

# Chapter 9

## Kidney Donors



2016

ANZDATA Registry

39th Annual Report

*Data to 31-Dec-2015*

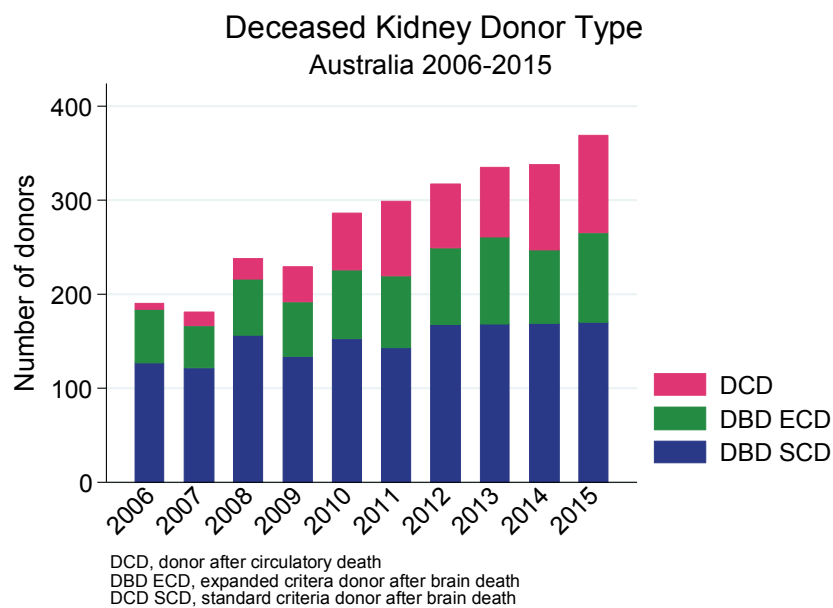
## Deceased Kidney Donors

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,

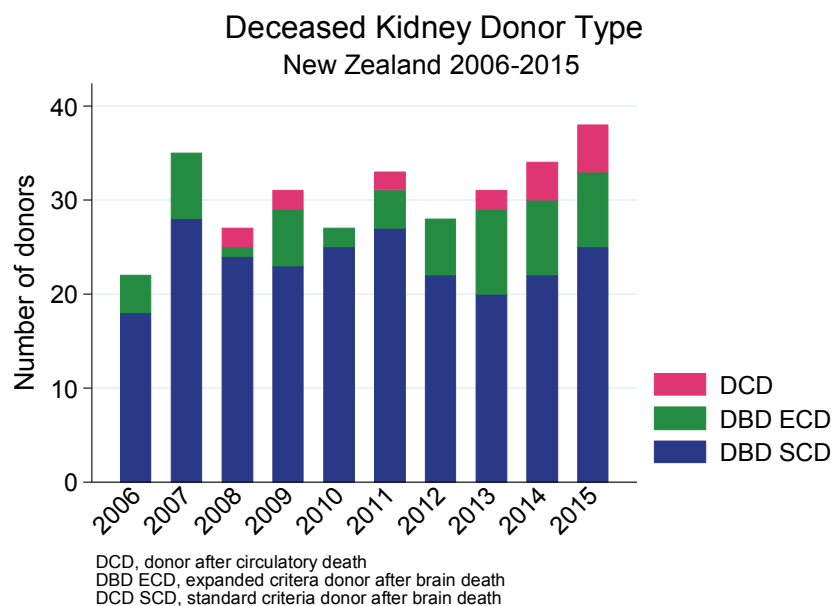
<http://www.anzdata.org.au/anzod/v1/indexanzod.html>

Figure 9.1 shows the different types of deceased kidney donors in each country over 2006-2015. In Australia there has been a large increase in the number of donors since 2008, driven primarily by an increase in expanded criteria (ECD) and in particular circulatory death (DCD) donors. In New Zealand the donor numbers are steady and the proportions of donors classified as ECD and DCD are much lower than in Australia, although the uptake of DCD donors has increased in recent years.

**Figure 9.1.1**

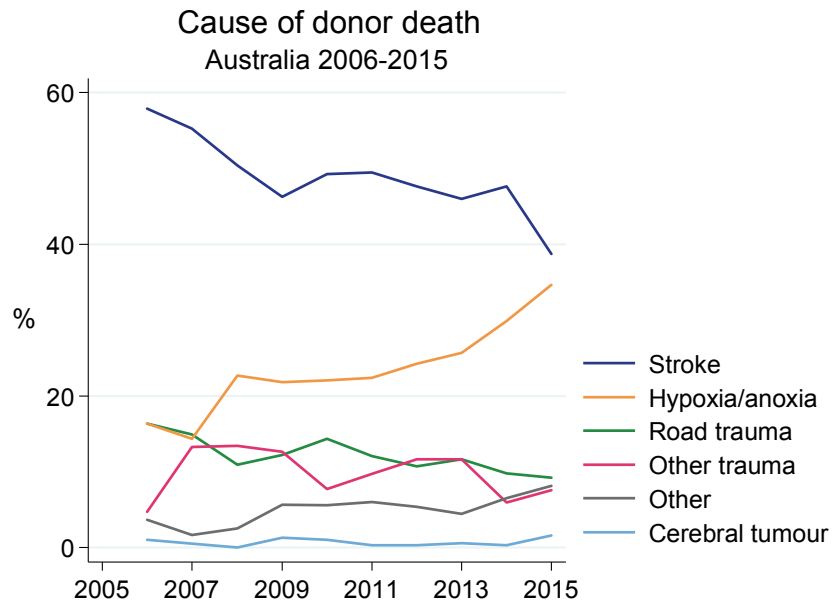


**Figure 9.1.2**



The causes of death of deceased donors are shown in Figure 9.2. Stroke remains the most common cause of kidney donor death in both Australia and New Zealand. In Australia there has been a slight reduction in the proportion of deaths due to trauma, with a corresponding increase in the proportion due to hypoxia/anoxia.

**Figure 9.2.1**



**Figure 9.2.2**

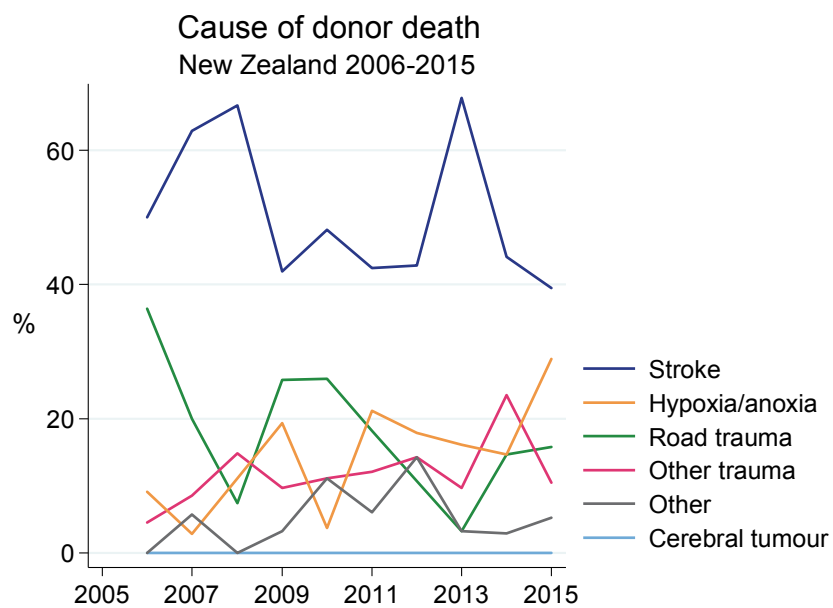
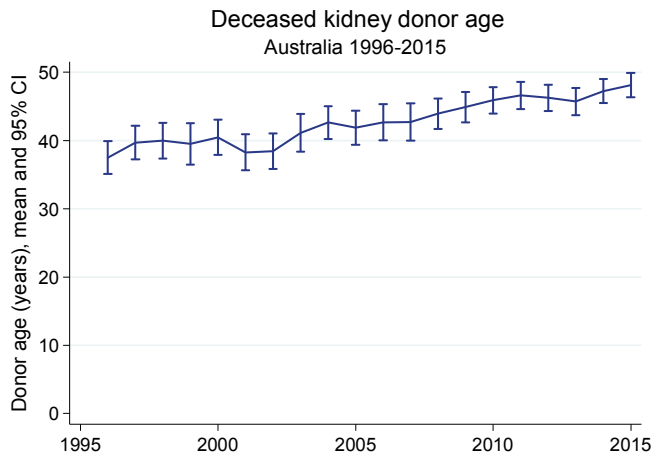


Figure 9.3 shows the mean age of deceased kidney donors in Australia and New Zealand over the last 20 years. In Australia the mean age has increased steadily from 35 years in 1995 to 48 years in 2015. In New Zealand the trend is less clear, and donors are generally younger than in Australia.

**Figure 9.3.1**



**Figure 9.3.2**

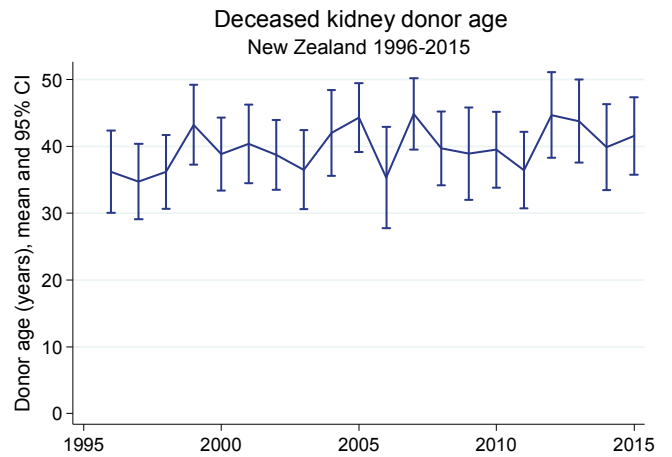
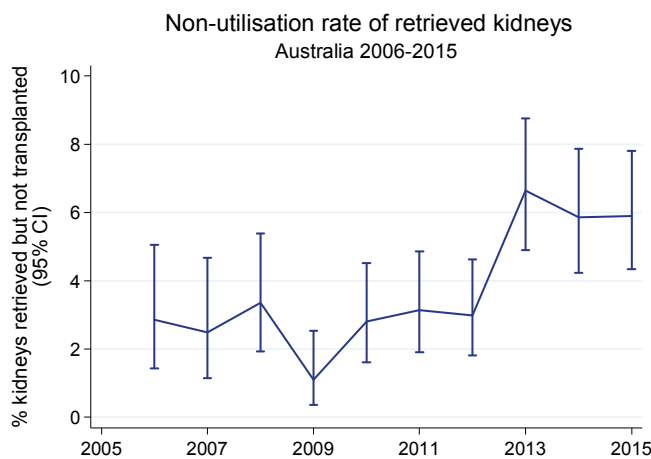
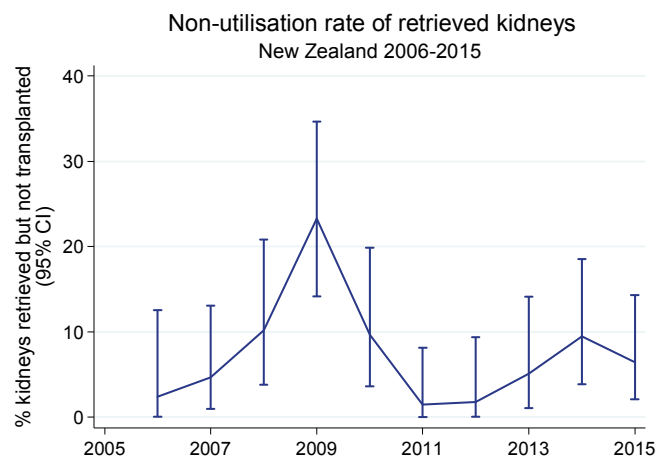


Figure 9.4 shows the non utilisation rate of retrieved kidneys – the proportion of kidneys that were retrieved for the purpose of transplantation, but not ultimately transplanted into a recipient (either due to an absence of suitable recipients, or the kidney being found to be medically unsuitable after retrieval). Despite the increasing age and complexity of donors in Australia the non utilization rate remained steady at around 3% over 2006-2012. However, this rate rose in 2013-15. In New Zealand non utilization rates have historically been slightly higher than in Australia (note the different y-axis scales).

**Figure 9.4.1**



**Figure 9.4.2**



## Living Kidney Donors

### Australia

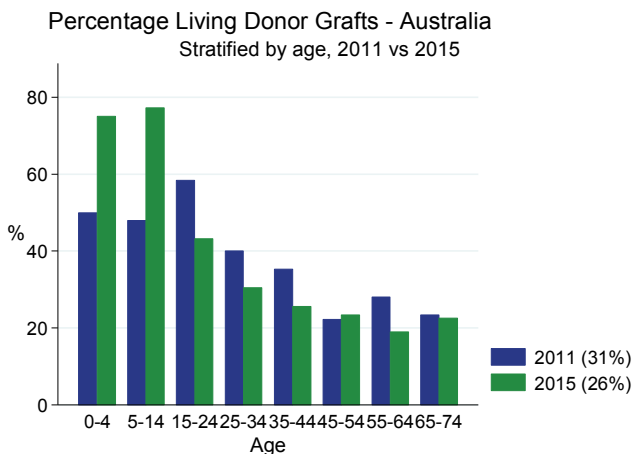
There were 242 living donor kidney transplants performed in 2015 in Australia, representing 26% of all transplant operations (table 9.1). Living donor transplants have been falling as a proportion of all transplants since 2011 (figure 9.5)

The proportion of living donor transplants for each state and New Zealand for recipients aged 25-44 years is shown for the years 2008-2011 and 2012-2015 in figure 9.6. Overall there has been a decrease in this age group for both countries from 2008-2011 to 2012-2015, more pronounced in Australia.

**Table 9.1. Proportion of Living Kidney Donor Transplants by Age Group 2010-2015**

Age group	2010	2011	2012	2013	2014	2015
0-4	60%	50%	67%	60%	89%	75%
5-14	60%	48%	70%	55%	52%	77%
15-24	76%	58%	58%	53%	48%	43%
25-34	43%	40%	29%	36%	44%	30%
35-44	41%	35%	32%	26%	31%	26%
45-54	26%	22%	21%	29%	24%	23%
55-64	31%	28%	21%	24%	21%	19%
65-74	18%	23%	25%	18%	24%	23%
75-84	67%	50%	50%	0%	36%	0%
All recipients	35%	31%	28%	29%	29%	26%

**Figure 9.5**



**Figure 9.6**

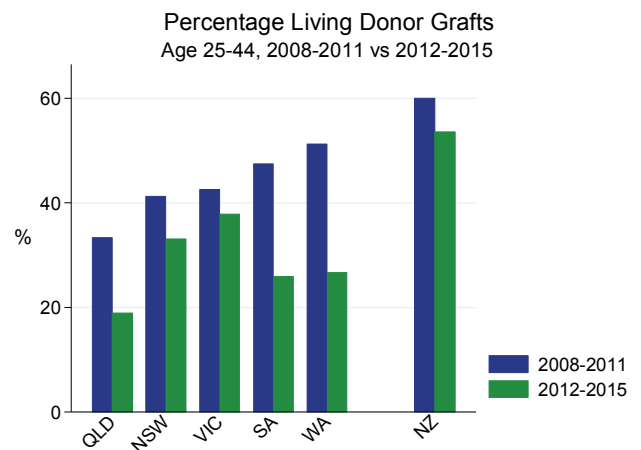
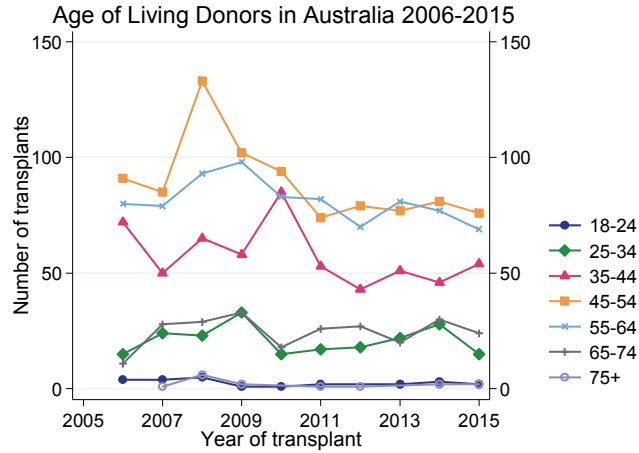


Figure 9.7 shows the number of living donors for the years 2006-2015 by donor age. Since 2008 the number of living donors decreased in the most common age groups of 45-54 and 55-64, but remained stable in the other age groups.

The proportion of genetically unrelated donors was 53% (129 donors) in 2015 compared with 49% (132 donors) in 2014, shown in figure 9.8. Forty-six percent of living unrelated donors were spouses or partners (table 9.2).

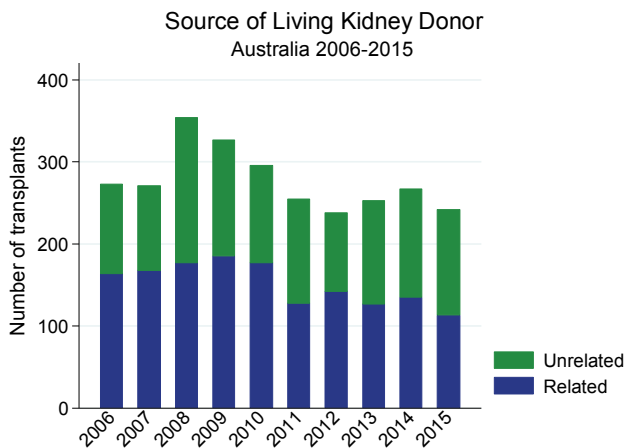
**Figure 9.7**



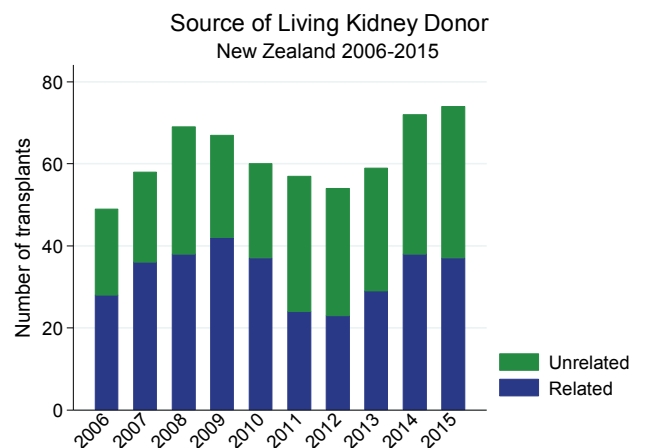
## New Zealand

There were 74 living kidney donors in New Zealand in 2015, 37 of whom were genetically unrelated to their recipient. Overall 50% percent of grafts were from a living donor. There were three non-directed donors in 2015.

**Figure 9.8.1**



**Figure 9.8.2**



**Table 9.2.1 Living Kidney Donor Relationship to Recipient - Australia- 2011-2015**

Donor source	Country	2011	2012	2013	2014	2015
<b>Total</b>	<b>Australia</b>	<b>255</b>	<b>238</b>	<b>253</b>	<b>267</b>	<b>242</b>
<b>Related</b>	<b>Australia</b>	<b>128</b>	<b>142</b>	<b>127</b>	<b>135</b>	<b>113</b>
<b>Unrelated</b>	<b>Australia</b>	<b>127</b>	<b>96</b>	<b>126</b>	<b>132</b>	<b>129</b>
<b>Sister</b>	<b>Australia</b>	<b>22</b>	<b>26</b>	<b>24</b>	<b>29</b>	<b>22</b>
<b>Brother</b>	<b>Australia</b>	<b>18</b>	<b>20</b>	<b>24</b>	<b>23</b>	<b>14</b>
<b>Mother</b>	<b>Australia</b>	<b>38</b>	<b>40</b>	<b>29</b>	<b>42</b>	<b>32</b>
<b>Father</b>	<b>Australia</b>	<b>33</b>	<b>35</b>	<b>28</b>	<b>22</b>	<b>30</b>
<b>Monzygotic (Identical Twin boy)</b>	<b>Australia</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Dizygotic (Non-Identical Twin Girl)</b>	<b>Australia</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>Dizygotic (Non-Identical Twin boy)</b>	<b>Australia</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Daughter</b>	<b>Australia</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>4</b>	<b>2</b>
<b>Son</b>	<b>Australia</b>	<b>1</b>	<b>3</b>	<b>6</b>	<b>5</b>	<b>3</b>
<b>Grandmother</b>	<b>Australia</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>1</b>
<b>Grandfather</b>	<b>Australia</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>Cousin</b>	<b>Australia</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>1</b>	<b>5</b>
<b>Niece</b>	<b>Australia</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Aunt</b>	<b>Australia</b>	<b>3</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>2</b>
<b>Uncle</b>	<b>Australia</b>	<b>2</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>0</b>
<b>Other related (Genetically - specify)</b>	<b>Australia</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>Wife</b>	<b>Australia</b>	<b>47</b>	<b>32</b>	<b>42</b>	<b>31</b>	<b>46</b>
<b>Husband</b>	<b>Australia</b>	<b>20</b>	<b>15</b>	<b>19</b>	<b>18</b>	<b>10</b>
<b>Partner</b>	<b>Australia</b>	<b>6</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>3</b>
<b>Mother-in-law</b>	<b>Australia</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>0</b>
<b>Father-in-law</b>	<b>Australia</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>Stepfather</b>	<b>Australia</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>
<b>Sister-in-law</b>	<b>Australia</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>
<b>Brother-in-law</b>	<b>Australia</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>3</b>	<b>2</b>
<b>Daughter-in-law</b>	<b>Australia</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>
<b>Son-in-law</b>	<b>Australia</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Stepdaughter</b>	<b>Australia</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Stepson</b>	<b>Australia</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>Friend</b>	<b>Australia</b>	<b>12</b>	<b>9</b>	<b>14</b>	<b>19</b>	<b>14</b>
<b>Other related (Emotionally - specify)</b>	<b>Australia</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>0</b>
<b>Non-directed, waiting list</b>	<b>Australia</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>5</b>	<b>0</b>
<b>Non-directed, kidney exchange</b>	<b>Australia</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>3</b>
<b>Directed kidney exchange</b>	<b>Australia</b>	<b>24</b>	<b>11</b>	<b>31</b>	<b>36</b>	<b>42</b>
<b>Pathological</b>	<b>Australia</b>	<b>9</b>	<b>13</b>	<b>3</b>	<b>4</b>	<b>6</b>
<b>Other unrelated (specify)</b>	<b>Australia</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>

**Table 9.2.2 Living Kidney Donor Relationship to Recipient New Zealand - 2011- 2015**

Donor source	Country	2011	2012	2013	2014	2015
<b>Total</b>	<b>NZ</b>	<b>57</b>	<b>54</b>	<b>59</b>	<b>72</b>	<b>74</b>
<b>Related</b>	<b>NZ</b>	<b>24</b>	<b>23</b>	<b>29</b>	<b>38</b>	<b>37</b>
<b>Unrelated</b>	<b>NZ</b>	<b>33</b>	<b>31</b>	<b>30</b>	<b>34</b>	<b>37</b>
<b>Sister</b>	<b>NZ</b>	<b>9</b>	<b>3</b>	<b>5</b>	<b>7</b>	<b>5</b>
<b>Brother</b>	<b>NZ</b>	<b>5</b>	<b>1</b>	<b>9</b>	<b>6</b>	<b>7</b>
<b>Mother</b>	<b>NZ</b>	<b>0</b>	<b>4</b>	<b>6</b>	<b>7</b>	<b>10</b>
<b>Father</b>	<b>NZ</b>	<b>3</b>	<b>6</b>	<b>2</b>	<b>5</b>	<b>3</b>
<b>Monzygotic (Identical Twin boy)</b>	<b>NZ</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Dizygotic (Non-Identical Twin Girl)</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Dizygotic (Non-Identical Twin boy)</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Daughter</b>	<b>NZ</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>7</b>
<b>Son</b>	<b>NZ</b>	<b>2</b>	<b>4</b>	<b>3</b>	<b>4</b>	<b>2</b>
<b>Grandmother</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Grandfather</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Cousin</b>	<b>NZ</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>0</b>
<b>Niece</b>	<b>NZ</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>
<b>Aunt</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>Uncle</b>	<b>NZ</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Other related (Genetically - specify)</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
<b>Wife</b>	<b>NZ</b>	<b>10</b>	<b>8</b>	<b>7</b>	<b>12</b>	<b>13</b>
<b>Husband</b>	<b>NZ</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>1</b>
<b>Partner</b>	<b>NZ</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>2</b>
<b>Mother-in-law</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>Father-in-law</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Stepfather</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Sister-in-law</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>Brother-in-law</b>	<b>NZ</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Daughter-in-law</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Son-in-law</b>	<b>NZ</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>Stepdaughter</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>Stepson</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Friend</b>	<b>NZ</b>	<b>4</b>	<b>14</b>	<b>5</b>	<b>10</b>	<b>12</b>
<b>Other related (Emotionally - specify)</b>	<b>NZ</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>
<b>Non-directed, waiting list</b>	<b>NZ</b>	<b>3</b>	<b>4</b>	<b>8</b>	<b>6</b>	<b>3</b>
<b>Non-directed, kidney exchange</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Directed kidney exchange</b>	<b>NZ</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>4</b>	<b>3</b>
<b>Pathological</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Other unrelated (specify)</b>	<b>NZ</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>



The gender distribution of living donors by relation to recipient, state and country is shown in table 9.3. ABO incompatible transplant numbers have been stable over the last four years (table 9.4).

Table 9.3 Gender Distribution of Living Donors by Relation to Recipient, State and Country 2011- 2015																
Donor source	Year	2011			2012			2013			2014			2015		
	Tx state	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Related	NSW/ACT	41%	59%	46	43%	57%	46	40%	60%	58	36%	64%	56	44%	56%	45
	VIC/TAS	50%	50%	44	40%	60%	50	65%	35%	34	39%	61%	44	48%	52%	29
	QLD	45%	55%	20	38%	62%	21	44%	56%	18	40%	60%	15	38%	62%	13
	SA/NT	30%	70%	10	57%	43%	14	60%	40%	5	44%	56%	9	45%	55%	11
	WA	50%	50%	8	55%	45%	11	83%	17%	12	55%	45%	11	47%	53%	15
	Aust.	45%	55%	128	44%	56%	142	52%	48%	127	39%	61%	135	45%	55%	113
	NZ	50%	50%	24	48%	52%	23	48%	52%	29	45%	55%	38	38%	62%	37
Unrelated	NSW/ACT	43%	57%	42	44%	56%	27	32%	68%	50	33%	67%	54	36%	64%	39
	VIC/TAS	43%	58%	40	47%	53%	36	47%	53%	49	56%	44%	45	43%	57%	53
	QLD	31%	69%	16	30%	70%	10	50%	50%	10	73%	27%	11	55%	45%	20
	SA/NT	50%	50%	6	33%	67%	9	43%	57%	7	50%	50%	8	50%	50%	6
	WA	43%	57%	23	36%	64%	14	60%	40%	10	43%	57%	14	45%	55%	11
	Aust.	42%	58%	127	42%	58%	96	42%	58%	126	46%	54%	132	43%	57%	129
	NZ	42%	58%	33	26%	74%	31	33%	67%	30	21%	79%	34	19%	81%	37

**Table 9.4 Living Donor Transplant Numbers by Blood Group Status 2006-2015**

<b>Year</b>	<b>Country</b>	<b>Compatible</b>	<b>Incompatible</b>	<b>Unknown</b>
2006	Australia	261	9	3
2006	NZ	48	1	0
2007	Australia	247	22	2
2007	NZ	58	0	0
2008	Australia	317	36	1
2008	NZ	66	1	2
2009	Australia	294	30	3
2009	NZ	64	2	1
210	Australia	255	40	1
210	NZ	59	1	0
2011	Australia	214	35	6
2011	NZ	49	3	5
2012	Australia	188	26	24
2012	NZ	46	5	3
2013	Australia	195	36	22
2013	NZ	51	6	2
2014	Australia	198	36	33
2014	NZ	58	8	6
2015	Australia	193	27	22
2015	NZ	64	9	1

## Living Donor Characteristics

Table 9.5 shows the clinical characteristics of living kidney donors over 2006-2015. Donors were predominantly Caucasian and commonly overweight or obese. A history of smoking was common. Australian donors were older and more likely to have hypertension.

<b>Table 9.5 Living Donor Clinical Characteristics 2006 - 2015</b>		
<b>Factor</b>	<b>Australia</b>	<b>NZ</b>
<b>N</b>	2689	619
<b>Age (years), mean (SD)</b>	50.3 (10.9)	44.6 (11.1)
<b>Gender</b>		
<b>Female</b>	1560 (58.0%)	372 (60.1%)
<b>Male</b>	1129 (42.0%)	247 (39.9%)
<b>Ethnicity</b>		
<b>Caucasian</b>	2421 (90.0%)	507 (81.9%)
<b>Aboriginal/Torres Strait Islander</b>	70 (2.6%)	8 (1.3%)
<b>Asian</b>	127 (4.7%)	37 (6.0%)
<b>Māori</b>	11 (0.4%)	55 (8.9%)
<b>Pacific</b>	8 (0.3%)	2 (0.3%)
<b>Other</b>	35 (1.3%)	1 (0.2%)
<b>Not reported</b>	17 (0.6%)	9 (1.5%)
<b>Body mass index</b>		
<b>&lt;18.5 (underweight)</b>	19 (0.7%)	2 (0.3%)
<b>18.5-24.9 (normal)</b>	942 (35.0%)	231 (37.3%)
<b>25-29.9 (overweight)</b>	1161 (43.2%)	274 (44.3%)
<b>≥30 (obese)</b>	477 (17.7%)	96 (15.5%)
<b>Not reported</b>	90 (3.3%)	16 (2.6%)
<b>Hypertension</b>	637 (23.7%)	53 (8.6%)
<b>Glycaemic status</b>		
<b>Normal</b>	2575 (95.8%)	593 (95.8%)
<b>Impaired fasting glucose</b>	13 (0.5%)	1 (0.2%)
<b>Impaired glucose tolerance</b>	59 (2.2%)	1 (0.2%)
<b>Diabetic</b>	9 (0.3%)	1 (0.2%)
<b>Not reported</b>	33 (1.2%)	23 (3.7%)
<b>Cigarette Smoking</b>		
<b>Never</b>	1579 (58.7%)	371 (59.9%)
<b>Former</b>	957 (35.6%)	149 (24.1%)
<b>Current</b>	126 (4.7%)	79 (12.8%)
<b>Not reported</b>	27 (1.0%)	20 (3.2%)

## Timing of Living Kidney Transplants

The timing of primary living donor transplants relative to the start of dialysis is shown in table 9.6.

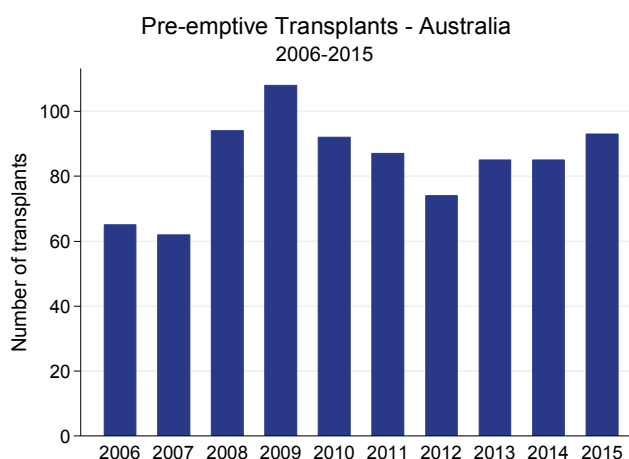
The proportion of all primary living donor transplants performed “pre-emptively” in Australia was 44%, a number that is slightly higher than for the last 5 years. The gradual reduction in the numbers of pre-emptive transplants over 2010 -2013 has stopped (figure 9.9). Thirty-four percent of recipients 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 was 28% in 2015, a relatively stable number that is consistently slightly lower than that in Australia. Fifty-one percent received dialysis for twelve months or longer prior to being transplanted.

**Table 9.6 Timing of Living Kidney Donor Transplants 2011 - 2015**

Country	Timing of transplant	2011	2012	2013	2014	2015
Australia	Pre-emptive	87 (37%)	74 (35%)	85 (38%)	85 (36%)	93 (44%)
	<1 month post dialysis	7 (3%)	6 (3%)	9 (4%)	4 (2%)	1 (<1%)
	1 month to <1 year post dialysis	66 (28%)	72 (34%)	65 (29%)	75 (32%)	46 (22%)
	≥1 year post dialysis	73 (31%)	62 (29%)	65 (29%)	73 (31%)	72 (34%)
NZ	Pre-emptive	12 (23%)	15 (31%)	15 (26%)	19 (28%)	19 (28%)
	<1 month post dialysis	1 (2%)	1 (2%)	2 (4%)	-	1 (1%)
	1 month to <1 year post dialysis	11 (21%)	12 (24%)	9 (16%)	15 (22%)	13 (19%)
	≥1 year post dialysis	28 (54%)	21 (43%)	31 (54%)	33 (49%)	35 (51%)

**Figure 9.9**



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