

# CHAPTER 8

## Kidney Donation

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

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## SUMMARY AND HIGHLIGHTS

Chapter 8 describes the trends and characteristics in organ donation for kidney transplantation in Australia and New Zealand. The data for this chapter come from the Australia and New Zealand Organ Donor (ANZOD) Registry and the Australia and New Zealand Living Kidney Donor (ANZLKD) Registry. Much more information about deceased organ donors in Australia and New Zealand can be found on the ANZOD website, <https://www.anzdata.org.au/anzod/> and the ANZLKD website, <https://www.anzdata.org.au/anzlkd/>.

The total number of deceased kidney donors was slightly higher in 2022 than in the preceding two years, though not as high as in 2017-2019. This may reflect a change in response to the COVID-19 pandemic. In New Zealand, the total rate remained static, though not as high as in 2017 and 2019. The most common number of deceased donors came from standard criteria donors after brain death (SCD DBD). The most common cause of donor death continued to be stroke in both countries. There has been a small increase in deceased donor age over the past 20 years though this change is more evident when looking at a longer time frame. The mean raw Kidney Donor Risk Index has increased over time for both Australia and New Zealand, perhaps reflecting greater need to accept donors with greater age and comorbidities to meet the demand for kidney donors. The median Kidney Donor Profile Index varied across transplanting centres and transplant jurisdictions, perhaps demonstrating some centre-level differences in practice. Despite the change in acceptance patterns, the rates of non-utilisation across both countries are higher in the past three years than previously.

For living kidney donors, the proportion remained stable, with a greater proportion of living donors in New Zealand than in Australia. In Australia, the number of living kidney donors decreased with recipient age, whereas the proportion was similar for all age groups within New Zealand. The source of living donors was more likely to be from a genetically related donor than an emotionally related donor in both countries. In Australia over the past four years, mothers were the most likely donor source for genetically related donors and wives the most likely source for emotionally related donors. In New Zealand over the past four years, brothers were the most likely donor source for genetically related donors and wives the most likely source for emotionally related donors. The rates of paired exchange kidney donation remained stable, and the number of blood group incompatible transplants has decreased. For living donor characteristics, the proportion of people with hypertension increased in Australia from 2018-2022 compared with 2013-2017; other characteristics were largely unchanged.

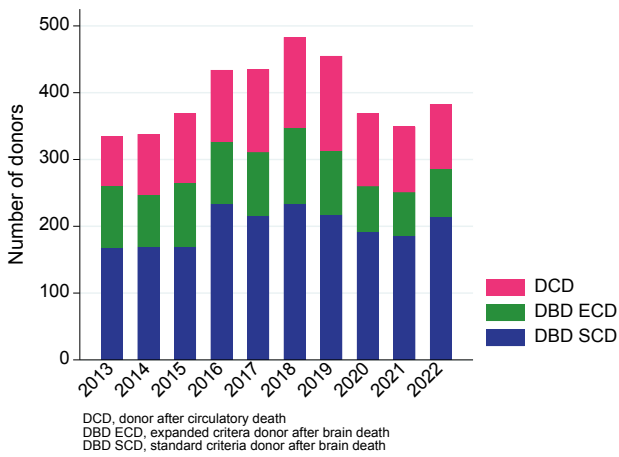
## SUGGESTED CITATION

G Irish, C Davies, E Au, S Bateman, J Chen, K Hurst, D Lee, H McCarthy, S McDonald, W Mulley, M Roberts, T Sun, P Clayton. 46th Report, Chapter 8: Kidney Donation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2023. Available at: <http://www.anzdata.org.au>

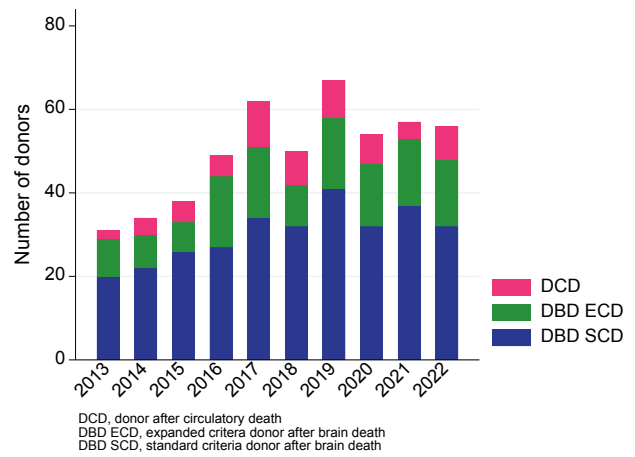
# DECEASED KIDNEY DONORS

Figure 8.1 shows the different types of deceased kidney donors in each country over 2013-2022.

**Figure 8.1.1**  
*Deceased Kidney Donor Type - Australia 2013-2022*

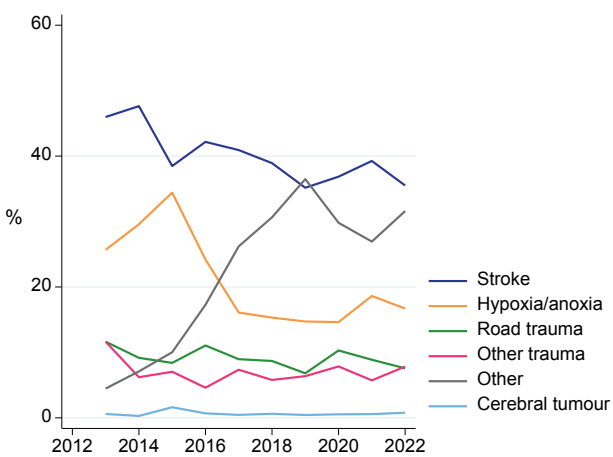


**Figure 8.1.2**  
*Deceased Kidney Donor Type - New Zealand 2013-2022*



The causes of death of deceased donors are shown in figure 8.2.

**Figure 8.2.1**  
*Cause of Donor Death - Australia 2013-2022*



**Figure 8.2.2**  
*Cause of Donor Death - New Zealand 2013-2022*

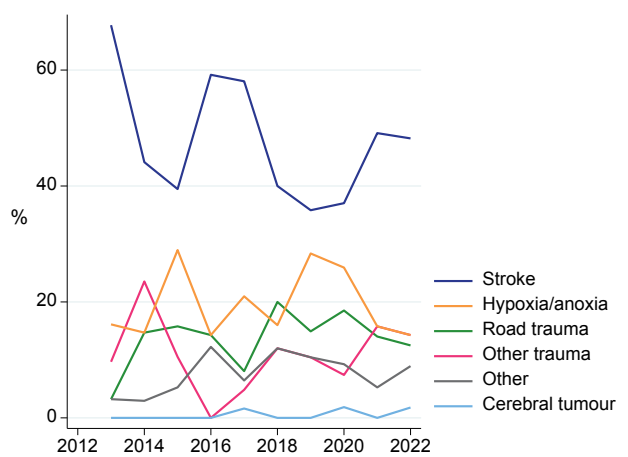
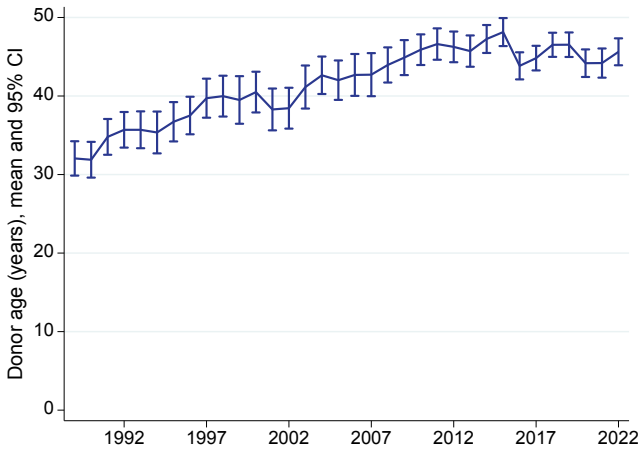


Figure 8.3 shows the mean age of deceased kidney donors in Australia and New Zealand since the ANZOD registry commenced in 1989 in Australia and 1993 in New Zealand.

**Figure 8.3.1**  
**Deceased Kidney Donor Type - Australia 2013-2022**



**Figure 8.3.2**  
**Deceased Kidney Donor Type - New Zealand 2013-2022**

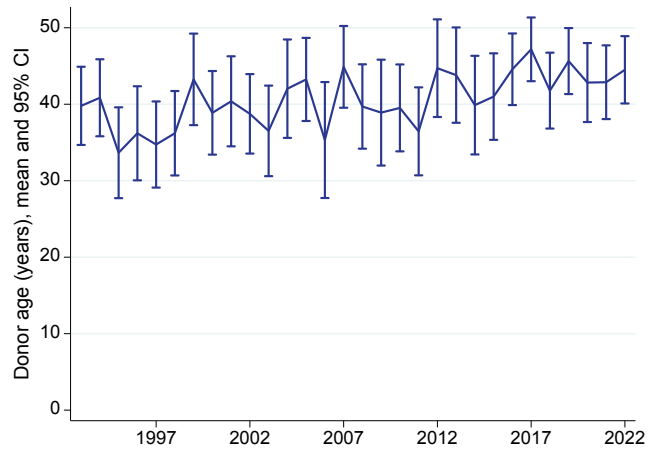
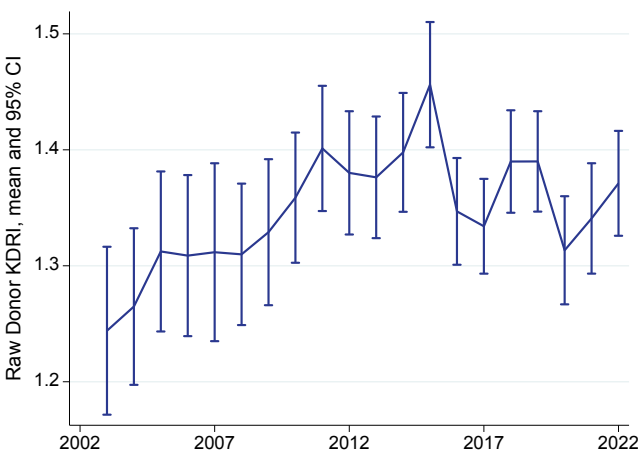


Figure 8.4 shows the mean raw Kidney Donor Risk Index (KDRI) of deceased kidney donors in Australia and New Zealand over the last 20 years.

**Figure 8.4.1**  
**Deceased Kidney Donor KDRI - Australia 2003-2022**



**Figure 8.4.2**  
**Deceased Kidney Donor KDRI - New Zealand 2003-2022**

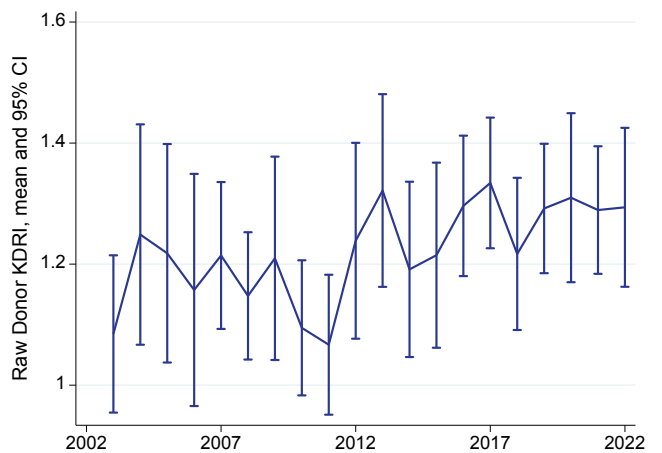
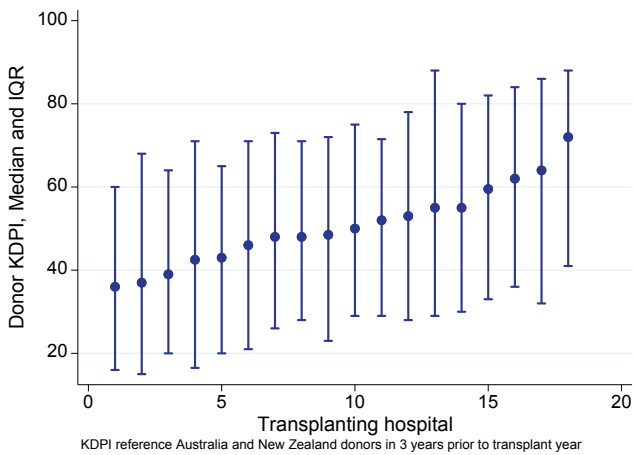


Figure 8.5 shows the median and IQR of the Kidney Donor Profile Index (KDPI) of deceased kidney donors in Australia and New Zealand over the last 5 years by transplant hospital, and figure 8.6 shows the same data by transplant region.

**Figure 8.5**  
**Deceased Kidney Donor KDPI by Transplant Hospital - Australia and New Zealand 2018-2022**



**Figure 8.6**  
**Deceased Kidney Donor KDPI by Transplant Region - Australia and New Zealand 2018-2022**

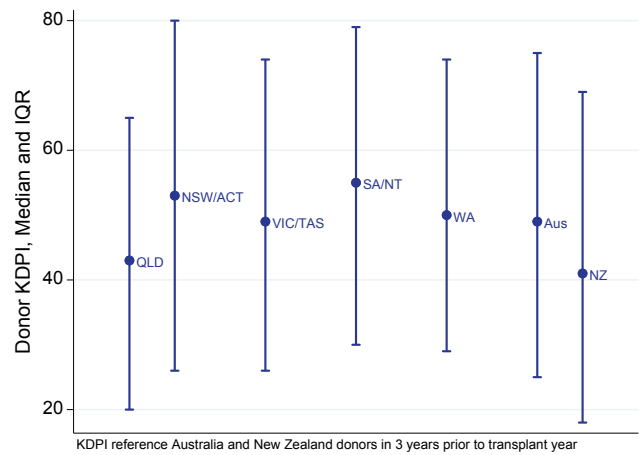
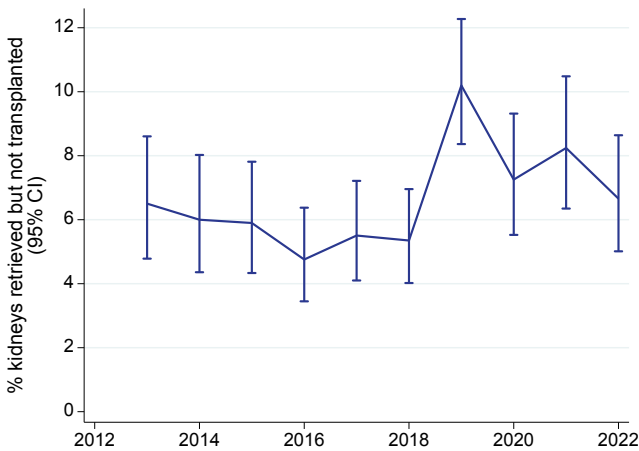
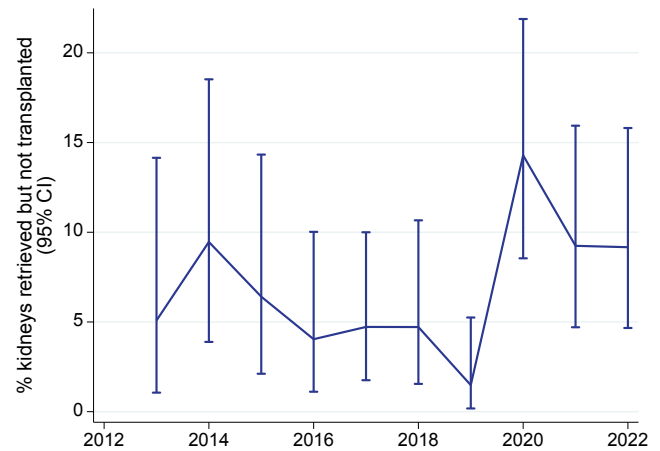


Figure 8.7 shows the non-utilisation rate of retrieved kidneys - the proportion of kidneys that were retrieved for the purpose of transplantation, but not ultimately transplanted into a recipient (either due to an absence of suitable recipients, or the kidney was deemed medically unsuitable after retrieval).

**Figure 8.7.1**  
**Non-utilisation Rate of Retrieved Kidneys - Australia 2013-2022**



**Figure 8.7.2**  
**Non-utilisation Rate of Retrieved Kidneys - New Zealand 2013-2022**



# LIVING KIDNEY DONORS

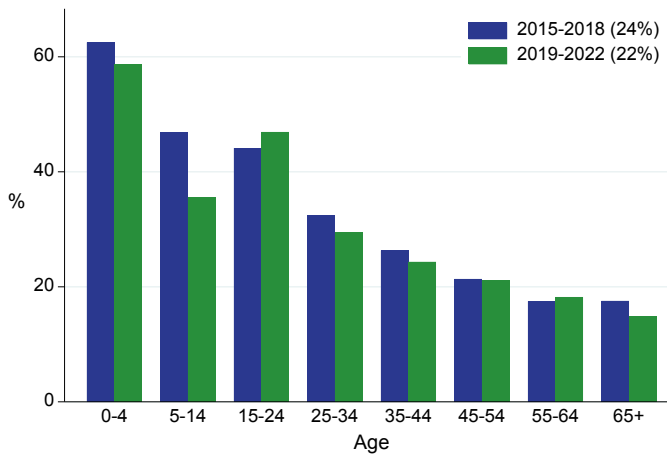
There were 225 living donor kidney transplants performed in 2022 in Australia, representing 24% of all transplant operations (table 8.1). In New Zealand, the 70 living donor transplants in 2022 represented 40% of all transplants.

**Table 8.1**  
*Living Donor Transplants (% of All Transplants) by Country 2017-2022*

Country	2017	2018	2019	2020	2021	2022
Australia	271 (24%)	238 (21%)	238 (22%)	181 (20%)	202 (24%)	225 (24%)
New Zealand	69 (37%)	84 (46%)	91 (41%)	87 (47%)	85 (45%)	70 (40%)

The living donor percentage of transplants in Australia and New Zealand is shown in figure 8.8 by recipient age groups for the years 2015-2018 to 2019-2022. For most age groups in both countries, living donors made up a smaller proportion of all transplants in 2019-2022 compared with 2015-2018.

**Figure 8.8.1**  
*Living Donor Percentage of Transplants - Australia - Stratified by Age of Recipient, 2015-2018 vs 2019-2022*



**Figure 8.8.2**  
*Living Donor Percentage of Transplants - New Zealand - Stratified by Age of Recipient, 2015-2018 vs 2019-2022*

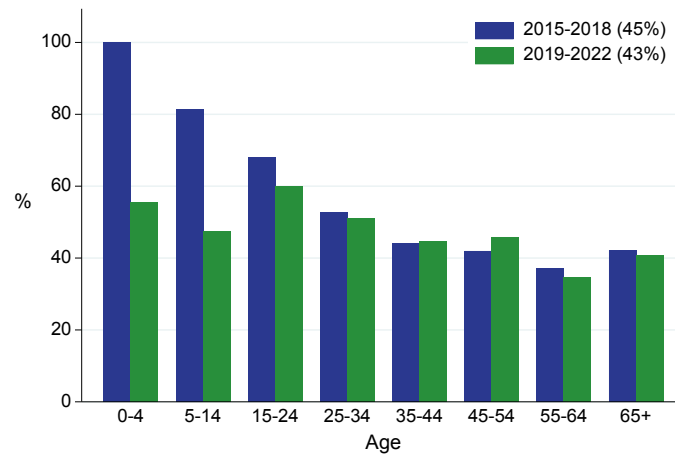


Figure 8.9 shows the living donor percentage of transplants for recipients aged 25-44 years by transplant region.

**Figure 8.9**  
*Living Donor Percentage of Transplants by Transplant Region - Age 25-44, 2015-2018 vs 2019-2022*

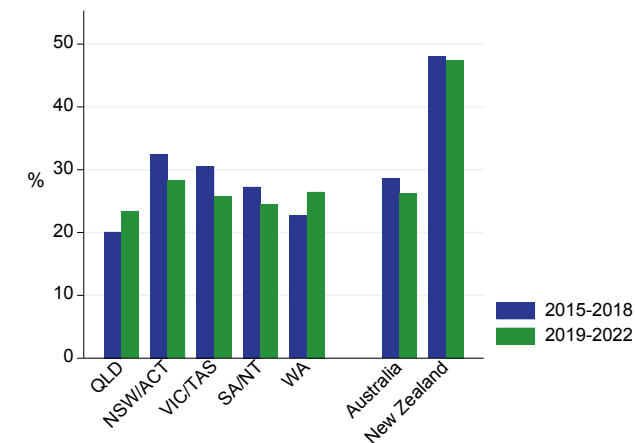
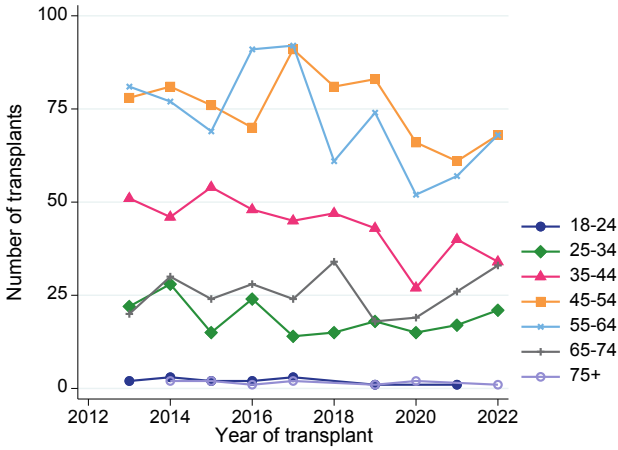
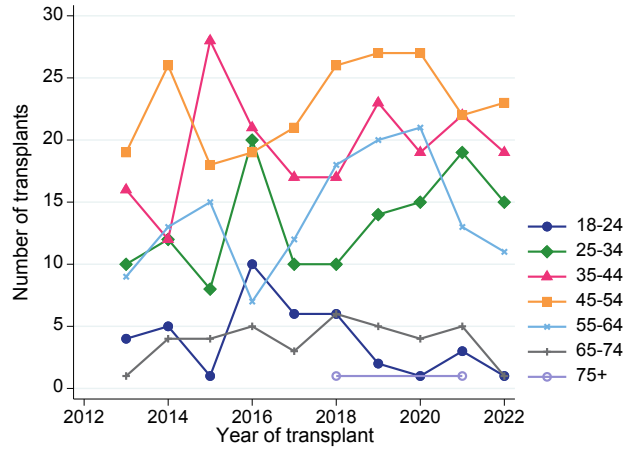


Figure 8.10 shows the number of living donors in Australia and New Zealand for the years 2013-2022 by donor age.

**Figure 8.10.1**  
*Living Kidney Donor Age - Australia 2013-2022*

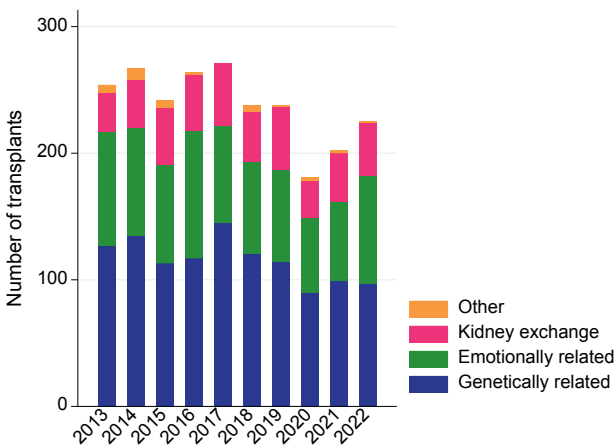


**Figure 8.10.2**  
*Living Kidney Donor Age - New Zealand 2013-2022*



The total number of living donor transplants in Australia and New Zealand are shown in figure 8.11. The proportion of genetically related donors was 43% (97 donors) in 2022 in Australia. In New Zealand 37 donors (53%) were genetically related to their recipient.

**Figure 8.11.1**  
*Source of Living Kidney Donor - Australia 2013-2022*



**Figure 8.11.2**  
*Source of Living Kidney Donor - New Zealand 2013-2022*

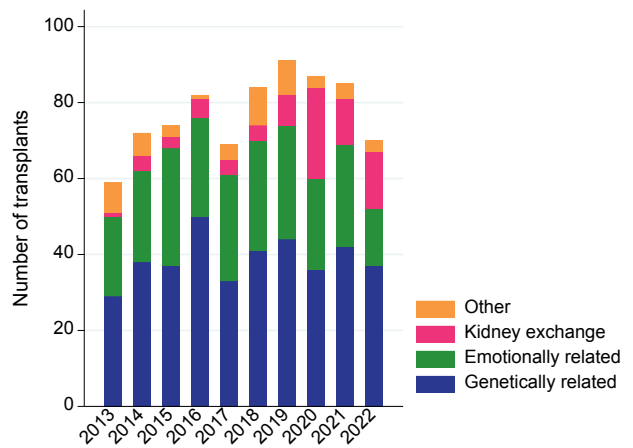




Table 8.2 provides details of the relationships between donors and recipients over 2018-2022 for Australia and New Zealand.

**Table 8.2.1**  
**Living Kidney Donor Relationship to Recipient, Australia 2018-2022**

Donor source	2018	2019	2020	2021	2022
<b>Total</b>	<b>238</b>	<b>238</b>	<b>181</b>	<b>202</b>	<b>225</b>
<b>Genetically Related Total</b>	<b>121</b>	<b>114</b>	<b>90</b>	<b>99</b>	<b>97</b>
Sister	24	22	12	22	17
Brother	19	20	21	15	20
Mother	40	34	30	36	20
Father	22	26	14	19	23
Monozygotic (Identical Twin Girl)	0	0	0	0	1
Dizygotic (Non-Identical Twin Boy)	0	0	0	0	0
Daughter	5	2	3	3	4
Son	1	3	5	2	3
Grandmother	1	0	0	0	1
Cousin	2	2	2	0	4
Niece	1	0	0	0	0
Nephew	0	0	1	0	0
Aunt	3	3	1	2	1
Uncle	3	2	1	0	3
<b>Emotionally Related Total</b>	<b>72</b>	<b>73</b>	<b>59</b>	<b>63</b>	<b>85</b>
Wife	29	33	28	25	43
Husband	14	10	12	8	15
Partner	9	8	11	8	6
Fiance / Fiancee	0	0	0	0	1
Mother-in-law	0	1	0	0	2
Father-in-law	3	0	0	0	0
Stepmother	1	0	0	0	0
Stepfather	1	0	0	0	0
Stepsister	1	0	0	0	0
Sister-in-law	1	3	0	1	0
Brother-in-law	1	3	1	2	0
Daughter-in-law	1	1	0	0	0
Son-in-law	0	1	0	2	1
Stepdaughter	0	0	0	0	0
Stepson	0	0	0	0	1
Friend	9	12	6	16	15
Other emotionally related	2	1	1	1	1
<b>Kidney Exchange Total</b>	<b>40</b>	<b>50</b>	<b>29</b>	<b>38</b>	<b>42</b>
Directed kidney exchange	37	49	26	36	34
Non-directed, kidney exchange	3	1	3	2	8
<b>Other Unrelated Total</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>
Non-directed, waiting list	4	1	2	2	1
Pathological	1	0	1	0	0

**Table 8.2.2**  
**Living Kidney Donor Relationship to Recipient, New Zealand 2018-2022**

Donor source	2018	2019	2020	2021	2022
<b>Total</b>	<b>84</b>	<b>91</b>	<b>87</b>	<b>85</b>	<b>70</b>
<b>Genetically Related Total</b>	<b>41</b>	<b>44</b>	<b>36</b>	<b>42</b>	<b>37</b>
Sister	7	8	5	8	4
Brother	7	6	7	10	10
Mother	8	11	6	7	6
Father	6	5	7	4	4
Monozygotic (Identical Twin Girl)	1	0	1	0	0
Dizygotic (Non-Identical Twin Boy)	1	0	0	0	0
Daughter	2	3	5	3	6
Son	7	4	2	10	3
Grandmother	0	0	0	0	0
Cousin	0	2	1	0	2
Niece	0	0	0	0	0
Nephew	1	1	1	0	0
Aunt	1	3	1	0	1
Uncle	0	1	0	0	1
<b>Emotionally Related Total</b>	<b>29</b>	<b>30</b>	<b>24</b>	<b>27</b>	<b>15</b>
Wife	8	11	11	6	1
Husband	4	4	0	3	1
Partner	2	3	4	3	2
Fiance / Fiancee	0	0	0	0	0
Mother-in-law	0	0	0	0	1
Father-in-law	0	0	0	1	0
Stepmother	0	0	0	0	0
Stepfather	0	1	1	0	0
Stepsister	0	0	1	0	0
Sister-in-law	3	1	1	2	0
Brother-in-law	0	0	0	0	0
Daughter-in-law	0	0	0	0	1
Son-in-law	0	0	0	0	0
Stepdaughter	0	0	0	1	0
Stepson	0	0	0	1	0
Friend	11	10	5	9	6
Other emotionally related	1	0	1	1	3
<b>Kidney Exchange Total</b>	<b>4</b>	<b>8</b>	<b>24</b>	<b>12</b>	<b>15</b>
Directed kidney exchange	2	4	21	9	12
Non-directed, kidney exchange	2	4	3	3	3
<b>Other Unrelated Total</b>	<b>10</b>	<b>9</b>	<b>3</b>	<b>4</b>	<b>3</b>
Non-directed, waiting list	10	9	3	4	3
Pathological	0	0	0	0	0

Table 8.3 shows the number of ABO incompatible living donor transplants performed in each country over the last 10 years.

**Table 8.3**  
**Living Donor Transplant Numbers by Blood Group Status 2013-2022**

Country	Year	Compatible	Incompatible	Unknown
Australia	2013	217	36	1
	2014	224	39	4
	2015	201	27	14
	2016	208	48	8
	2017	226	45	0
	2018	196	41	1
	2019	211	27	0
	2020	150	27	4
	2021	180	22	0
	2022	194	31	0
New Zealand	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
	2020	81	6	0
	2021	76	9	0
	2022	65	5	0

## LIVING DONOR CHARACTERISTICS

Table 8.4 shows the clinical characteristics of living kidney donors over 2013-2022.

**Table 8.4**  
**Living Donor Clinical Characteristics 2013-2022**

Factor	Australia		New Zealand	
	2013-2017	2018-2022	2013-2017	2018-2022
<b>N</b>	<b>1283</b>	<b>1082</b>	<b>356</b>	<b>417</b>
Age (years), mean (SD)	51.1 (11.1)	51.4 (10.9)	43.8 (12.3)	45.7 (12.2)
Hypertension	344 (26.9%)	352 (32.6%)	43 (12.1%)	47 (11.3%)
<b>Gender</b>				
Female	732 (57.1%)	608 (56.2%)	218 (61.2%)	234 (56.1%)
Male	551 (42.9%)	474 (43.8%)	138 (38.8%)	183 (43.9%)
<b>Ethnicity</b>				
First Nations Australian	12 (0.9%)	6 (0.6%)	-	-
Māori New Zealander	-	-	34 (9.6%)	58 (13.9%)
Other	1237 (96.4%)	1017 (94.0%)	318 (89.3%)	357 (85.6%)
Not reported	34 (2.7%)	59 (5.5%)	4 (1.1%)	2 (0.5%)
<b>Body mass index (kg/m<sup>2</sup>)</b>				
<18.5	12 (0.9%)	7 (0.6%)	1 (0.3%)	0 (0.0%)
18.5-24.9	404 (31.5%)	365 (33.7%)	123 (34.6%)	129 (30.9%)
25-29.9	569 (44.3%)	476 (44.0%)	143 (40.2%)	200 (48.0%)
≥30	253 (19.7%)	175 (16.2%)	82 (23.0%)	85 (20.4%)
Not reported	45 (3.5%)	59 (5.5%)	7 (2.0%)	3 (0.7%)
<b>Glycaemic status</b>				
Normal	1210 (94.3%)	977 (90.3%)	344 (96.6%)	409 (98.1%)
Impaired fasting glucose	13 (1.0%)	21 (1.9%)	0 (0.0%)	2 (0.5%)
Impaired glucose tolerance	28 (2.2%)	19 (1.8%)	0 (0.0%)	0 (0.0%)
Diabetic	5 (0.4%)	2 (0.2%)	0 (0.0%)	1 (0.2%)
Not reported	27 (2.1%)	63 (5.8%)	12 (3.4%)	5 (1.2%)
<b>Cigarette Smoking</b>				
Never	788 (61.4%)	685 (63.3%)	212 (59.6%)	256 (61.4%)
Former	426 (33.2%)	299 (27.6%)	99 (27.8%)	118 (28.3%)
Current	27 (2.1%)	19 (1.8%)	33 (9.3%)	36 (8.6%)
Not reported	42 (3.3%)	79 (7.3%)	12 (3.4%)	7 (1.7%)

## TIMING OF LIVING KIDNEY DONOR TRANSPLANTATION

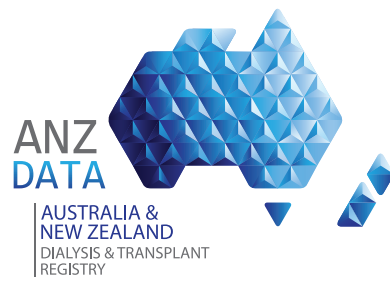
The timing of primary living donor transplants relative to the start of dialysis is shown in table 8.5.

The proportion of all primary living donor transplants performed pre-emptively in Australia in 2022 was 41%. 30% 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 2022 was 31%, 46% received dialysis for twelve months or longer prior to being transplanted.

**Table 8.5**  
**Timing of Living Kidney Donor Transplants 2018-2022**

Country	Timing of transplant	2018	2019	2020	2021	2022
Australia	Pre-emptive	99 (45%)	97 (46%)	65 (39%)	74 (42%)	83 (41%)
	<1 month post dialysis	4 (2%)	5 (2%)	7 (4%)	2 (1%)	4 (2%)
	1 month to <1 year post dialysis	51 (23%)	54 (25%)	47 (28%)	49 (28%)	54 (27%)
	≥1 year post dialysis	64 (29%)	57 (27%)	48 (29%)	52 (29%)	61 (30%)
New Zealand	Pre-emptive	32 (40%)	31 (38%)	35 (44%)	34 (44%)	20 (31%)
	<1 month post dialysis	2 (2%)	-	1 (1%)	-	1 (2%)
	1 month to <1 year post dialysis	14 (17%)	17 (21%)	12 (15%)	19 (25%)	14 (22%)
	≥1 year post dialysis	33 (41%)	33 (41%)	32 (40%)	24 (31%)	30 (46%)



# CHAPTER 8

Kidney Donation