



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

The total number of deceased donors continued to increase in both Australia and New Zealand in 2017. While this increase has historically been driven by increasing numbers of circulatory death donor and extended criteria brain death donors, 2016-17 also saw an increase in standard criteria brain death donors in Australia. New Zealand's increasing donor numbers were driven by increases in all types of donors over the last 5 years. Mean deceased donor age in Australia remained lower in 2017 than the 2015 peak following a long-term trend of increasing donor age, whereas mean donor age continued gradually to increase in New Zealand. Organ non-utilisation rates remained stable in both countries.

In both countries, living donor transplants have been falling as a proportion of all transplants due to increasing deceased donor numbers. The proportion of living kidney transplants performed through kidney exchange has increased, however, in recent years in both Australia and New Zealand.

Suggested citation

ANZDATA Registry. 41st Report, Chapter 8: Kidney Donation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2018. 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 2008-2017. 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 2008-2017

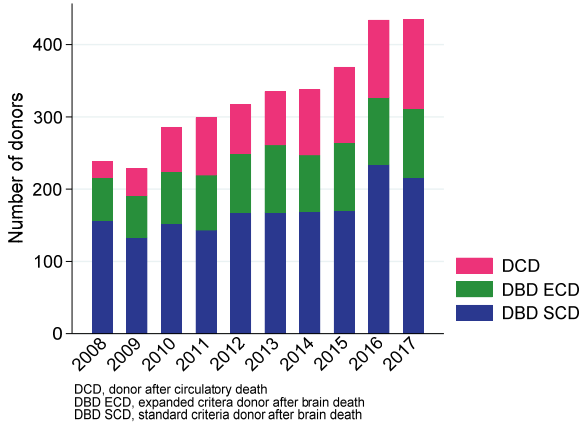
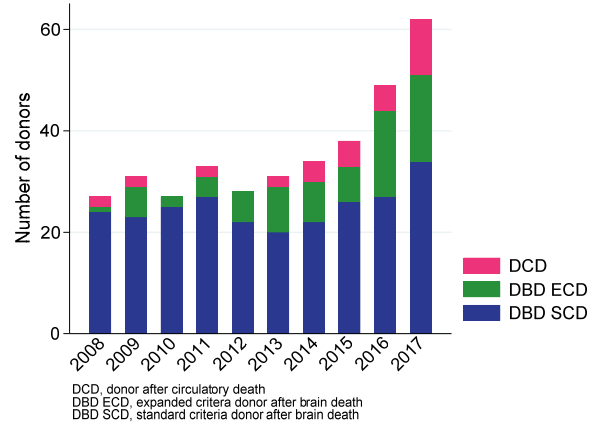


Figure 8.1.2 - Deceased Kidney Donor Type - New Zealand 2008-2017



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 2008-2017

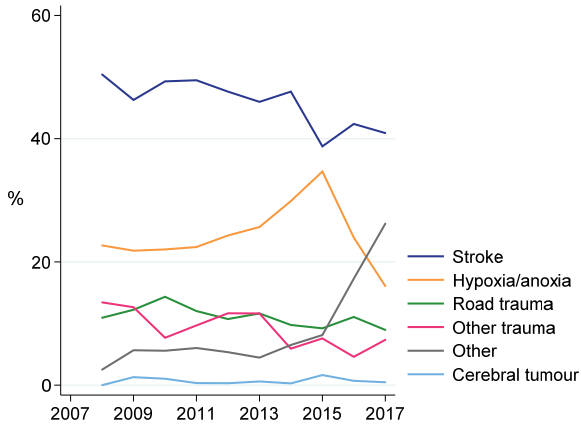


Figure 8.2.2 - Cause of Donor Death - New Zealand 2008-2017

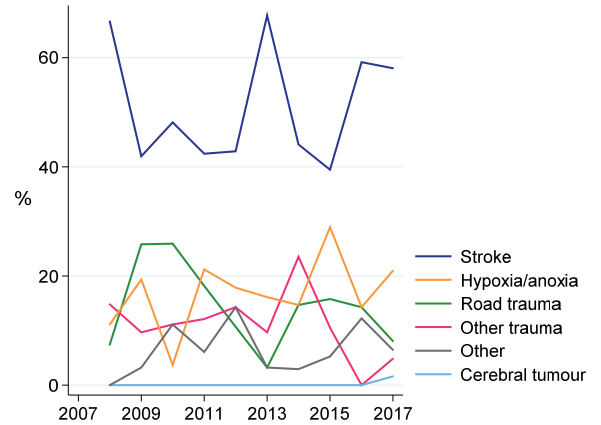


Figure 8.3 shows the mean age of deceased kidney donors in Australia and New Zealand over the last 20 years. In Australia the mean age increased steadily from 2001-2015, but was lower during 2016-17. In New Zealand there has also been a gradual increase in mean age which has continued in 2017, although there is more year to year fluctuation due to lower donor numbers.

Figure 8.3.1 - Deceased Kidney Donor Age - Australia 1998-2017

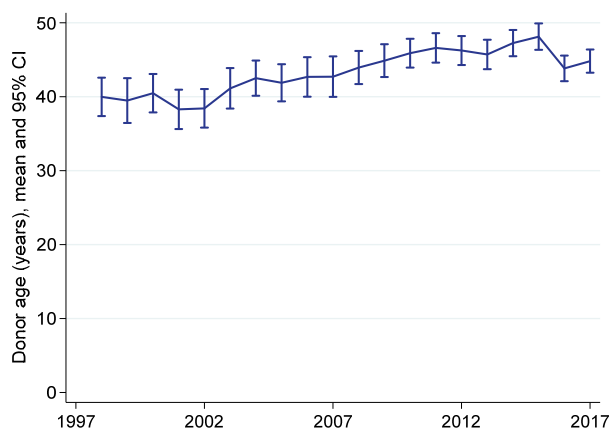


Figure 8.3.2 - Deceased Kidney Donor Age - New Zealand 1998-2017

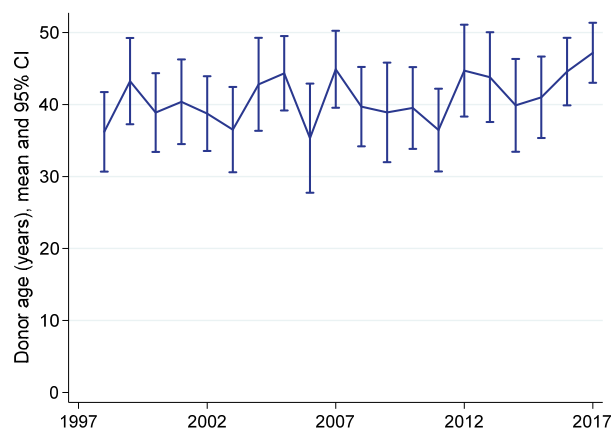


Figure 8.4 shows the non-utilisation rate of retrieved kidneys – the proportion of kidneys that were retrieved for the purpose of transplantation, but not ultimately transplanted into a recipient (either due to an absence of suitable recipients, or the kidney was deemed medically unsuitable after retrieval). 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 2013-2017. In New Zealand non-utilisation rates have historically been 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 2008-2017

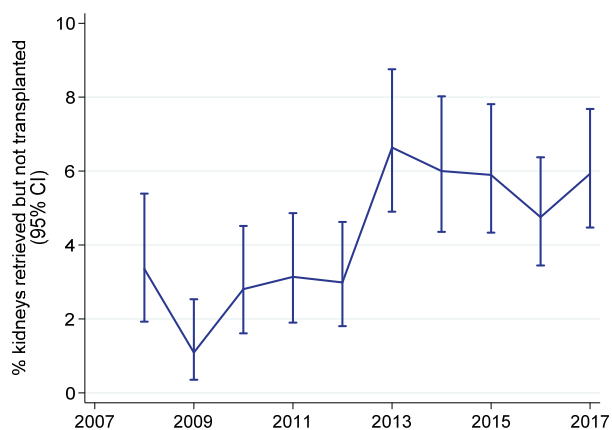


Figure 8.4.2 - Non-utilisation Rate of Retrieved Kidneys - New Zealand 2008-2017



Living Kidney Donors

There were 271 living donor kidney transplants performed in 2017 in Australia, representing 24% of all transplant operations (table 8.1). In New Zealand, the 69 living donor transplants in 2017 represented 37% 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 2012-2017

Country	2012	2013	2014	2015	2016	2017
Australia	28%	29%	29%	26%	24%	24%
New Zealand	50%	51%	52%	50%	48%	37%

The living donor percentage of transplants in Australia and New Zealand is shown in figure 8.5 by recipient age groups for the years 2010-2013 to 2014-2017. 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 except 0-4 years from 2010-2013 to 2014-2017.

Figure 8.5.1 - Living Donor Percentage of Transplants - Australia - Stratified by Age of Recipient, 2010-2013 vs 2014-2017

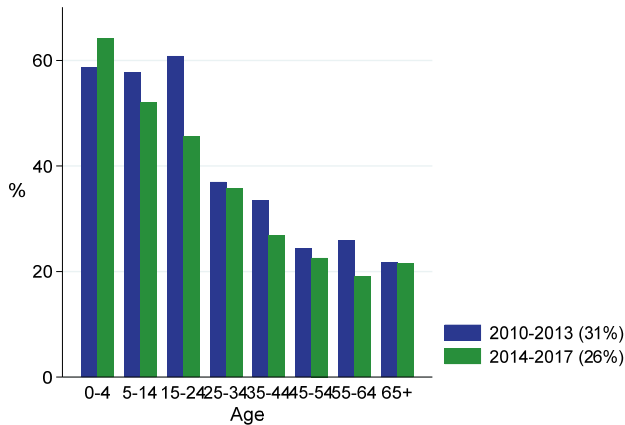


Figure 8.5.2 - Living Donor Percentage of Transplants - New Zealand - Stratified by Age of Recipient, 2010-2013 vs 2014-2017

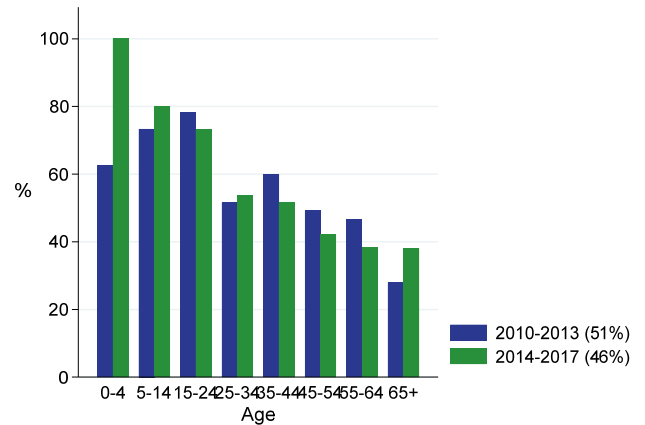


Figure 8.6 shows the living donor percentage of transplants for recipients aged 25-44 years by transplant region. There has been a decrease in this age group for each transplant region within Australia and also in New Zealand from 2010-2013 to 2014-2017.

Figure 8.6 - Living Donor Percentage of Transplants by Transplant Region - Age 25-44, 2010-2013 vs 2014-2017

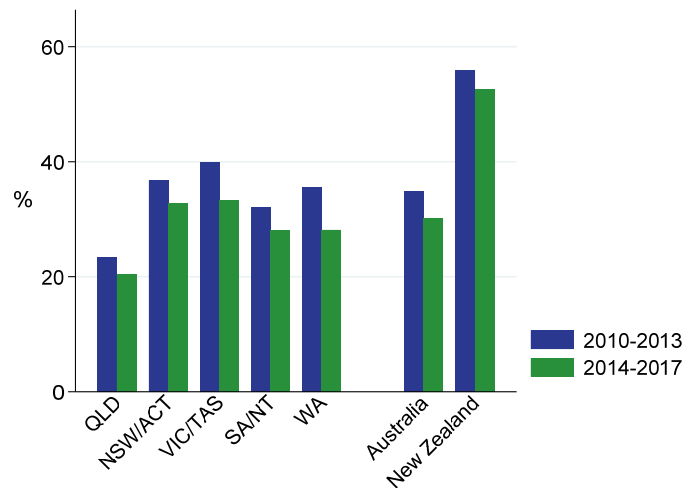


Figure 8.7 shows the number of living donors in Australia and New Zealand for the years 2008-2017 by donor age. Living donors in New Zealand are generally younger than those in Australia.

Figure 8.7.1 - Living Kidney Donor Age - Australia 2008-2017

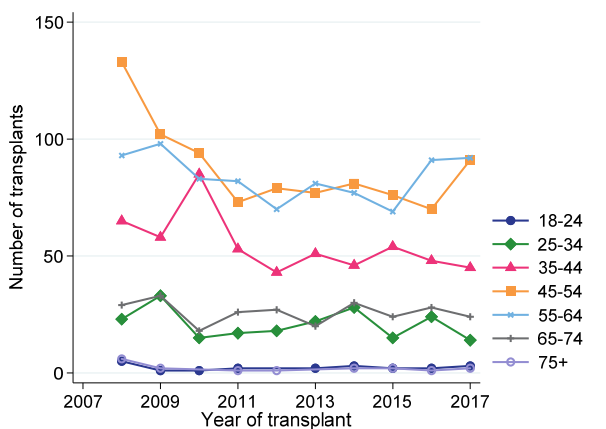
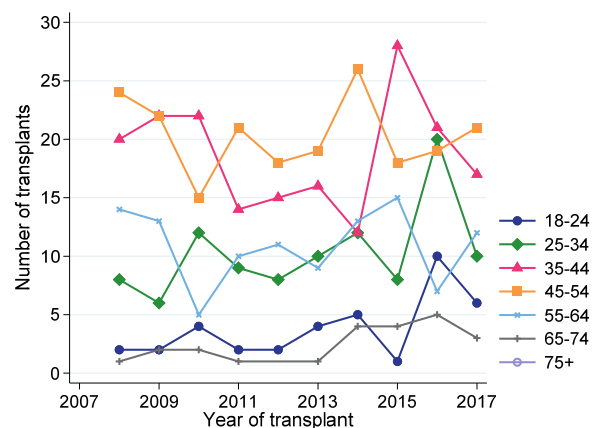


Figure 8.7.2 - Living Kidney Donor Age - New Zealand 2008-2017



The total number of living donor transplants has remained stable in Australia over the last few years. In New Zealand there was growth over 2012-2016 but a decline in numbers in 2017 (figure 8.8). The proportion of genetically related donors was 54% (145 donors) in 2017 in Australia. In New Zealand 33 donors (48%) 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 2008-2017

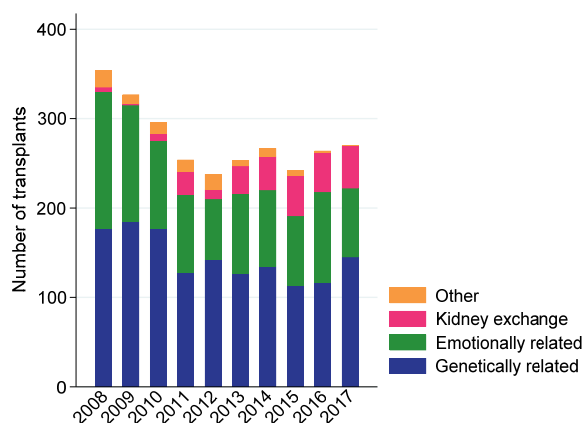


Figure 8.8.2 - Source of Living Kidney Donor - New Zealand 2008-2017

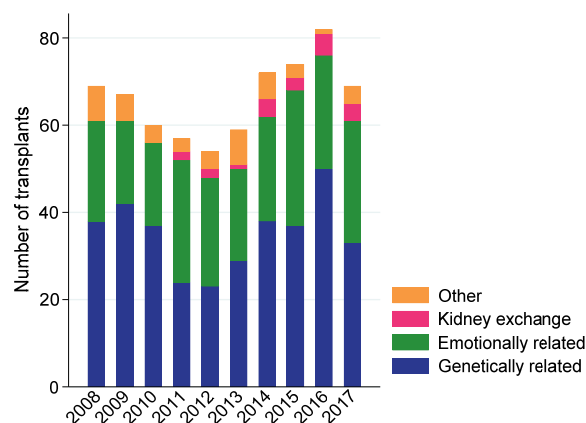


Table 8.2 provides details of the relationships between donors and recipients over 2013-2017 for Australia and New Zealand.

Table 8.2.1 Living Kidney Donor Relationship to Recipient, Australia 2013-2017

Donor source	2013	2014	2015	2016	2017
Total	253	267	242	264	271
Genetically Related Total	127	135	113	117	145
Sister	24	29	22	25	22
Brother	24	23	14	20	27
Mother	29	42	32	36	41
Father	28	22	30	17	30
Monzygotic (Identical Twin Girl)	0	0	0	0	0
Dizygotic (Non-Identical Twin Girl)	1	1	0	0	0
Dizygotic (Non-Identical Twin Boy)	0	0	1	0	1
Daughter	2	4	2	2	5
Son	6	5	3	5	1
Grandmother	1	3	1	2	2
Grandfather	1	1	0	0	1
Cousin	6	1	5	4	5
Niece	0	0	1	0	1
Nephew	0	0	0	2	1
Aunt	1	3	2	3	4
Uncle	3	1	0	1	3
Other related (Genetically - specify)	1	0	0	0	1
Emotionally Related Total	89	85	78	101	77
Wife	42	31	46	54	34
Husband	19	18	10	14	22
Partner	5	5	3	9	6
Mother-in-law	0	2	0	1	0
Father-in-law	1	0	1	0	0
Stepfather	0	1	0	1	0
Stepbrother	0	0	0	0	0
Sister-in-law	1	1	2	0	0
Brother-in-law	4	3	2	0	1
Daughter-in-law	0	2	0	0	0
Son-in-law	0	0	0	1	1
Stepdaughter	0	0	0	0	0
Stepson	1	0	0	0	0
Friend	14	19	14	18	10
Other related (Emotionally - specify)	2	3	0	3	3
Kidney Exchange Total	31	38	45	44	48
Directed kidney exchange	31	36	42	42	46
Non-directed, kidney exchange	0	2	3	2	2
Other Unrelated Total	6	9	6	2	1
Non-directed, waiting list	2	5	0	0	1
Pathological	3	4	6	2	0
Other unrelated (specify)	1	0	0	0	0

Table 8.2.2 Living Kidney Donor Relationship to Recipient, New Zealand 2013-2017

Donor source	2013	2014	2015	2016	2017
Total	59	72	74	82	69
Genetically Related Total	29	38	37	50	33
Sister	5	7	5	6	3
Brother	9	6	7	13	6
Mother	6	7	10	4	7
Father	2	5	3	8	3
Monzygotic (Identical Twin Girl)	0	0	0	1	0
Dizygotic (Non-Identical Twin Girl)	0	0	0	0	0
Dizygotic (Non-Identical Twin Boy)	0	0	1	0	0
Daughter	2	3	7	7	5
Son	3	4	2	9	5
Grandmother	0	0	0	0	0
Grandfather	0	0	0	0	0
Cousin	1	4	0	1	0
Niece	0	1	0	0	1
Nephew	0	0	0	1	0
Aunt	1	0	1	0	1
Uncle	0	0	1	0	2
Other related (Genetically - specify)	0	1	0	0	0
Emotionally Related Total	21	24	31	26	28
Wife	7	12	13	8	10
Husband	3	0	1	1	3
Partner	2	0	2	3	2
Mother-in-law	1	0	1	1	0
Father-in-law	0	0	0	0	0
Stepfather	0	0	0	0	0
Stepbrother	0	0	0	0	1
Sister-in-law	1	1	1	0	2
Brother-in-law	0	0	1	1	1
Daughter-in-law	0	0	0	0	0
Son-in-law	1	0	0	0	0
Stepdaughter	1	0	0	2	0
Stepson	0	0	0	0	1
Friend	5	10	12	10	6
Other related (Emotionally - specify)	0	1	0	0	2
Kidney Exchange Total	1	4	3	5	4
Directed kidney exchange	1	4	3	4	0
Non-directed, kidney exchange	0	0	0	1	4
Other Unrelated Total	8	6	3	1	4
Non-directed, waiting list	8	6	3	1	4
Pathological	0	0	0	0	0
Other unrelated (specify)	0	0	0	0	0

The gender distribution of living donors by relation to recipient, state and country is shown in table 8.3.

Table 8.3 Gender Distribution of Living Donors by Relation to Recipient, State and Country 2013-2017

Donor Relationship	Transplant Region	2013			2014			2015			2016			2017		
		M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Genetically Related	NSW/ACT	40%	60%	58	36%	64%	56	44%	56%	45	57%	43%	46	48%	52%	71
	VIC/TAS	65%	35%	34	39%	61%	44	48%	52%	29	34%	66%	38	32%	68%	44
	QLD	44%	56%	18	40%	60%	15	38%	62%	13	36%	64%	14	42%	58%	12
	SA/NT	60%	40%	5	44%	56%	9	45%	55%	11	13%	88%	8	60%	40%	5
	WA	83%	17%	12	55%	45%	11	47%	53%	15	18%	82%	11	77%	23%	13
	Australia	52%	48%	127	39%	61%	135	45%	55%	113	40%	60%	117	46%	54%	145
	New Zealand	48%	52%	29	45%	55%	38	38%	62%	37	62%	38%	50	48%	52%	33
Genetically Unrelated	NSW/ACT	32%	68%	50	33%	67%	54	36%	64%	39	37%	63%	59	48%	52%	42
	VIC/TAS	47%	53%	49	56%	44%	45	43%	57%	53	35%	65%	48	42%	58%	50
	QLD	50%	50%	10	73%	27%	11	55%	45%	20	36%	64%	14	50%	50%	10
	SA/NT	43%	57%	7	50%	50%	8	50%	50%	6	23%	77%	13	22%	78%	9
	WA	60%	40%	10	43%	57%	14	45%	55%	11	46%	54%	13	40%	60%	15
	Australia	42%	58%	126	46%	54%	132	43%	57%	129	36%	64%	147	43%	57%	126
	New Zealand	33%	67%	30	21%	79%	34	19%	81%	37	38%	63%	32	28%	72%	36

In 2017, New Zealand performed its highest ever number of ABO incompatible living donor transplants at 14, whereas in Australia the number was similar to the peak in 2016 (table 8.4).

Table 8.4 Transplant Numbers by Blood Group Status 2008-2017

Country	Year	Compatible	Incompatible	Unknown
Australia	2008	316	36	2
	2009	294	30	3
	2010	255	40	1
	2011	213	35	6
	2012	187	27	24
	2013	213	36	4
	2014	221	38	8
	2015	201	27	14
	2016	209	48	7
	2017	226	44	1
New Zealand	2008	66	1	2
	2009	64	2	1
	2010	59	1	0
	2011	49	3	5
	2012	46	5	3
	2013	52	6	1
	2014	63	9	0
	2015	64	9	1
	2016	73	6	3
	2017	55	14	0

Living Donor Characteristics

Table 8.5 shows the clinical characteristics of living kidney donors over 2008-2017. 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 8.5 Living Donor Clinical Characteristics 2008-2017

Factor	Australia	NZ
N	2698	663
Age (years), mean (SD)	50.7 (10.9)	44.1 (11.7)
Gender		
Female	1559 (57.8%)	388 (58.5%)
Male	1139 (42.2%)	275 (41.5%)
Ethnicity		
Caucasian	2366 (87.7%)	517 (78.0%)
Aboriginal/Torres Strait Islander	63 (2.3%)	9 (1.4%)
Asian	151 (5.6%)	45 (6.8%)
Māori	11 (0.4%)	61 (9.2%)
Pacific	13 (0.5%)	18 (2.7%)
Other	52 (1.9%)	5 (0.8%)
Not reported	42 (1.6%)	8 (1.2%)
Body mass index		
<18.5 (underweight)	19 (0.7%)	2 (0.3%)
18.5-24.9 (normal)	893 (33.1%)	232 (35.0%)
25-29.9 (overweight)	1209 (44.8%)	287 (43.3%)
≥30 (obese)	490 (18.2%)	128 (19.3%)
Not reported	87 (3.2%)	14 (2.1%)
Hypertension	688 (25.5%)	64 (9.7%)
Glycaemic status		
Normal	2552 (94.6%)	639 (96.4%)
Impaired fasting glucose	20 (0.7%)	0 (0.0%)
Impaired glucose tolerance	60 (2.2%)	1 (0.2%)
Diabetic	9 (0.3%)	1 (0.2%)
Not reported	57 (2.1%)	22 (3.3%)
Cigarette Smoking		
Never	1609 (59.6%)	394 (59.4%)
Former	940 (34.8%)	170 (25.6%)
Current	91 (3.4%)	77 (11.6%)
Not reported	58 (2.1%)	22 (3.3%)

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 2017 was 49%. 26% 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 2017 was 31%, a relatively stable number that is consistently lower than in Australia. 50% received dialysis for twelve months or longer prior to being transplanted.

Table 8.6 Timing of Living Kidney Donor Transplants 2013-2017

Country	Timing of transplant	2013	2014	2015	2016	2017
Australia	Pre-emptive	85 (38%)	85 (36%)	92 (43%)	104 (44%)	118 (49%)
	<1 month post dialysis	9 (4%)	4 (2%)	1 (<1%)	6 (3%)	2 (1%)
	1 month to <1-year post dialysis	65 (29%)	75 (32%)	47 (22%)	68 (29%)	59 (24%)
	≥1 year post dialysis	65 (29%)	73 (31%)	72 (34%)	57 (24%)	62 (26%)
New Zealand	Pre-emptive	15 (26%)	19 (28%)	19 (28%)	18 (24%)	19 (31%)
	<1 month post dialysis	2 (4%)	-	1 (1%)	1 (1%)	-
	1 month to <1-year post dialysis	9 (16%)	15 (22%)	13 (19%)	17 (23%)	12 (19%)
	≥1 year post dialysis	31 (54%)	33 (49%)	35 (51%)	39 (52%)	31 (50%)