

# No postcode untouched

Stroke in Australia  
2017



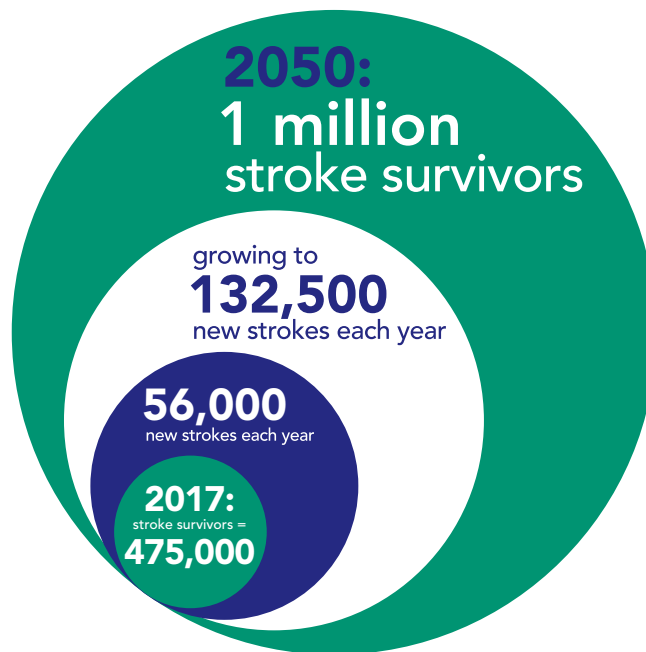
# Key insights



In 2017, someone has a stroke in Australia every **9 minutes**



Regional Australians are **19 percent** more likely to suffer a stroke than those in metropolitan areas.



**Highest stroke incidence**  
per capita



**Australia's stroke**  
hotspot North coast, NSW



Federal electorate stroke and stroke risk numbers are detailed in full on the Stroke Foundation website [strokefoundation.org.au/no-postcode-untouched](http://strokefoundation.org.au/no-postcode-untouched) and paint the clearest picture yet of the impact of stroke in Australian cities and towns.



# Introduction

**Every nine minutes someone in Australia will suffer a stroke. By 2050, without action, this number will increase to one stroke every four minutes.**

**In 2017 alone, Australians will suffer more than 56,000 strokes. Many of these will be experienced by people living in regional Australia. In fact, regional Australians are 19 percent more likely to suffer a stroke than those living in a metropolitan area.**

**Advancements in stroke treatment and care mean that stroke is no longer a death sentence for many. However for the more than 470,000 stroke survivors and their families living in our community its impacts are far reaching. Patient outcomes from stroke vary widely depending on where you live and your access to a stroke unit.**

*No postcode untouched, Stroke in Australia 2017* demonstrates the impact of stroke on millions of lives in cities and towns across the nation now and into the future. It highlights the ever increasing burden of stroke on regional and rural Australia. The challenge to our health system is significant.

In this latest report we provide analysis of stroke statistics and estimations by Federal electorate of the incidence of stroke, the number of stroke survivors living in the community and the leading risk factors for preventable stroke. Risk factors include high blood pressure, high cholesterol, atrial fibrillation (irregular heartbeat) and physical inactivity.

Using population, health and research data we have also estimated the number of new strokes in Australia over the next 30 years.

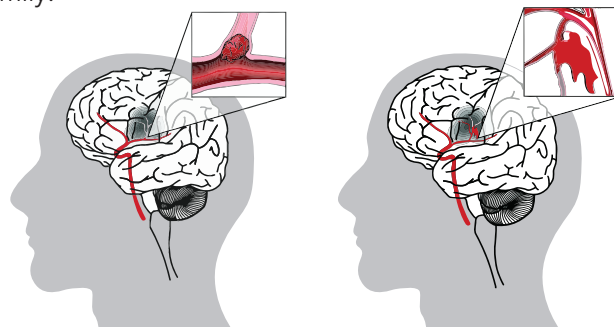
*No postcode untouched, Stroke in Australia 2017* tells the story of stroke and provides a roadmap for targeted action to improve outcomes for patients. The data provides a clear view of the cities and towns where stroke is having its biggest impact, where the need for stroke survivor support is most urgent and where the future stroke hotspots are located.

**The Stroke Foundation is a national charity that partners with the community to prevent, treat and beat stroke. We do this through raising awareness, facilitating research and supporting stroke survivors.**

# What is stroke?

Stroke attacks the brain – our most vital organ. A stroke occurs when blood supply to the brain is cut off because of a clot blocking an artery (ischaemic stroke) or due to a burst artery (haemorrhagic stroke). When blood supply to the brain is blocked brain cells begin to die at a rate of 1.9 million a minute.

Every stroke is different depending on where in the brain it strikes and how severe it is. What is common is the devastation it can cause the survivor, their carer and family.



**Ischaemic stroke**  
– a clot

**Intracerebral haemorrhage**  
– a bleed

# The impact of stroke

Stroke is a leading cause of disability for Australians. Consequences of stroke can include:

- › Weakness or paralysis of the face, arm or leg.
- › Blurred vision or loss of vision.
- › Difficulties communicating, speaking or understanding.
- › Difficulty with memory and thinking.
- › Problems completing everyday activities such as dressing and eating.

There is significant unmet need for stroke survivors. Most stroke survivors report having unmet needs in the one or more years after their stroke. Eighty-four percent describe unmet health needs relating to concentration, cognition, memory, fatigue and emotion. Thirty-nine percent and 17 percent respectively<sup>1</sup> report unmet needs relating to home help and personal care.

# Treating stroke

Stroke is a serious medical emergency requiring urgent medical attention, but with the right treatment at the right time, many people are able to recover from stroke.

## 'Time is brain' therapies

Some of the more recent advances in ischaemic stroke (caused by a clot) treatment are particularly time critical, and can only be provided within the first few hours of stroke. The earlier treatment is delivered, the better the outcomes for patients.

- › **Thrombolysis** (clot dissolving treatment) must occur within the first 4.5 hours of stroke symptoms occurring. Thrombolysis involves administering a drug which can break down and disperse a clot that is preventing blood from reaching the brain.
- › **Endovascular clot retrieval** (removal of a clot by a retractable mechanical device) needs to be administered within six hours of stroke symptoms occurring. Known as ECR, a large clot blocking a brain vessel is removed via an artery (intra-arterial approach) and has shown to be highly effective, when combined with thrombolysis treatment (or alone in patients ineligible for thrombolysis).

**Ensuring every Australian household has someone who knows the signs of stroke and to call 000 is a key priority of the Stroke Foundation. Think F.A.S.T. Act FAST.**



Has their **FACE** drooped?

Can they lift both **ARMS**?

Is their **SPEECH** slurred and do they understand you?

Call 000, **TIME** is critical.



"When I was a young neurologist in 1977, we decided to do a list of all the acute interventions that were working to make people better and improve their outcomes once a stroke had occurred. There was nothing, there was zero. We were unable to do anything. That was very frustrating, but at the same time, an enormous opportunity to explore new possibilities. The interventions today, in 2017, that are proven to significantly deliver better outcomes for people with stroke are extensive and well beyond my initial expectations."

- **Geoff Donnan**

Director of The Florey Institute of Neuroscience and Mental Health and Professor of Neurology, University of Melbourne, Austin Hospital

## Telemedicine

Historically, regional hospital emergency departments have been unable to provide time critical therapies. Patients with stroke need detailed assessment by a stroke specialist to ensure a patient is suitable for treatment. Telemedicine delivers people living in rural and regional areas the opportunity to quickly access stroke specialists who can correctly diagnose stroke and support clinicians on the ground to administer time critical thrombolysis treatment or arrange transfer to a comprehensive stroke centre for clot retrieval treatment.

**Telemedicine services are now operating in limited areas, but more investment is required to develop a nationally coordinated stroke telemedicine network.**

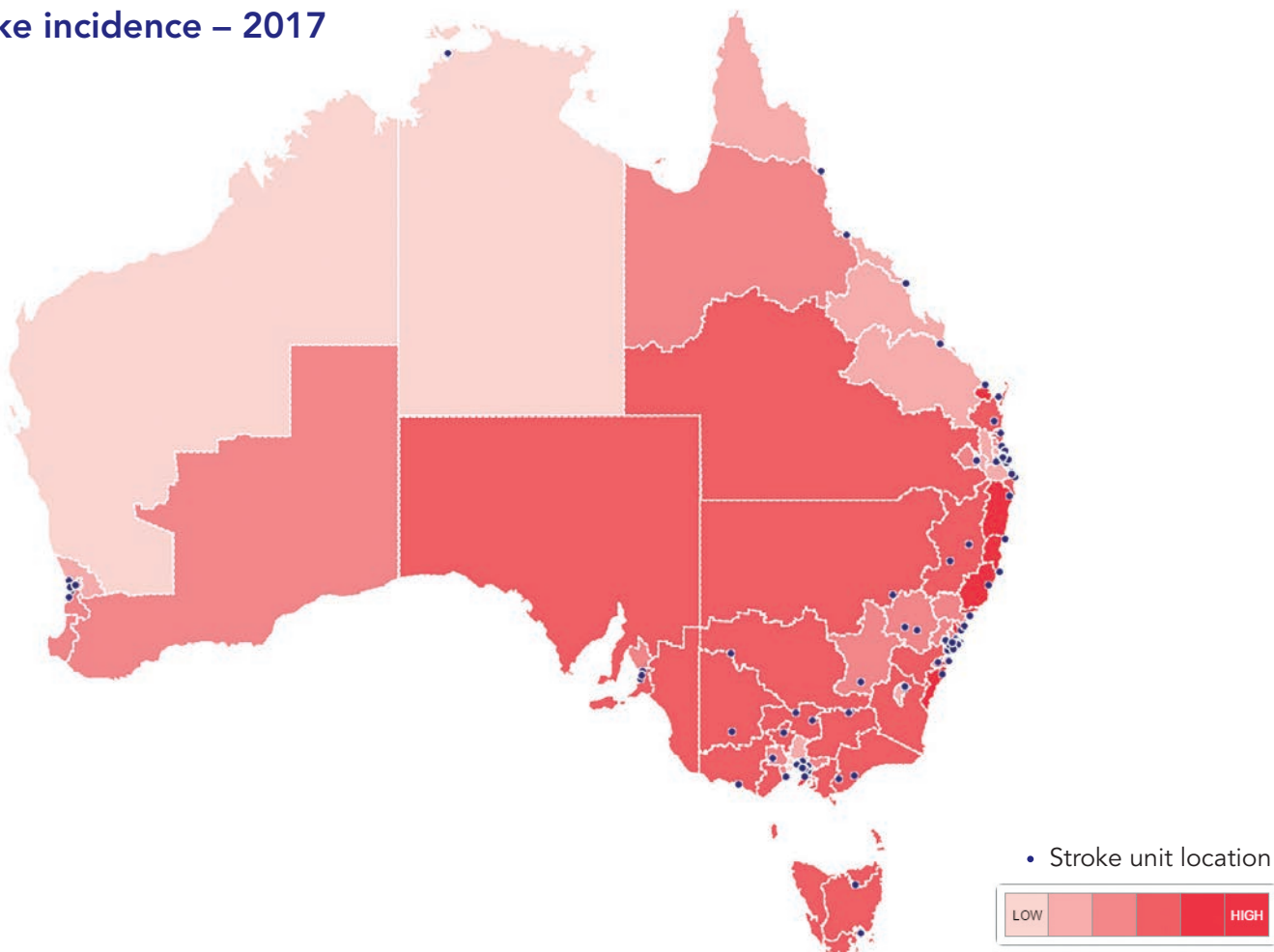
New treatments for stroke are evolving all the time. Current evidence-based stroke treatments proven to reduce death and disability include:

- › **Stroke unit care** – immediate clinical care within a specialised stroke unit significantly reduces death and disability compared with care in general wards for all people with stroke.<sup>2</sup> About 67 percent of patients access stroke unit care in Australia.<sup>3</sup>
- › **Antiplatelet therapy** – reduces blood clots by preventing platelets in the blood from sticking together, reducing the risk of stroke due to blood clots. These drugs are given to 97 percent<sup>3</sup> of ischaemic stroke patients but adherence declines after discharge to 21 percent.<sup>4</sup>
- › **Anticoagulant therapy** – used for secondary prevention of stroke, particularly when atrial fibrillation (AF) is a factor. Only 62 percent of eligible patients receive anticoagulation after ischaemic stroke.<sup>3</sup>
- › **Blood pressure-lowering therapy** – vital for preventing secondary stroke. About one in four of eligible stroke survivors are discharged from hospital without this medication.<sup>3,5</sup>
- › **Cholesterol-lowering therapy** – prevents clots from getting to the brain and is an important medication for secondary stroke. These drugs are given to about 80 percent of eligible stroke patients, but adherence after discharge declines to about 65 percent.<sup>4</sup>

## The national picture of stroke in Australia

	Total Aus	NSW	VIC	QLD	WA	SA	TAS	ACT	NT
<b>Population</b>	24,720,750	7,960,702	6,162,195	4,972,061	2,567,906	1,837,561	569,412	410,360	240,553
<b>Number of strokes in 2017</b> (number per 100k people)	55,831 (226)	18,922 (238)	14,239 (231)	10,334 (208)	5,084 (198)	4,868 (265)	1,453 (255)	713 (174)	218 (91)
<b>Number of stroke survivors in 2017</b> (number per 100k people)	475,160 (1,922)	159,169 (1,999)	119,895 (1,946)	90,255 (1,815)	44,693 (1,740)	39,946 (2,174)	12,384 (2,175)	6,371 (1,553)	2,447 (1,017)
<b>Number of deaths from stroke in 2017</b> (number per 100k people)	12,507 (51)	4,320 (54)	3,245 (53)	2,220 (45)	1,083 (42)	1,146 (62)	318 (56)	148 (36)	27 (11)

## Stroke incidence – 2017



# The over representation of stroke in regional Australia

Regional Australians are 19 percent more likely to suffer a stroke than those in metropolitan areas.

Communities living in regional areas are over represented in stroke statistics, partly due to an ageing population.

Statistics have shown the further people live from major Australian cities, the poorer their health and lower their life expectancy.<sup>6</sup>

These figures are disturbing, yet echo a widespread issue of health inequality across Australia.

Hospitals with specialist staff and stroke units are proven to deliver improved outcomes for survivors, but due to the small numbers of patients treated for stroke, many rural hospitals do not have stroke units or specialist treatment and care teams.

Many stroke specialists, who play an essential role in diagnosing and treating stroke, work predominantly in metropolitan areas.

**Ensuring all Australians have access to high quality stroke care, regardless of where they live is a key priority of the Stroke Foundation.**

## When stroke happens, time is of the essence

"My husband Stephen was 48 when he had a stroke – I found him on the floor – eyes open, unable to speak. I immediately suspected stroke and dialled 000. The paramedics thought he was too young to have a stroke and took him to the local hospital, which doesn't have a stroke unit.

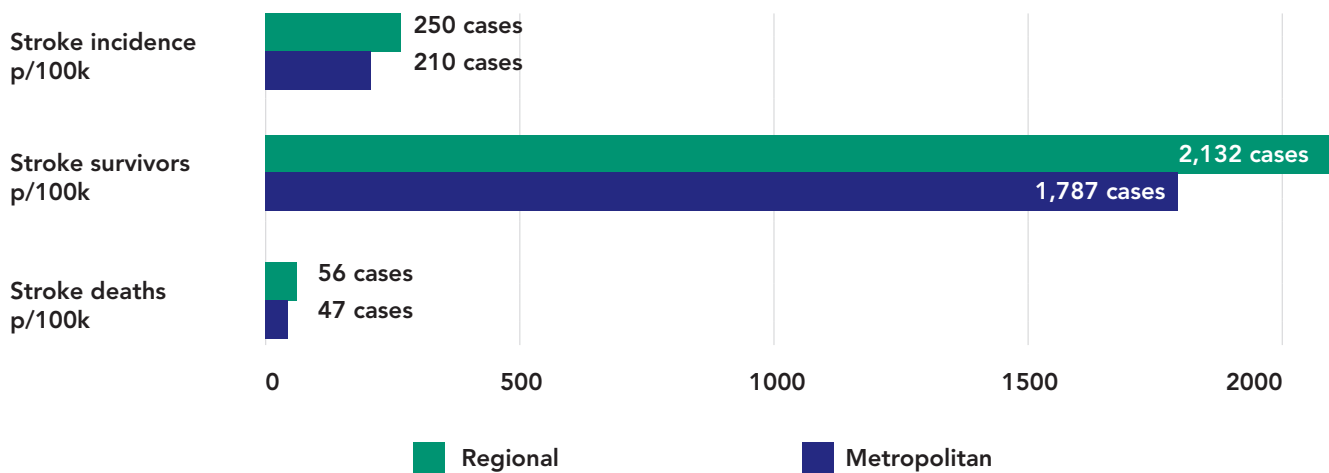
"After stroke was confirmed, the Westpac Rescue helicopter was organised to take Stephen to a large regional hospital with specialised stroke services, however by the time he arrived he had completely missed the window for thrombolysis. In the days after the stroke he suffered multiple life threatening complications, spending four weeks in intensive care, six weeks on the stroke ward and another six months in rehab.

"The one thing I always remember is the doctor in charge in ICU saying it took us too long to get to the stroke unit. I remember asking how rural patients were supposed to get to hospital in time."

**- Tracy Ward**  
Carer, Denman NSW



## Stroke incidence, stroke survivors and deaths per 100,000 people (metropolitan vs regional)



## Stroke care is not equal

"Life saving treatments exist for stroke but the reality is that access to these treatments and public awareness of stroke remains inadequate.

"Unfortunately access and awareness varies by postcode such that outside of major cities the outcomes in stroke will be poorer, causing death or life threatening disability. Not only are these patients and their families denied the potential benefits of stroke treatment but when the outcomes are poor they will not receive the skilled guidance, counselling and palliative care that occurs in an acute stroke unit.



"These patients deserve the benefits of clinicians who understand the need to advocate for patients unable to communicate their wishes; and who empower patients' relatives to make complex decisions regarding life threatening disability as well as end-of-life care."

- Dr Claire Muller  
Neurologist



# National stroke forecast

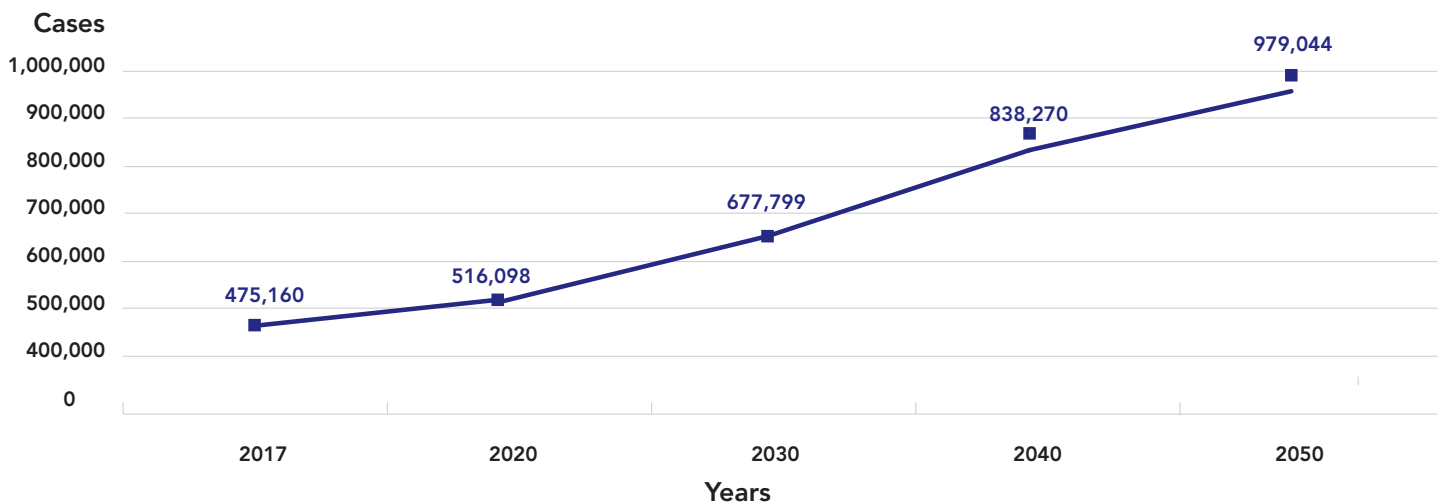
Stroke has been called a national health priority since 1996, but no nationally funded strategy to tackle it from the Federal Government has ever been produced. In today's world our health system struggles to meet the needs of stroke patients and survivors. More than 56,000 strokes will occur in Australia this year and two in three patients will not receive best practice care.<sup>6</sup>

Australia is facing the challenges of both a growing and an ageing population. In the absence of a substantial

policy response, there will be almost one million people living with the consequences of stroke in Australia by 2050, more than double the number today.

The challenge looms large and this report points to a critical need for investment in prevention measures and investment to improve the quality and equity of stroke care in Australia. Without action to prevent, treat and beat stroke there is no doubt the system will be overwhelmed.

## Numbers of stroke survivors in Australia – trends over time



## Predicted top 20 electorates for stroke survivors in 2050

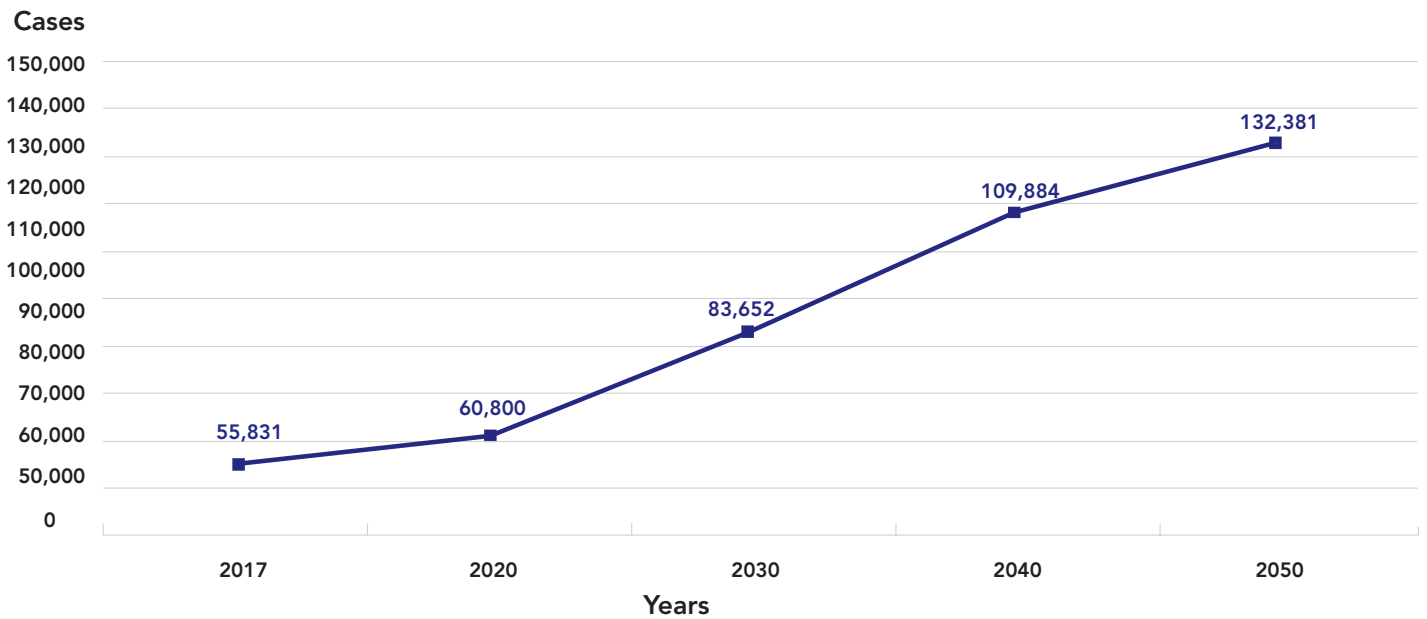
■ Regional ■ Metropolitan

Rank	State	Electorate	Location	Predicted number of stroke survivors 2050
1	VIC	Lalor	Metropolitan	9,830
2	NSW	Paterson	Regional	9,633
3	VIC	Flinders	Regional	9,523
4	NSW	Lyne	Regional	9,226
5	NSW	Richmond	Regional	9,200
6	NSW	Page	Regional	9,112
7	NSW	Cowper	Regional	9,067
8	VIC	McMillan	Regional	8,752
9	QLD	Hinkler	Regional	8,718
10	SA	Mayo	Regional	8,388
11	NSW	Gilmore	Regional	8,377
12	VIC	McEwen	Regional	8,342
13	QLD	Fairfax	Regional	8,337
14	QLD	Fisher	Regional	8,334
15	NSW	Eden-Monaro	Regional	8,280
16	SA	Wakefield	Regional	8,133
17	NSW	Dobell	Regional	8,063
18	QLD	Petrie	Metropolitan	8,021
19	NSW	Shortland	Regional	7,981
20	NSW	Farrer	Regional	7,921



Australia needs a national strategy to guide planning and a funded action plan to support resource allocation for stroke services. This will address the issues of today and plan for the challenges of the future.

### Numbers of new strokes in Australia – trends over time



### Predicted top 20 electorates for stroke incidence in 2050 ■ Regional ■ Metropolitan

Rank	State	Electorate	Location	Predicted number of stroke incidence 2050
1	NSW	Paterson	Regional	1,343
2	NSW	Lyne	Regional	1,331
3	NSW	Page	Regional	1,296
4	VIC	Flinders	Regional	1,294
5	NSW	Cowper	Regional	1,291
6	NSW	Richmond	Regional	1,269
7	VIC	McMillan	Regional	1,207
8	NSW	Gilmore	Regional	1,182
9	QLD	Hinkler	Regional	1,176
10	SA	Mayo	Regional	1,175
11	QLD	Petrie	Metropolitan	1,165
12	QLD	Fairfax	Regional	1,150
13	VIC	Lalor	Metropolitan	1,149
14	QLD	Fisher	Regional	1,149
15	SA	Boothby	Metropolitan	1,143
16	NSW	Eden-Monaro	Regional	1,137
17	NSW	Dobell	Regional	1,131
18	NSW	Whitlam	Regional	1,126
19	VIC	Corangamite	Regional	1,112
20	SA	Sturt	Metropolitan	1,112

# Stroke hotspots

National and state data is helpful, but understanding stroke needs at a local level provides valuable insights into where the need is greatest. This can assist with service planning and coordination. It also demonstrates that no postcode across Australia is untouched by this devastating disease.

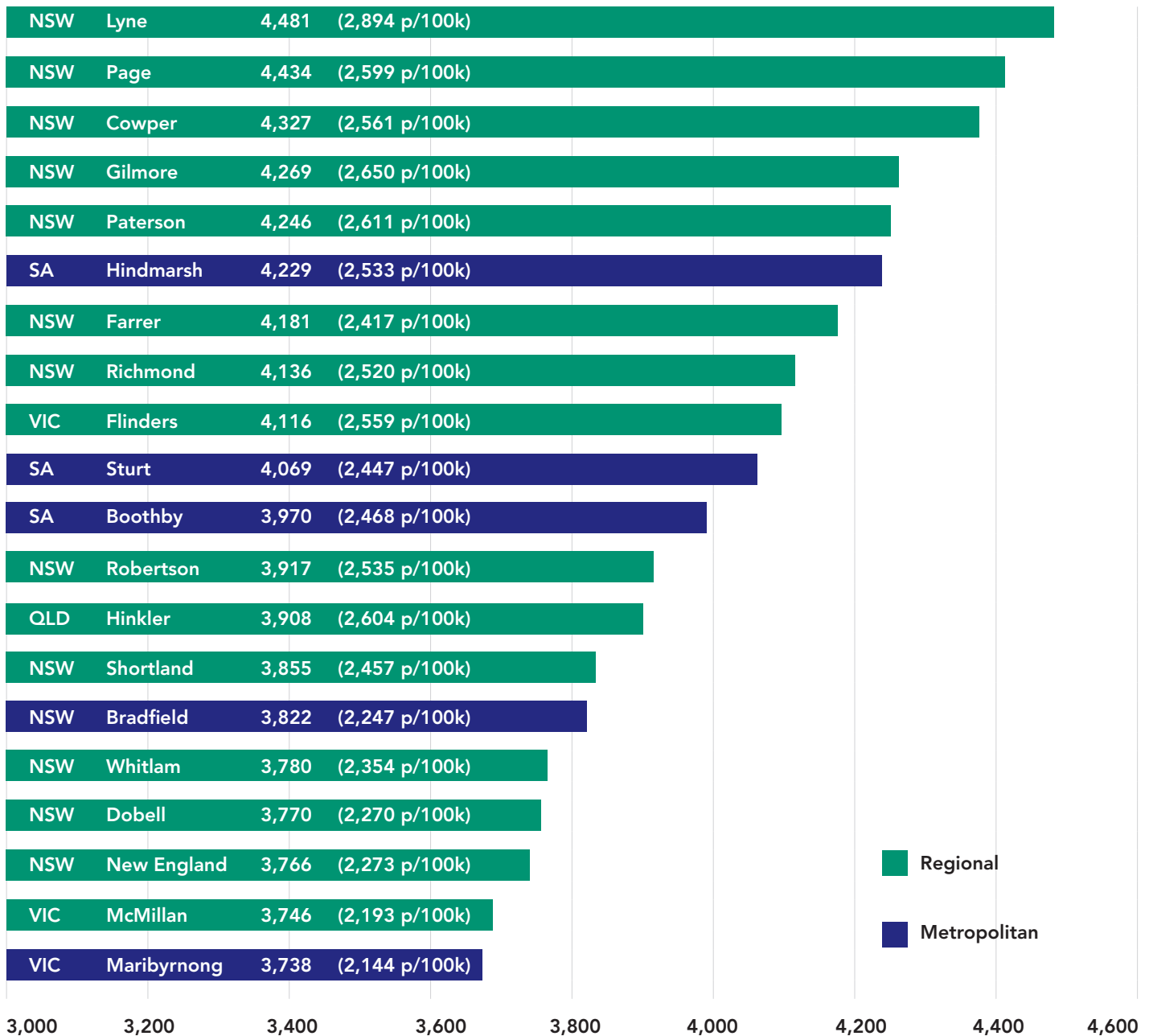
## Stroke survivors

Recovery can be long and difficult for people surviving a stroke and their needs for health and social support change over time.

**Number of stroke survivors in Australia today: 475,160**

**Proportion of top 20 stroke survivor electorates found in regional areas: 75 percent**

## Top 20 stroke survivor electorates in 2017



## Stroke incidence



"It's not fair that our health system forces patients into this cruel lottery. Consistent lack of stroke-specific funding and poor resourcing is costing us lives and money. For the most part, doctors and nurses are doing what they can in a system that is fragmented, under-resourced and overwhelmed."

- Associate Professor Bruce Campbell  
Chair of Stroke Foundation Clinical Council

### Top 20 stroke incidence electorates in 2017





2017 > 2050

The number of strokes will  
**MORE THAN DOUBLE** by 2050

## Determination is vital for stroke recovery

"The fatigue that was caused by the stroke was absolutely debilitating. I was so in and out of sleep I could barely talk or even listen. My memory was so bad I'd have to be told repeatedly why I couldn't move my body. I was given anti-depressants and told my brain was no longer able to maintain serotonin levels to keep me happy. I think they helped a lot through rehab as it was such a terrible time.

"The mental side of the stroke has been a lot harder to recover from than the physical side. When I moved from hospital to a rehab centre I was given a strict timetable of physical rehabilitation for my arms and legs. From then on recovery became my life, doing relentless exercises and if after hours of practicing I could move my leg or hand I'd consider it a productive day. To recover from a stroke you need a huge amount of determination. Fortunately I had a very committed wife and family to support me and keep me going in the right direction."

- Alex Wright  
Stroke survivor, Melbourne





# Stroke risk factors by state

High blood pressure, atrial fibrillation (irregular heartbeat), high cholesterol and physical inactivity are all modifiable risk factors for stroke. Non-modifiable risk factors include age, gender and family history of stroke.

The table below shows a significant proportion of the Australian population is living at risk of stroke and other chronic diseases. Many of these people live without awareness of their risk and are therefore powerless to take control.

A reduction in modifiable risk factors will help prevent stroke, reducing incidence and impact of the disease.

**Supporting the Australian community to identify and manage their health risks must be addressed at multiple levels and sustained over time.**

## The national picture of stroke risk

	Total Aus	NSW	VIC	QLD	WA	SA	TAS	ACT	NT
<b>Population</b>	<b>24,720,750</b>	<b>7,960,702</b>	<b>6,162,195</b>	<b>4,972,061</b>	<b>2,567,906</b>	<b>1,837,561</b>	<b>569,412</b>	<b>410,360</b>	<b>240,553</b>
<b>High blood pressure</b>	<b>4,364,804</b>	1,428,161	1,092,245	854,872	436,137	345,575	108,202	66,506	33,106
(% of population)	<b>(18)</b>	(17.9)	(17.7)	(17.2)	(17)	(18.8)	(19)	(16.2)	(13.8)
<b>Atrial fibrillation</b>	<b>475,367</b>	159,949	119,943	89,818	44,200	40,461	12,622	6,182	2,193
(% of population)	<b>(2)</b>	(2)	(2)	(1.8)	(1.7)	(2.2)	(2.2)	(1.5)	(0.9)
<b>High cholesterol</b>	<b>6,426,245</b>	2,077,848	1,605,710	1,277,138	660,609	490,050	152,990	104,452	57,448
(% of population)	<b>(26)</b>	(26.1)	(26.1)	(25.7)	(25.7)	(26.7)	(26.9)	(25.5)	(23.9)
<b>Physical inactivity</b>	<b>11,206,644</b>	3,622,180	2,815,252	2,218,929	1,149,751	854,336	262,290	184,232	99,674
(% of population)	<b>(45)</b>	(45.5)	(45.7)	(44.6)	(44.8)	(46.5)	(46.1)	(44.9)	(41.5)

**“The number of strokes would be practically cut in half (44 percent) if high blood pressure was eliminated.”**

**- World Stroke Organization**

## High blood pressure

Around 4.1 million Australians have high blood pressure.<sup>7</sup> High blood pressure is a leading risk factor for stroke. The World Health Organization and the National Heart Foundation of Australia guidelines define 'high' blood pressure as systolic pressure at or above 140mmHg, diastolic pressure at or above 90mmHg or anyone receiving medication for high blood pressure.

Major contributors to high blood pressure include poor diet (especially high salt intake), being overweight, excessive alcohol consumption and insufficient physical activity.

Research<sup>8</sup> suggests even a small blood pressure reduction (5 to 6 mmHg systolic, 2 to 3 mmHg diastolic) would result in 40 percent fewer strokes. Lowering blood pressure has been conclusively shown to prevent both ischaemic and haemorrhagic strokes, and it is equally important in secondary prevention.

### Top 15 electorates for high blood pressure

■ Regional ■ Metropolitan

Rank	State	Electorate	Number of people with high blood pressure	% of population with high blood pressure
1	NSW	Lyne	33,783	21.8
2	NSW	Gilmore	33,566	20.8
3	NSW	Paterson	33,514	20.6
4	NSW	Cowper	34,756	20.6
5	QLD	Hinkler	30,858	20.6
6	NSW	Page	35,051	20.5
7	NSW	Richmond	33,633	20.5
8	VIC	Flinders	32,849	20.4
9	QLD	Wide Bay	30,475	20.4
10	SA	Hindmarsh	33,578	20.1
11	NSW	Robertson	31,055	20.1
12	NSW	Eden-Monaro	31,626	20.0
13	SA	Boothby	31,965	19.9
14	VIC	Indi	27,695	19.9
15	NSW	Shortland	31,170	19.9

## Atrial fibrillation

More than 475,000 Australians across the country have an irregular heartbeat known as atrial fibrillation. Atrial fibrillation (AF) is associated with one in four strokes.<sup>9</sup>

Like high blood pressure, many people are unaware they suffer from AF and how serious the condition is. As a consequence, too few people are accessing life-saving treatments to control AF.

### Top 15 electorates for atrial fibrillation

■ Regional ■ Metropolitan

Rank	State	Electorate	Number of people with atrial fibrillation	% of population with atrial fibrillation
1	NSW	Lyne	4,693	3.0
2	NSW	Gilmore	4,452	2.8
3	QLD	Hinkler	4,094	2.7
4	NSW	Paterson	4,417	2.7
5	NSW	Page	4,582	2.7
6	NSW	Cowper	4,480	2.7
7	VIC	Flinders	4,254	2.6
8	NSW	Robertson	4,022	2.6
9	NSW	Richmond	4,247	2.6
10	SA	Hindmarsh	4,318	2.6
11	NSW	Shortland	3,987	2.5
12	VIC	Mallee	3,553	2.5
13	QLD	Wide Bay	3,762	2.5
14	SA	Boothby	4,039	2.5
15	SA	Sturt	4,169	2.5

## High cholesterol

More than 6.4 million Australians live with high cholesterol. High cholesterol (hyperlipidemia/dyslipidemia) contributes to blood vessel disease, which often leads to stroke. High-density lipoprotein ('good') cholesterol helps reduce cardiovascular disease risk, while low-density lipoprotein ('bad') cholesterol can increase risk.

Cholesterol comes from two sources – the food we eat (of which only 50 percent of the cholesterol may be absorbed) as well as that synthesised and metabolised in the body, mainly the liver, which is by far the greater amount. High cholesterol levels have been associated with ischaemic stroke – those caused by clots. Statins (a group of medicines that can help lower the level of bad cholesterol in the blood) are demonstrated to reduce the risk of stroke by about 20 percent.

### Top 15 electorates for high cholesterol

■ Regional ■ Metropolitan

Rank	State	Electorate	Number of people with high cholesterol	% of population with high cholesterol
1	NSW	Lyne	43,320	28.0
2	QLD	Wide Bay	41,727	27.9
3	NSW	Richmond	45,684	27.8
4	NSW	Eden-Monaro	43,883	27.7
5	TAS	Lyons	32,101	27.7
6	SA	Mayo	42,581	27.6
7	NSW	Cowper	46,593	27.6
8	NSW	Gilmore	44,299	27.5
9	VIC	Flinders	44,043	27.4
10	SA	Hindmarsh	45,681	27.4
11	NSW	Paterson	44,466	27.3
12	NSW	Page	46,601	27.3
13	QLD	Hinkler	40,952	27.3
14	VIC	Menzies	39,598	27.3
15	VIC	Indi	37,984	27.2

## Physical inactivity

Over 11 million Australians, or about 45 percent of the population, are considered physically inactive. The National Physical Activity Guidelines recommend Australians accumulate 2.5-5 hours of moderate physical activity or 1.25-2.5 hours of vigorous physical activity each week, and aim to be active on most, or preferably all days each week.

Insufficient physical activity may be linked to stroke, as well as to other risk factors such as being overweight and obese, having diabetes, high blood pressure and high cholesterol.

### Top 15 electorates for physical inactivity

■ Regional ■ Metropolitan

Rank	State	Electorate	Number of people physically inactive	% of population who are physically inactive
1	NSW	Sydney	98,451	49.0
2	SA	Hindmarsh	81,496	48.8
3	VIC	Melbourne Ports	85,730	48.3
4	NSW	Lyne	74,350	48.0
5	NSW	Wentworth	76,569	48.0
6	QLD	Moncrieff	80,683	47.9
7	VIC	Melbourne	103,477	47.9
8	SA	Sturt	79,384	47.7
9	SA	Boothby	76,721	47.7
10	VIC	Higgins	78,176	47.4
11	SA	Adelaide	86,081	47.4
12	VIC	Menzies	68,827	47.4
13	WA	Perth	76,186	47.4
14	NSW	Gilmore	76,196	47.3
15	VIC	Chisholm	81,378	47.2

# About this report

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 in Australia. This report follows the 2013 paper, the *Economic impact of stroke in Australia*, which estimated that stroke costs the Australian economy \$5 billion per year, including \$3 billion in lost productivity. Estimates of the impact of stroke by Federal electorate (2014) are also available.

Incidence reflects new stroke cases in a given year, whereas prevalence refers to the number of people living after a stroke (survivors) in a given year.

The rates (or proportions) for incidence, prevalence and mortality used in Deloitte Access Economics (2013) have been used again in this report to ensure consistency. Incidence rates were taken from Thrift<sup>10</sup> which was based on the North East Melbourne Stroke Study (NEMESIS)<sup>11</sup>.

Prevalence rates were taken from the fourth survey of Disability Ageing and Carers conducted by the Australian Bureau of Statistics (ABS). The survey provides detailed information on the self-reported prevalence of stroke by age and gender.

Mortality rates were derived from Begg<sup>12</sup> and ABS (2012a), whereby for each age-gender cohort, the percentage of the population who had stroke and died from it was compared to the percentage of the population who did not have stroke but died from other causes. The difference between the two percentages is the relative risk of death from stroke.

Risk factors for stroke data is obtained from the Australian Health Survey, 2011-12 (ABS, 2013), except for Atrial

Fibrillation, which is derived from Deloitte Access Economic (2011).

For the purpose of the report, Australian Electoral Commission geographic classifications of provincial and rural electorates have been combined under a regional banner. Inner metropolitan and outer metropolitan electorate classifications have been combined under a metropolitan banner. The Modified Monash Model is used by the Stroke Foundation to define metropolitan/regional splits for hospitals as part of national stroke audits.

**Please don't hesitate to contact Stroke Foundation Chief Executive Officer, Sharon McGowan [ceo@strokefoundation.org.au](mailto:ceo@strokefoundation.org.au) with any queries about this report.**

## References

- <sup>1</sup> Nadine E. Andrew, Monique Kilkenny, Rebecca Naylor, Tara Purvis, Erin Lalor, Natasha Moloczij, Dominique A. Cadilhac – Understanding long-term unmet needs in Australian survivors of stroke survivors (2014).
- <sup>2</sup> Stroke unit trialists' Collaboration. Organised inpatient (stroke unit) care for stroke. Cochrane Database of Syst Rev 2007.
- <sup>3</sup> Stroke Foundation Acute Services Audit 2015
- <sup>4</sup> Reid et al 2008
- <sup>5</sup> Stroke Foundation Rehabilitation Services Audit 2016
- <sup>6</sup> <http://myhealthycommunities.gov.au/our-reports/Life-expectancy-and-PAD/september-2016/view-the-data>
- <sup>7</sup> AIHW, Australia's Health
- <sup>8</sup> Law M, Morris J and Wald N (2009) – Use of blood pressure-lowering drugs in the prevention of cardiovascular disease: meta-analysis of 147 randomised trials in the context of expectations from prospective epidemiological studies BMJ 338:b1665.
- <sup>9</sup> Stroke Foundation, Price Waterhouse Coopers, The economic costs of Atrial Fibrillation in Australia, June 2011
- <sup>10</sup> Thrift A, Tong B, Senes S, Waters A-M, Lalor E 2012, "No Evidence for an Epidemic of Stroke with the Ageing of the population" *Neuroepidemiology* 2012;38:268–273.
- <sup>11</sup> As mentioned in Deloitte Access Economics (2014), NEMESIS defined stroke according to the World Health Organization definition as 'rapidly developing clinical signs of focal (or global) disturbance of cerebral function lasting more than 24 hours (unless interrupted by surgery or death) with no apparent cause other than of vascular origin. Therefore transient ischaemic attacks less than 24 hours and silent strokes are not measure in this report'.
- <sup>12</sup> Begg S, Vos T, Barker B, Stevenson C, Stanley L & Lopez A 2007, The burden of disease and injury in Australia 2003. PHE 82. Canberra: AIHW.



### How to get more involved

- Give time** – become a volunteer.
- Raise funds** – hold a community fundraising event.
- Speak up** – join our advocacy team.
- Leave a lasting legacy** – with a gift in your Will.
- Know your numbers** – check your health regularly.
- Stay informed** – keep up-to-date and share our message.

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### Contact us

- 1300 194 196**
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