



# 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/>

### Deceased kidney donors

The last three years have seen a decline in the numbers of deceased kidney donors in Australia, with the number in 2021 the lowest since 2014 (figure 8.1.1). Donor numbers in New Zealand have been essentially stable for the last 5 years (figure 8.1.2). One contributing factor to the Australian decline may be that donor acceptance has become more conservative, with mean donor age and kidney donor risk index both dropping in 2016 after years of steady rises (figures 8.3.1 and 8.4.1). Although the COVID-19 pandemic may have affected organ donation and acceptance patterns, it is important to note that these changes began prior to the pandemic.

Rates of kidney non-utilisation in both countries have risen in the last 2-3 years compared with historic rates (figure 8.6).

### Living kidney donors

Living kidney donors contribute around one-quarter of kidney transplants in Australia and just under one-half in New Zealand, proportions that are reasonably stable over the last few years.

The Australian and New Zealand Paired Kidney Exchange Program (ANZKX) was established in 2019, increasing New Zealand patients' access to kidney exchange donors (figure 8.10.2).

The clinical characteristics of living kidney donors is quite similar between Australia and New Zealand, except that many more Australian donors are hypertensive (32.8% vs 12.5% in 2017-21, table 8.4). In general donor characteristics appear to be quite stable over time.

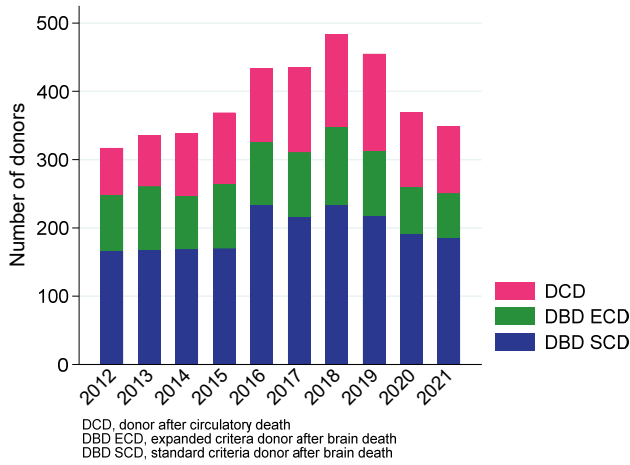
## Suggested Citation

ANZDATA Registry. 45th Report, Chapter 8: Kidney Donation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2022. Available at: <http://www.anzdata.org.au>

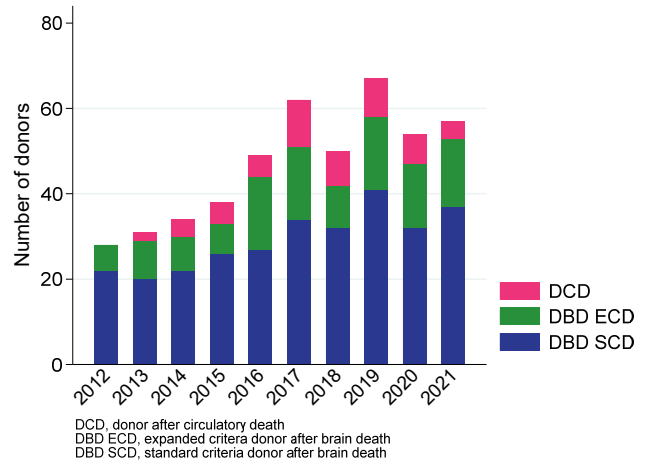
## Deceased Kidney Donors

Figure 8.1 shows the different types of deceased kidney donors in each country over 2012-2021.

**Figure 8.1.1 - Deceased Kidney Donor Type - Australia 2012-2021**

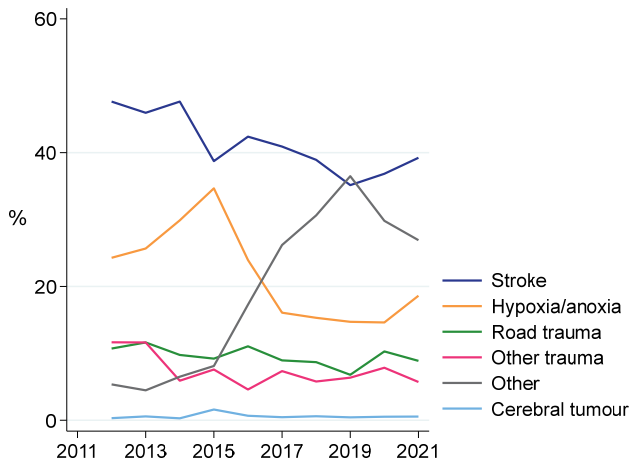


**Figure 8.1.2 - Deceased Kidney Donor Type - New Zealand 2012-2021**



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

**Figure 8.2.1 - Cause of Donor Death - Australia 2012-2021**



**Figure 8.2.2 - Cause of Donor Death - New Zealand 2012-2021**

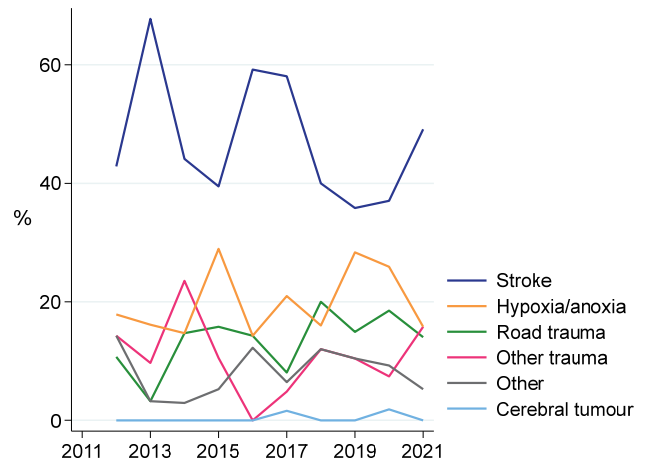
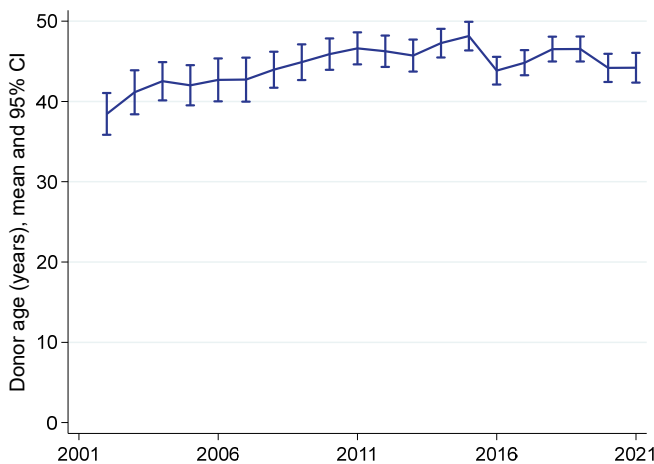


Figure 8.3 shows the mean age of deceased kidney donors in Australia and New Zealand over the last 20 years.

**Figure 8.3.1 - Deceased Kidney Donor Age - Australia 2002-2021**



**Figure 8.3.2 - Deceased Kidney Donor Age - New Zealand 2002-2021**

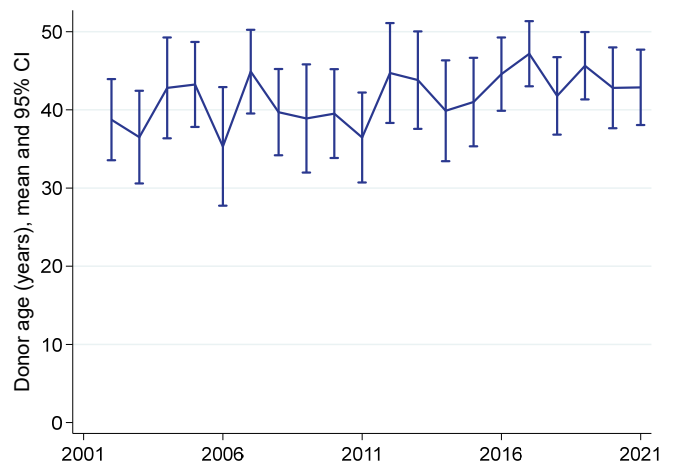
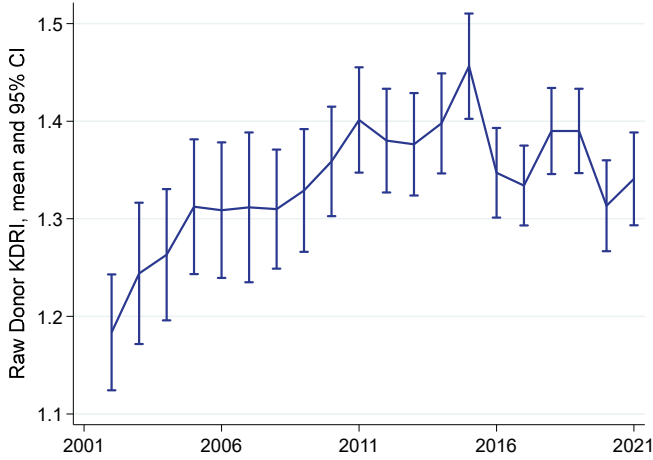
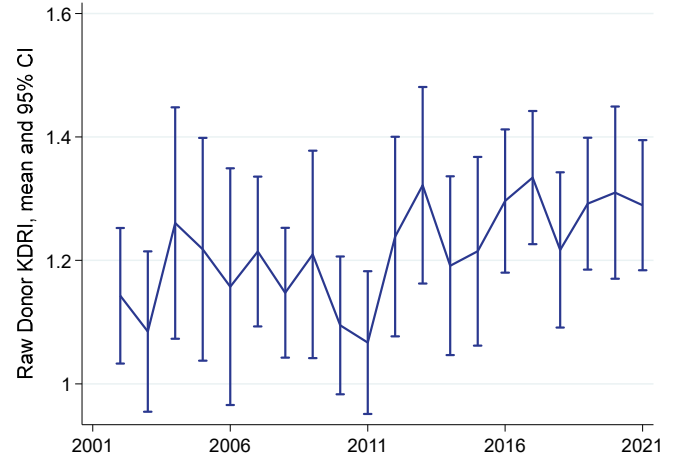


Figure 8.4 shows the mean raw Kidney Donor Risk Index (KDRI) of deceased kidney donors in Australia and New Zealand over the last 20 years. Figure 8.5 shows the median and IQR of the raw KDRI of deceased kidney donors in Australia and New Zealand over the last 5 years by transplant hospital.

**Figure 8.4.1 - Deceased Kidney Donor KDRI - Australia 2002-2021**



**Figure 8.4.2 - Deceased Kidney Donor KDRI - New Zealand 2002-2021**



**Figure 8.5 - Deceased Kidney Donor KDRI by Transplant Hospital - Australia and New Zealand 2017-2021**

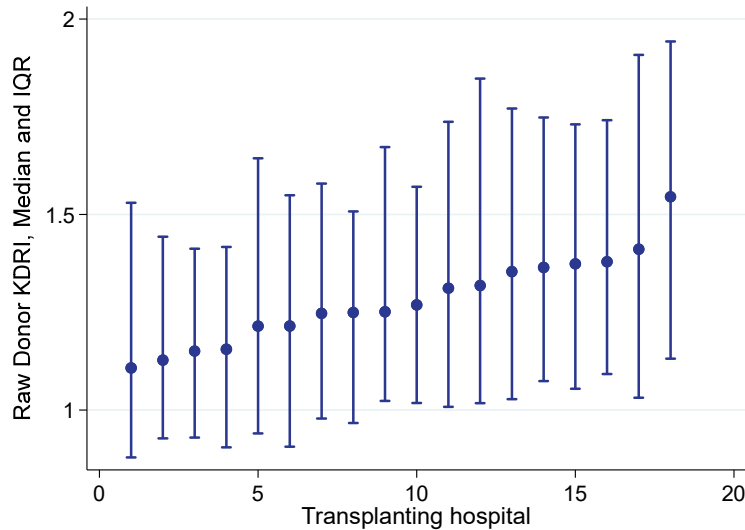
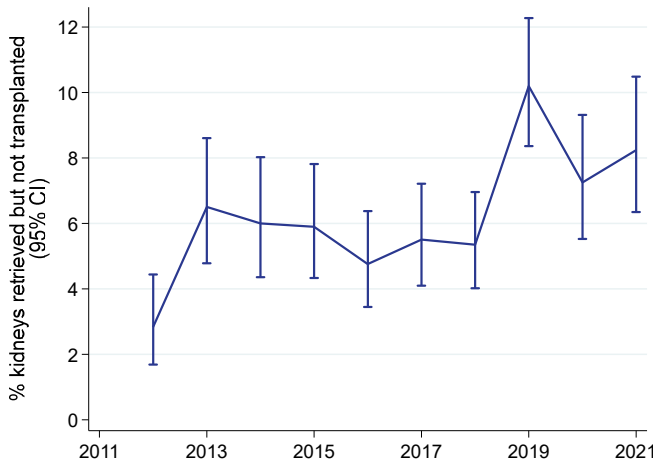
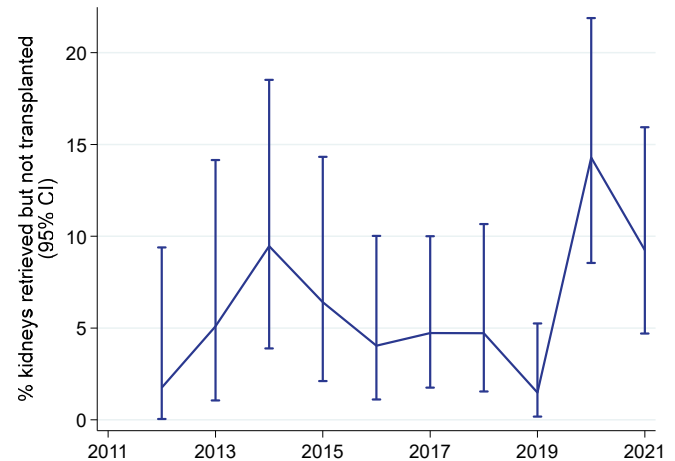


Figure 8.6 shows the non-utilisation rate of retrieved kidneys – the proportion of kidneys that were retrieved for the purpose of transplantation, but not ultimately transplanted into a recipient (either due to an absence of suitable recipients, or the kidney was deemed medically unsuitable after retrieval).

**Figure 8.6.1 - Non-utilisation Rate of Retrieved Kidneys - Australia 2012-2021**



**Figure 8.6.2 - Non-utilisation Rate of Retrieved Kidneys - New Zealand 2012-2021**



## Living Kidney Donors

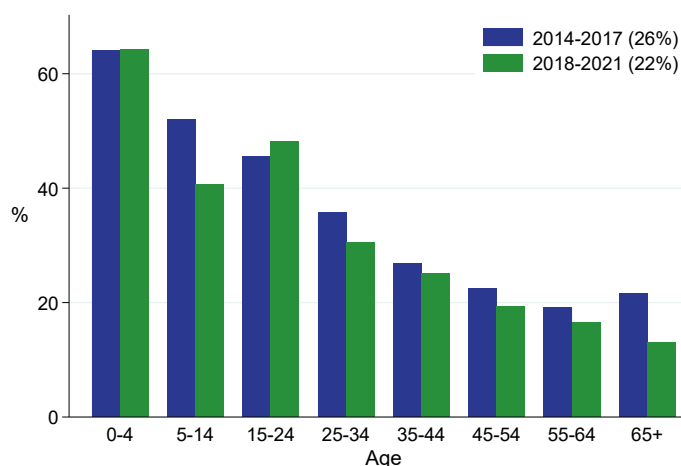
There were 202 living donor kidney transplants performed in 2021 in Australia, representing 24% of all transplant operations (table 8.1). In New Zealand, the 85 living donor transplants in 2021 represented 45% of all transplants.

**Table 8.1 Living Donor Percentage of Transplants by Country 2016-2021**

Country	2016	2017	2018	2019	2020	2021
Australia	24%	24%	21%	22%	20%	24%
New Zealand	48%	37%	46%	41%	47%	45%

The living donor percentage of transplants in Australia and New Zealand is shown in figure 8.7 by recipient age groups for the years 2014-2017 to 2018-2021. For most age groups in both countries, living donors made up a smaller proportion of all transplants in 2018-2021 compared with 2014-2017.

**Figure 8.7.1 - Living Donor Percentage of Transplants - Australia - Stratified by Age of Recipient, 2014-2017 vs 2018-2021**



**Figure 8.7.2 - Living Donor Percentage of Transplants - New Zealand - Stratified by Age of Recipient, 2014-2017 vs 2018-2021**

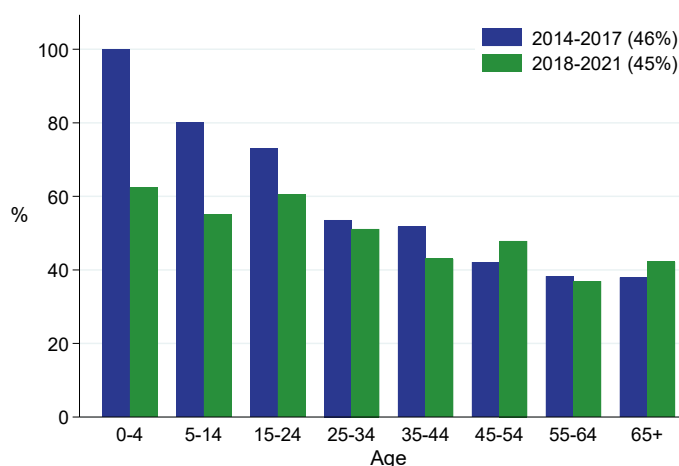


Figure 8.8 shows the living donor percentage of transplants for recipients aged 25-44 years by transplant region.

**Figure 8.8 - Living Donor Percentage of Transplants by Transplant Region - Age 25-44, 2014-2017 vs 2018-2021**

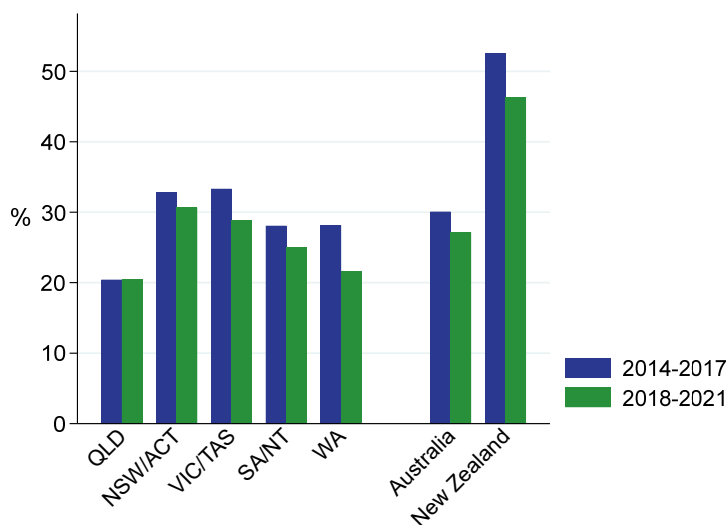
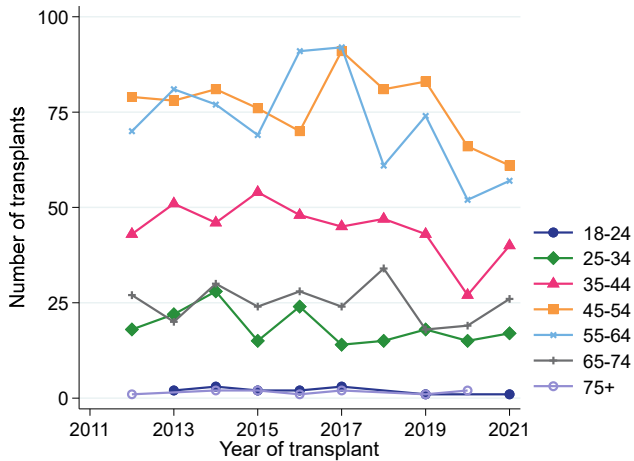
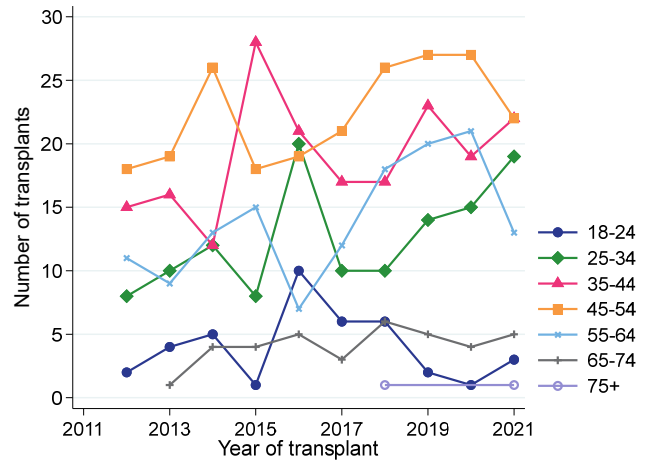


Figure 8.9 shows the number of living donors in Australia and New Zealand for the years 2012-2021 by donor age.

**Figure 8.9.1 - Living Kidney Donor Age - Australia 2012-2021**

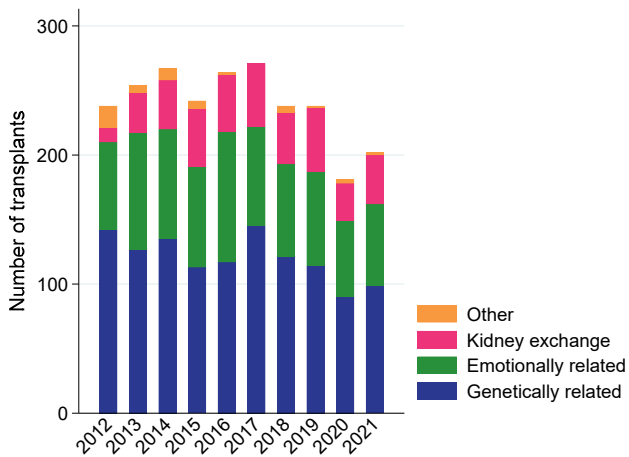


**Figure 8.9.2 - Living Kidney Donor Age - New Zealand 2012-2021**



The total number of living donor transplants in Australia and New Zealand are shown in figure 8.10. The proportion of genetically related donors was 49% (99 donors) in 2021 in Australia. In New Zealand 42 donors (49%) were genetically related to their recipient.

**Figure 8.10.1 - Source of Living Kidney Donor - Australia 2012-2021**



**Figure 8.10.2 - Source of Living Kidney Donor - New Zealand 2012-2021**

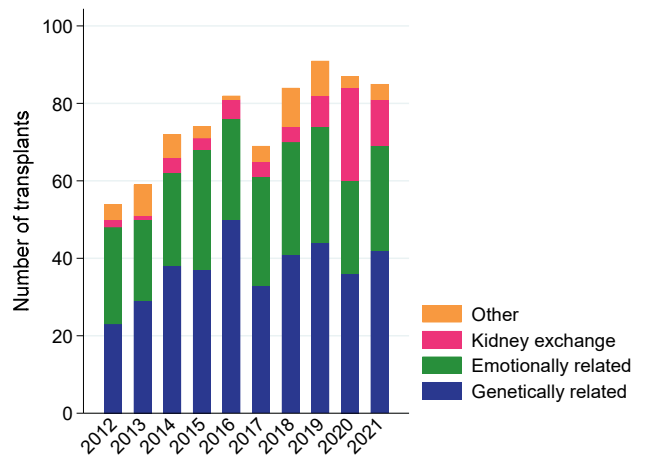


Table 8.2 provides details of the relationships between donors and recipients over 2017-2021 for Australia and New Zealand.

**Table 8.2.1 Living Kidney Donor Relationship to Recipient, Australia 2017-2021**

Donor source	2017	2018	2019	2020	2021
<b>Total</b>	<b>271</b>	<b>238</b>	<b>238</b>	<b>181</b>	<b>202</b>
<b>Genetically Related Total</b>	<b>145</b>	<b>121</b>	<b>114</b>	<b>90</b>	<b>99</b>
Sister	22	24	22	12	22
Brother	27	19	20	21	15
Mother	41	40	34	30	36
Father	30	22	26	14	19
Monozygotic (Identical Twin Girl)	0	0	0	0	0
Dizygotic (Non-Identical Twin Boy)	1	0	0	0	0
Daughter	5	5	2	3	3
Son	1	1	3	5	2
Grandmother	2	1	0	0	0
Grandfather	1	0	0	0	0
Cousin	5	2	2	2	0
Niece	1	1	0	0	0
Nephew	1	0	0	1	0
Aunt	4	3	3	1	2
Uncle	3	3	2	1	0
Other related (Genetically - Specify)	1	0	0	0	0
<b>Emotionally Related Total</b>	<b>77</b>	<b>72</b>	<b>73</b>	<b>59</b>	<b>63</b>
Wife	34	29	33	28	25
Husband	22	14	10	12	8
Partner	6	9	8	11	8
Mother-in-law	0	0	1	0	0
Father-in-law	1	3	0	0	0
Stepmother	0	1	0	0	0
Stepfather	0	1	0	0	0
Stepsister	0	1	0	0	0
Stepbrother	0	0	0	0	0
Sister-in-law	0	1	3	0	1
Brother-in-law	1	1	3	1	2
Daughter-in-law	0	1	1	0	0
Son-in-law	1	0	1	0	2
Stepdaughter	0	0	0	0	0
Stepson	0	0	0	0	0
Friend	10	9	12	6	16
Other related (Emotionally - Specify)	2	2	1	1	1
<b>Kidney Exchange Total</b>	<b>49</b>	<b>40</b>	<b>50</b>	<b>29</b>	<b>38</b>
Directed kidney exchange	47	37	49	26	36
Non-directed, kidney exchange	2	3	1	3	2
<b>Other Unrelated Total</b>	<b>0</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>
Non-directed, waiting list	0	4	1	2	2
Pathological	0	1	0	1	0



**Table 8.2.2 Living Kidney Donor Relationship to Recipient, New Zealand 2017-2021**

Donor source	2017	2018	2019	2020	2021
<b>Total</b>	<b>69</b>	<b>84</b>	<b>91</b>	<b>87</b>	<b>85</b>
<b>Genetically Related Total</b>	<b>33</b>	<b>41</b>	<b>44</b>	<b>36</b>	<b>42</b>
Sister	3	7	8	5	8
Brother	6	7	6	7	10
Mother	7	8	11	6	7
Father	3	6	5	7	4
Monozygotic (Identical Twin Girl)	0	1	0	1	0
Dizygotic (Non-Identical Twin Boy)	0	1	0	0	0
Daughter	5	2	3	5	3
Son	5	7	4	2	10
Grandmother	0	0	0	0	0
Grandfather	0	0	0	0	0
Cousin	0	0	2	1	0
Niece	1	0	0	0	0
Nephew	0	1	1	1	0
Aunt	1	1	3	1	0
Uncle	2	0	1	0	0
Other related (Genetically - Specify)	0	0	0	0	0
<b>Emotionally Related Total</b>	<b>28</b>	<b>29</b>	<b>30</b>	<b>24</b>	<b>27</b>
Wife	10	8	11	11	6
Husband	3	4	4	0	3
Partner	2	2	3	4	3
Mother-in-law	1	0	0	0	0
Father-in-law	0	0	0	0	1
Stepmother	0	0	0	0	0
Stepfather	0	0	1	1	0
Stepsister	0	0	0	1	0
Stepbrother	1	0	0	0	0
Sister-in-law	2	3	1	1	2
Brother-in-law	1	0	0	0	0
Daughter-in-law	0	0	0	0	0
Son-in-law	0	0	0	0	0
Stepdaughter	0	0	0	0	1
Stepson	1	0	0	0	1
Friend	6	11	10	5	9
Other related (Emotionally - Specify)	1	1	0	1	1
<b>Kidney Exchange Total</b>	<b>4</b>	<b>4</b>	<b>8</b>	<b>24</b>	<b>12</b>
Directed kidney exchange	0	2	4	21	9
Non-directed, kidney exchange	4	2	4	3	3
<b>Other Unrelated Total</b>	<b>4</b>	<b>10</b>	<b>9</b>	<b>3</b>	<b>4</b>
Non-directed, waiting list	4	10	9	3	4
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 2012-2021**

Country	Year	Compatible	Incompatible	Unknown
Australia	2012	198	29	11
	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	<b>180</b>	<b>22</b>	<b>0</b>
New Zealand	2012	48	5	1
	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	<b>76</b>	<b>9</b>	<b>0</b>

## Living Donor Characteristics

Table 8.4 shows the clinical characteristics of living kidney donors over 2012-2021.

**Table 8.4 Living Donor Clinical Characteristics 2012-2021**

Factor	Australia		New Zealand	
	2012-2016	2017-2021	2012-2016	2017-2021
<b>N</b>	<b>1237</b>	<b>1128</b>	<b>341</b>	<b>416</b>
<b>Age (years), mean (SD)</b>	51.0 (11.2)	51.3 (10.7)	43.7 (12.0)	45.9 (12.5)
<b>Gender</b>				
Female	710 (57.4%)	636 (56.4%)	210 (61.6%)	243 (58.4%)
Male	527 (42.6%)	492 (43.6%)	131 (38.4%)	173 (41.6%)
<b>Ethnicity</b>				
First Nations Australian	23 (1.9%)	6 (0.5%)	-	-
Māori New Zealander	-	-	32 (9.4%)	53 (12.7%)
Other	1196 (96.7%)	1056 (93.6%)	300 (88.0%)	362 (87.0%)
Not reported	18 (1.5%)	66 (5.9%)	9 (2.6%)	1 (0.2%)
<b>Body mass index (kg/m<sup>2</sup>)</b>				
<18.5	11 (0.9%)	8 (0.7%)	1 (0.3%)	0 (0.0%)
18.5-24.9	411 (33.2%)	366 (32.4%)	125 (36.7%)	129 (31.0%)
25-29.9	539 (43.6%)	499 (44.2%)	135 (39.6%)	194 (46.6%)
≥30	241 (19.5%)	194 (17.2%)	73 (21.4%)	91 (21.9%)
Not reported	35 (2.8%)	61 (5.4%)	7 (2.1%)	2 (0.5%)
<b>Hypertension</b>	322 (26.1%)	370 (32.8%)	35 (10.3%)	52 (12.5%)
<b>Glycaemic status</b>				
Normal	1172 (94.7%)	1018 (90.2%)	325 (95.3%)	412 (99.0%)
Impaired fasting glucose	13 (1.1%)	19 (1.7%)	0 (0.0%)	0 (0.0%)
Impaired glucose tolerance	26 (2.1%)	23 (2.0%)	0 (0.0%)	0 (0.0%)
Diabetic	6 (0.5%)	4 (0.4%)	1 (0.3%)	1 (0.2%)
Not reported	20 (1.6%)	64 (5.7%)	15 (4.4%)	3 (0.7%)
<b>Cigarette Smoking</b>				
Never	753 (60.9%)	704 (62.4%)	196 (57.5%)	259 (62.3%)
Former	428 (34.6%)	317 (28.1%)	91 (26.7%)	117 (28.1%)
Current	28 (2.3%)	22 (2.0%)	36 (10.6%)	34 (8.2%)
Not reported	28 (2.3%)	85 (7.5%)	18 (5.3%)	6 (1.4%)

## 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 2021 was 42%. 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 2021 was 44%, 31% received dialysis for twelve months or longer prior to being transplanted.

**Table 8.5 Timing of Living Kidney Donor Transplants 2017-2021**

Country	Timing of transplant	2017	2018	2019	2020	2021
Australia	Pre-emptive	117 (49%)	99 (45%)	97 (46%)	65 (39%)	74 (42%)
	<1 month post dialysis	3 (1%)	4 (2%)	5 (2%)	7 (4%)	2 (1%)
	1 month to <1 year post dialysis	59 (24%)	51 (23%)	54 (25%)	47 (28%)	49 (28%)
	≥1 year post dialysis	62 (26%)	64 (29%)	57 (27%)	48 (29%)	52 (29%)
New Zealand	Pre-emptive	19 (31%)	32 (40%)	31 (38%)	35 (44%)	34 (44%)
	<1 month post dialysis	-	2 (2%)	-	1 (1%)	-
	1 month to <1 year post dialysis	12 (19%)	14 (17%)	17 (21%)	12 (15%)	19 (25%)
	≥1 year post dialysis	31 (50%)	33 (41%)	33 (41%)	32 (40%)	24 (31%)