



CHAPTER 8

Kidney Donation

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

Contents

Executive Summary	2
Suggested Citation	2
Deceased Kidney Donors.....	3
Living Kidney Donors.....	4
Living Donor Characteristics	10
Timing of Living Kidney Donor Transplantation.....	11

Executive Summary

The total number of deceased donors continued to increase in both Australia and New Zealand in 2018. While this increase has historically been driven by increasing numbers of circulatory death donor and expanded criteria brain death donors, there has also been an increase in standard criteria brain death donors in both countries. Organ non-utilisation rates were stable in both countries; in Australia this rate has been substantially higher than its historical rate since 2013.

The total number of living kidney donor transplants has remained stable in Australia over the last few years, however, this has been reducing as a percentage of all transplants performed. New Zealand has seen an increasing number of living donor transplants each year since 2012, though the percentage of all transplants has remained stable. The proportion of living kidney transplants performed through paired kidney exchange has increased in recent years in both Australia and New Zealand.

Suggested Citation

ANZDATA Registry. 42nd Report, Chapter 8: Kidney Donation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2019. 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. Much more information about deceased organ donors in Australia and New Zealand can be found on the ANZOD website, <http://www.anzdata.org.au/anzod/v1/indexanzod.html>

Figure 8.1 shows the different types of deceased kidney donors in each country over 2009-2018. In Australia there has been a large increase in the number of donors since 2008, driven by an increase in expanded criteria (ECD) and circulatory death (DCD) donors, although there was also an increase in the number of standard criteria (SCD) brain death donors (DBD) in 2016-17. In New Zealand the donor numbers have risen dramatically since 2012, and the proportion of DCD donors is lower than in Australia.

Figure 8.1.1 - Deceased Kidney Donor Type - Australia 2009-2018

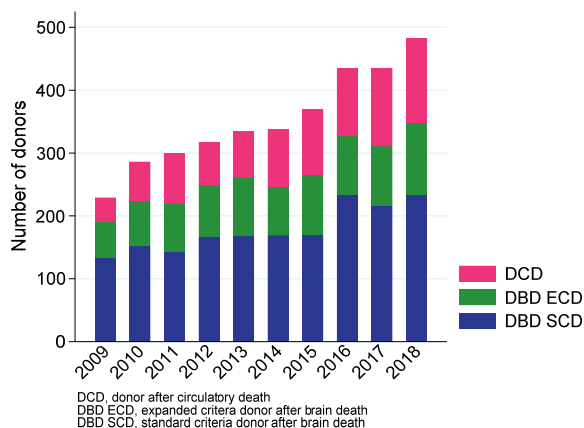
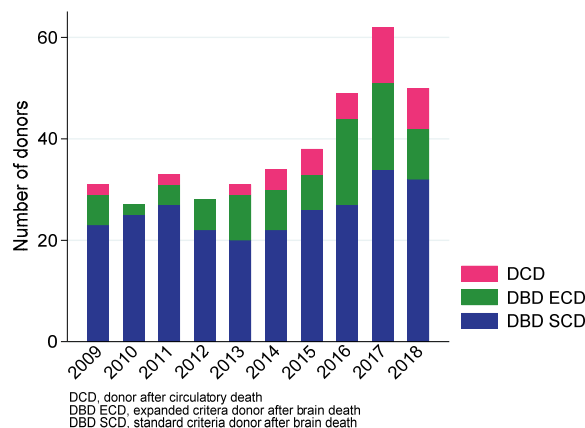


Figure 8.1.2 - Deceased Kidney Donor Type - New Zealand 2009-2018



The causes of death of deceased donors are shown in figure 8.2. Stroke remains the most common cause of kidney donor death in both Australia and New Zealand.

Figure 8.2.1 - Cause of Donor Death - Australia 2009-2018

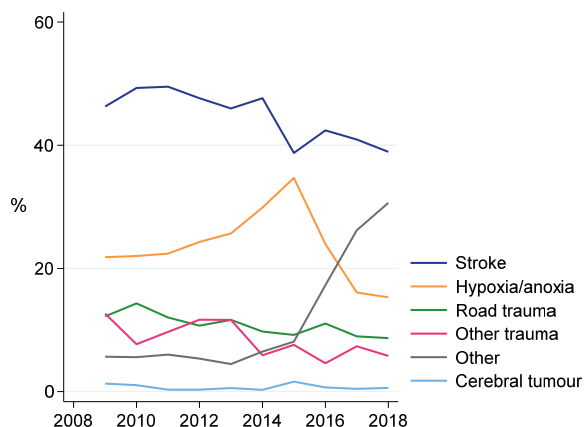


Figure 8.2.2 - Cause of Donor Death - New Zealand 2009-2018

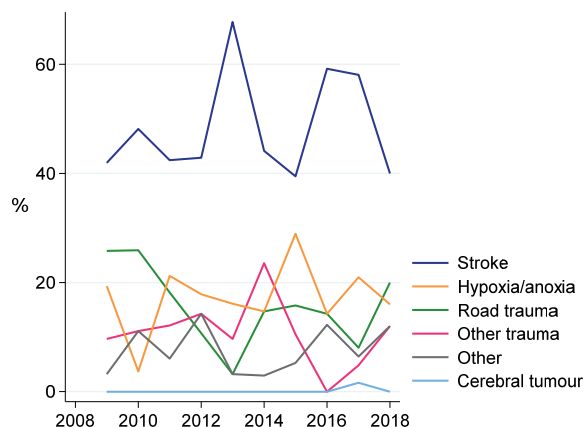


Figure 8.3 shows the mean age of deceased kidney donors in Australia and New Zealand over the last 20 years. In Australia the mean age increased steadily from 2001-2015, dropped in 2016, and has been rising again since then. In New Zealand there has also been a gradual increase in mean age, although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

Figure 8.3.1 - Deceased Kidney Donor Age - Australia 1999-2018

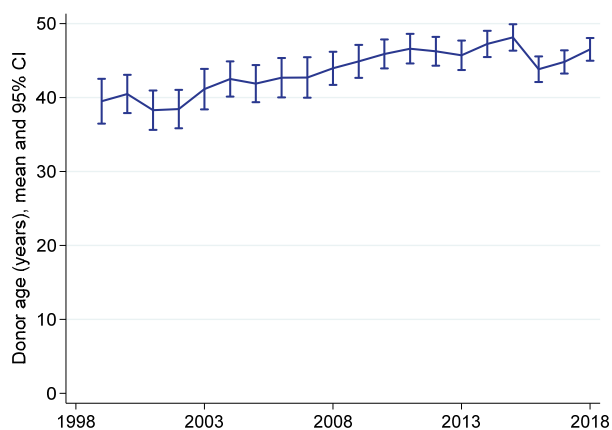


Figure 8.3.2 - Deceased Kidney Donor Age - New Zealand 1999-2018

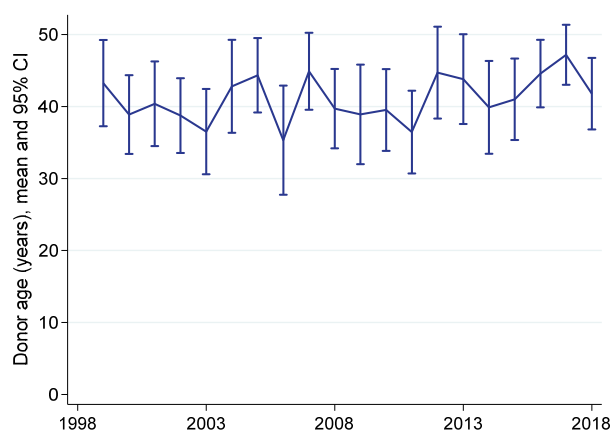


Figure 8.4 shows the non-utilisation rate of retrieved kidneys – the proportion of kidneys that were retrieved for the purpose of transplantation, but not ultimately transplanted into a recipient (either due to an absence of suitable recipients, or the kidney was deemed medically unsuitable after retrieval). Despite the increasing age and complexity of donors in Australia the non-utilisation rate remained steady at around 3% prior to 2012. However, this rate rose in 2013-2018. In New Zealand non-utilisation rates were historically slightly higher than in Australia and have remained stable in recent years (note the different y-axis scales).

Figure 8.4.1 - Non-utilisation Rate of Retrieved Kidneys - Australia 2009-2018

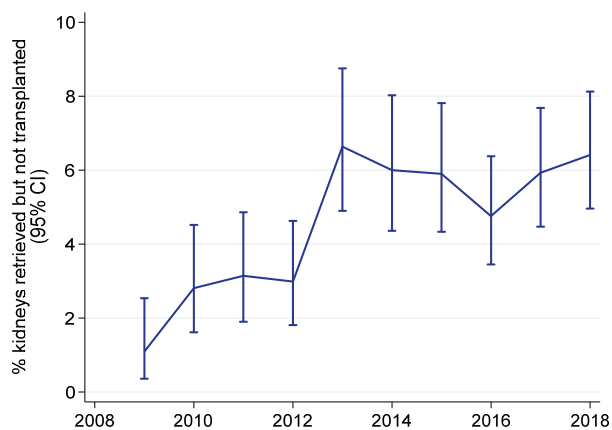
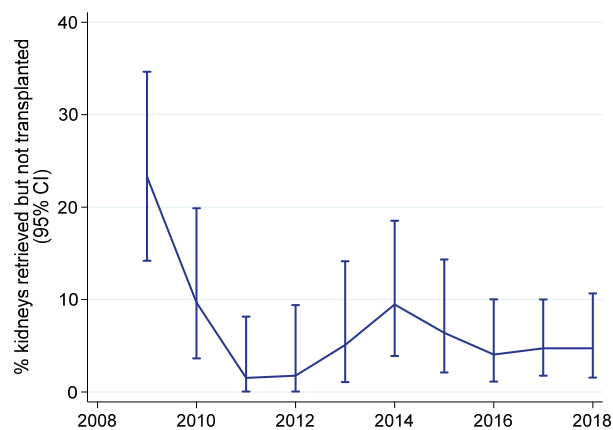


Figure 8.4.2 - Non-utilisation Rate of Retrieved Kidneys - New Zealand 2009-2018



Living Kidney Donors

There were 238 living donor kidney transplants performed in 2018 in Australia, representing 21% of all transplant operations (table 8.1). In New Zealand, the 84 living donor transplants in 2018 represented 46% of all transplants. In both countries, living donor transplants have been falling as a proportion of all transplants due to increasing deceased donor numbers.

Table 8.1 Living Donor Percentage of Transplants by Country 2013-2018

Country	2013	2014	2015	2016	2017	2018
Australia	29%	29%	26%	24%	24%	21%
New Zealand	51%	52%	50%	48%	37%	46%

The living donor percentage of transplants in Australia and New Zealand is shown in figure 8.5 by recipient age groups for the years 2011-2014 to 2015-2018. 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 2011-2014 to 2015-2018.

Figure 8.5.1 - Living Donor Percentage of Transplants - Australia - Stratified by Age of Recipient, 2011-2014 vs 2015-2018

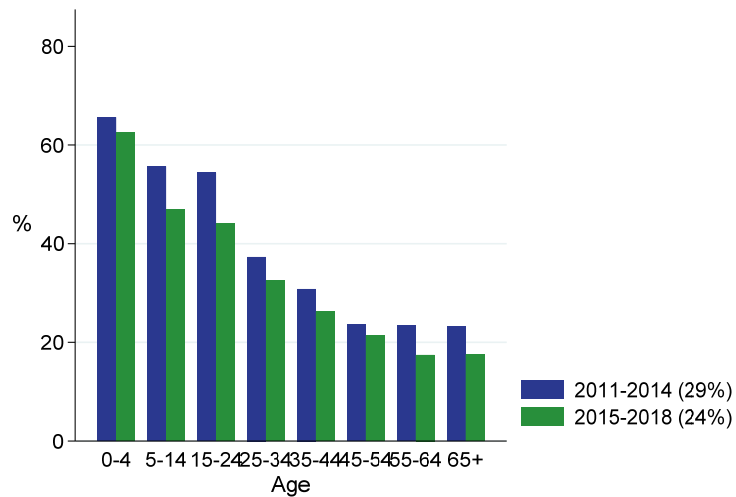


Figure 8.5.2 - Living Donor Percentage of Transplants - New Zealand - Stratified by Age of Recipient, 2011-2014 vs 2015-2018

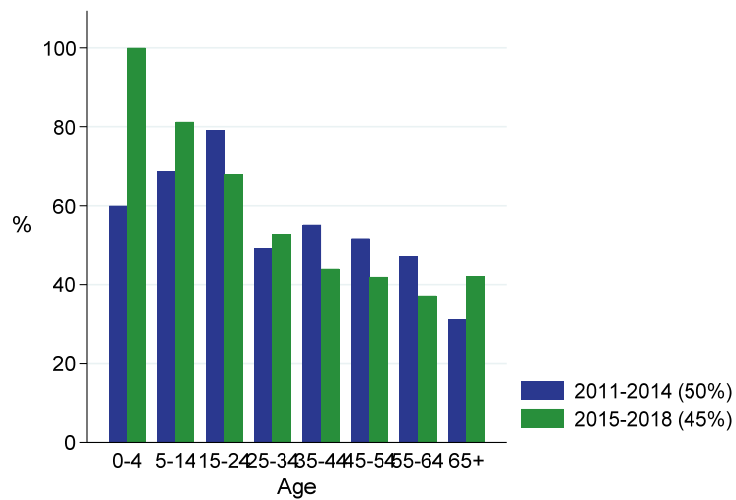


Figure 8.6 shows the living donor percentage of transplants for recipients aged 25-44 years by transplant region. There has been a decrease in this age group for each transplant region within Australia apart from Queensland, and also in New Zealand, from 2011-2014 to 2015-2018.

Figure 8.6 - Living Donor Percentage of Transplants by Transplant Region - Age 25-44, 2011-2014 vs 2015-2018

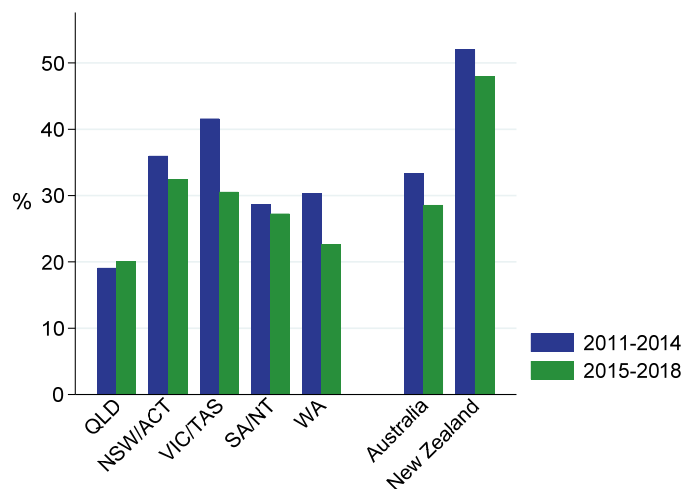


Figure 8.7 shows the number of living donors in Australia and New Zealand for the years 2009-2018 by donor age. Living donors in New Zealand are generally younger than those in Australia.

Figure 8.7.1 - Living Kidney Donor Age - Australia 2009-2018

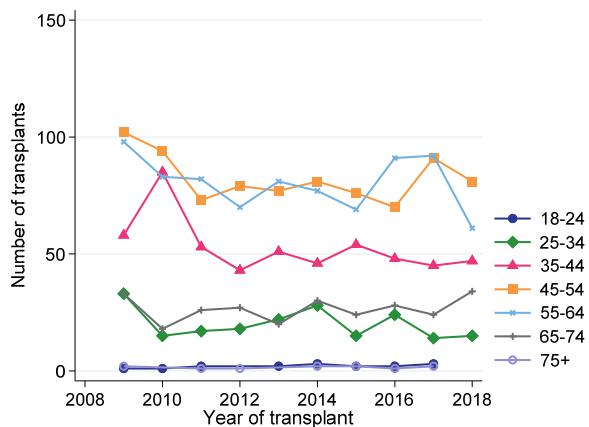
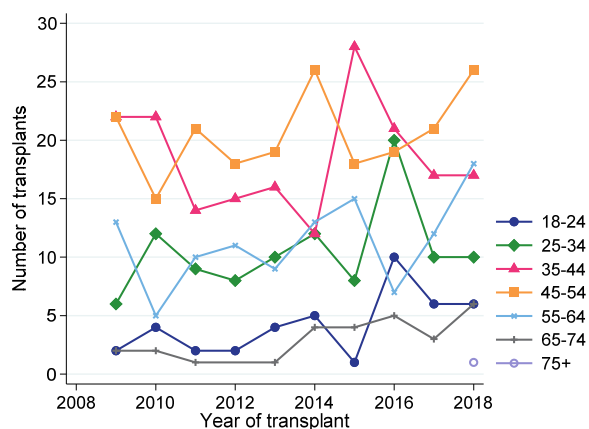


Figure 8.7.2 - Living Kidney Donor Age - New Zealand 2009-2018



The total number of living donor transplants has remained stable in both countries over the last few years (figure 8.8). The proportion of genetically related donors was 51% (121 donors) in 2018 in Australia. In New Zealand 41 donors (49%) were genetically related to their recipient. The proportion of living donor transplants performed through kidney exchange has increased in both Australia and New Zealand over the past 5 years.

Figure 8.8.1 - Source of Living Kidney Donor - Australia 2009-2018

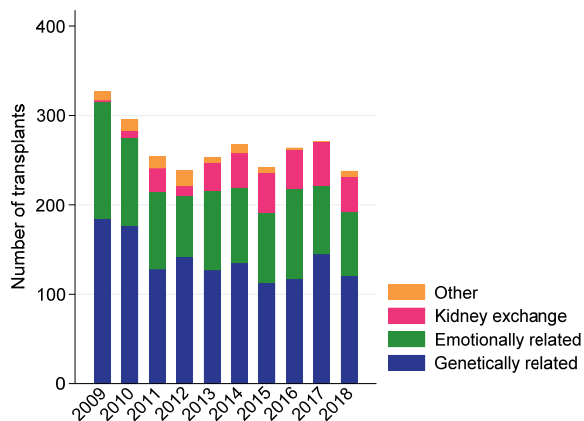


Figure 8.8.2 - Source of Living Kidney Donor - New Zealand 2009-2018

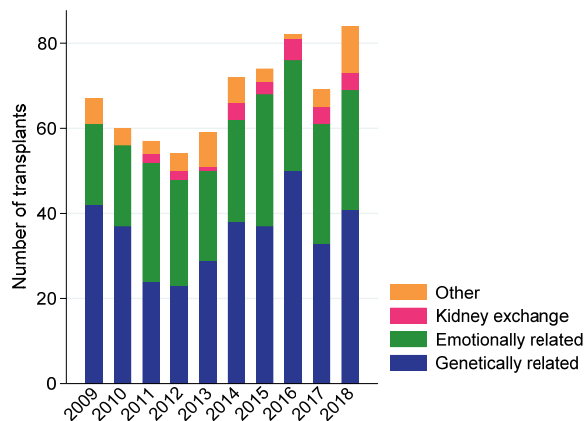


Table 8.2 provides details of the relationships between donors and recipients over 2014-2018 for Australia and New Zealand.

Table 8.2.1 Living Kidney Donor Relationship to Recipient, Australia 2014-2018

Donor source	2014	2015	2016	2017	2018
Total	267	242	264	271	238
Genetically Related Total	135	113	117	145	121
Sister	29	22	25	22	24
Brother	23	14	20	27	19
Mother	42	32	36	41	40
Father	22	30	17	30	22
Monzygotic (Identical Twin Girl)	0	0	0	0	0
Dizygotic (Non-Identical Twin Girl)	1	0	0	0	0
Dizygotic (Non-Identical Twin Boy)	0	1	0	1	0
Daughter	4	2	2	5	5
Son	5	3	5	1	1
Grandmother	3	1	2	2	1
Grandfather	1	0	0	1	0
Cousin	1	5	4	5	2
Niece	0	1	0	1	1
Nephew	0	0	2	1	0
Aunt	3	2	3	4	3
Uncle	1	0	1	3	3
Other related (Genetically - specify)	0	0	0	1	0
Emotionally Related Total	85	78	101	77	71
Wife	31	46	54	34	29
Husband	18	10	14	22	14
Partner	5	3	9	6	9
Mother-in-law	2	0	1	0	0
Father-in-law	0	1	0	0	3
Stepmother	0	0	0	0	1
Stepfather	1	0	1	0	1
Stepsister	0	0	0	0	1
Stepbrother	0	0	0	0	0
Sister-in-law	1	2	0	0	1
Brother-in-law	3	2	0	1	1
Daughter-in-law	2	0	0	0	1
Son-in-law	0	0	1	1	0
Stepdaughter	0	0	0	0	0
Stepson	0	0	0	0	0
Friend	19	14	18	10	9
Other related (Emotionally - specify)	3	0	3	3	1
Kidney Exchange Total	38	45	44	48	40
Directed kidney exchange	36	42	42	46	37
Non-directed, kidney exchange	2	3	2	2	3
Other Unrelated Total	9	6	2	1	6
Non-directed, waiting list	5	0	0	1	4
Pathological	4	6	2	0	1
Other unrelated (specify)	0	0	0	0	1

Table 8.2.2 Living Kidney Donor Relationship to Recipient, New Zealand 2014-2018

Donor source	2014	2015	2016	2017	2018
Total	72	74	82	69	84
Genetically Related Total	38	37	50	33	41
Sister	7	5	6	3	7
Brother	7	7	13	6	7
Mother	7	10	4	7	8
Father	4	3	8	3	6
Monozygotic (Identical Twin Girl)	0	0	1	0	1
Dizygotic (Non-Identical Twin Girl)	0	0	0	0	0
Dizygotic (Non-Identical Twin Boy)	0	1	0	0	1
Daughter	3	7	7	5	2
Son	4	2	9	5	7
Grandmother	0	0	0	0	0
Grandfather	0	0	0	0	0
Cousin	4	0	1	0	0
Niece	1	0	0	1	0
Nephew	0	0	1	0	1
Aunt	0	1	0	1	1
Uncle	0	1	0	2	0
Other related (Genetically - specify)	1	0	0	0	0
Emotionally Related Total	24	31	26	28	28
Wife	12	13	8	10	8
Husband	0	1	1	3	4
Partner	0	2	3	2	2
Mother-in-law	0	1	1	0	0
Father-in-law	0	0	0	0	0
Stepmother	0	0	0	0	0
Stepfather	0	0	0	0	0
Stepsister	0	0	0	0	0
Stepbrother	0	0	0	1	0
Sister-in-law	1	1	0	2	3
Brother-in-law	0	1	1	1	0
Daughter-in-law	0	0	0	0	0
Son-in-law	0	0	0	0	0
Stepdaughter	0	0	2	0	0
Stepson	0	0	0	1	0
Friend	10	12	10	6	11
Other related (Emotionally - specify)	1	0	0	2	0
Kidney Exchange Total	4	3	5	4	4
Directed kidney exchange	4	3	4	0	2
Non-directed, kidney exchange	0	0	1	4	2
Other Unrelated Total	6	3	1	4	11
Non-directed, waiting list	6	3	1	4	10
Pathological	0	0	0	0	0
Other unrelated (specify)	0	0	0	0	1

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 2014-2018

Donor Relationship	Transplant Region	2014			2015			2016			2017			2018		
		M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Genetically Related	NSW/ACT	36%	64%	56	44%	56%	45	57%	43%	46	48%	52%	71	31%	69%	51
	VIC/TAS	39%	61%	44	48%	52%	29	34%	66%	38	32%	68%	44	40%	60%	43
	QLD	40%	60%	15	38%	62%	13	36%	64%	14	42%	58%	12	44%	56%	9
	SA/NT	44%	56%	9	45%	55%	11	13%	88%	8	60%	40%	5	50%	50%	8
	WA	55%	45%	11	47%	53%	15	18%	82%	11	77%	23%	13	40%	60%	10
	Australia	39%	61%	135	45%	55%	113	40%	60%	117	46%	54%	145	37%	63%	121
	New Zealand	45%	55%	38	38%	62%	37	62%	38%	50	48%	52%	33	54%	46%	41
Genetically Unrelated	NSW/ACT	33%	67%	54	36%	64%	39	37%	63%	59	48%	52%	42	50%	50%	50
	VIC/TAS	56%	44%	45	43%	57%	53	35%	65%	48	42%	58%	50	47%	53%	43
	QLD	73%	27%	11	55%	45%	20	36%	64%	14	50%	50%	10	33%	67%	12
	SA/NT	50%	50%	8	50%	50%	6	23%	77%	13	22%	78%	9	50%	50%	4
	WA	43%	57%	14	45%	55%	11	46%	54%	13	40%	60%	15	38%	63%	8
	Australia	46%	54%	132	43%	57%	129	36%	64%	147	43%	57%	126	46%	54%	117
	New Zealand	21%	79%	34	19%	81%	37	38%	63%	32	28%	72%	36	37%	63%	43

Table 8.3 shows the number of ABO incompatible living donor transplants performed in each country over the last 10 years. Activity increased in New Zealand over 2017-18, but was reasonably stable in Australia over 2013-18.

Table 8.3 Living Donor Transplant Numbers by Blood Group Status 2009-2018

Country	Year	Compatible	Incompatible	Unknown
Australia	2009	296	30	1
	2010	255	40	1
	2011	219	34	1
	2012	198	29	11
	2013	216	36	1
	2014	223	38	6
	2015	201	27	14
	2016	209	48	7
	2017	226	45	0
	2018	197	41	0
New Zealand	2009	64	2	1
	2010	59	1	0
	2011	49	3	5
	2012	46	5	3
	2013	53	6	0
	2014	63	9	0
	2015	65	9	0
	2016	76	6	0
	2017	55	14	0
	2018	73	11	0

Living Donor Characteristics

Table 8.4 shows the clinical characteristics of living kidney donors over 2009-2018. 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.

Table 8.4 Living Donor Clinical Characteristics 2009-2018

Factor	Australia	NZ
N	2595	678
Age (years), mean (SD)	50.9 (10.9)	44.3 (12.0)
Gender		
Female	1503 (57.9%)	395 (58.3%)
Male	1092 (42.1%)	283 (41.7%)
Ethnicity		
Caucasian	2242 (86.4%)	519 (76.5%)
Aboriginal/Torres Strait Islander	55 (2.1%)	9 (1.3%)
Asian	156 (6.0%)	45 (6.6%)
Māori	10 (0.4%)	67 (9.9%)
Pacific	21 (0.8%)	24 (3.5%)
Other	59 (2.3%)	7 (1.0%)
Not reported	52 (2.0%)	7 (1.0%)
Body mass index		
<18.5 (underweight)	20 (0.8%)	1 (0.1%)
18.5-24.9 (normal)	853 (32.9%)	241 (35.5%)
25-29.9 (overweight)	1167 (45.0%)	291 (42.9%)
≥30 (obese)	467 (18.0%)	135 (19.9%)
Not reported	88 (3.4%)	10 (1.5%)
Hypertension	695 (26.8%)	65 (9.6%)
Glycaemic status		
Normal	2441 (94.1%)	657 (96.9%)
Impaired fasting glucose	20 (0.8%)	0 (0.0%)
Impaired glucose tolerance	56 (2.2%)	0 (0.0%)
Diabetic	11 (0.4%)	1 (0.1%)
Not reported	67 (2.6%)	20 (2.9%)
Cigarette Smoking		
Never	1553 (59.8%)	397 (58.6%)
Former	884 (34.1%)	177 (26.1%)
Current	79 (3.0%)	82 (12.1%)
Not reported	79 (3.0%)	22 (3.2%)

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 2018 was 46%. 29% 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 2018 was 40%, a relatively stable number that is consistently lower than in Australia. 41% received dialysis for twelve months or longer prior to being transplanted.

Table 8.5 Timing of Living Kidney Donor Transplants 2014-2018

Country	Timing of transplant	2014	2015	2016	2017	2018
Australia	Pre-emptive	85 (36%)	92 (43%)	104 (44%)	117 (49%)	100 (46%)
	<1 month post dialysis	4 (2%)	1 (<1%)	6 (3%)	3 (1%)	4 (2%)
	1 month to <1 year post dialysis	75 (32%)	47 (22%)	68 (29%)	59 (24%)	51 (23%)
	≥1 year post dialysis	73 (31%)	72 (34%)	57 (24%)	62 (26%)	64 (29%)
New Zealand	Pre-emptive	19 (28%)	19 (28%)	18 (24%)	19 (31%)	32 (40%)
	<1 month post dialysis	-	1 (1%)	1 (1%)	-	2 (2%)
	1 month to <1 year post dialysis	15 (22%)	13 (19%)	17 (23%)	12 (19%)	14 (17%)
	≥1 year post dialysis	33 (49%)	35 (51%)	39 (52%)	31 (50%)	33 (41%)