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Executive Summary

The Stroke Foundation is the voice of stroke in Australia with a national office in Melbourne and state offices located in Queensland, Western Australia, New South Wales and Tasmania.

The Stroke Foundation provides multiple programs across health jurisdictions including delivery of the StrokeConnect program and services, research and development of stroke clinical guidelines[1], interactive web based resources for professionals and consumers (InformMe; Enableme), and annual National Stroke Audits (acute care and rehabilitation). In order to support these programs, the Stroke Foundation Tasmanian team actively collaborates with clinical networks and stakeholders across the state.

The Stroke Foundation welcomes the opportunity to submit to the Acute Services Inquiry and outline the steps which can be taken to reduce the impact of stroke in Tasmania.

Early recognition of stroke - community awareness

Early recognition and response to stroke signs and symptoms saves lives.

Stroke treatment is time critical as brain cells die every minute that someone is suffering a stroke. Unfortunately, many patients are unable to benefit from life-saving treatment such as clot-busting therapy because they arrive at hospital outside the 4.5 hour treatment window. Much of the delay is known to be due to people being unable to recognise when someone is having a stroke and not calling an ambulance. The Stroke Foundation has been successful raising awareness of stroke signs through promotion of the FAST (Face, Arms, Speech & Time) message.

Further investment would support further recruitment and training of volunteer speakers, promotion of talks as well as further community engagement and social marketing to spread the FAST message.

Hyper-Acute Stroke Pathway

There is currently no formalised ambulance transfer protocols for stroke patients in Tasmania. It is vital that these are established to increase the number of people accessing time critical stroke treatments.

The pre-hospital stroke triage protocol developed by the John Hunter Hospital in NSW has been successfully adopted for use in other hospitals to help alert and prepare a stroke team and improve "door to needle" times.[2] The "in the field" stroke screening tool used by ambulance staff is estimated to boost thrombolysis rates from the typical 3% to around 50% of patients with ischaemic stroke.

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[1] National Stroke Foundation: Clinical Guidelines for Stroke Management 2010

[2] Quain, Debbie A. et al "Improving access to acute stroke therapies: a controlled trial of organised pre-hospital and emergency care." Med J Aust 189.8 (2008): 429-433

Prehospital Stroke pathway:

- Stroke patients are identified by paramedics using an internationally recognised and validated tool - Face, Arm, Speech, Time (FAST).
- Once identified as a FAST positive patient within three (3) hours of symptom onset, the patient is transported to the closest Acute Stroke Treatment Centre offering access to thrombolysis and Stroke Unit Care.
- Ambulance control will notify the receiving hospital of the incoming patient and provide an Estimate Time of Arrival (ETA).
- The hospital will notify the Stroke team (hospital specific) and upon arrival the patient will receive rapid early medical assessment including brain imaging, neurology review and early decision on definitive treatment (thrombolysis).

Equitable access to acute stroke services and acute stroke treatment - the right care in the right place at the right time

There have been significant recent advances in stroke treatment including the ability to dissolve stroke clots (thrombolysis) and now a new therapy to remove clots via a procedure called endovascular clot retrieval (ECR). These treatments significantly reduce morbidity and mortality.

Access to these time-critical treatments is still very low for a range of reasons but partly due to the availability of stroke clinical expertise and delays in patients accessing appropriately resourced hospitals.

In Tasmania the Royal Hobart Hospital and the Launceston General Hospital are equipped to treat patients with thrombolysis. The Royal Hobart Hospital also provides limited access to ECR, a highly specialised procedure which requires senior multidisciplinary clinician involvement and intensive post procedure monitoring.

To increase access to these highly effective treatments in regional areas, Victoria has successfully trialled a stroke tele-medicine service which links regional hospitals to senior neurologists via videoconferencing technology (refer to Appendix A). This service provides support 24 hours, seven days a week, to assess and treat acute stroke patients.

As a result of this link and regardless of their location, patients are receiving clot busting thrombolysis in their regional hospital. Tele-medicine provides appropriate clinical supervision to recognise and treat stroke which improves patient outcomes. This service a simple way to increase equity of access to acute stroke treatment and avoid unnecessary patient transfers. It provides an opportunity to up skill doctors in regional hospitals and recognise those patients who should be transferred for clot-retrieval.

The introduction and ongoing investment into a tele-medicine stroke service for Tasmania would facilitate a direct link for local doctors to highly skilled neurologists. It will reduce the impact of stroke on acute services in Hobart by treating patients at their local hospital. Preliminary discussions are underway to link the North West Regional Hospital into the Victorian Stroke Tele-medicine programme.

Stroke unit care is the single most important recommendation for improving stroke management.[3]

There is overwhelming evidence that stroke unit care significantly reduces death and disability after stroke compared with conventional care in general wards for all people with stroke.[4] There is also evidence that stroke unit care has reduced mortality through prevention and treatment of complications, especially infections and immobility-related complications.[5]

A systematic review of 18 observational studies found similar outcomes for stroke units to those described in the trials making a strong case for the generalisability of stroke unit care.[6]

The stroke units that have been shown to deliver highly effective stroke care share a number of characteristics including:

- location in a geographically discrete unit
- comprehensive assessments
- a coordinated multidisciplinary team
- early mobilisation and avoidance of bed-rest
- staff with a special interest in the management of stroke, and access to ongoing professional education and training
- clear communication, with regular team meetings to discuss management (including discharge planning) and other meetings as needed (e.g. family conferences)
- active encouragement of stroke survivors and their carers/ families to be involved in the rehabilitation process.[7]

Tasmania currently has a stroke unit at the Royal Hobart Hospital and The Launceston General Hospital. However, patients admitted to the North West Regional Hospital do not have access to Stroke Unit care. The investment and ongoing management of a Stroke Unit in the North West of Tasmania is required to significantly reduce morbidity and mortality allowing patients to remain in their local area for treatment and avoid additional loading on the other existing Stroke Units.

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[3] Stroke Unit Trialists' Collaboration. Organised inpatient (stroke unit) care for stroke. Cochrane Database Syst Rev. 2007, Issue 4. CD000197.
[4] National Stroke Foundation. National Stroke Audit Acute Services Clinical Audit Report 2009. Melbourne, Australia.
[5] Govan L, Langhorne P, Weir CJ. Does the prevention of complications explain the survival benefit of organized inpatient (stroke unit) care? Further analysis of a systematic review. Stroke. 2007;38(9):2536–40.
[6] Seenan P, Long M, Langhorne. Stroke Units in their natural habitat. Systematic review of observational studies. Stroke. 2007;38:1886–92.
[7] Langhorne P, Pollock A. What are the components of effective stroke unit care? Age Ageing. 2002;31(5):365–71.

Enabling stroke recovery

Despite having high needs and long-term recovery challenges, most stroke patients do not receive any follow up support once they are discharged from hospital. The Stroke Foundation is currently implementing a program of telephone follow up for stroke patients in

Queensland, Victoria and New South Wales. The service will shortly commence in the Australian Capital Territory.

Delivered by the Stroke Foundation in partnership with the health system, this highly efficient service ensures that patients with unmet needs get vital information and support via a telephone needs assessment and service referral conducted by an appropriately qualified health professional.

Stroke in Australia

The World Stroke Organisation highlights the impact of stroke on a global level. Each year 17 million people suffer stroke worldwide; of these over 6 million die and another 5 million are permanently disabled. Stroke is the second leading cause of death and the third leading cause of disability in lost disability-adjusted life years (DALYs). Yet, at least half of all strokes are potentially preventable with appropriate awareness and prevention.[8]

From a national perspective, the prevalence of stroke is very significant from personal, economic and community perspectives. 1 in 5 Australians will experience a stroke in their lifetime. Stroke kills more women than breast cancer and more men than prostate cancer.

Stroke is one of Australia's biggest killers and a leading cause of disability[9].

There are over 475,000 people living with the effects of stroke across Australia. Two thirds of those affected by stroke will have sustained an impairment that impacts their ability to carry out activities of daily living, work and be independent. By 2050, the number of stroke survivors in Australia is expected to be nearly 1 million.[10]

Every year in Australia, there are more than 56,000 new and recurrent strokes – one stroke every nine minutes. By 2050, without action, this number will increase to one stroke every 4 minutes.

Stroke impact in Tasmania - current and projected state demand for acute stroke services

Stroke remains a very high impact disease despite significant advances in treatment.

It is estimated that around 1,400 strokes will occur in Tasmania in 2017 and this number will rise to almost 3500 per year in 2050. 12,000 survivors of stroke are estimated to live in the Tasmanian community and by 2050 this population will top 25,000.

Around two-thirds of stroke survivors live with disability and around one-third of survivors are working age. The combined cost to the Australian economy of stroke is estimated to be $5 billion per year. $3 billion of this is lost productivity. Almost $1 billion is lost wages.[11]

Stroke risk factors are highly prevalent in Tasmania with over 100,000 estimated to live with high blood pressure – the biggest modifiable risk factor. High cholesterol affects 150,000 Tasmanians and more than 250,000 are estimated to be physically inactive.

[8] World Stroke Organization (WSO). Annual Report 2015.
[9] Australian Institute of Health and Welfare 2014: Australia's Health 2014
[10] Deloitte: The Economic Impact of Stroke in Australia 2013
[11] Deloitte: The Economic Impact of Stroke in Australia 2013

Research has shown that the further people live from major Australian cities, the poorer their health and lower their life expectancy. Regional Australians are 19-percent more likely to suffer a stroke than those living in metropolitan areas.[12]

Advancements in stroke treatment and care mean that stroke is no longer a death sentence. However, patient outcomes from stroke vary widely depending on where you live and your ability to access appropriate treatment.

Cost of stroke

The economic impacts of the increasing prevalence and incidence of chronic diseases such as stroke is profound. Australia's Health (2014) reports, in 2011–12, there were 36,800 hospitalisations for acute care of stroke and 27,400 hospitalisations for rehabilitation care for stroke. The average length of stay in acute hospital care for stroke was 9 days, and in rehabilitation care 14 days.

In 2013, the total cost of stroke health expenditure was estimated by Deloitte to be $881 million with State Governments contributing $233 million (26.4%), the Australian Government $376 million (42.7%) and the cost to individuals, families and carers $111million (18.3%).

However, the total cost of stroke is not limited to health expenditure. Based on Deloitte's Economic Impact of Stroke Report (2012), the total financial costs of stroke in Australia were estimated to be $5 billion with the largest cost component as productivity costs ($3 billion) and carer costs estimated at over $220 million.

Largely reflecting productivity costs, individuals bear the greatest financial burden of stroke ($2.2 billion in 2012). However, the biggest impact of stroke is not the financial costs it causes, but the loss of healthy life. Using the market-based price of risk methodology required by the Commonwealth Department of Finance and Deregulation, which estimates the disability adjusted life years (DALYs) and multiplies these by the value of a statistical life year (VSLY), the total burden of disease cost in 2012 was $49.3 billion.

Given the substantial financial and wellbeing costs of stroke, it is important to identify cost-effective means to ameliorate its disabling consequences, promote optimal recovery and reduce the risk of secondary stroke.

The Acute Stroke Clinical Care Standard

Access to expert stroke care has a direct impact upon patient outcomes, stroke recovery and quality of life. The Acute Stroke Clinical Care Standard[13] provides guidance to clinicians and health service managers on delivering appropriate care to people with an acute stroke.

[12] Deloitte Access Economics: Stroke in Australia – No postcode untouched 2017
[13] Australian Commission for Safety and Quality in Health Care: Acute Stroke Clinical Care Standard 2015

Quality Statement 1 – Early assessment

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.

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[14].

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.[15]

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.

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.

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 patient with stroke.

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.

[14] National Stroke Foundation: Clinical Guidelines for Stroke Management 2010
[15] National Stroke Foundation: Acute Stroke Services Framework 2011

Acute stroke services in Tasmania - current situation

The Stroke Foundation conducts an annual audit of hospital stroke care in Australia and several Tasmanian hospitals participate. This audit alternates year on year between the acute stroke setting and stroke rehabilitation. Tasmanian results have been mixed in the past two cycles.

The 2015 national audit of **acute** stroke services showed Tasmanian hospitals were among the most poorly performing in stroke care.[16]

1. Only 61% of Tasmanians experiencing stroke were admitted to a stroke unit compared to the national average of 67%, ranking Tasmania sixth of seven states. This result includes significant geographical disparity.
2. Only 22% of Tasmanian stroke patients received a written care plan to support their ongoing recovery. Nationally the figure was 56%.
3. 48% of patients received risk factor modification advice and 50% received a carer support needs assessment.

A number of recommendations were made by the Stroke Foundation following this audit and we continue to advocate for appropriate infrastructure and resourcing to ensure stroke patients receive best practice care. We are currently collecting data for the 2017 acute stroke audit and results will be available later this year.

The 2016 national audit of **rehabilitation** stroke services found that Tasmanian stroke patients are receiving some of the best quality in-patient rehabilitation care compared to other states but that improvements need to be made to the systems and processes that underpin this work.[17]

1. 100% of patients were involved in setting their rehabilitation goals;
2. Three-quarters of patients and family received stroke information (national average was 50%); and
3. 70% of patients received information about behaviour change prior to discharge (national average was 51%)

However:

1. Improvement is required in terms of building links between rehabilitation and acute service providers;
2. Only 25% of hospitals routinely use evidence-based guidelines; and
3. The same proportion have systems to support quality improvement

[16] National Stroke Foundation: National Acute Audit Report 2015
[17] National Stroke Foundation: National Rehabilitation Audit Report 2016

Appendix A

Victorian Stroke Telemedicine (VST) Program

The Victorian Stroke Telemedicine (VST) program allows people living in rural and regional areas to quickly access stroke specialists and new acute stroke therapies, such as thrombolysis (clot-dissolving drugs) and endovascular clot retrieval (catheter removal of the blood clot).

Until now, regional hospital emergency departments have often been unable to give these therapies as patients with stroke require detailed assessment by a specialist with stroke expertise to ensure a patient is suitable for treatment. This is important because "Time is Brain" – therapies must be given as soon as possible after symptoms commence to achieve the best possible outcomes.

The VST program is unique in Australia and works by seamlessly connecting 16 Victorian rural and regional emergency departments to a roster of metropolitan-based neurologists. The neurologists are accessible every day, all day (24/7/365) via a single 1300 telephone number. Through new "state-of-the-art" mobile technology and software, the stroke specialist can remotely examine patients at the bedside, review brain imaging and provide rapid diagnosis and treatment advice in consultation with local clinicians and the patient, irrespective of their geographic location.

The VST program is based at the Florey Institute of Neuroscience and Mental Health and is led by Prof Chris Bladin and A/Prof Dominique Cadilhac. The VST program first commenced in 2010 and has received funding support funding from the Commonwealth Department of Health, the Victorian Department of Health (Victorian Stroke Clinical Network), Monash University, amongst others.

The VST program has deployed fully integrated telemedicine technology in Emergency Departments in all 16 hospitals in regional Victoria. There is extensive data collection and ongoing monitoring of VST activity and clinical outcomes, with use of the Australian Stroke Clinical Registry (AuSCR), supporting a full clinical and health economic evaluation of the VST program.

Major achievements to date

- >1400 initial consults performed, 70 patients referred for endovascular clot retrieval
- 1 in 3 calls results in a diagnosis other than a stroke; i.e. the VST program provides both telestroke and teleneurology consultations
- 1 in 5 calls result in stroke thrombolysis – some regional hospitals are now thrombolysing patients for the first time with the assistance of VST consultants
- 130% increase in patients with acute stroke treated under 60 mins of hospital arrival
- 30% decrease in treatment time – e.g. door to CT, door to stroke thrombolysis times
- 60% decrease in complications following thrombolysis – treatment is safer when delivered with a VST consultant involved

The Future – Australian Telestroke Network (ATN)

The national "post-code lottery" of stroke care has been well highlighted by the Stroke Foundation. The VST program has been very successful and has delivered equity of access to acute stroke care for people living in regional Victoria. We now believe this telestroke model can be scaled nationally. With our partnership with the Stroke Foundation, the Australian Telestroke Network (ATN) will achieve the goal of "no stroke untreated in Australia".

We currently have 16 neurologists performing telestroke consults. They are based in Victoria, NSW, WA, and Christchurch, NZ. Many more neurologists across Australia are keen to be involved in the ATN. Through extensive consultation and data evaluation, we have identified 58 regional sites with the appropriate medical facilities where acute stroke services can be located.

The ATN is unique – there is no other national service like it. We estimate that for a modest national investment of approximately $5.5million ($3.4 Infrastructure ($80k x 42 sites), $2.1m operating (0.4EFT per site, 1-year)), we can fund infrastructure and staff training/support to scale up the ATN. We are seeking support from the Australian Stroke Coalition to advocate via their professional networks for Federal and State/Territory Government support for this innovative national telemedicine program to improve stroke outcomes for thousands of patients across Australia.

Further information. Further information on VST can be found by visiting the program website, www.vst.org.au or by emailing vst-support@florey.edu.au

Appendix B

No Post Code Untouched Report 2017 – summary of data related to Tasmanian electorates

Deloitte Access Economics was commissioned by the Stroke Foundation to undertake analyses of stroke statistics and provide estimates of the incidence, prevalence and mortality of stroke. This report follows the 2013 paper, the economic impact of stroke in Australia, which estimated that stroke costs the economy more than $5 billion a year. A range of sources have been used to develop the data, including Australian Bureau of Statistics and Australian Electoral Commission information.

TAS stroke incidence by Federal electorate (green=regional / blue=metro)

Electorate	#strokes 2017	#strokes 2017 /100k		Electorate	#strokes 2050
Braddon	297	266		Franklin	741
Bass	293	256		Lyons	712
Franklin	292	255		Braddon	663
Denison	291	258		Bass	661
Lyons	280	241		Denison	645

TAS stroke survivors by Federal electorate (green=regional / blue=metro)

Electorate	#stroke survivors 2017	#stroke survivors 2017 /100k		Electorate	# stroke survivors 2050
Lyons	2,527	2,177		Lyons	5,441
Braddon	2,520	2,259		Franklin	5,439
Franklin	2,493	2,173		Bass	4,907
Bass	2,455	2,148		Braddon	4,885
Denison	2,389	2,118		Denison	4,768

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[18] Deloitte Access Economics: Stroke in Australia – No postcode untouched 2017