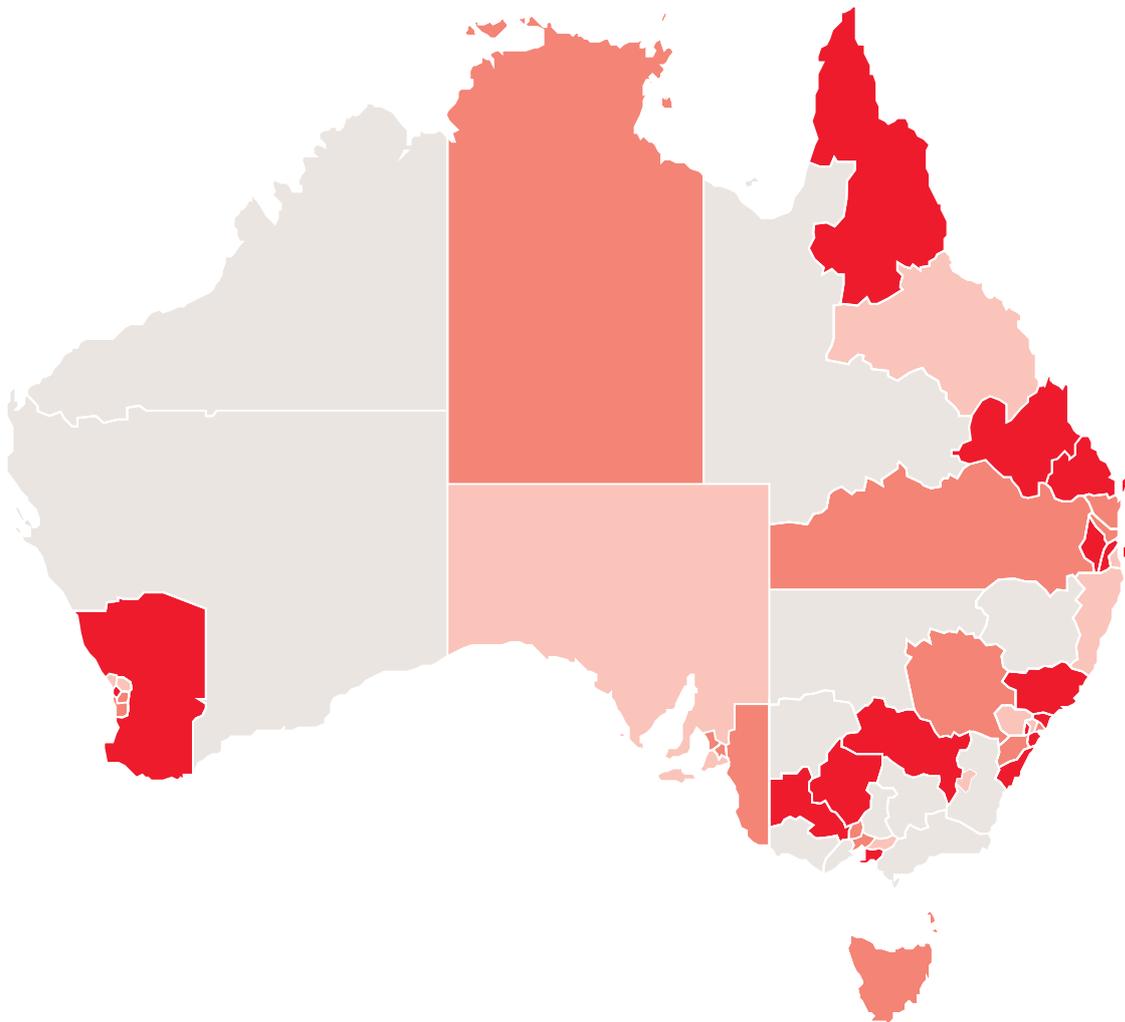


State of the Nation

2016 Kidney Health Week

Chronic Kidney Disease Hot Spots



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chronic kidney disease in Australia**

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Contents

Foreword	3
Burden of end stage kidney disease	4
Incidence	4
Prevalence	4
Cause of death	5
Burden of chronic kidney disease	6
CKD in Aboriginal and Torres Strait Islander peoples	7
Economic burden of chronic kidney disease	8
Hospitalisations	8
Cost of treatment	8
Chronic kidney disease hot spots	9
Hot spots for Aboriginal and Torres Strait Islander peoples	15
Acknowledgements	16

Foreword

“State of the Nation: Chronic Kidney Disease in Australia” is an annual opportunity to present up to date information to the public and to kidney stakeholders about what is happening in the kidney world. This report highlights trends over time in the delivery of dialysis and transplantation and draws on the remarkable and unique database known as the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) that has maintained records of all kidney failure patients treated since these treatments became available 50 years ago.

For the first time ever, this year the report also utilises previously unpublished data from the Australian Health Survey 2011-13 to identify the Top 20 Australian chronic kidney disease (CKD) hot spots, based on the proportion of the adult population within each Medicare Local catchment area with biomedical signs of CKD.

This data draws important attention to priority areas for community and clinical CKD education and awareness. It also enables policymakers to better target health interventions and fund the enablers for more effective and sustainable interventions.

Several caveats surrounding this data must be considered. The data is based on Medicare Local catchment areas, which have been superseded by Primary Health Networks. The Medicare Local data collection was restricted to urban and rural areas in all states and territories. This impacts most on the Northern Territory data, as 23 per cent of the population of this jurisdiction reside in Very remote areas, and research and primary care data has documented the heaviest CKD burden in these regions. Lastly, several of the estimates of CKD numbers and proportions have confidence intervals in the range of 25 per cent to 50 per cent, and therefore should be interpreted with caution.

This CKD hot spot report provides a preliminary insight into the areas of greatest need for CKD education, awareness and health services. A longer-term objective is to supplement this data with postcode-level analyses to identify the anticipated future hot spots for CKD. This data will be used to merge the CKD hot spot data with other chronic disease maps to create a comprehensive picture of the most commonly experienced chronic diseases in Australia (stroke, heart disease, diabetes and CKD), as well as look at the interaction with other socio-economic indicators.

State of the Nation is produced each year for release during Kidney Health Week. Copies are downloadable from www.kidney.org.au.

Dr Marie Ludlow (PhD)

General Manager Health Outcomes and Evaluation
Kidney Health Australia

Burden of end stage kidney disease

Incidence

Latest data from the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) show that in 2014, 2,610 people commenced kidney replacement therapy (dialysis or kidney transplant) for end stage kidney disease. The population-based incidence of new dialysis or kidney transplant patients in Australia each year has stabilised in the last decade (Figure 1). The pattern for Aboriginal and Torres Strait Islander¹ patients has shown more fluctuation, and incidence varies markedly by remoteness. Nationally, a trend towards stabilisation of incidence amongst Aboriginal and Torres Strait Islander people may be emerging.

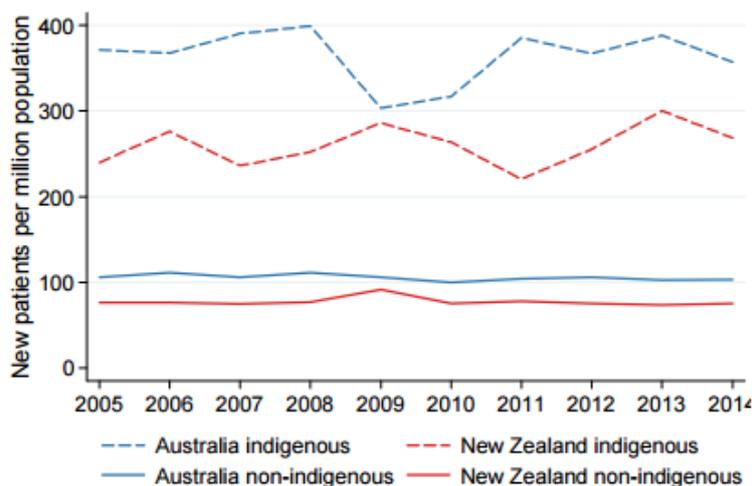


Figure 1. New kidney replacement therapy patients per million population in Australia, 2005-2014¹

Prevalence

The total number of people on dialysis or living with a kidney transplant continues to grow in Australia, although the growth has slowed in recent years (Figure 2). At the end of 2014 there were 22,234 people on dialysis or living with a transplant in Australia¹.

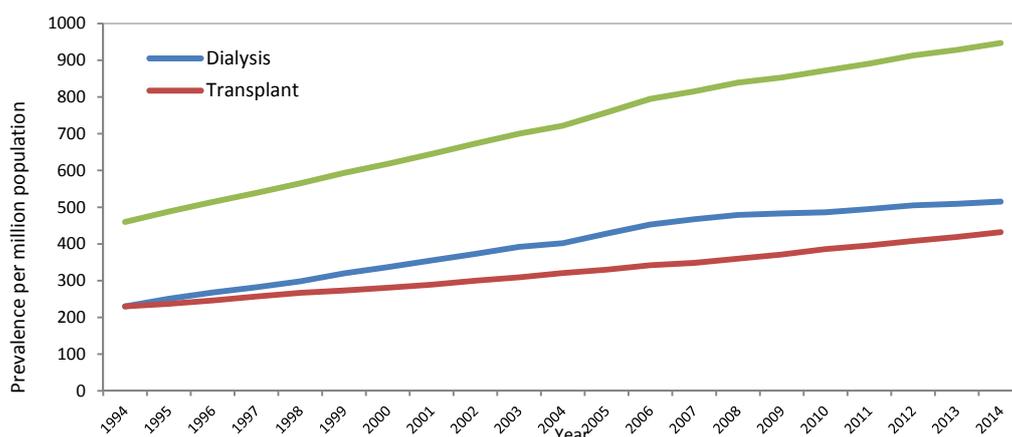


Figure 2. Prevalence (per million population) of kidney replacement therapy, 1994-2014¹

Projections forecast the number of people on dialysis and transplantation is expected to rise by 60 per cent between 2011 and 2020 (19,780 patients in 2011 to 31,589 in 2020), although the Australian population will only increase by 13 per cent over this period². The number of people whose end stage kidney disease is caused by diabetes is projected to double between 2011 and 2020. This is fuelled by recent research showing that globally the number of people with diabetes has nearly quadrupled since 1980³.

¹ The terms Aboriginal and Torres Strait Islander and Indigenous Australians are interchangeable in this report. The term Indigenous is used with reference and respect to Australian Aboriginal and Torres Strait Islanders.

Cause of death

In 2014, a total of 22,218 people died with kidney-related diseases. This equates to 60 people dying with kidney-related diseases every day, or one person dying every 25 minutes.⁴

Kidney and urinary diseases were the fifth most common cause of death mentioned on Australian death certificates, to which 15 per cent of deaths were attributable.

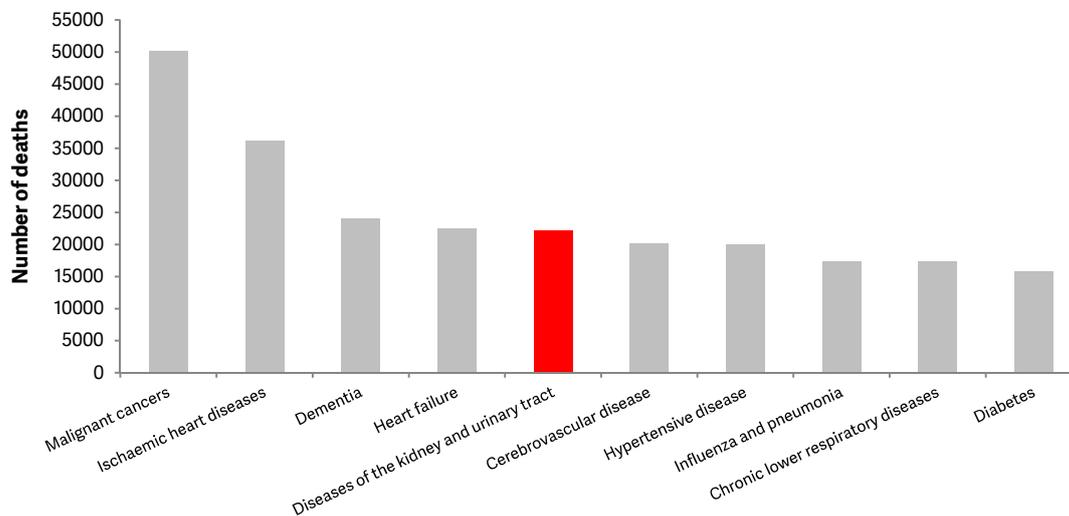


Figure 3. Selected multiple causes of death, 2014⁴

Someone with CKD is up to 20 times more likely to die from a heart attack or stroke than they are to progress to end stage kidney disease requiring dialysis or transplant⁵.

For people who do receive a transplant or go on to dialysis, the survival rate at five years is worse than most common cancers (Figure 9)⁶.

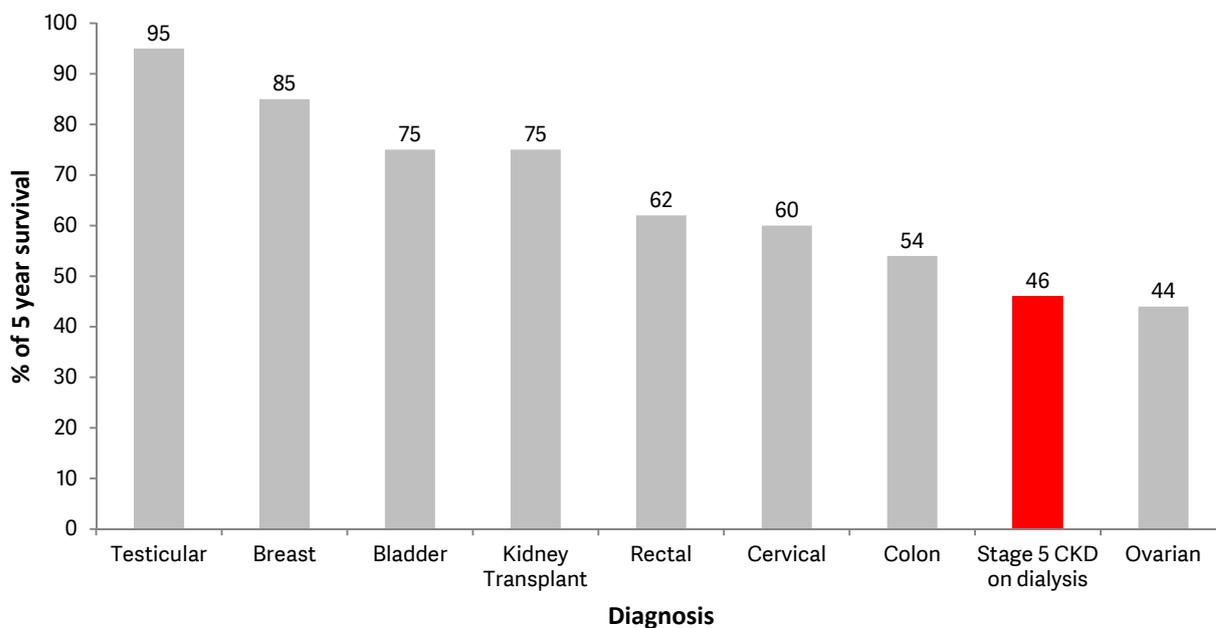


Figure 4. Five year survival of patients aged 60 years with common cancers compared with CKD⁶

Burden of chronic kidney disease

Australian population studies have estimated that every year at least 16,000 Australian adults will develop CKD⁷. The vast majority of these people will be unaware they have CKD, as it is a largely asymptomatic condition, and identification relies on opportunistic testing in people with identified risk factors.

Over 1.7 million Australian adults (1 in 10)⁸ are currently living with biomedical markers of CKD such as a reduced estimated glomerular filtration rate or protein in their urine. For Indigenous Australians, this figure is doubled to 1 in 5⁹ (See footnote²).

Figure 5 presents the number of adults (proportion of population) with biomedical signs of CKD. For non-Indigenous Australians, New South Wales, Victoria and Queensland experience the highest burden of CKD in terms of the number of people affected, and collectively these three states account for 80 per cent of the estimated burden of people with signs of CKD.

For Indigenous Australians, Queensland and New South Wales account for over half of the estimated burden of people with signs of CKD.

In terms of the proportion of the population with biomedical signs of CKD, for non-Indigenous Australians Tasmania experiences the highest burden (11.3 per cent versus the national average of 10 per cent).

For Indigenous Australians, the estimated proportion of the population with signs of CKD in the Northern Territory is almost double the national average (32.4 per cent versus 17.9 per cent).

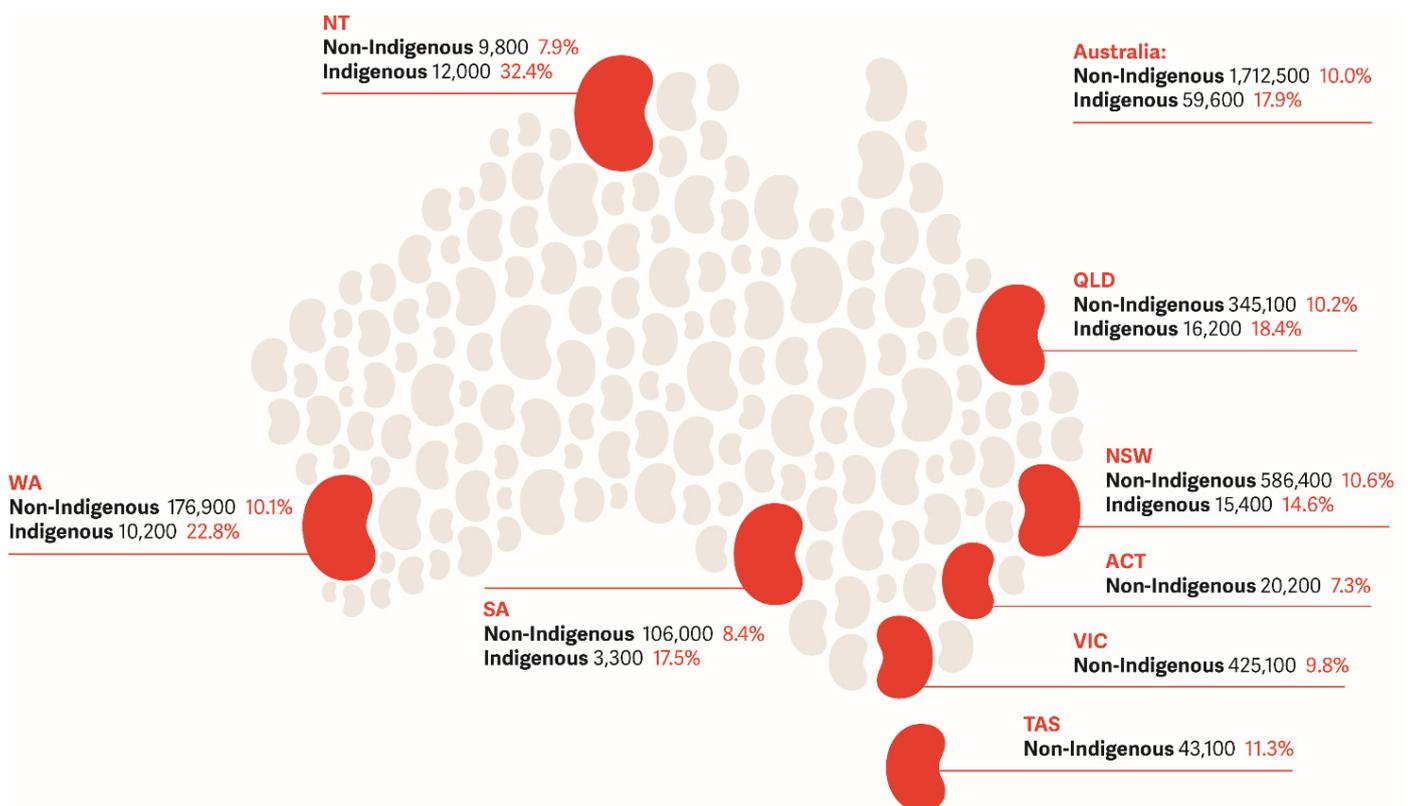


Figure 5. Living with signs of CKD – Number of people (proportion of population)⁸

² The 2011-13 Australian Health Survey recorded estimated glomerular filtration rate (eGFR) and urinary albumin creatinine ratio (ACR) in participants aged 18 years and over on a single occasion. While these results may indicate impaired kidney function, they cannot provide a diagnosis for kidney disease, as CKD can only be confirmed if abnormal results persist for at least three months. Data is derived from a sample of approximately 25,000 private dwellings across Australia. Very Remote areas of Australia and discrete Aboriginal and Torres Strait Islander communities (and the remainder of the Collection Districts in which these communities were located) were excluded. These exclusions are unlikely to affect national estimates, and will only have a minor effect on aggregate estimates produced for individual states and territories, except the Northern Territory where the population living in Very remote areas accounts for around 23 per cent of persons. Indigenous data is derived from the concomitant National Aboriginal and Torres Strait Islander Health Measures Survey of 3,300 Aboriginal and Torres Strait Islander adults across Australia.

CKD in Aboriginal and Torres Strait Islander peoples

An estimated 59,600 adults of Aboriginal or Torres Strait Islander origin (1 in 5) are living with biomedical markers of CKD⁹.

After taking age differences into account, Aboriginal and Torres Strait Islander people are more than twice as likely as non-Indigenous people to have indicators of CKD. They are three times as likely as their non-Indigenous counterparts to have indicators of Stage 1 CKD and more than four times as likely to have Stages 4–5⁹.

Among those Aboriginal and Torres Strait Islander people who have indicators of CKD, 11.2 per cent self-reported having the condition. Although this rate is significantly higher than that for the non-Indigenous population (where 6.0 per cent with indicators of chronic kidney disease self-reported having the condition), these results still indicate that around 90 per cent Aboriginal and Torres Strait Islander people with signs of CKD are not aware they have it.

Indigenous adults living in remote areas are more than twice as likely as those in non-remote areas to have signs of CKD (34 per cent compared with 13 per cent)^{9, 10}

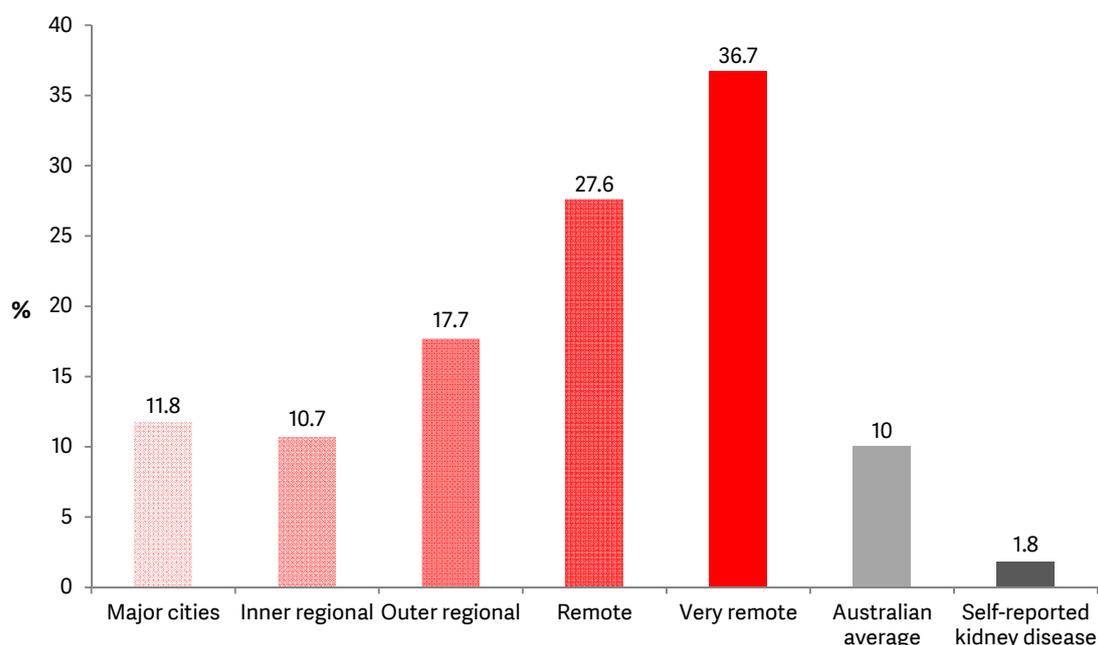


Figure 6. Aboriginal and Torres Strait Islander adults with signs of CKD by remoteness^{9, 10}

Economic burden of chronic kidney disease

Hospitalisations

Of the 10.2 million admissions to hospitals in 2014-15, dialysis for end stage kidney disease was the most common single reason for care (over 1.3 million admissions). Dialysis currently represents 13% of hospitalisations in Australia. Between 2010-11 and 2014-15, admissions for dialysis increased by 3.6 per cent on average each year¹¹.

Aboriginal and Torres Strait Islander peoples are admitted to hospital for dialysis at 12 times the rate for other Australians¹¹.

Cost of treatment

People with CKD incur 85 per cent higher healthcare costs and 50 per cent higher government subsidies than individuals without CKD. Even early stage CKD is associated with a 50 per cent increase in direct costs, with more advanced stages associated with a sixfold increase in expenditure¹².

In 2012, the total costs attributable solely to CKD were estimated at \$4.1 billion, made up of \$2.5 billion in direct healthcare costs, \$700 million in direct non-healthcare costs, and \$900 in government subsidies¹². Note that these costs are for pre end-stage kidney disease only, as people receiving dialysis or transplant were excluded from these cost estimates.

In Australia, dialysis and transplantation for ESKD are estimated to cost over \$1 billion each year. The cumulative cost of treating all current and new cases of end stage kidney disease from 2009 to 2020 is conservatively estimated to be between \$11.3 billion and \$12.3 billion (in 2009 dollars)¹³.

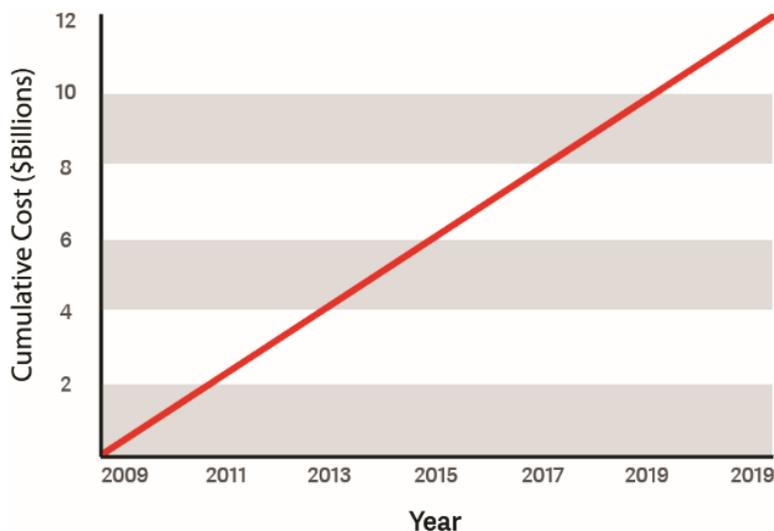


Figure 7. Projected treatment costs for all new and existing kidney patients¹³

Chronic kidney disease hot spots

Kidney Health Australia commissioned the Australian Bureau of Statistics to provide customised analyses of estimates and proportions of CKD stages according to Medicare Local catchment areas. Although Medicare Locals are no longer in operation, the boundary areas remain relevant for analysis of state and federal electorates, and Primary Health Network classifications. Medicare Local catchment areas also provide an opportunity to identify regions more generally, and are a basis for future work with other data that exists regarding health service delivery and chronic disease risk factors.

As stated previously in this report, this Medicare Local data is derived from a sample of approximately 25,000 private dwellings across Australia. Urban and rural areas in all states and territories were included, while Very Remote areas of Australia and discrete Aboriginal and Torres Strait Islander communities (and the remainder of the Collection Districts in which these communities were located) were excluded. These exclusions are unlikely to affect national estimates, and will only have a minor effect on aggregate estimates produced for individual states and territories, with the exception of the Northern Territory. In the Northern Territory the population living in Very Remote areas accounts for around 23 per cent of persons, and research and primary care data has documented the heaviest CKD burden in these regions.

Table 1 and Figure 8 present the Top 20 Medicare Locals in urban and rural areas with the highest proportion of people living with signs of CKD. All of these hot spots are associated with an estimated prevalence of CKD higher than the national average of ten per cent.

These 20 hot spots account for an estimated 48 per cent of the 1.7 million Australian adults with signs of CKD.

Hot spots – proportion of population affected

The significant hot spots areas based on the proportion of adults with signs of CKD are the Illawarra – Shoalhaven and the Inner West Sydney areas of NSW and the West Moreton-Oxley area west of Brisbane (QLD).

In the Illawarra – Shoalhaven Medicare Local, the estimated proportion of people with signs of CKD (19.5 per cent) is almost double the national average, and 45,000 individuals are potentially affected. Inner West Sydney and West Moreton-Oxley have the second and third highest proportions (16.7 and 16.4 per cent respectively) with almost 100,000 affected individuals residing in these areas.

Hot spots – number of adults affected

The significant hot spot areas based on the estimated number of adults with signs of CKD are in the south metropolitan area of Brisbane (QLD), the Hunter area north of Sydney (NSW) and the inner east area of Melbourne (VIC).

In the Greater Metro South Brisbane Medicare Local area alone it is estimated that there are over 96,000 adults living with signs of CKD. An additional 74,500 adults with signs of CKD reside in the Hunter Medicare Local, and a further 63,200 individuals with signs of CKD are located in the Inner East Melbourne Medicare Local.

The full list of 61 Medicare Local catchments by state/territory is presented in Table 2.

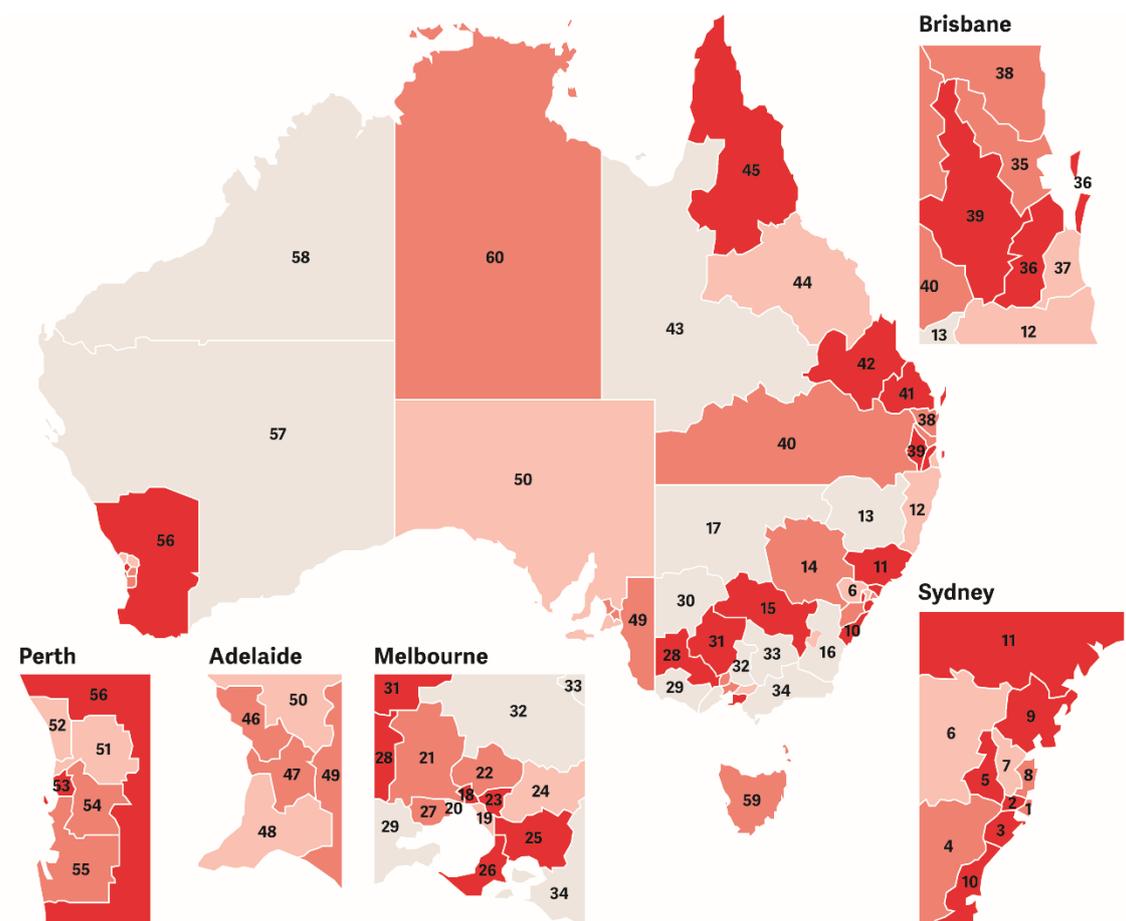
Table 1. Top 20 Medicare Local catchment urban and rural areas with the highest proportion of the adult population with biomedical signs of CKD¹³

Rank	State	Medicare Local (code)	Primary Health Network (PHN)	Selected included towns	Includes part or all of the following federal 2016 electorates	Proportion of adult population with biomedical signs of CKD stage 1-5	Estimated number of adults with biomedical signs of CKD stage 1-5
1	NSW	Illawarra – Shoalhaven (10)	South Eastern NSW	Wollongong, Nowra and Ulladulla	Whitlam Gillmore Cunningham	19.5*	45,000
2	NSW	Inner West Sydney (2)	Central and Eastern Sydney	Homebush, Tempe and Rozelle	Sydney Grayndler Watson Barton Banks*	16.7*	62,600
3	QLD	West Moreton – Oxley (39)	Darling Downs and West Moreton	Ipswich, Lockyer Valley, Scenic Rim and Somerset	Wright Blair Moreton Oxley Ryan	16.4*	34,300
4	VIC	Frankston – Mornington Peninsula (26)	South Eastern Melbourne	Frankston, Portsea and Finders	Flinders Dunkley	14.9*	29,100
5	WA	Fremantle (53)	Perth South	Fremantle, Coogee and Hammond Park	Freemantle Tangney	14.5	30,600
6	NSW	South Eastern Sydney (3)	Central and Eastern Sydney	Sutherland, Heathcote, Kogarah and Riverwood	Barton Cook Banks Hughes	14.2*	46,900
7	VIC	Inner East Melbourne (23)	Eastern Melbourne	Oakleigh, Hawthorn and Park Orchards	Chisholm Kooyong Higgins Bruce Menzies Deakin Hotham	13.8*	63,200
8	WA	South West WA (56)	Country WA	Margaret River, Albany, Mouroubra and Merridin	Pearce Forrest Durack Canning O'Connor	13.8	34,600
9	VIC	South Eastern Melbourne (25)	South Eastern Melbourne	Dandenong, Tonimbuk and Caldermeade	Bruce Hotham Holt Latrobe Isaacs Flinders McMillan	13.7*	50,700
10	VIC	Grampians (28)	Western Victoria	Nhill, Warracknabeal and Ballarat	Ballarat Mallee Wannon Corangamite*	13.5*	21,800

11	VIC	Loddon – Mallee – Murray (31)	Murray	Donald, Echuca and Bendigo	Bendigo Mallee Murray Farrer	13.5*	16,500
12	QLD	Central Queensland (42)	Central Queensland, Wide Bay, Sunshine Coast	Rockhampton, Emerald and Eurombah	Capricornia Flynn	13.0	24,100
13	NSW	Murrumbidgee (15)	Murrumbidgee	Wagga Wagga, Griffith, Hay and West Wyalong	Parke Hume Farrer Riverina Eden-Monaro [#]	12.9*	23,900
14	VIC	Inner North West Melbourne (18)	North Western Melbourne	Melbourne CBD, Brunswick and Glenroy	Batman Maribyrnong Melbourne Wills Melbourne Ports	12.5*	47,000
15	QLD	Far North Queensland (45)	Northern Queensland	Cape York Peninsula, Thursday Island and Mission Beach	Kennedy Leichhardt	12.5*	15,700
16	QLD	Wide Bay (41)	Central Queensland, Wide Bay, Sunshine Coast	Bundaberg, Maryborough and Mundubbera	Flynn Hinkler Wide Bay	12.3*	16,100
17	NSW	Hunter (11)	Hunter New England and Central Coast	Forster, Muswellbrook and Cassilis	Hunter Shortland Lyne Newcastle Paterson New England	12.1	74,500
18	NSW	Western Sydney (5)	Western Sydney	Parramatta, Blacktown and Maroota	Berowra Parramatta Greenway Chifley Mitchell Reid Bennelong Blaxland McMahon	12.0*	50,600
19	QLD	Greater Metro South Brisbane (36)	Brisbane South	Woolloongabba, North Stradbroke Island and Beaudesert	Bonner Bowman Forde Griffith Moreton Oxley Rankin Wright	11.9	96,200
20	NSW	Central Coast NSW (9)	Hunter New England and Central Coast	Gosford, The Entrance and Kulnura	Robertson Dobell Shortland	11.9*	32,700

* Estimate has a relative standard error between 25 per cent and 50 per cent and should be used with caution

Only a small populated area of the electorate falls within the Medicare Local



Legend

- ≥ 12% of population with signs of chronic kidney disease
- 8-11% of population with signs of chronic kidney disease
- ≤ 7% of population with signs of chronic kidney disease
- No data available

Medicare Local Areas

New South Wales

- 1 Eastern Sydney
- 2 Inner West Sydney
- 3 South Eastern Sydney
- 4 South Western Sydney
- 5 Western Sydney
- 6 Nepean–Blue Mountains
- 7 Northern Sydney
- 8 Sydney North Shore & Beaches
- 9 Central Coast NSW
- 10 Illawarra–Shoalhaven
- 11 Hunter
- 12 North Coast NSW
- 13 New England
- 14 Western NSW
- 15 Murrumbidgee
- 16 Southern NSW
- 17 Far West NSW

Victoria

- 18 Inner North West Melbourne
- 19 Bayside
- 20 South Western Melbourne
- 21 Macedon Ranges & North Western Melbourne
- 22 Northern Melbourne

Queensland

- 23 Inner East Melbourne
- 24 Eastern Melbourne
- 25 South Eastern Melbourne
- 26 Frankston–Mornington Peninsula
- 27 Barwon
- 28 Grampians
- 29 Great South Coast
- 30 Lower Murray
- 31 Loddon–Mallee–Murray
- 32 Hume
- 33 Goulburn Valley
- 34 Gippsland
- 35 Metro North Brisbane
- 36 Greater Metro South Brisbane
- 37 Gold Coast
- 38 Sunshine Coast
- 39 West Moreton–Oxley
- 40 Darling Downs–South West Queensland
- 41 Wide Bay
- 42 Central Queensland
- 43 Central and North West QLD
- 44 Townsville–Mackay
- 45 Far North Queensland

Adelaide

- 46 Northern Adelaide
- 47 Central Adelaide & Hills
- 48 Southern Adelaide–Fleurieu–Kangaroo Island
- 49 Country South SA
- 50 Country North SA

Western Australia

- 51 Perth Central & East Metro
- 52 Perth North Metro
- 53 Fremantle
- 54 Bentley–Armadale
- 55 Perth South Coastal
- 56 South West WA
- 57 Goldfields–Midwest
- 58 Kimberley–Pilbara

Tasmania

- 59 Tasmania

Northern Territory

- 60 Northern Territory

Australian Capital Territory

- 61 Australian Capital Territory

Figure 8. Medicare Local urban and rural hot spots³

³ Hot spots are based on the proportion of the population with signs of CKD for Australian urban and rural Medicare Local catchment areas. Data was not available for all urban and rural Medicare Local areas due to high confidence intervals (detailed in Table 2). Note that Medicare Local catchment areas have been superseded by Primary Health Networks (PHNs). Detailed PHN and federal electorate information is presented in Table 1.

Table 2. Proportions and estimates of the adult population with signs of CKD by Medicare Local urban and rural catchment area^{9, 14}

Medicare Local (code)	Proportion of adult population with biomedical signs of CKD stage 1-5	Estimated number of adults with biomedical signs of CKD stage 1-5
AUSTRALIA TOTAL	10.0	1,712,500
AUSTRALIAN INDIGENOUS TOTAL	17.9	59,600
New South Wales Total	10.6	586,400
New South Wales Indigenous Total	14.6	15,400
Illawarra – Shoalhaven (10)	19.5*	45,000
Inner West Sydney (2)	16.7*	62,600
South Eastern Sydney (3)	14.2*	46,900
Murrumbidgee (15)	12.9*	23,900
Hunter (11)	12.1	74,500
Western Sydney (5)	12.0*	50,600
Central Coast NSW (9)	12.0*	32,700
Eastern Sydney (1)	9.7*	38,200
South Western Sydney (4)	9.0*	57,800
Western NSW (14)	8.9*	14,000
Sydney North Shore and Beaches (8)	8.0*	33,800
Northern Sydney (7)	7.0*	33,000
North Coast NSW (12)	5.9*	26,100
Nepean – Blue Mountains (6)	5.6*	11,500
New England (13)	np	np
Southern NSW (16)	np	np
Far West NSW (17)	np	np
Northern Territory Total**	7.9	9,800
Northern Territory Indigenous Total	32.4	12,000
Northern Territory (60)	7.9	9,800
Australian Capital Territory Total**	7.3	20,200
Australian Capital Territory (61)	7.3	20,200
Victoria Total	9.8	425,100
Frankston – Mornington Peninsula (26)	14.9*	29,100
Inner East Melbourne (23)	13.8*	63,200
South Eastern Melbourne (25)	13.7*	50,700
Grampians (28)	13.5*	21,800
Loddon – Mallee – Murray (31)	13.5*	16,500
Inner North West Melbourne (18)	12.5*	47,000
Barwon (27)	11.0*	29,100
Macedon Ranges and North Western Melbourne (21)	10.5*	28,400
Northern Melbourne (22)	8.7*	47,300
Eastern Melbourne (24)	7.0*	19,400
Bayside (19)	5.4*	27,500
South Western Melbourne (20)	np	np
Great South Coast (29)	np	np
Lower Murray (30)	np	np
Hume (32)	np	np
Goulburn Valley (33)	np	np
Gippsland (34)	np	np
South Australia Total	8.4	106,100
South Australia Indigenous Total	17.5	3,300
Country South (49)	11.4*	11,300
Central Adelaide and Hills (47)	9.2	36,900
Northern Adelaide (46)	8.0	23,600
Southern Adelaide – Fleurieu – Kangaroo Island (48)	7.7	27,800
Country North (50)	5.8*	6,500

Queensland Total	10.2	345,100
Queensland Indigenous Total	18.4	16,200
West Moreton – Oxley (39)	16.4*	34,300
Central Queensland (42)	13.0	24,100
Far North Queensland (45)	12.5*	15,700
Wide Bay (41)	12.3*	16,100
Greater Metro South Brisbane (36)	12.0	96,200
Sunshine Coast (38)	11.4	33,200
Darling Downs – South West Queensland (40)	11.4*	36,000
Metro North Brisbane (35)	8.6	59,900
Gold Coast (37)	5.7	21,500
Townsville – Mackay (44)	3.0*	8,100
Central and North West Queensland (43)	np	np
Western Australia Total	10.1	176,900
Western Australia Indigenous Total	22.8	10,200
Fremantle (53)	14.5	30,600
South West WA (56)	13.8	34,600
Bentley – Armadale (54)	11.4	36,400
Perth South Coastal (55)	11.2	22,300
Perth North Metro (52)	7.1*	24,300
Perth Central East Metro (51)	6.3*	23,600
Goldfields – Midwest (57)	np	np
Kimberley – Pilbara (58)	np	np
Tasmania Total**	11.3	43,100
Tasmania (59)	11.3	43,100

* Estimate has a relative standard error between 25 per cent and 50 per cent and should be used with caution

** State/territory consist of one Medicare Local

np = not suitable for publication as estimate had a relative standard error greater than 50 per cent

Hot spots for Aboriginal and Torres Strait Islander peoples

The analysis of signs of CKD for each Medicare Local catchment area was not able to be calculated for Aboriginal and Torres Strait Islander peoples due to the high confidence intervals surrounding the estimates.

Across Australia, rates of Indigenous adults living with signs of CKD in Very remote (37 per cent) and Remote areas (28 per cent) are much higher than those for Indigenous adults living in Major cities (12 per cent) or Inner regional areas (13 per cent)⁹.

Previous mapping exercises utilising postcode of usual residence have revealed that the incidence of end stage kidney disease among Indigenous Australians is highest in the remote regions of Tennant Creek, Aputula and Jabiru in the Northern Territory, Warburton and Kalgoorlie in Western Australia, and Ceduna in South Australia¹⁵.

The geographical distribution of Aboriginal and Torres Strait Islander peoples receiving treatment for end stage kidney disease is also depicted in Figure 9. This map shows the number of Aboriginal and Torres Strait Islander peoples on dialysis in 2014, by statistical subdivision (SSD)¹.

Australian SSDs are defined as socially and economically homogeneous regions characterised by identifiable links between the inhabitants. The statistical subdivision was obtained by mapping postcodes of residence for people when they start dialysis to SSD (some postcodes were distributed over more than one SSD).

Note that postcode of residence at the start of dialysis treatment is an imperfect indicator of the usual place of residence. People from remote areas are often required to relocate to a major regional centre to access dialysis services. Research has shown that 78 per cent of patients in remote areas have to relocate to access end stage kidney disease treatment, compared with 39 per cent of those who live in rural areas and 15 per cent of urban Indigenous end stage kidney disease patients.

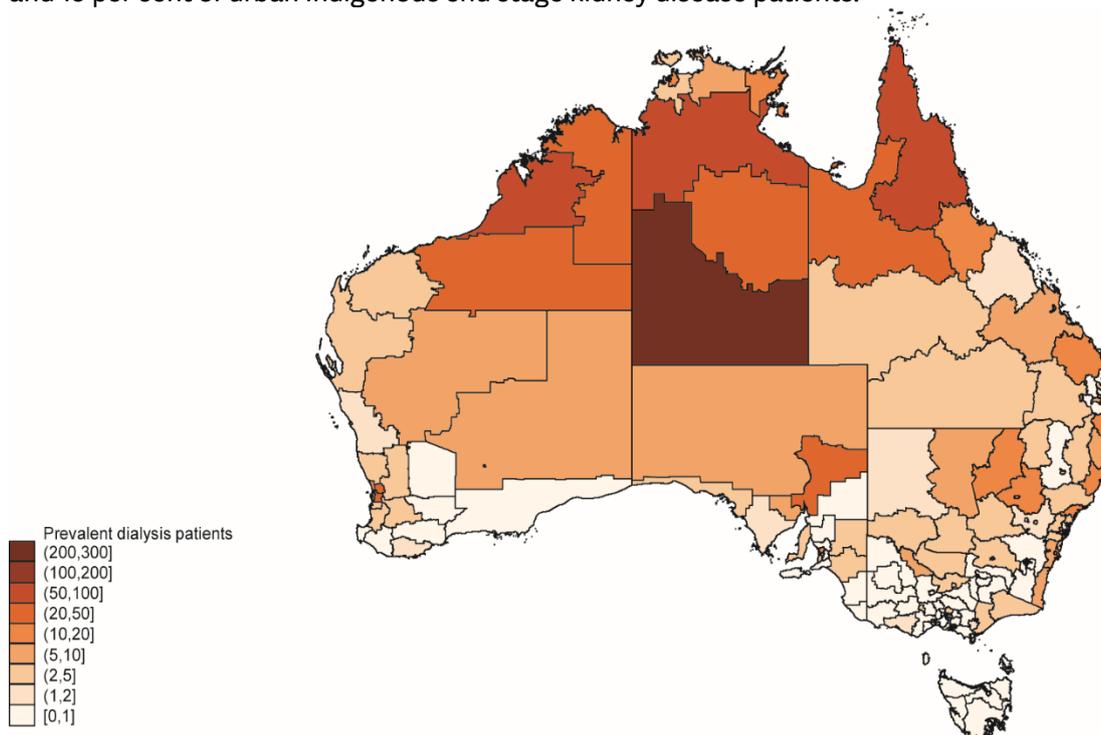


Figure 9. Prevalent Aboriginal and Torres Strait Islander dialysis patients in 2014 by statistical subdivision⁴

⁴ Image is courtesy of the ANZDATA Registry and mapping data are courtesy of the Australian Bureau of Statistics.

Acknowledgements

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