



CHAPTER 8

Kidney Donation

Reporting the number of deceased and living kidney donors in Australia and New Zealand and describing donor characteristics.

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Executive Summary

Following a decade of steadily increased numbers, the total number of deceased kidney donors in Australia fell from a peak of 483 in 2018 to 455 in 2019. In contrast, New Zealand had its highest number of deceased kidney donors in 2019 at 67, due primarily to increases in the number of brain death donors. Australia has seen a steady decline in the proportion of donors dying as a result of stroke with an increase in *other* causes of death. Between 2013-2018, Australia's kidney non-utilisation rate remained relatively static around 6%, however in 2019 this has jumped to over 10%, while New Zealand's non-utilisation rate has continued to fall and reached its lowest level in the last decade at 1.5% in 2019.

New Zealand also saw an increase in the total number of living kidney donors in 2019 to 91, accounting for 41% of all kidney transplants performed that year. In Australia, the number of living kidney donors remained static at 238 and made up 22% of all kidney transplants. In both countries more mothers donated to their children than fathers and more wives donated to their spouses than donor husbands, contributing to a higher number of female donors overall compared to male donors. Despite a smaller population size, in 2019, New Zealand had 13 non-directed living kidney donors compared with only 3 in Australia.

Suggested Citation

ANZDATA Registry. 43rd Report, Chapter 8: Kidney Donation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2020. Available at: <http://www.anzdata.org.au>

Deceased Kidney Donors

The data for this section come from the Australia and New Zealand Organ Donor (ANZOD) Registry. Further information relating to deceased organ donors in Australia and New Zealand can be found on the ANZOD website, <https://www.anzdata.org.au/anzod/publications-2/>

Figure 8.1 shows the different types of deceased kidney donors in each country over 2010-2019. In Australia there has been a steady increase in the number of donors since 2010, however this trend was reversed in 2019 with a total of 455 donors compared with a peak of 483 donors in 2018. This was due to a reduction in the number of both standard and extended criteria brain death (DBD) donors while the number of circulatory death donors (DCD) continued to increase from 135 in 2018 to 142 in 2019. In New Zealand the long-term trend of increasing numbers of deceased kidney donors continued with 2019 having the highest number recorded at 67 donors. An extended criteria donor (ECD) is defined as a brain death donor aged greater than or equal to 60 years of age, or greater than 50 years of age with at least two of the following: cause of death stroke, history of hypertension or terminal creatinine greater than 133µmol/L.

Figure 8.1.1 - Deceased Kidney Donor Type - Australia 2010-2019

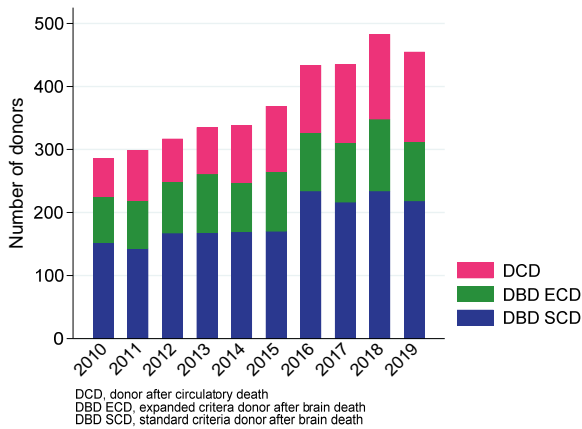
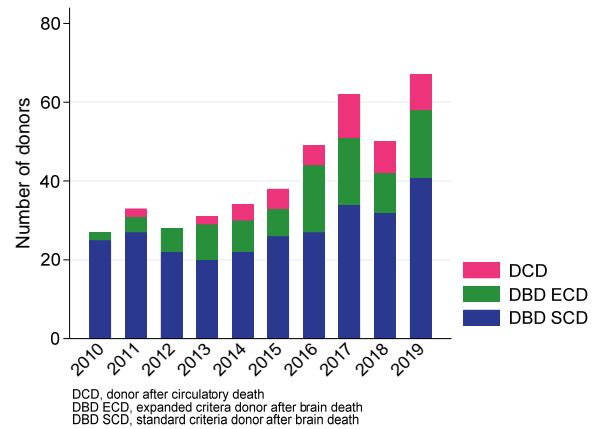


Figure 8.1.2 - Deceased Kidney Donor Type - New Zealand 2010-2019



The causes of death of deceased donors are shown in figure 8.2. Stroke remains the most common single cause of kidney donor death in both Australia and New Zealand, although in Australia there has been a substantial rise in the proportion of donors dying from *other* causes.

Figure 8.2.1 - Cause of Donor Death - Australia 2010-2019

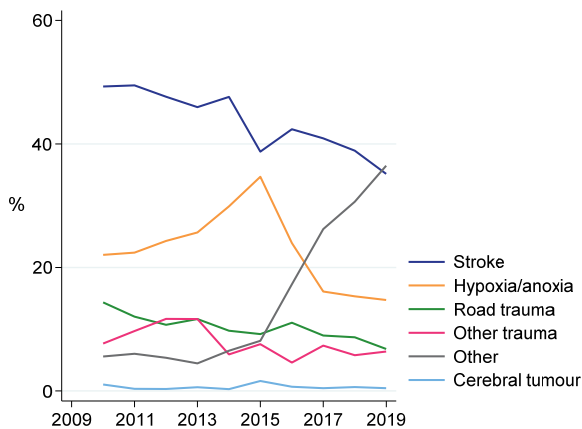


Figure 8.2.2 - Cause of Donor Death - New Zealand 2010-2019

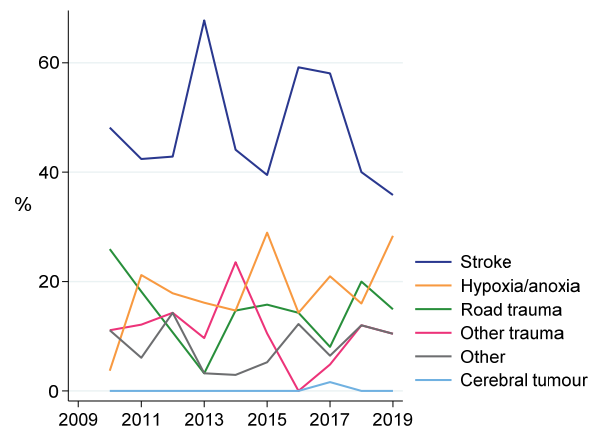


Figure 8.3 shows the mean age of deceased kidney donors in Australia and New Zealand over the last 20 years. In Australia the mean age increased steadily from 2001-2015, dropped in 2016, and has been rising again since then. In New Zealand there has also been a gradual increase in mean age, although there is more year to year fluctuation due to lower donor numbers.

Figure 8.3.1 - Deceased Kidney Donor Age - Australia 2000-2019

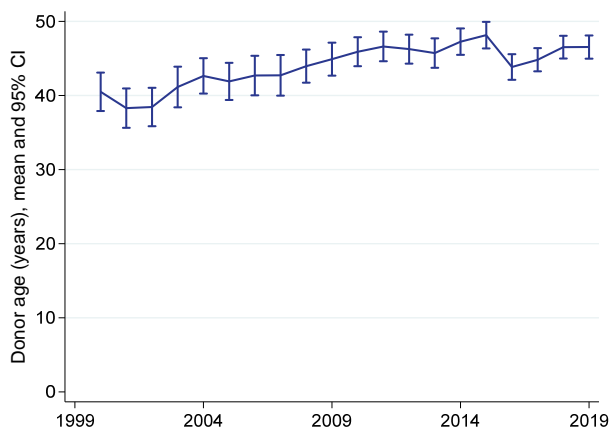


Figure 8.3.2 - Deceased Kidney Donor Age - New Zealand 2000-2019

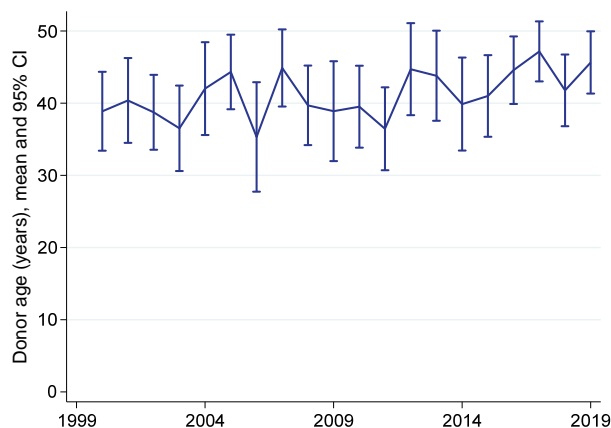


Figure 8.4 shows the non-utilisation rate of retrieved kidneys – the proportion of kidneys that were retrieved for the purpose of transplantation, but not ultimately transplanted into a recipient (either due to an absence of suitable recipients, or the kidney was deemed medically unsuitable after retrieval). In Australia, historically low non-utilisation rates showed a stepwise increase in 2013 that remained stable at around 6% between 2013-2018. In 2019 the non-utilisation rate rose again to over 10% of all kidneys retrieved. In New Zealand, non-utilisation rates were historically slightly higher than in Australia, however these have come down in recent years and in 2019 the non-utilisation rate in New Zealand was far below that in Australia (note the different y-axis scales).

Figure 8.4.1 - Non-utilisation Rate of Retrieved Kidneys - Australia 2010-2019

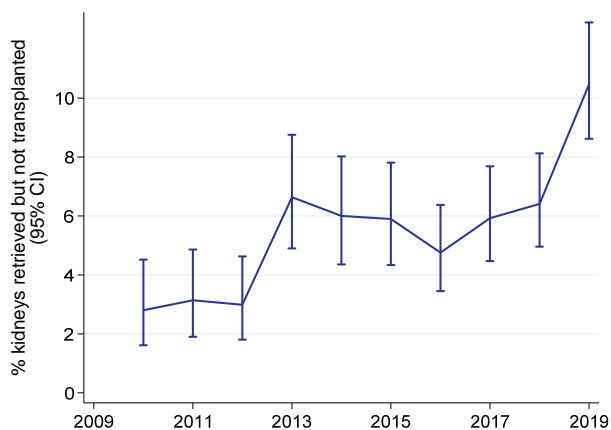
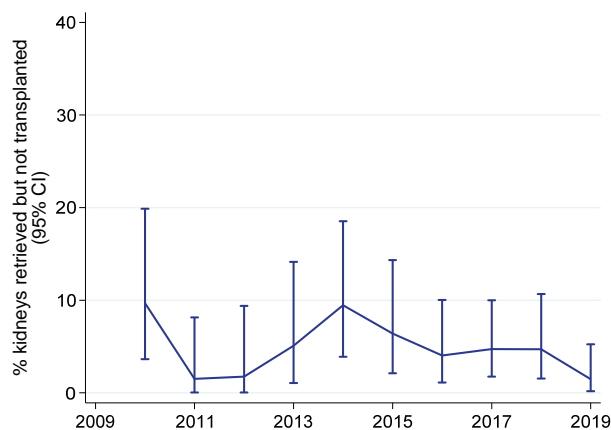


Figure 8.4.2 - Non-utilisation Rate of Retrieved Kidneys - New Zealand 2010-2019



Living Kidney Donors

There were 238 living donor kidney transplants performed in 2019 in Australia, representing 22% of all kidney transplant operations (table 8.1). In New Zealand, the 91 living donor transplants in 2019 represented 41% of all kidney transplants.

Table 8.1 Living Donor Percentage of Transplants by Country 2014-2019

Country	2014	2015	2016	2017	2018	2019
Australia	29%	26%	24%	24%	21%	22%
New Zealand	52%	50%	48%	37%	46%	41%

The percentage of all kidney transplants from living donors in Australia and New Zealand is shown in figure 8.5 by recipient age groups for the years 2012-2015 to 2016-2019. The percentage of living donor transplants is higher for younger recipient age groups. In Australia, there has been a decrease in the living donor percentage of transplants in every age group from 2012-2015 to 2016-2019.

Figure 8.5.1 - Living Donor Percentage of Transplants - Australia - Stratified by Age of Recipient, 2012-2015 vs 2016-2019

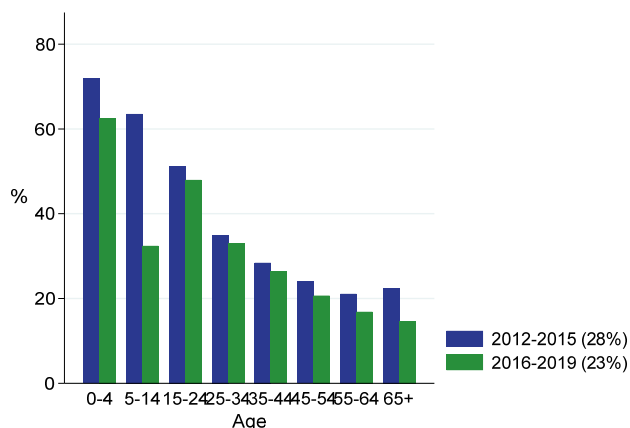


Figure 8.5.2 - Living Donor Percentage of Transplants - New Zealand - Stratified by Age of Recipient, 2012-2015 vs 2016-2019

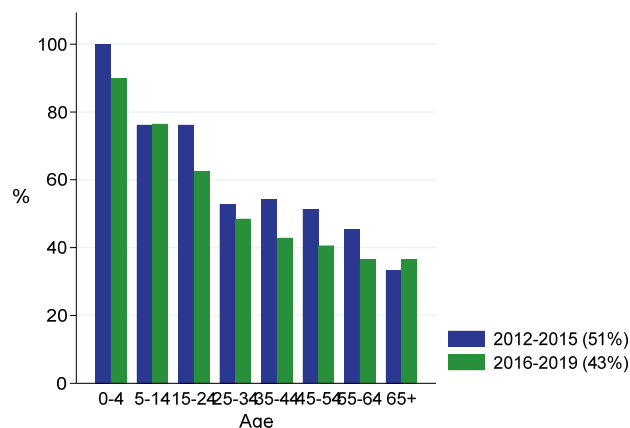


Figure 8.6 shows the living donor percentage of transplants for recipients aged 25-44 years by transplant region. There has been a decrease in this age group for each transplant region within Australia apart from Queensland, and also in New Zealand, from 2012-2015 to 2016-2019.

Figure 8.6 - Living Donor Percentage of Transplants by Transplant Region - Age 25-44, 2012-2015 vs 2016-2019

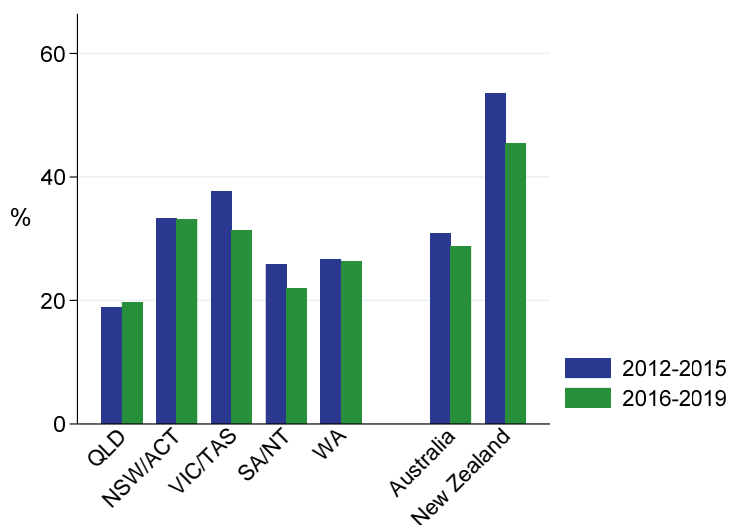


Figure 8.7 shows the number of living donors in Australia and New Zealand for the years 2010-2019 by donor age. Living donors in New Zealand are generally younger than those in Australia.

Figure 8.7.1 - Living Kidney Donor Age - Australia 2010-2019

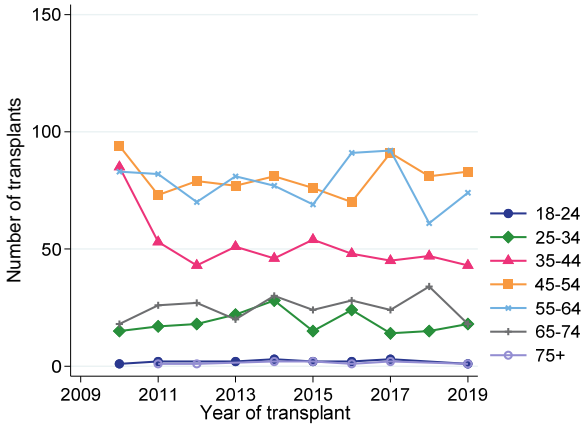
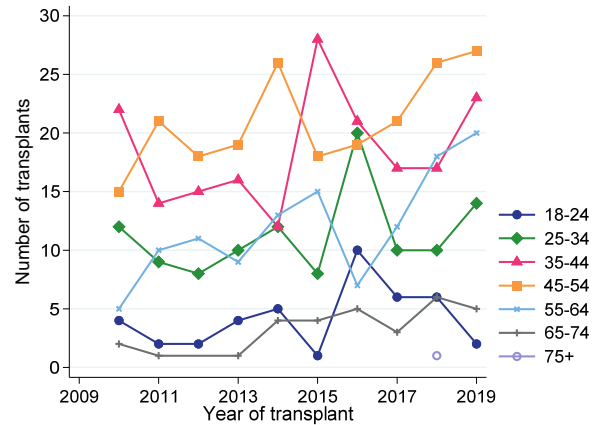


Figure 8.7.2 - Living Kidney Donor Age - New Zealand 2010-2019



The total number of living donor transplants has reduced slightly in Australia over the last few years but shown growth in New Zealand figure 8.8). In 2019, the proportion of genetically related donors was 48% in both Australia (n=114) and New Zealand (n=44). The higher proportion of *other* donors in New Zealand is due to the higher number of non-directed living kidney donors in New Zealand compared with Australia (in Australia the *other* category also includes pathological living kidney donors).

Figure 8.8.1 - Source of Living Kidney Donor - Australia 2010-2019

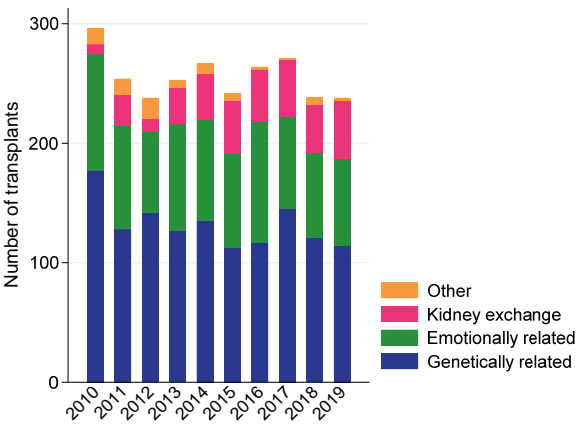


Figure 8.8.2 - Source of Living Kidney Donor - New Zealand 2010-2019

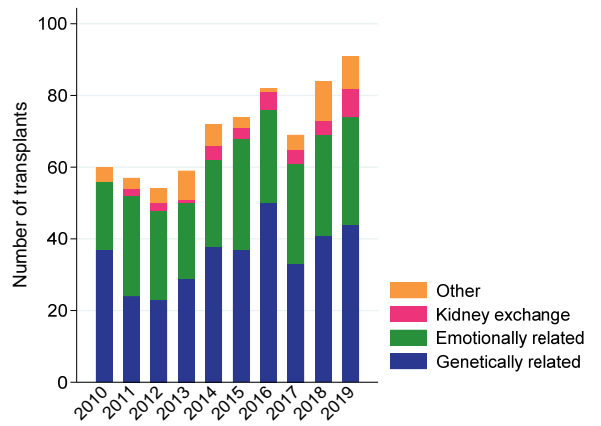


Table 8.2 provides details of the relationships between donors and recipients over 2015-2019 for Australia and New Zealand. There have been consistently more mothers donating than to their children than fathers in both countries, and more wives donating to their spouses than donor husbands.

Table 8.2.1 Living Kidney Donor Relationship to Recipient, Australia 2015-2019

Donor source	2015	2016	2017	2018	2019
Total	242	264	271	238	238
Genetically Related Total	113	117	145	121	114
Sister	22	25	22	24	22
Brother	14	20	27	19	20
Mother	32	36	41	40	34
Father	30	17	30	22	26
Monozygotic (Identical Twin Girl)	0	0	0	0	0
Dizygotic (Non-Identical Twin Boy)	1	0	1	0	0
Daughter	2	2	5	5	2
Son	3	5	1	1	3
Grandmother	1	2	2	1	0
Grandfather	0	0	1	0	0
Cousin	5	4	5	2	2
Niece	1	0	1	1	0
Nephew	0	2	1	0	0
Aunt	2	3	4	3	3
Uncle	0	1	3	3	2
Other related (Genetically - Specify)	0	0	1	0	0
Emotionally Related Total	78	101	77	71	73
Wife	46	54	34	29	33
Husband	10	14	22	14	10
Partner	3	9	6	9	8
Mother-in-law	0	1	0	0	1
Father-in-law	1	0	0	3	0
Stepmother	0	0	0	1	0
Stepfather	0	1	0	1	0
Stepsister	0	0	0	1	0
Stepbrother	0	0	0	0	0
Sister-in-law	2	0	0	1	3
Brother-in-law	2	0	1	1	2
Daughter-in-law	0	0	0	1	1
Son-in-law	0	1	1	0	1
Stepdaughter	0	0	0	0	0
Stepson	0	0	0	0	0
Friend	14	18	10	9	12
Other related (Emotionally - Specify)	0	3	3	1	2
Kidney Exchange Total	45	44	48	40	49
Directed kidney exchange	42	42	46	37	48
Non-directed, kidney exchange	3	2	2	3	1
Other Unrelated Total	6	2	1	6	2
Non-directed, waiting list	0	0	1	4	2
Pathological	6	2	0	1	0
Other unrelated (Specify)	0	0	0	1	0

Table 8.2.2 Living Kidney Donor Relationship to Recipient, New Zealand 2015-2019

Donor source	2015	2016	2017	2018	2019
Total	74	82	69	84	91
Genetically Related Total	37	50	33	41	44
Sister	5	6	3	7	8
Brother	7	13	6	7	6
Mother	10	4	7	8	11
Father	3	8	3	6	5
Monozygotic (Identical Twin Girl)	0	1	0	1	0
Dizygotic (Non-Identical Twin Boy)	1	0	0	1	0
Daughter	7	7	5	2	3
Son	2	9	5	7	4
Grandmother	0	0	0	0	0
Grandfather	0	0	0	0	0
Cousin	0	1	0	0	2
Niece	0	0	1	0	0
Nephew	0	1	0	1	1
Aunt	1	0	1	1	3
Uncle	1	0	2	0	1
Other related (Genetically - Specify)	0	0	0	0	0
Emotionally Related Total	31	26	28	28	30
Wife	13	8	10	8	11
Husband	1	1	3	4	4
Partner	2	3	2	2	3
Mother-in-law	1	1	0	0	0
Father-in-law	0	0	0	0	0
Stepmother	0	0	0	0	0
Stepfather	0	0	0	0	1
Stepsister	0	0	0	0	0
Stepbrother	0	0	1	0	0
Sister-in-law	1	0	2	3	1
Brother-in-law	1	1	1	0	0
Daughter-in-law	0	0	0	0	0
Son-in-law	0	0	0	0	0
Stepdaughter	0	2	0	0	0
Stepson	0	0	1	0	0
Friend	12	10	6	11	10
Other related (Emotionally - Specify)	0	0	2	0	0
Kidney Exchange Total	3	5	4	4	8
Directed kidney exchange	3	4	0	2	4
Non-directed, kidney exchange	0	1	4	2	4
Other Unrelated Total	3	1	4	11	9
Non-directed, waiting list	3	1	4	10	9
Pathological	0	0	0	0	0
Other unrelated (Specify)	0	0	0	1	0

The gender distribution of living donors by relation to recipient, state and country is shown in table 8.2.

Table 8.2.3 Gender Distribution of Living Donors by Relation to Recipient, State and Country 2015-2019

Donor Relationship	Transplant Region	2015			2016			2017			2018			2019		
		M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Genetically Related	NSW/ACT	44%	56%	45	57%	43%	46	48%	52%	71	31%	69%	51	47%	53%	43
	VIC/TAS	48%	52%	29	34%	66%	38	32%	68%	44	40%	60%	43	41%	59%	32
	QLD	38%	62%	13	36%	64%	14	42%	58%	12	44%	56%	9	50%	50%	16
	SA/NT	45%	55%	11	13%	88%	8	60%	40%	5	50%	50%	8	75%	25%	8
	WA	47%	53%	15	18%	82%	11	77%	23%	13	40%	60%	10	40%	60%	15
	Australia	45%	55%	113	40%	60%	117	46%	54%	145	37%	63%	121	46%	54%	114
	New Zealand	38%	62%	37	62%	38%	50	48%	52%	33	54%	46%	41	39%	61%	44
Genetically Unrelated	NSW/ACT	36%	64%	39	37%	63%	59	48%	52%	42	50%	50%	50	39%	61%	44
	VIC/TAS	43%	57%	53	35%	65%	48	42%	58%	50	47%	53%	43	59%	41%	44
	QLD	55%	45%	20	36%	64%	14	50%	50%	10	33%	67%	12	42%	58%	19
	SA/NT	50%	50%	6	23%	77%	13	22%	78%	9	50%	50%	4	9%	91%	11
	WA	45%	55%	11	46%	54%	13	40%	60%	15	38%	63%	8	50%	50%	6
	Australia	43%	57%	129	36%	64%	147	43%	57%	126	46%	54%	117	44%	56%	124
	New Zealand	19%	81%	37	38%	63%	32	28%	72%	36	37%	63%	43	45%	55%	47

Table 8.3 shows the number of ABO incompatible living donor transplants performed in each country over the last 10 years. The number of ABO incompatible transplants decreased in Australia in 2019 but continued to grow in New Zealand.

Table 8.3 Living Donor Transplant Numbers by Blood Group Status 2010-2019

Country	Year	Compatible	Incompatible	Unknown
Australia	2010	255	40	1
	2011	219	34	1
	2012	198	29	11
	2013	217	36	0
	2014	224	39	4
	2015	201	27	14
	2016	208	48	8
	2017	226	45	0
	2018	196	41	1
	2019	211	27	0
New Zealand	2010	59	1	0
	2011	49	3	5
	2012	46	5	3
	2013	53	6	0
	2014	62	9	1
	2015	65	9	0
	2016	76	6	0
	2017	55	14	0
	2018	73	11	0
	2019	74	17	0

Living Donor Characteristics

Table 8.4 shows the clinical characteristics of living kidney donors over 2010-2019. Donors were predominantly Caucasian* and commonly overweight or obese. A history of smoking was common. Australian donors were older and much more likely to have hypertension compared with New Zealand donors. *Collection of ethnicity data in ANZDATA has evolved to align with Australian Bureau of Statistics Australian Standard Classification of Cultural and Ethnic Groups¹ and data collection now allows for a patient to nominate more than one ethnicity group, however, consultation regarding reporting of ethnicity data is currently ongoing and reporting guidelines have not been finalised at the time of publication. As a result, ethnicity data thorough this report includes only the first ethnicity category entered for each patient and uses the legacy term 'Caucasian' which includes data recorded as 'Caucasoid', 'Oceanian – Australian', 'Oceanian – New Zealand European', 'North American' and a number of European ethnicities.

Table 8.4 Living Donor Clinical Characteristics 2010-2019

Factor	Australia	New Zealand
N	2512	702
Age (years), mean (SD)	50.9 (10.9)	44.4 (12.1)
Gender		
Female	1437 (57.2%)	412 (58.7%)
Male	1075 (42.8%)	290 (41.3%)
Ethnicity		
Caucasian	2131 (84.8%)	529 (75.4%)
Aboriginal/Torres Strait Islander	43 (1.7%)	8 (1.1%)
Asian	167 (6.6%)	48 (6.8%)
Māori	9 (0.4%)	71 (10.1%)
Pacific	34 (1.4%)	31 (4.4%)
Other	65 (2.6%)	9 (1.3%)
Not reported	63 (2.5%)	6 (0.9%)
Body mass index		
<18.5 (underweight)	21 (0.8%)	1 (0.1%)
18.5-24.9 (normal)	816 (32.5%)	242 (34.5%)
25-29.9 (overweight)	1153 (45.9%)	308 (43.9%)
≥30 (obese)	442 (17.6%)	142 (20.2%)
Not reported	80 (3.2%)	9 (1.3%)
Hypertension	673 (26.8%)	75 (10.7%)
Glycaemic status		
Normal	2352 (93.6%)	682 (97.2%)
Impaired fasting glucose	26 (1.0%)	0 (0.0%)
Impaired glucose tolerance	58 (2.3%)	0 (0.0%)
Diabetic	11 (0.4%)	1 (0.1%)
Not reported	65 (2.6%)	19 (2.7%)
Cigarette Smoking		
Never	1527 (60.8%)	416 (59.3%)
Former	840 (33.4%)	187 (26.6%)
Current	65 (2.6%)	79 (11.3%)
Not reported	80 (3.2%)	20 (2.8%)

Timing of Living Kidney Donor Transplantation

The timing of primary living donor transplants relative to the start of dialysis is shown in table 8.5.

The proportion of all primary living donor transplants performed pre-emptively in Australia in 2019 was 46%. 27% of recipients had received dialysis treatment for twelve months or longer prior to a first living donor graft.

The proportion of pre-emptive primary living donor transplants in New Zealand in 2019 was 38%. 41% received dialysis for twelve months or longer prior to being transplanted.

Table 8.5 Timing of Living Kidney Donor Transplants 2015-2019

Country	Timing of transplant	2015	2016	2017	2018	2019
Australia	Pre-emptive	92 (43%)	103 (44%)	117 (49%)	99 (45%)	97 (46%)
	<1 month post dialysis	1 (<1%)	6 (3%)	3 (1%)	4 (2%)	5 (2%)
	1 month to <1 year post dialysis	47 (22%)	69 (29%)	59 (24%)	51 (23%)	54 (25%)
	≥1 year post dialysis	72 (34%)	57 (24%)	62 (26%)	64 (29%)	57 (27%)
New Zealand	Pre-emptive	19 (28%)	18 (24%)	19 (31%)	32 (40%)	31 (38%)
	<1 month post dialysis	1 (1%)	1 (1%)	-	2 (2%)	-
	1 month to <1 year post dialysis	13 (19%)	17 (23%)	12 (19%)	14 (17%)	17 (21%)
	≥1 year post dialysis	35 (51%)	39 (52%)	31 (50%)	33 (41%)	33 (41%)

References

¹ Australian Bureau of Statistics, 2019, Australian Standard Classification of Cultural and Ethnic Groups (ASCCEG), December 2019, viewed 23 Oct 2020, <https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/1249.0Main+Features12019?OpenDocument>