thrombectomy were first recognised through the publication of five landmark clinical trials in 2015, which found significant improvements in patient outcomes.[16] Since that time, research has continued to report positive clinical outcomes associated with mechanical thrombectomy + standard care versus standard care alone, including:

- **Reduced risk of mortality** by 17 per cent at 90 days,[17] which modelling suggests would achieve a sustained and **statistically significant mortality benefit** up to 15 years post-treatment, with associated benefits in disability-adjusted life years (DALY) and quality-adjusted life years (QALY).[18]
  - A substantially greater **level of disability** in the standard medical treatment only group compared to the mechanical thrombectomy group,[18]
- **Improved functional outcomes** and chance of functional independence at 90 days,[18]
- The DAWN trial (published 2018) found that **almost half of all stroke patients treated with mechanical thrombectomy were independent at 90 days**, compared to 13.1 per cent of the patients treated medically – a difference of 35 per cent.5 This trial was completed early based on overwhelming efficacy. However, these findings may not be generalizable to the real-world patient population as this trial had very strict inclusion criteria.
- A significant reduction in length of hospital stays:[18]
  - Acute stroke unit stays reduced by an average of four days (from 12 to 8 days),
  - Rehabilitation stays in survivors reduced by an average of 19 days (33 days to 14 days).
- The DEFUSE 3 trial demonstrated that mechanical thrombectomy + standard medical therapy for ischaemic stroke 6 to 16 hours after a patient was last known well resulted in better functional outcomes than standard medical therapy alone.[19]
- **Reduction in inpatient costs** at 90 days (average US$4,365 per patient treated with mechanical thrombectomy vs thrombolysis alone),[18]
- More thrombolysis patients (5 of 35) required **ongoing nursing care**, compared to 0 of 35 mechanical thrombectomy patients.[18]

Avoiding premature death and minimising disability means people can live independently in the community, have reduced reliance on care and social support systems, return to work and/or family commitments, and enjoy basic functions like speech, unassisted eating, and self-care.

UNDERUTILISATION OF MECHANICAL THROMBECTOMY

Despite demonstrating significant clinical and cost benefits, mechanical thrombectomy remains significantly underutilised in Australia.

According to the Stroke Foundation, there were **2,194** patients treated using mechanical thrombectomy in 2021.[20] This means that **less than 7 per cent of people suffering an ischaemic stroke, and between 15 and 30 per cent of people with a LVO, were treated with mechanical thrombectomy.**

Initially, the procedure was limited to patients within a six-hour timeframe. Since that time, the treatment window extended to 24 hours after stroke onset, depending on stroke severity and amount of salvageable brain tissue. In theory, this should allow more patients to be treated, and there has been a gradual increase in cases treated with mechanical thrombectomy in Australia. However, the translation of this evidence into practice has been ad hoc across the country.

As a result, the vast majority of patients suffering an ischaemic stroke are still not receiving appropriate treatment.

Case study

Kate

"If you saw me, you'd never know that I've had a stroke".

It has been six years since Kate, 40, experienced a stroke in regional Victoria. The treatment she received in the precious hours that followed demonstrates how fortunate Kate was to be close to brain scanning and that a helicopter was available to fly her to a major tertiary hospital.

A radiographer at Hamilton Base Hospital, Kate had been at work when she received a call to pick up her son from day care. On arrival, Kate collapsed and was unable to use her right side or talk. She was conscious though and understood all that was going on.

The day care staff called triple zero immediately and Kate was taken back to her workplace. Stroke protocols kicked in and Kate was taken straight for a CT brain scan. Local doctors spoke to a stroke specialist in Melbourne who had seen her brain scans via telehealth. The decision was made to helicopter Kate to Melbourne.

The stroke happened at 9:30am and Kate arrived in a Melbourne hospital at 2:10pm. She was wheeled into room and intubated before mechanical thrombectomy was performed to remove the clots. At 5:30pm Kate woke up and could speak and move again. She spent three nights in hospital before going home.

Her recovery has been remarkable, so much so that she describes herself as being "absolutely fine". However, she realises she how lucky she was to receive co-ordinated, urgent pre-hospital care. This fast response and urgent treatment made a lifelong difference.

BARRIERS AND INEQUITABLE ACCESS TO TREATMENT

The challenges to delivering this time-critical treatment are complex. Some key barriers to providing greater access to mechanical thrombectomy are outlined below. In many cases, these barriers do not operate in isolation, but intersect with each other and operate across geographic, clinical and service boundaries. They therefore need to be addressed through a coordinated and integrated strategy.

1. Geographic access to services

Providing a high-quality mechanical thrombectomy service 24 hours a day, seven days a week requires the centralisation of highly specialised equipment and expertise in areas with the patient population to sustain expertise, enable viable models of service and foster quality care. It is generally accepted that low-volume mechanical thrombectomy services in more sparsely populated areas are not feasible.

At present, Australia has 21 stroke centres providing mechanical thrombectomy, all of which are located in public hospitals in major cities.

While there are robust protocols in some states, these services have been established without national coordination or planning. As a result, there are gaps in their coverage and some populations do not have access to these services or only have access at specific times.

● Stroke unit with mechanical thrombectomy

Impact on rural communities

The burden of stroke is higher for people in rural Australia, who are 17 per cent more likely to suffer a stroke. This increased risk is exacerbated by the fact that geographic access to time-critical stroke treatment is limited, and often reliant of air transfer.[11]

Imaging and diagnosis: Patients require diagnosis confirmed on CT imaging before stroke treatment can commence. This step is essential, but CT facilities are not always available, particularly in rural and remote communities.

More than half of all strokes occur outside of business hours, so having around-the-clock access to imaging specialists and services is essential for diagnosis and treatment.

Due to their smaller populations, many rural communities do not have the necessary diagnostic infrastructure to manage stroke locally, nor have stroke units or specialised stroke teams. These communities rely on locally available health expertise (such as rural GPs, emergency doctors and nurses/nurse practitioners) to recognise the signs of stroke and initiate stroke care. It is vital that health care providers in rural and regional areas are aware of the recent research extending the 'treatment window' for mechanical thrombectomy to 24 hours and base their selection of patients for transfer on this evidence as well as the patient's overall presentation and individual suitability for transfer and treatment. They must also be empowered to navigate the process for transferring eligible patients for treatment.

These sites benefit from being networked with (and remotely connected to) nearby stroke teams through telehealth services.

Rapid transfer for treatment:

Even if a rural patient is correctly diagnosed at their referring hospital and deemed suitable for mechanical thrombectomy, they may not be able to access treatment due to lack of access to retrieval and transfer services.

Access to these services is crucial for improving stroke outcomes in rural Australia, particularly given the higher incidence of stroke and risk factors for stroke such as obesity. Not all stroke patients are suitable for immediate long inter-hospital transfers, especially aeromedical retrievals/flights; for the safety of the patient and the transferring team, some patients will require specialist procedures, such as intubation and mechanical ventilation prior to transfer. These necessarily delay urgent transfers.

The Royal Flying Doctor Service (RFDS) of Australia provide most aeromedical retrievals for rural communities in Australia. In a four-year period – from July 2014 to June 2018 – the RFDS retrieved 1,773 patients with suspected stroke, with an average retrieval distance of 291km (ranging from 211km to 500km) and transfer time of four hours.[21]

Since the expansion of the treatment window to 24 hours in 2018, there have been some long-haul transfers undertaken to deliver patients for treatment, for example from Darwin to Adelaide (3,000km), and from Townsville to the Gold Coast (1,500km) noting that Townsville has recently established a stroke centre capable of delivering mechanical thrombectomy.

At present, aeromedical retrieval sites often do not have access to diagnostic imaging, thus limiting their ability to diagnose stroke, commence in-flight treatment and redirect patients to an appropriate stroke centre for treatment.[21]

Figure 2: Australian aeromedical retrievals for stroke and receiving Stroke Unit locations, 1 July 2014 to 30 June 2018. *Source: Royal Flying Doctor Service, 2020*

2. Lack of coordinated planning and treatment pathways

The successful delivery of mechanical thrombectomy requires a **clear care pathway from stroke onset to treatment**. This pathway crosses several health system areas (such as retrieval services, ambulance, and various in-hospital teams) as well as local and state boundaries.

Currently there are critical gaps across the system. Each component is interconnected, and there are opportunities for better efficiency and streamlining at every stage of the pathway to expediate treatment and improve outcomes.

Dedicated planning, coordination and cooperation across the entire stroke care pathway is needed to optimise the system, including pre-hospital (e.g., triage) and in-hospital (e.g. protocols to reduce ED presentation-to-needle time and door in – door out times).

State-wide strategic and service planning has been effective in some states at increasing access to mechanical thrombectomy, particularly for rural and regional patients. While some states and territories have well-established stroke strategies, such as Victoria[8] and Western Australia, not all jurisdictions have plans or networks in place to facilitate rapid access to mechanical thrombectomy.

While there are some transfer agreements between specific regions, such as Victoria-Tasmania, ACT-NSW Alice Springs-Adelaide, there is also no nationally coordinated strategy to coordinate the transfer of patients across state/territory boundaries. Given the breadth of stakeholder groups who play a role in facilitating timely access to stroke diagnosis and treatment, and lack of central coordinating body within the sector, government has an important role to play in facilitating the collaboration needed to develop a national plan for mechanical thrombectomy.

Without coordinated service planning at state and federal levels, patients receive different treatment and a different outcome following a stroke, depending on where they live.

3. Lack of workforce planning and support

Mechanical thrombectomy is a relatively new treatment and awareness of its availability and benefits remains low among the general medical workforce. As many stroke patients first present to their GP or are attended by ambulance paramedics, it is critical that these health professionals are able to rapidly identify and assess stroke symptoms to determine the most appropriate course of action. This may require education about stroke and mechanical thrombectomy across all health professionals likely to encounter stroke patients.

The delivery of the treatment itself requires a highly specialised multidisciplinary team to be available during the day and after hours.

Modelling is needed to map this workforce against stroke incidence and service capacity, as such planning would be valuable to ensure that Australia has a fit-for-purpose workforce ready to meet the projected increase in demand for stroke treatment.

The development of dedicated training programs, as well as quality improvement resources to help individual specialists and hospitals audit and improve practice and outcomes (such as a national clinical registry), to support high quality care should be explored.

4. Service delivery & funding models need to evolve

For hospitals, offering a 24/7 mechanical thrombectomy service typically requires a significant commitment of both funding and resources. Unlike elective procedures, mechanical thrombectomy is an emergency procedure requiring on call rostering. There is a capital cost associated with the equipment required, large running costs to maintain a 24/7 service, and resources required to train sufficient numbers of medical specialists and multidisciplinary team members.

Without adequate funding, these services operate with minimal staff and the demands of delivering 24/7 acute care has significant flow on effects for in-hours service delivery due to staff fatigue.

Mechanical thrombectomy has been shown to be cost effective (explored further over page). However, the largest savings achieved from this treatment are realised beyond the hospital walls. Real value is seen in the areas of disability care, rehabilitation, use of social support and health services, the ability for patients to return to work and contribute to their communities and the economy. The hospital providing the treatment may not receive any financial benefit, and in fact may be financially disadvantaged if improved outcomes result in shorter lengths of stay (depending on the funding model in place).

New models of funding, which reimburse for treatment based on value and patient outcomes, should be explored for mechanical thrombectomy to ensure hospitals are not financially disincentivised or penalised for providing this life-saving treatment to patients.

Case study

Western Australia's State-wide Service

Western Australia has a dedicated state-wide neurointervention and neuroimaging service (NIISWA). This service provides a 24/7 neurointervention service, including stroke treatment, across three large hopsitals located in Perth. In 2019, NIISWA delivered mechanical thrombectomy to around 300 patients from across the state.

NIISWA operates based on the following principles:

- High-volume operators performing large numbers of diffferent intracranial endovascular procedures, including mechanical thrombectomy,
- A dedicated, specialised team of neurointerventionists, diagnostic neuroradiologists, radiographers, nurses and support staff are available 24/7,
- 24/7 cover for general anaesthetic,
- Close liaison with ICU,
- Hands-on triage of acute stroke patients, and direct contact with ambulance services, RFDS and emergency department staff. This allows rapid and reliable transfer with efficient use of anaesthetic resources and staff,
- Treating neurointerventionists review each case, interpret CT findings, consider co-morbidities and coordinate transfer logistics for every stroke patient with a suspected LVO,
- Close liaison and ongoing teaching with ambulance services to triage severe strokes, and direct appropriate patients directly to the relevant hosptial capable of delivering mechanical thrombectomy,
- Protocols and streamlined pathways for assessment and diagnosis for all patients, based on intial triage and Rapid Arterial aCclusion (RACE) score,
- Ongoing measurement and audit of performance metrics and patient outcomes,
- Quality improvement processes, including mortality and morbidity reviews,
- Participation in research and clinical trials; publication in peer-reviewed journals

THE ECONOMIC CASE FOR CHANGE

Strokes resulting in premature death or lifelong disability impose a high cost on individuals, the community, and the economy. Every year, stroke costs the Australian economy an estimated A$6.2 billion with a further A$26 billion lost wellbeing due to long term disability and death.[1] In 2020, the federal government bore the greatest financial and economic burden at A$2.5 billion due to lost productivity and the cost of services provided by the federal government.[1]

Stroke is not a disease of the elderly. One in five strokes occur in people aged 60 and under, who are of working age. Around half of all stroke survivors are disabled enough to decrease their employment, and 65 per cent of people who survive a stroke sustain a disability that impedes their ability to carry out activities of daily living unassisted.[22]

In 2021, treating 2,194 patient with mechanical thrombectomy saved the Australian health system an estimated $36 million in direct medical costs over 5 years.

Cost-benefit and economic outcomes

Mechanical thrombectomy has been repeatedly found to be cost-effective in Australia[4] and internationally.[23] Efficiency allows the decision-maker to be guided in the selection of a strategy for maximum collective benefit. As efficiency does not guarantee funding sustainability, a budgetary impact analysis was undertaken specifically for the Australian context.

This analysis of the budget impacts of mechanical thrombectomy + thrombolysis, compared to thrombolysis alone, found that by treating **2,194 patients with mechanical thrombectomy** in 2021, the Australian health system saved an estimated **A$22.5 million in that year alone**. Over 5 years, **an estimated A$36.0 million will be saved for the same cohort of patients** due to better patient outcomes leading to reduced long-term expenditure (ongoing rehabilitation, disability support and healthcare).[ii]

If the number of patients treated with mechanical thrombectomy were to increase, so too would the savings. Modelling shows that **treating 10 percent of ischaemic strokes (approximately 3,185 patients) with mechanical thrombectomy** would deliver **savings of A$32.7 million in the first year alone**; and **A$52.2 million over 5 years**.[ii]

After careful evaluation of the clinical efficacy and cost benefits of mechanical thrombectomy, the Medical Services Advisory Committee (MSAC) recommended that the procedure be listed on the Medicare Benefit Schedule (listing took place in November 2017). This was based on MSAC's finding that mechanical thrombectomy is cost-effective both in the short- and long-term.[24]

Case study

Bill

Bill suffered a stroke during the night. Despite his wife's, fast action, Bill was in a remote location in Western Australia and treatment was tragically slow.

When Bill suffered a stroke at 1.30am, his wife Denise called triple zero immediately.

He arrived at the local regional hospital by ambulance within 20 minutes. When they arrived, Denise asked the young doctor if he thought Bill had experienced a stroke. After a call to Perth, the doctor said he thought it was a stroke but because they couldn't determine whether the stroke was caused by a clot or a bleed, hospital staff could not provide treatment. Bill was paralysed and in very poor shape. He was made comfortable and left in a dark room to wait for the morning when it was planned to transfer him to another hospital.

Denise recalls the fear of not knowing if Bill would make it through the night.

In the morning Bill's condition had not improved. The doctor arranged for him to be transported to Bunbury hospital, 45 minutes away. He was assessed, scanned, and transferred to the Royal Perth Hospital.

In a devastating blow, Bill was told he would never be able to walk or talk again. He was determined this would not be the case.

He and Denise moved to Perth for a year so he could access the rehabilitation he needed. He worked incredibly hard on his rehabilitation and can now walk but has trouble with his memory and finding words. Bill will never be able to return to work.

THE SOLUTION: A NATIONAL STRATEGY FOR MECHANICAL THROMBECTOMY

Getting the right treatment shouldn't be a stroke of luck.

The Australian Government's *National Strategic Action Plan for Heart Disease and Stroke* adopted in 2020 recommends the development of a national strategy for mechanical thrombectomy. This strategy is urgently needed to support service, workforce and infrastructure planning and help to ensure timely and equitable stroke treatment for all Australians.

The goal of this strategy should be to provide all Australians with equitable access to time-critical stroke treatment, regardless of where they live, with a particular focus on populations outside of metropolitan areas.

A national approach to this issue is essential.

Mechanical thrombectomy requires dedicated planning, coordination, and cooperation across the entire stroke care pathway, which crosses several health system areas (such as general practice, ambulance, retrieval services and various in-hospital teams) as well as local and state boundaries.

The draft National Strategy should be developed in collaboration with, and endorsed by, all state and territory jurisdictions.

A NATIONAL ADVISORY COMMITTEE ON MECHANICAL THROMBECTOMY

A National Advisory Committee on Mechanical Thrombectomy should be established to work with the Department of Health on the development of a draft National Strategy.

This Committee should involve all relevant stakeholders, including the following:

- Representatives of all state and territory governments,
- Peak bodies involved in stroke issues such as the Stroke Foundation, professional bodies (e.g. medical and nursing colleges and societies), rural health organisations and stroke research bodies,
- Representatives from all relevant sectors of the health system, including Primary Health Networks, rural and remote councils, hospitals, interventional neuroradiology, ambulance services retrieval services, general practice, and other specialist medical groups involved in stroke diagnosis and treatment,
- Input from consumers, including those currently disadvantaged in relation to access to stroke services such as rural communities.

KEY ISSUES FOR A NATIONAL STRATEGY

The National Strategy for Mechanical Thrombectomy should explore the following four key issues:

1 

Agreed treatment protocols and pathways

This should include at a minimum:

- Agreed protocols of care and patient pathways from first presentation to treatment, including inter-hospital transfer and discharge strategies,
- Protocols for in-hospital flow of patients to reduce time between stroke onset, presentation to emergency, imaging, and treatment, and
- Specific approaches for rural and remote communities with reduced access to stroke care.

2 

Repatriation of patients post procedure/24 hours service, workforce and infrastructure planning.

State-wide strategic and service planning in some jurisdictions (Victorian and Western Australia, Tasmania) has effectively facilitated access to mechanical thrombectomy, particularly for rural and regional patients. This approach should be adopted by every state and territory across Australia.

Guiding these state-based plans is a need for a national strategy, to support the identification of optimal treatment site numbers and locations (initially and projected) as well as gaps in current infrastructure and resources required to support greater access to mechanical thrombectomy.

This may include:

- Workforce planning (encompassing the multidisciplinary stroke team) and training – minimum staffing requirements modelling against projected need,
- Access to neuroimaging (CT) technology, particularly in rural communities,
- Availability of retrieval and patient transfer capability (road and air),
- Support the development of networks designed to connect regional sites and emergency services with stroke expertise at their nearest CSC (which may be interstate),
- Information and communication technology (ICT) to support efficiency and connectivity across the pathway, including telestroke and pre-notification systems.
- The role of specialist ECR nurses in the context of an international certification course currently being developed.

3

Funding models

The development of an appropriate funding model for mechanical thrombectomy based on value and patient outcomes achieved, and reflective of the real costs associated with delivering mechanical thrombectomy services.

4

Quality improvement

A quality improvement framework would support the continued enhancement of mechanical thrombectomy service delivery across Australia. Such a framework should include measures to evaluate the outcomes of the National Strategy for Mechanical Thrombectomy and improve performance, where appropriate.

A national outcome audit registry that is specific for mechanical thrombectomy, and encompassing of all cases across Australia, should also be established to improve services, enable high-quality clinical outcomes, facilitate clinical research and for post-market surveillance.

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LIMITATION OF OUR WORK – GENERAL USE RESTRICTION

This paper is prepared for consideration by the Australian Government. It is not intended to and should not be used or relied upon by anyone else and we accept no duty of care to any other person or entity.

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