CHAPTER 10

End Stage Kidney Disease in Aboriginal and Torres Strait Islander Australians

Reporting the incidence, prevalence and survival of Aboriginal and Torres Strait Islander Australians receiving renal replacement.

Contents

Executive Summary

In this chapter, the rates and practice patterns for end-stage kidney disease for people identifying as Aboriginal and Torres Strait Islander living in Australia are reported. We acknowledge the distinctiveness of many nations of Aboriginal and Torres Strait Islander peoples, and respectfully refer to them as Indigenous Australians within this report. Self-identified ethnicity is reported by renal units on behalf of patients.

Denominator population statistics are stratified by ethnicity. For example, the incidence of renal replacement therapy (RRT) for Indigenous Australians includes the Indigenous Australian population as the denominator. Denominator populations are not age standardised. Notably, Indigenous and non-Indigenous populations possess different age structures: Indigenous populations tend to be younger and demonstrate onset of long-term conditions at ages 10-20 years younger than non-Indigenous communities.

Suggested Citation

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New Patients

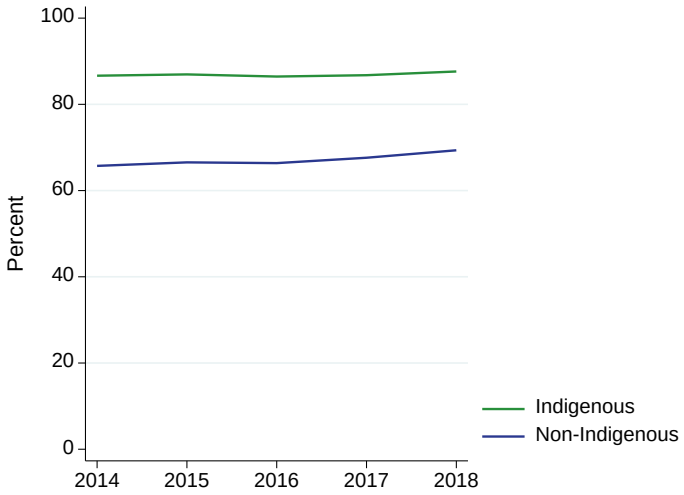
A total of 281 Aboriginal and 19 Torres Strait Islander people (n=305 total of Indigenous Australians) commenced dialysis in Australia during 2018 (table 10.1). The majority (88%) were treated with haemodialysis as their initial RRT modality (figure 10.1). Two pre-emptive kidney transplants were accessed by Indigenous Australians in 2018.

Haemodialysis incidence was approximately four-fold higher for Indigenous Australians (324 pmp) than for non-Indigenous Australians (77 pmp). Only 12% of Indigenous Australians accessed peritoneal dialysis as first treatment compared with over one-quarter of non-Indigenous Australians.

Table 10.1 New Patients (pmp) Australia 2014-2018

Year	Modality	Non-Indigenous	Indigenous	Total
2014	HD	1584 (70)	266 (347)	**1850 (79)**
	PD	743 (33)	37 (48)	**780 (33)**
	Graft	83 (4)	4 (5)	**87 (4)**
2015	HD	1581 (69)	253 (323)	**1834 (77)**
	PD	710 (31)	37 (47)	**747 (31)**
	Graft	85 (4)	1 (1)	**86 (4)**
2016	HD	1626 (70)	268 (336)	**1894 (78)**
	PD	743 (32)	41 (51)	**784 (32)**
	Graft	81 (3)	1 (1)	**82 (3)**
2017	HD	1804 (76)	308 (378)	**2112 (86)**
	PD	743 (31)	47 (58)	**790 (32)**
	Graft	121 (5)	0 (0)	**121 (5)**
2018	HD	1862 (77)	269 (324)	**2131 (85)**
	PD	732 (30)	36 (43)	**768 (31)**
	Graft	91 (4)	2 (2)	**93 (4)**

Figure 10.1 - Percentage of New Patients Commencing on Haemodialysis – Australia



Primary Renal Disease

The primary renal diseases of new Australian patients over 2014-2018 are shown in table 10.2. Indigenous patients experience diabetes at a substantially higher rate than non-Indigenous patients.

Table 10.2 Primary Renal Disease of New Patients Australia 2014-2018

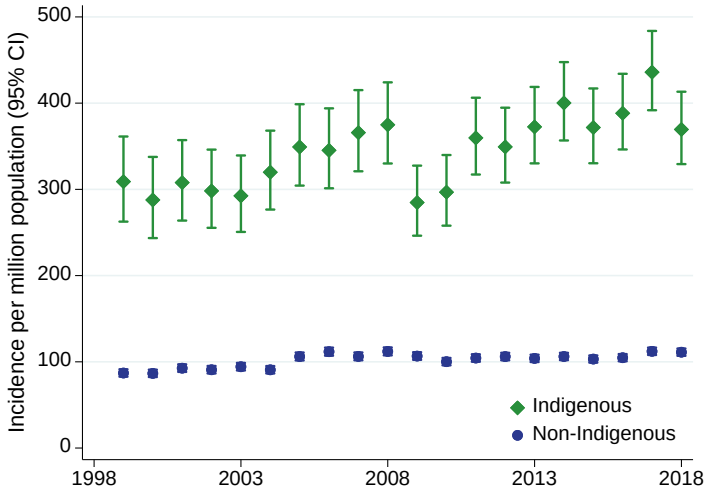
Primary Renal Disease	Non-Indigenous	Indigenous
Diabetic Nephropathy	4316 (34%)	1080 (69%)
Glomerulonephritis	2387 (19%)	163 (10%)
Hypertension	1800 (14%)	110 (7%)
Polycystic Disease	894 (7%)	11 (1%)
Reflux Nephropathy	274 (2%)	16 (1%)
Other	1981 (16%)	96 (6%)
Uncertain	678 (5%)	46 (3%)
Not reported	259 (2%)	48 (3%)
Total	**12589**	**1570**

Incidence Rates

Overall, the incidence rates (per million of population) of end-stage kidney disease for Indigenous patients were markedly and persistently higher than those for non-Indigenous patients. The disparity is confounded and underestimated by the age distributions of each population - Indigenous populations are considerably younger.

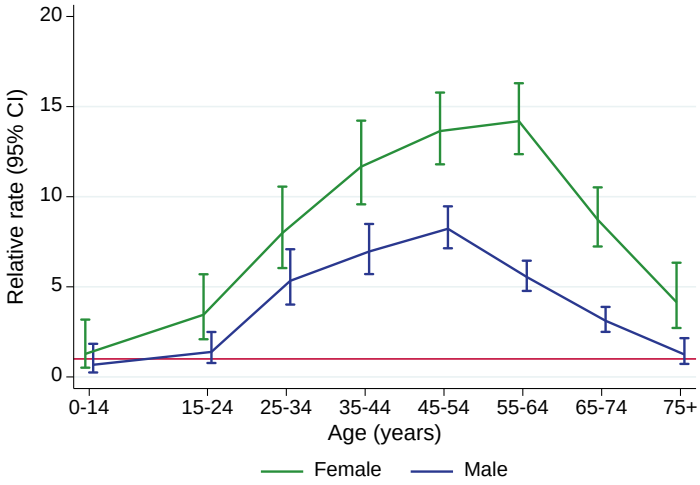
Although rates fluctuate from year to year, in Australia the incidence rate among Indigenous people is slowly increasing (figure 10.2). The relative rate differs with age and also with gender - this is illustrated in figure 10.3.

Figure 10.2 - Unadjusted Incident RRT Rate – Australia



Indigenous Australians experience higher rates of end-stage kidney disease at all ages. This disparity is particularly evident for Indigenous women and is also particularly marked even in the second and third decades of life for both men and women (figure 10.3).

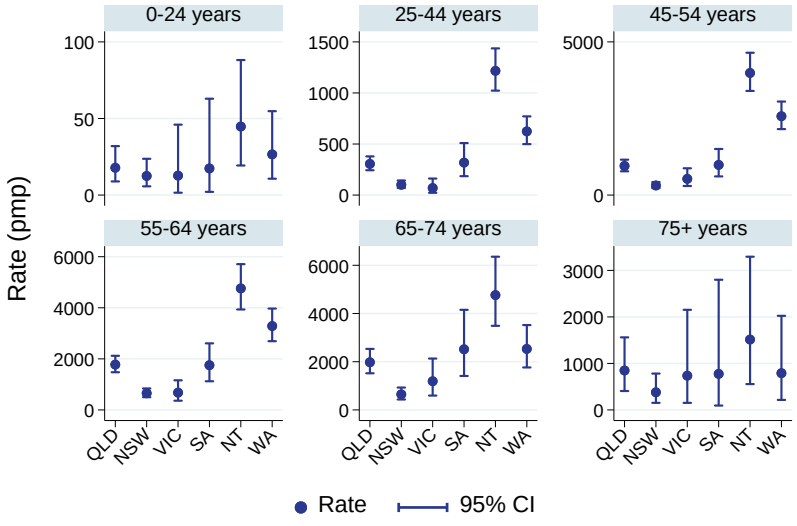
Figure 10.3 - Relative Incidence Rate of Treated ESKD for Indigenous Patients by Gender - Australia 2014-2018



There is also considerable variation in the incidence of renal replacement therapy for Indigenous Australians across Australian States and Territories (figure 10.4; note that the Y axis scales vary).

While rates for the very young (<25 years) and older (>75 years) groups are similar in each State/Territory, the rates for people 25-74 years of age show a clear trend of progressively higher rates from NSW/Victoria to Queensland then South Australia, Western Australia and the Northern Territory (highest). Data are shown for a five-year period given the small numbers in some locations.

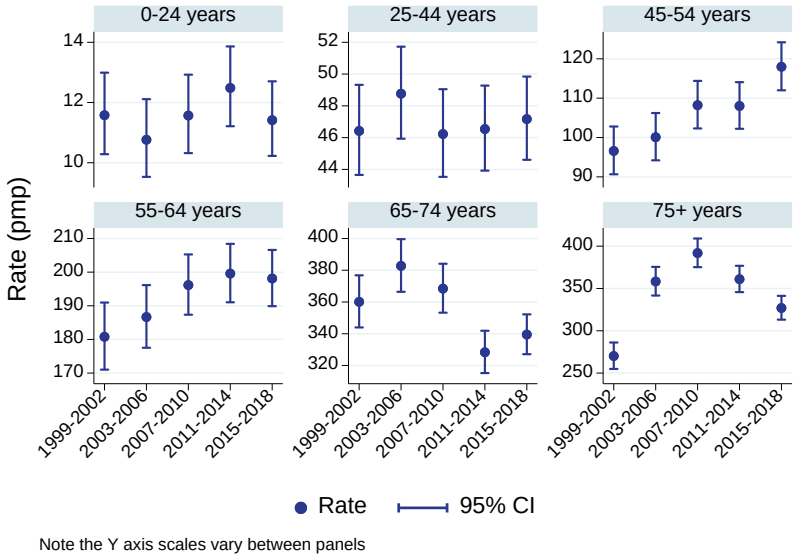
Figure 10.4 - Age-specific Incidence Rates of Treated ESKD - Among Indigenous Australians, by State and Age at RRT start 2014-2018



Note the Y axis scales vary between panels

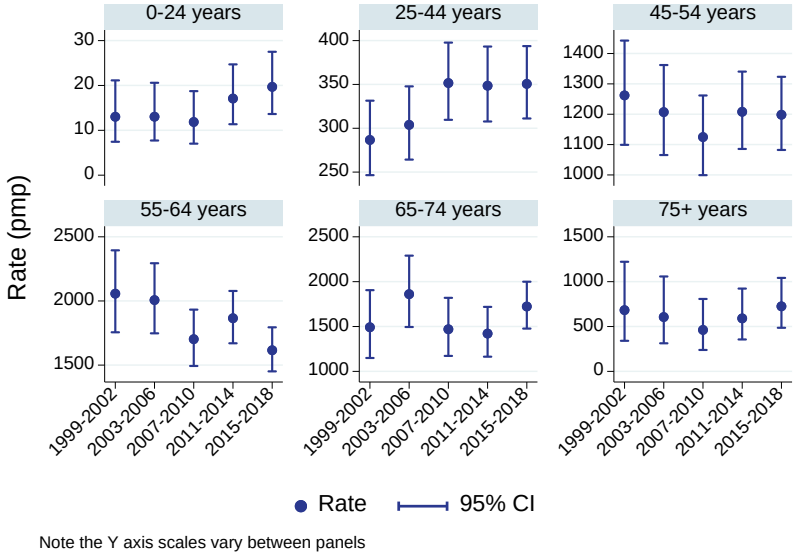
The patterns of age-specific incidence rates of RRT differ between Indigenous and non-Indigenous Australians. This difference is particularly marked among those aged 25-64 years (figure 10.5), where differences in y-axis indicates approximately 10-fold higher difference in Indigenous Australians in this age-range. There are a number of factors which contribute to incident numbers of RRT (among both Indigenous and non-Indigenous people). It is not clear whether the increase in that age group reflects the underlying rates of diabetes, rates of disease progression, referral patterns, or other diseases.

Figure 10.5.1 - Age-specific Incidence Rates of Treated ESKD - Non-Indigenous, Australia



Note the Y axis scales vary between panels

Figure 10.5.2 - Age-specific Incidence Rates of Treated ESKD - Indigenous, Australia



Note the Y axis scales vary between panels

Prevalent Patients

The number of Indigenous Australians with treated end-stage kidney disease at the end of 2018 increased from 2145 persons in 2017 to 2224 persons (table 10.3).

There were marked differences in treatment modalities for Indigenous Australians (figures 10.6 and 10.7). Most Indigenous Australians were treated with facility-based haemodialysis (76%), with very few accessing home haemodialysis (6%), long-term peritoneal dialysis (7%), or kidney transplantation (13%). The proportion of Indigenous Australians with a kidney transplant as long-term treatment for end-stage kidney disease was 13% during 2018 compared with half (51%) of non-Indigenous Australians. Only 6% of Indigenous Australians accessed home-based haemodialysis compared with 11% of non-Indigenous Australians.

Table 10.3 Prevalent Patients by Ethnicity and Treatment Modality Australia 2014-2018

Year	Modality	Non-Indigenous	Indigenous
2014	HD	8286 (41%)	1450 (80%)
	% HD at home	13%	8%
	PD	2330 (11%)	150 (8%)
	Tx	9817 (48%)	219 (12%)
2015	HD	8458 (40%)	1545 (81%)
	% HD at home	13%	7%
	PD	2347 (11%)	131 (7%)
	Tx	10176 (49%)	235 (12%)
2016	HD	8546 (40%)	1619 (81%)
	% HD at home	12%	6%
	PD	2267 (11%)	132 (7%)
	Tx	10677 (50%)	258 (13%)
2017	HD	8711 (39%)	1734 (81%)
	% HD at home	11%	6%
	PD	2236 (10%)	141 (7%)
	Tx	11199 (51%)	270 (13%)
2018	HD	9007 (39%)	1780 (80%)
	% HD at home	11%	6%
	PD	2235 (10%)	147 (7%)
	Tx	11742 (51%)	297 (13%)

Figure 10.6.1 - Prevalent Patients by Modality - Australia – Indigenous

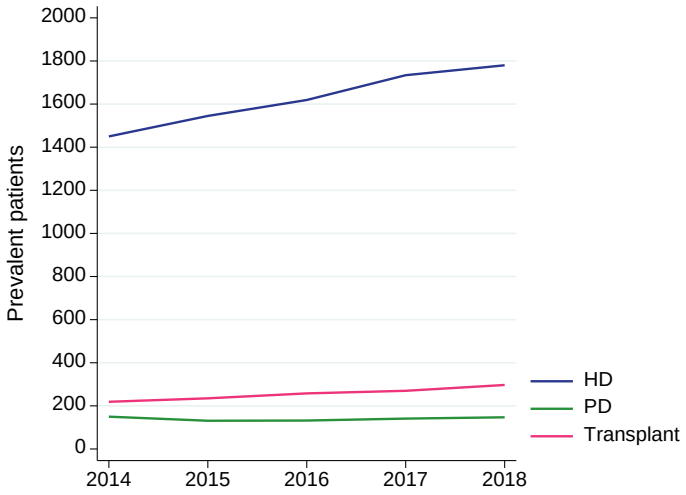


Figure 10.6.2 - Prevalent Patients by Modality - Australia - Non-Indigenous

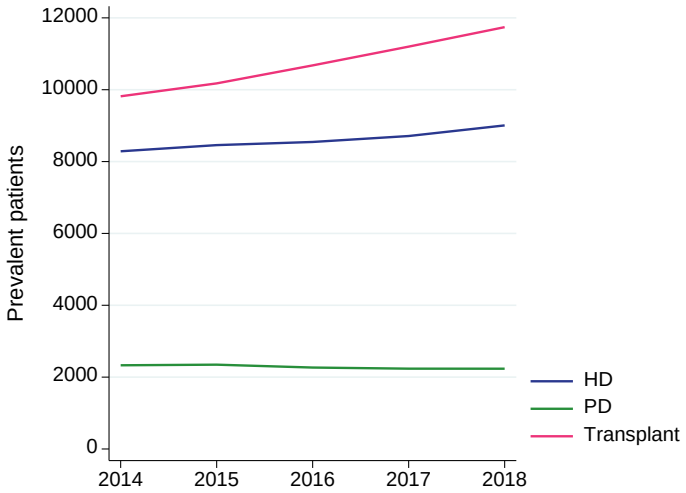
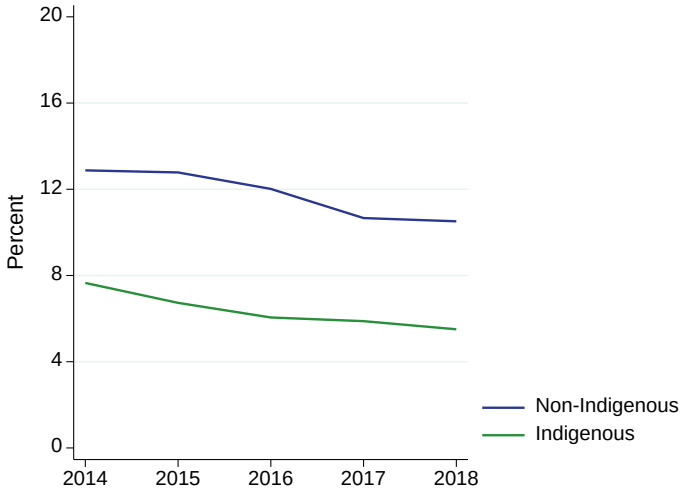


Figure 10.7 - Prevalent Haemodialysis at Home by Ethnicity – Australia



Transplantation

In Australia, the proportion of Indigenous patients who receive a kidney transplant is very low (table 10.4). Information on donor type is shown in figure 10.8 and trends are shown in figure 10.9. There are substantially lower rates of living donation for Indigenous Australians.

Table 10.4 Number of Transplant Recipients (pmp) by Ethnicity Australia 2009-2018

Year	Donor Type	Non-Indigenous	Indigenous
2009	**DD**	426 (20)	20 (29)
	LD	323 (15)	4 (6)
	Total	**749 (36)**	**24 (35)**
2010	**DD**	522 (24)	28 (40)
	LD	296 (14)	0 (0)
	Total	**818 (38)**	**28 (40)**
2011	**DD**	544 (25)	26 (36)
	LD	252 (12)	2 (3)
	Total	**796 (37)**	**28 (39)**
2012	**DD**	587 (27)	20 (27)
	LD	233 (11)	0 (0)
	Total	**820 (37)**	**20 (27)**
2013	**DD**	600 (27)	30 (40)
	LD	249 (11)	1 (1)
	Total	**849 (38)**	**31 (41)**
2014	**DD**	605 (27)	37 (48)
	LD	252 (11)	4 (5)
	Total	**857 (38)**	**41 (53)**
2015	**DD**	666 (29)	32 (41)
	LD	223 (10)	3 (4)
	Total	**889 (39)**	**35 (45)**
2016	**DD**	776 (33)	32 (40)
	LD	229 (10)	2 (3)
	Total	**1005 (43)**	**34 (43)**
2017	**DD**	786 (33)	32 (39)
	LD	258 (11)	2 (2)
	Total	**1044 (44)**	**34 (42)**
2018	**DD**	824 (34)	45 (54)
	LD	208 (9)	3 (4)
	Total	**1032 (43)**	**48 (58)**

Over the period 2009-2018 there has been a gradual increase in the number of deceased donor transplants overall, but this trend is less clear in the Australian Indigenous patients (figure 10.8). Numbers from living donors remain extremely low.

Figure 10.8 - Donor Type by Ethnicity - Australia 2009-2018

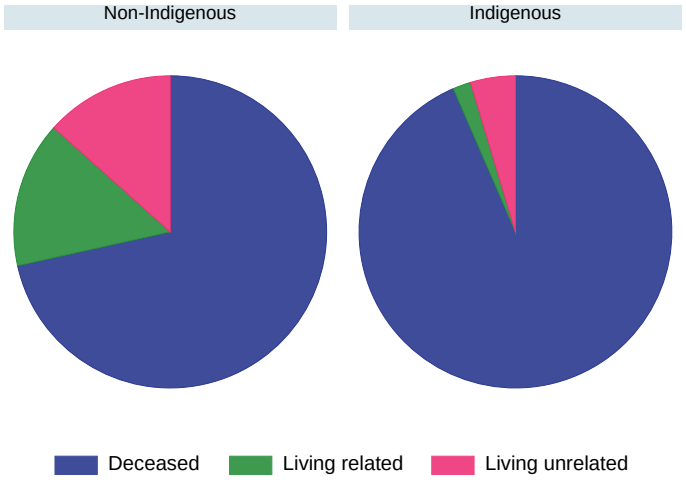


Figure 10.9 - Donor Type by Ethnicity and Year – Australia

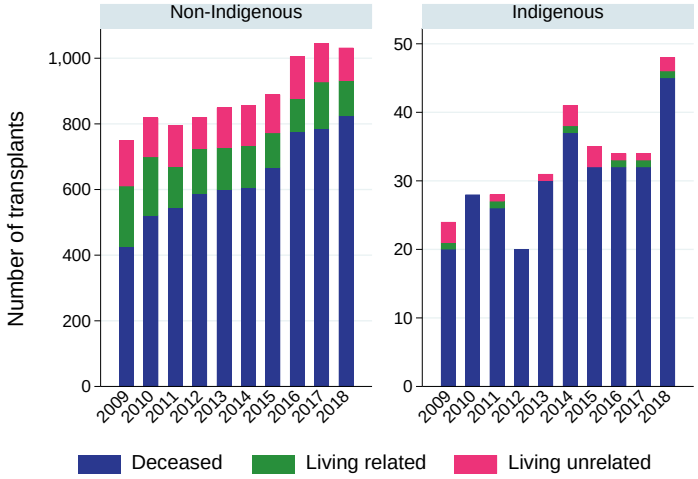
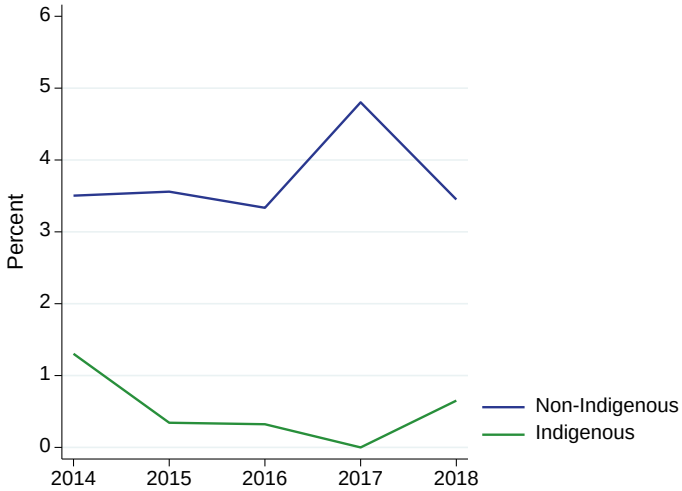


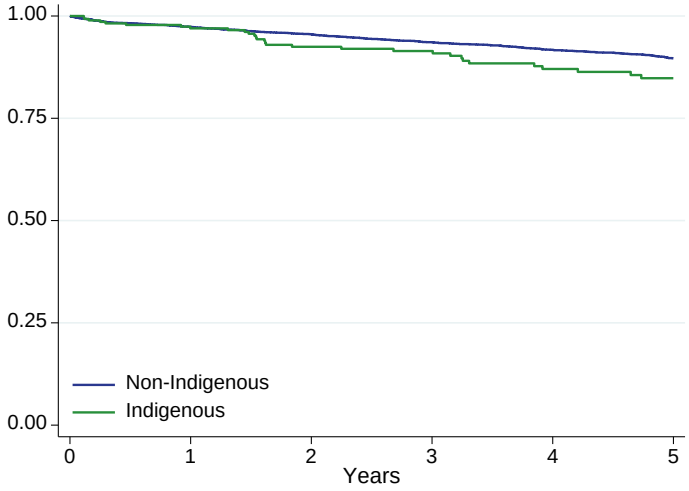
Figure 10.10 - Percentage of Patients Starting RRT with Pre-emptive Kidney Transplant – Australia



Transplant Survival

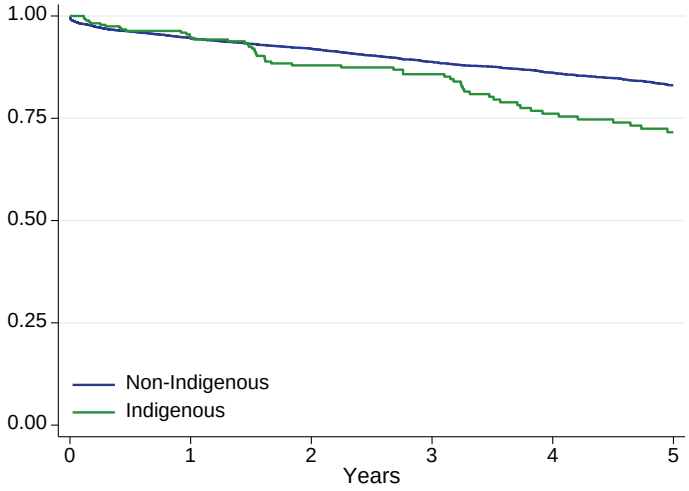
There is a difference in survival after kidney transplantation from a deceased donor between non-Indigenous and Indigenous recipients, which is apparent from approximately 1.5 years after transplantation. 85% of Indigenous Australians and 90% of non-Indigenous persons were alive five years after kidney transplantation from a deceased donor (figure 10.11).

Figure 10.11 - Primary DD Graft Patient Survival 2009-2018 – Australia



Over the first five years after kidney transplantation from a deceased donor, some kidney transplants have been lost either through the transplant failing or the patient dying with a functioning kidney. In the first year, there was no difference in the proportions of Indigenous and non-Indigenous recipients who experienced graft loss. Transplant kidney function at five years post-transplant was recorded in 72% of Indigenous recipients compared with 83% of non-Indigenous persons (figure 10.12).

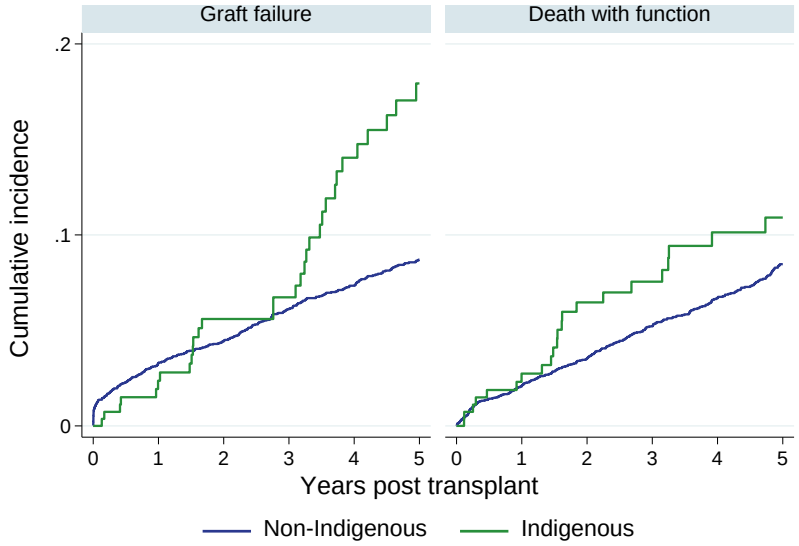
Figure 10.12 - Primary DD Overall Graft Survival 2009-2018 – Australia



Cumulative incidence curves (utilising competing risk techniques to account for the effects of both components of graft failure) are shown for Indigenous transplant outcomes in figure 10.13.

For Indigenous Australians, there are markedly higher rates of transplant loss, particularly evident beyond three years post-transplant. Indigenous Australians experience higher mortality rates after the first 1.5 years.

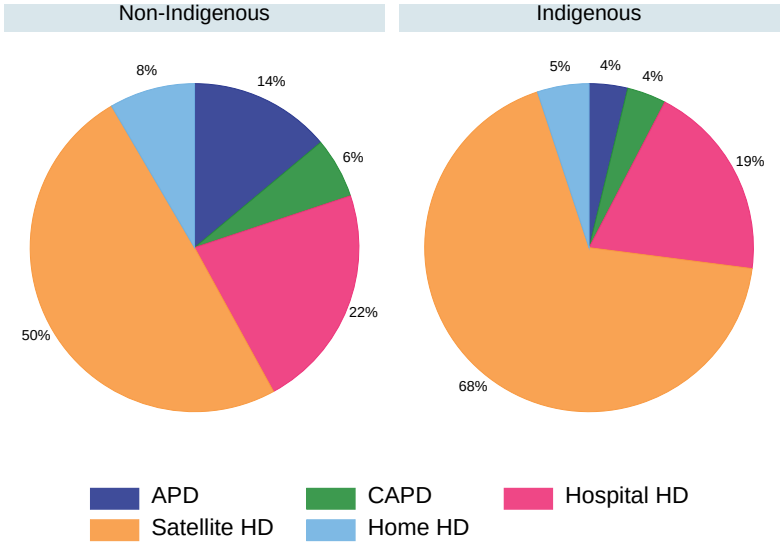
Figure 10.13 - Transplant Outcomes, Australia - Primary Deceased Donor Kidney-only Transplants 2009-2018



Dialysis

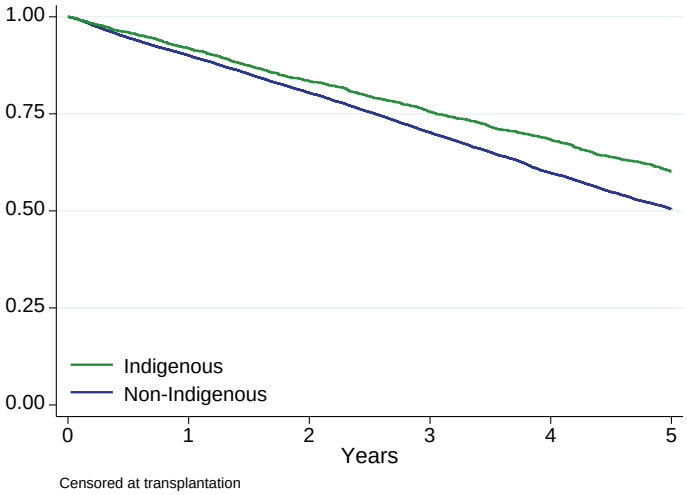
The distribution of dialysis modality is shown graphically in figure 10.14. For Indigenous Australians, the predominant modality is satellite haemodialysis. Access to home-based dialysis care including both haemodialysis and peritoneal dialysis is proportionally much lower. Indigenous Australians utilise automated peritoneal dialysis (APD) at much lower rates than non-Indigenous Australians.

Figure 10.14 - Dialysis Modality End 2018 - Australia, by Ethnicity



60% of the Indigenous Australians who started dialysis over 2009-2018 were alive 5 years later (figure 10.15). This was a slightly higher proportion in Indigenous compared with non-Indigenous patients (50%), although it is possible that differences between populations including age distribution and access to competing treatments (transplantation) may have impacted mortality estimates.

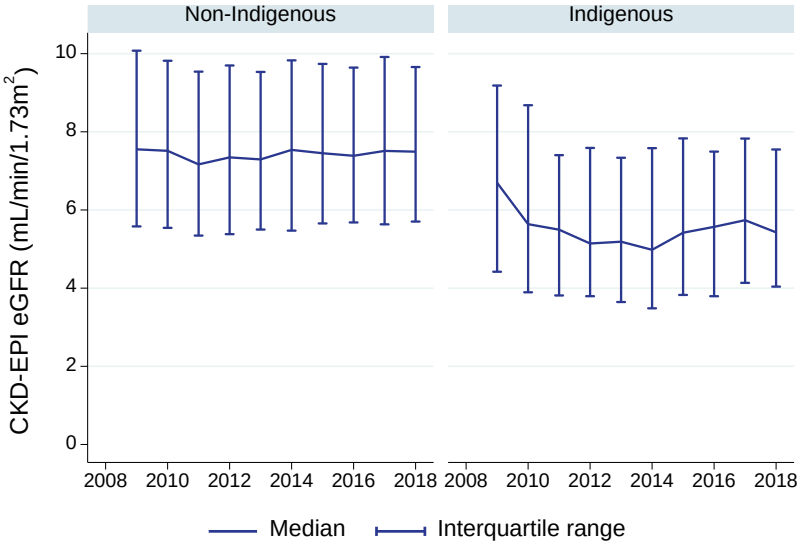
Figure 10.15 - Incident Dialysis Patient Survival 2009-2018 – Australia



Timing of Renal Replacement Therapy Initiation

In Australia, the level of kidney function at which dialysis is commenced ranges between eGFR 5-6 mL/min/1.73m^2 for Indigenous Australians while the kidney function at dialysis commencement for non-Indigenous Australians is approximately 7 mL/min/1.73m^2.

Figure 10.16 - eGFR at RRT start – Australia



Incidence and Prevalence by State

The next few pages show a variety of figures that summarise various key rates (incidence, prevalence, transplant rates) for Indigenous Australians. In large part they show information from previous pages, in a series of differing formats.

State Incidence

There is marked variation in the incidence of renal replacement therapy between States and Territories in Australia. NT had the highest national incidence for Indigenous Australians treated for end-stage kidney disease at 1305 per million of population in 2018; the next highest was in WA (658 pmp) (figure 10.17).

Kidney transplantation is offered in major metropolitan centres in NSW, QLD, WA, VIC and SA. There is a marked State/Territory variation in the incidence of kidney transplantation in Australia and between years (figure 10.18). Both NT and SA had peak transplantation incidence in 2014 which were not sustained. For the NT, transplantation incidence represents approximately one tenth of the incidence of new patients commencing dialysis.

Figure 10.17 - Incidence of New Indigenous Australian Patients

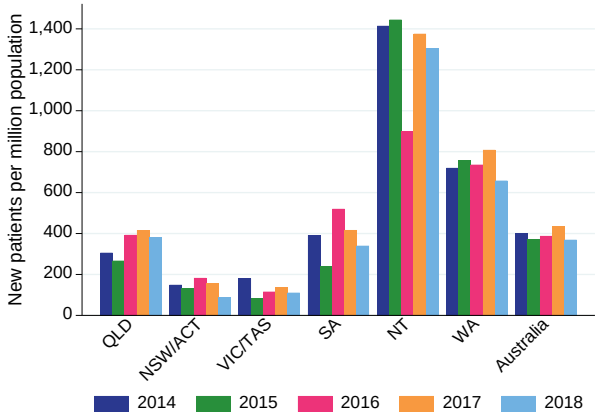
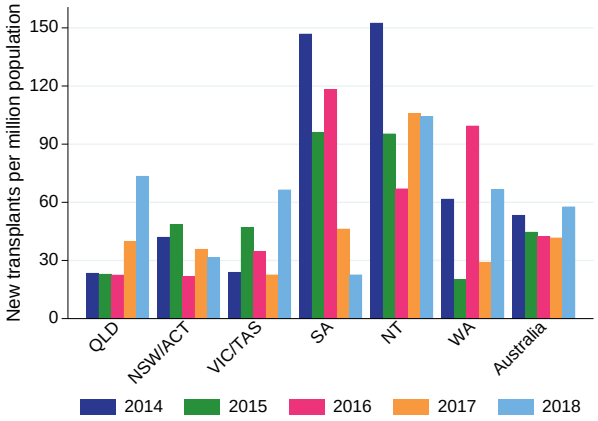
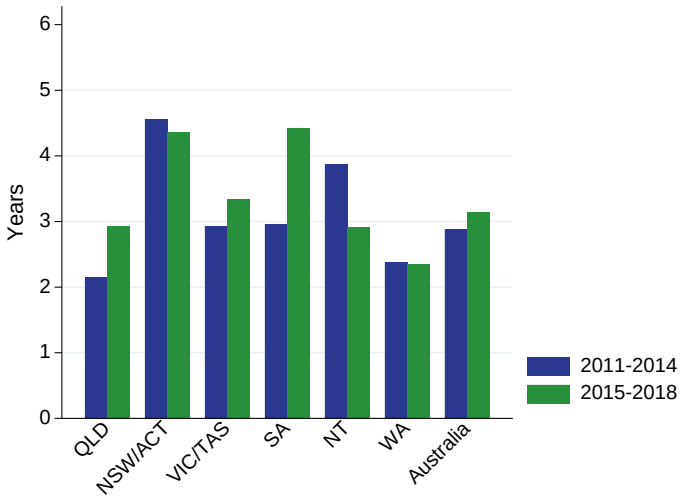


Figure 10.18 - Incidence of New Transplants Indigenous Australian Patients - By referring state



The time from commencement of dialysis to receipt of first transplant is shown in figure 10.19, with varying patterns between different states and territories.

Figure 10.19 - Median Time to Primary Transplant Indigenous Australian Patients - By referring state, Transplants during 2011-2014 vs 2015-2018



Dialysis by Resident State

Treatment patterns for Indigenous Australians vary by state. The highest rates for haemodialysis are in the Northern Territory, Western Australia and South Australia. The highest rates for peritoneal dialysis are in Queensland, Western Australia and the Northern Territory.

Figure 10.20 - Prevalent Indigenous Australian Haemodialysis Patients

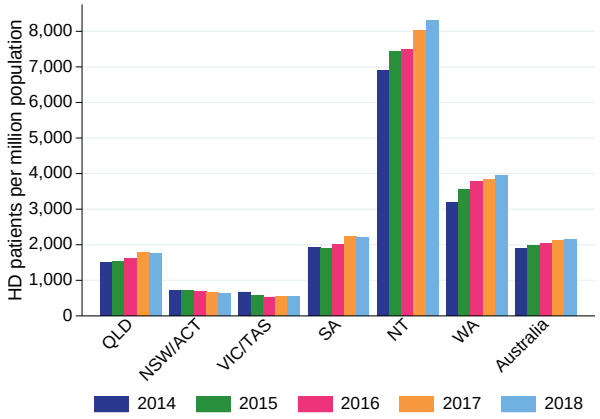
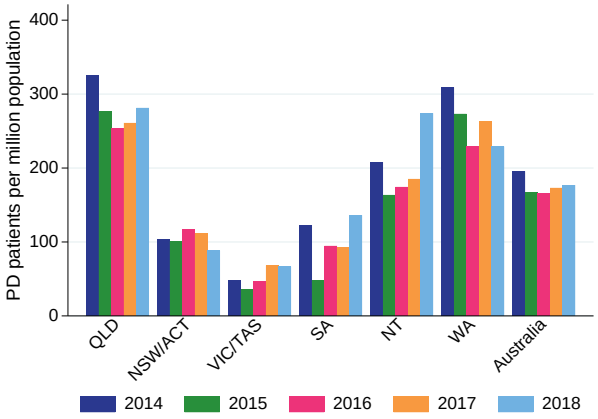


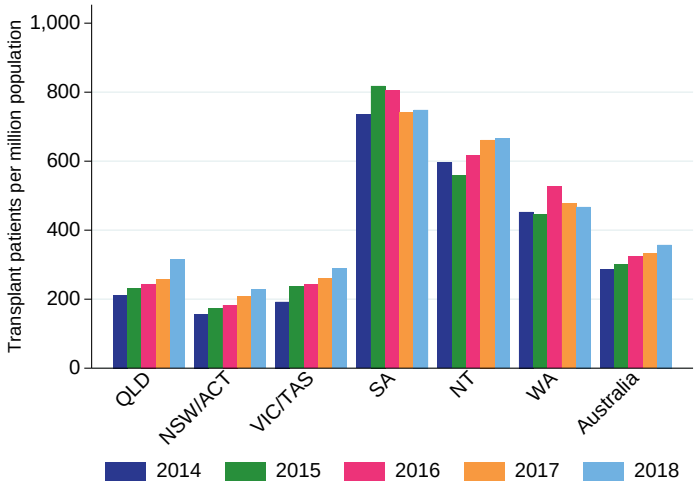
Figure 10.21 - Prevalent Indigenous Australian Peritoneal Dialysis Patients



Transplantation by Referring State

Rates of prevalent transplants vary substantially between states with the highest prevalence rates in South Australia, the Northern Territory and Western Australia. These rates are per population, not per dialysis patient, and they reflect both background rates of kidney disease and transplant practices. Transplant rates per dialysis patient are presented in Chapter 7 of this Report. Transplantation prevalence appears to be increasing in most jurisdictions (figure 10.22).

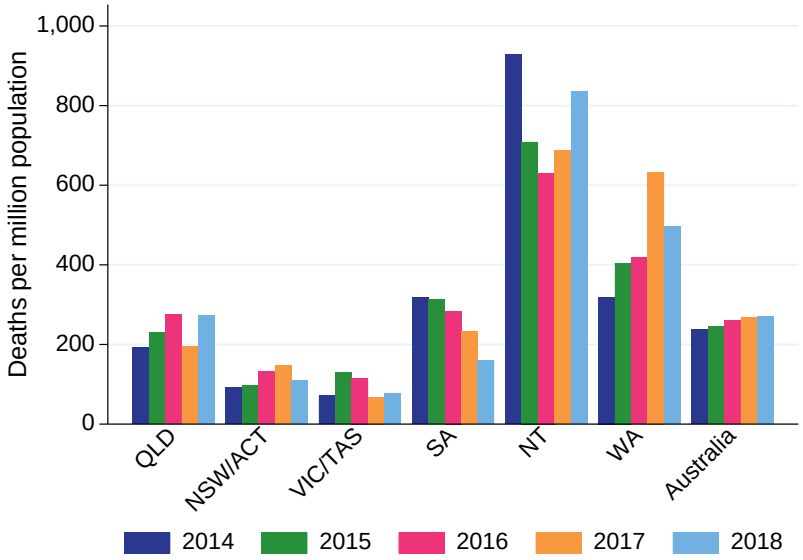
Figure 10.22 - Prevalent Indigenous Australian Transplant Patients



Deaths by Resident State

State based mortality rates for Indigenous Australians on renal replacement therapy are shown in figure 10.23. The differences in death rates between states are likely to reflect a combination of the differences in ESKD prevalence, practice patterns and patient factors.

Figure 10.23 - Deaths of Indigenous Australian RRT patients



Geographical Distribution

Figure 10.24 shows the number of incident Indigenous Australian patients by postcode. The distribution of prevalent dialysis patients is summarised in figure 10.25 (by state) and 10.26 by statistical area level 3 (SA3, obtained by mapping postcodes to SA3). Note that some postcodes are distributed over more than one SA3. Mapping data are based on the 2016 Australian Statistical Geography Standard courtesy of the Australian Bureau of Statistics (2016)[1].

Figure 10.24 - Incident Indigenous Australian Patients 2014-2018 - By Postcode

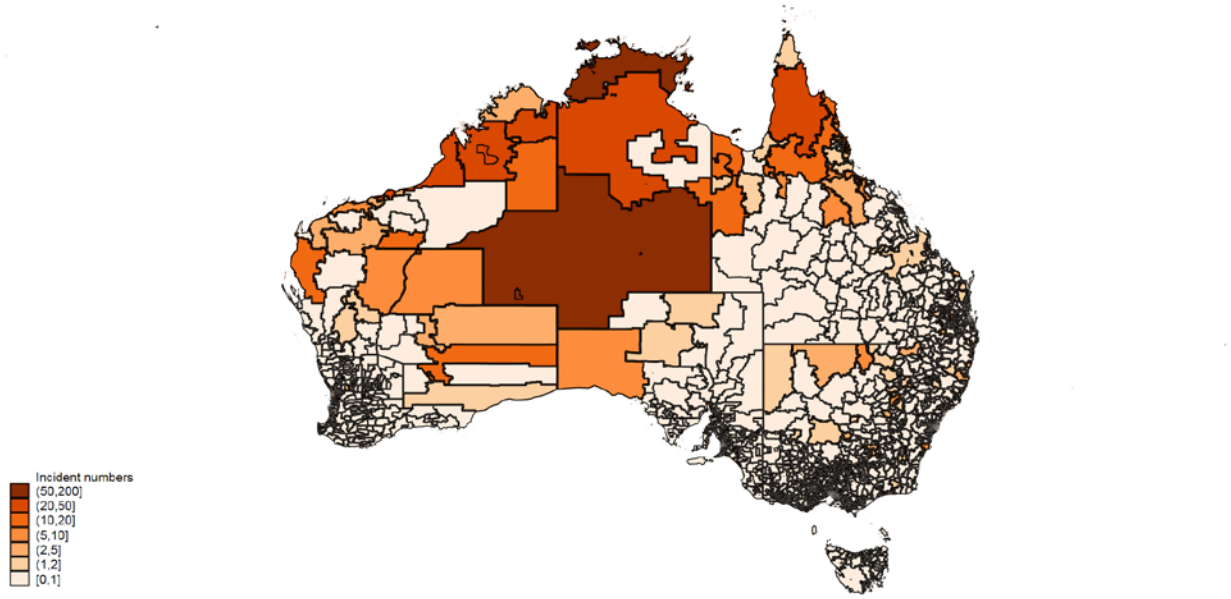


Figure 10.25 - Prevalent Indigenous Australian Patients 2018 - By State

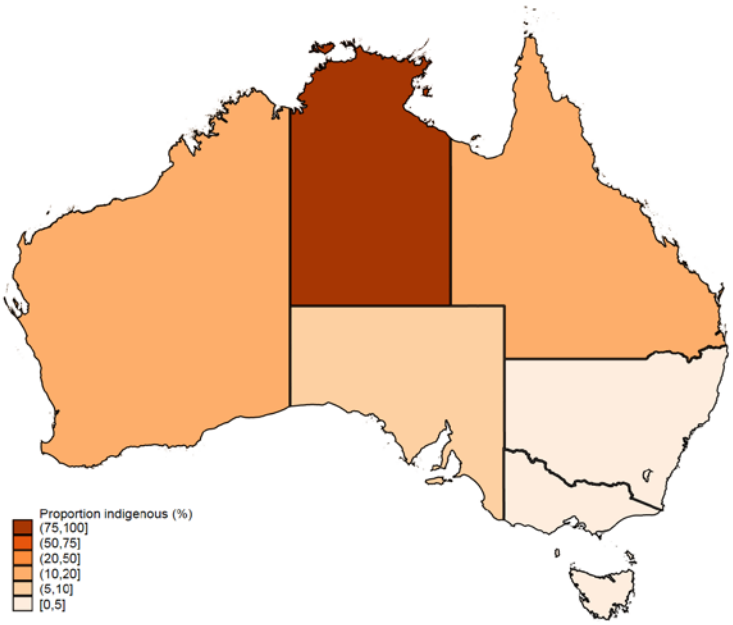
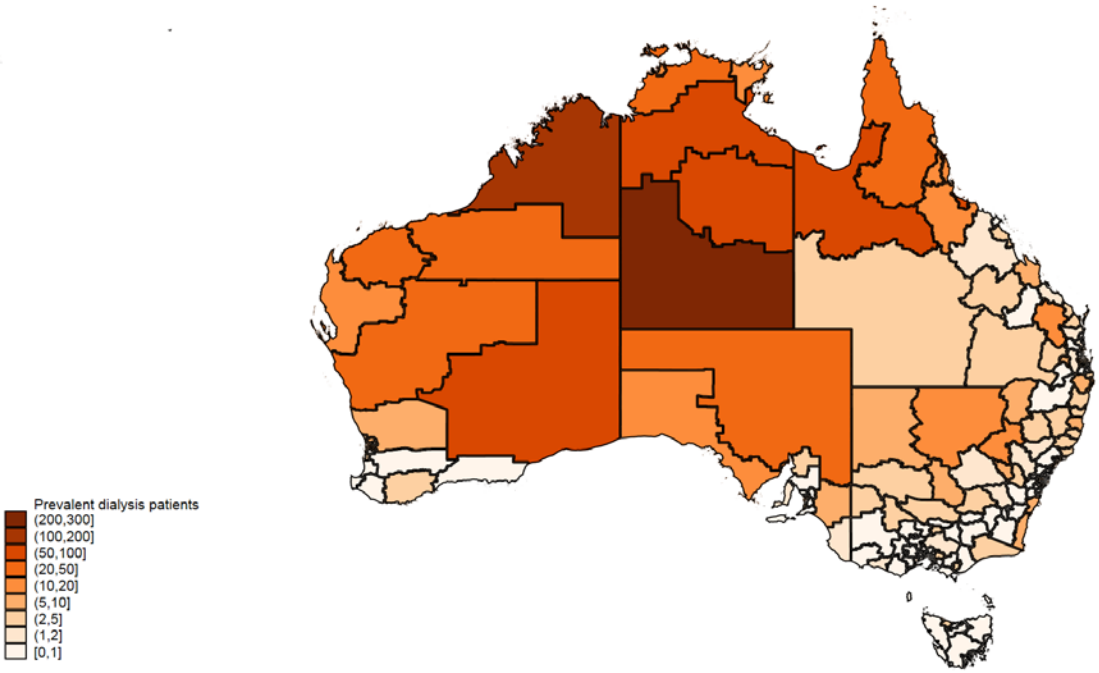


Figure 10.26 - Prevalent Indigenous Australian Dialysis Patients 2018 - By Statistical Area Level 3



Late Referral

The percentage of Indigenous Australians referred late for treatment has been stable over 2014-2018 (table 10.5).

Table 10.5 Percentage of Late Referral by Ethnicity Australia 2014-2018

Year	Non-Indigenous	Indigenous
2014	18%	15%
2015	17%	17%
2016	18%	14%
2017	18%	17%
2018	16%	17%

Vascular Access

Incident Vascular Access

Incident vascular access data are presented in table 10.6, and prevalent data in table 10.7.

The proportion of Indigenous Australian patients commencing RRT with haemodialysis using a catheter rather than permanent access was slightly higher than in non-Indigenous patients in 2018 (table 10.6).

Table 10.6 Incident Vascular Access Australia 2014-2018

Year	Vascular access	Non-Indigenous	Indigenous
201	**AVF**	677 (43%)	90 (34%)
	AVG	24 (2%)	4 (2%)
	CVC	854 (54%)	163 (61%)
	Not reported	29 (2%)	9 (3%)
2015	**AVF**	680 (43%)	93 (37%)
	AVG	26 (2%)	5 (2%)
	CVC	847 (54%)	151 (60%)
	Not reported	28 (2%)	4 (2%)
2016	**AVF**	673 (41%)	106 (40%)
	AVG	20 (1%)	1 (<1%)
	CVC	910 (56%)	161 (60%)
	Not reported	23 (1%)	0 (0%)
2017	**AVF**	754 (42%)	112 (36%)
	AVG	21 (1%)	9 (3%)
	CVC	1011 (56%)	186 (60%)
	Not reported	18 (1%)	1 (<1%)
2018	**AVF**	754 (40%)	102 (38%)
	AVG	21 (1%)	2 (1%)
	CVC	1082 (58%)	165 (61%)
	Not reported	5 (<1%)	0 (0%)

Prevalent Vascular Access

In contrast to incident vascular access, the rate of catheter use for prevalent dialysis patients in 2018 is lower for Indigenous Australian patients than non-Indigenous patients (table 10.7).

Table 10.7 Prevalent Vascular Access Australia 2014-2018

Year	Vascular access	Non-Indigenous	Indigenous
2014	AVF	6272 (76%)	1148 (79%)
	AVG	647 (8%)	45 (3%)
	CVC	1101 (13%)	186 (13%)
	Not reported	266 (3%)	71 (5%)
2015	AVF	6373 (75%)	1185 (77%)
	AVG	560 (7%)	47 (3%)
	CVC	1113 (13%)	176 (11%)
	Not reported	412 (5%)	137 (9%)
2016	AVF	6352 (74%)	1248 (77%)
	AVG	465 (5%)	50 (3%)
	CVC	1160 (14%)	164 (10%)
	Not reported	569 (7%)	157 (10%)
2017	AVF	6683 (77%)	1374 (79%)
	AVG	434 (5%)	51 (3%)
	CVC	1356 (16%)	205 (12%)
	Not reported	238 (3%)	104 (6%)
2018	AVF	6897 (77%)	1405 (79%)
	AVG	422 (5%)	50 (3%)
	CVC	1514 (17%)	235 (13%)
	Not reported	174 (2%)	90 (5%)

Patient Flow

Table 10.8 shows the overall flow of Indigenous Australian patients, by state. For new and pre-emptive transplants, numbers are shown by referring state. The differences in death rates between states are likely to reflect a combination of the differences in ESKD prevalence, practice patterns and patient factors.

Table 10.8 Patient Flow (pmp) Australian Indigenous Patients 2014-2018

Year	Event	QLD	NSW/ACT	VIC/TAS	SA	NT	WA	Australia
2014	**New patients**	65 (306)	39 (149)	15 (180)	16 (392)	102 (1415)	70 (721)	**307 (400)**
	New transplants	5 (24)	11 (42)	2 (24)	6 (147)	11 (153)	6 (62)	**41 (53)**
	Pre-emptive transplants	0 (0)	4 (15)	0 (0)	0 (0)	0 (0)	0 (0)	**4 (5)**
	Prevalent dialysis	390 (1836)	213 (816)	60 (721)	84 (2057)	512 (7101)	341 (3510)	**1600 (2086)**
	Prevalent transplants	45 (212)	41 (157)	16 (192)	30 (735)	43 (596)	44 (453)	**219 (285)**
	Total prevalence	435 (2048)	254 (973)	76 (914)	114 (2792)	555 (7698)	385 (3963)	**1819 (2371)**
	Deaths	41 (193)	24 (92)	6 (72)	13 (318)	67 (929)	31 (319)	**182 (237)**
2015	**New patients**	58 (267)	35 (131)	7 (83)	10 (241)	106 (1445)	75 (759)	**291 (372)**
	New transplants	5 (23)	13 (49)	4 (47)	4 (96)	7 (95)	2 (20)	**35 (45)**
	Pre-emptive transplants	0 (0)	1 (4)	0 (0)	0 (0)	0 (0)	0 (0)	**1 (1)**
	Prevalent dialysis	393 (1811)	216 (809)	51 (602)	81 (1949)	557 (7592)	378 (3825)	**1676 (2141)**
	Prevalent transplants	50 (230)	46 (172)	20 (236)	34 (818)	41 (559)	44 (445)	**235 (300)**
	Total prevalence	443 (2042)	262 (981)	71 (839)	115 (2767)	598 (8151)	422 (4270)	**1911 (2441)**
	Deaths	50 (230)	26 (97)	11 (130)	13 (313)	52 (709)	40 (405)	**192 (245)**
2016	**New patients**	87 (393)	50 (183)	10 (116)	22 (521)	67 (899)	74 (736)	**310 (388)**
	New transplants	5 (23)	6 (22)	3 (35)	5 (118)	5 (67)	10 (99)	**34 (43)**
	Pre-emptive transplants	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (10)	**1 (1)**
	Prevalent dialysis	414 (1871)	223 (816)	50 (579)	89 (2106)	571 (7660)	404 (4019)	**1751 (2193)**
	Prevalent transplants	54 (244)	50 (183)	21 (243)	34 (804)	46 (617)	53 (527)	**258 (323)**
	Total prevalence	468 (2115)	273 (999)	71 (823)	123 (2910)	617 (8277)	457 (4547)	**2009 (2516)**
	Deaths	61 (276)	36 (132)	10 (116)	12 (284)	47 (630)	42 (418)	**208 (261)**
2017	**New patients**	94 (416)	44 (158)	12 (136)	18 (417)	104 (1376)	83 (809)	**355 (436)**
	New transplants	9 (40)	10 (36)	2 (23)	2 (46)	8 (106)	3 (29)	**34 (42)**
	Pre-emptive transplants	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	**0 (0)**
	Prevalent dialysis	462 (2044)	217 (779)	54 (612)	100 (2317)	620 (8203)	422 (4112)	**1875 (2303)**
	Prevalent transplants	58 (257)	58 (208)	23 (261)	32 (742)	50 (662)	49 (477)	**270 (332)**
	Total prevalence	520 (2300)	275 (988)	77 (873)	132 (3059)	670 (8864)	471 (4589)	**2145 (2634)**
	Deaths	44 (195)	41 (147)	6 (68)	10 (232)	52 (688)	65 (633)	**218 (268)**
2018	**New patients**	88 (381)	25 (88)	10 (111)	15 (340)	100 (1305)	69 (658)	**307 (369)**
	New transplants	17 (74)	9 (32)	6 (67)	1 (23)	8 (104)	7 (67)	**48 (58)**
	Pre-emptive transplants	1 (4)	0 (0)	1 (11)	0 (0)	0 (0)	0 (0)	**2 (2)**
	Prevalent dialysis	469 (2030)	202 (712)	56 (621)	103 (2337)	658 (8587)	439 (4189)	**1927 (2319)**
	Prevalent transplants	73 (316)	65 (229)	26 (288)	33 (749)	51 (666)	49 (468)	**297 (357)**
	Total prevalence	542 (2346)	267 (941)	82 (909)	136 (3086)	709 (9253)	488 (4656)	**2224 (2677)**
	Deaths	63 (273)	31 (109)	7 (78)	7 (159)	64 (835)	52 (496)	**224 (270)**

Cause of Death

The causes of death in 2018 are shown in figure 10.27 and table 10.9, categorised by ethnicity and modality at time of death.

215 Indigenous Australian patients who were receiving dialysis died in 2018, with cardiovascular disease followed by withdrawal from treatment as the two most common causes of death.

Among non-Indigenous Australian dialysis patients, withdrawal from dialysis was the most common cause of death.

Figure 10.27 - Cause of Death by Modality and Ethnicity, Australia - Deaths Occurring During 2018

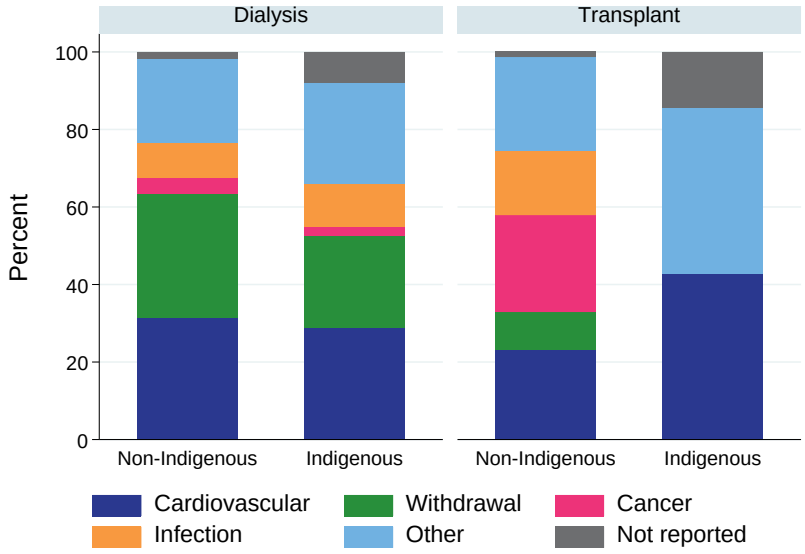


Table 10.9 Cause of Death by Modality and Ethnicity, Australia 2018

Modality	Cause of death	Non-Indigenous	Indigenous
Dialysis	**Cardiovascular**	494 (32%)	62 (29%)
	Withdrawal	500 (32%)	51 (24%)
	Cancer	66 (4%)	5 (2%)
	Infection	139 (9%)	24 (11%)
	Other	342 (22%)	56 (26%)
	Not reported	26 (2%)	17 (8%)
	Total	**1567**	**215**
Transplant	**Cardiovascular**	53 (23%)	3 (43%)
	Withdrawal	22 (10%)	0 (0%)
	Cancer	57 (25%)	0 (0%)
	Infection	38 (17%)	0 (0%)
	Other	55 (24%)	3 (43%)
	Not reported	3 (1%)	1 (14%)
	Total	**228**	**7***

**Two additional deaths occurred in patients who were no longer receiving RRT at the time of death.*

References

[1] Australian Bureau of Statistics, 2016, Australian Statistical Geography Standard (ASGS): Volume 1 - Main Structure and Greater Capital City Statistical Areas, July 2016, cat. no. 1270.0.55.001, viewed 22 May 2018, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1270.0.55.001July%202016?OpenDocument