



# CHAPTER 7

## Kidney Transplantation

*Reporting the incidence and prevalence of renal transplantation in Australia and New Zealand; summarizing immunosuppression regimens, rejection episodes and graft and patient survival.*

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## Executive Summary

During 2017, there were 1,109 kidney transplants performed in Australia and 187 performed in New Zealand, with live donor transplants contributing 24% and 37% of total transplants, respectively. The 31% growth in kidney transplants between 2012 and 2017 in Australia parallels the increase in the number of deceased donors, whereas the number of live donors has remained unchanged. In New Zealand, there has been a 73% growth over the same period, with corresponding increases of 119% and 28% in deceased and live donor transplants, respectively. There is a substantial geographical variation in the transplantation rate in Australia, with Tasmania and Victoria having the highest transplant rate of dialysed patients in 2017. Even though the number of kidney transplants in every ethnic group has increased over time, Caucasian patients contribute to 70% and 46% of total patients transplanted in Australia and New Zealand, respectively; whereas Aboriginal/Torres Strait Islander and Māori patients contribute 3% and 12%, respectively (2017 data).

The number of prevalent patients with functioning kidney transplants has grown in the last decade, increasing by 53% between 2008 and 2017 (from 7,658 to 11,687 recipients) in Australia, and by 40% (from 1,354 to 1,890 recipients) in New Zealand. At the end of 2017, 10% and 12% of prevalent transplants had functioned for at least 20 years in Australia and New Zealand, respectively. Death with a functioning graft and chronic allograft nephropathy are the two most common causes of allograft failure, accounting for 47% and 31% of all allograft failures in Australia, respectively; and 62% and 22% in New Zealand, respectively (2017 data). Cancer is the most common cause of death with a functioning graft in Australia, whereas cardiovascular disease remains the most common in New Zealand.

The proportion of first kidney transplant recipients who had experienced acute rejection in the first 6 months has reduced over the last 5 years for recipients of deceased donor kidneys (from 20% in 2011 to 15% in 2017), but has remained unchanged for recipients of live-donor kidneys (17% in 2011 and 2017). There has been considerable improvement in short and intermediate-term allograft and patient survivals following live and deceased donor kidney transplants since 1990, with 1-year (95% confidence interval) allograft survival in Australia for primary live and deceased donor kidney transplants of 99% (98%, 100%) and 94% (93%, 96%), respectively; and 96% (90%, 98%) and 96% (91%, 98%) in New Zealand, respectively (2016-2017 data).

## Suggested citation

ANZDATA Registry. 41<sup>st</sup> Report, Chapter 7: Kidney Transplantation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2018. Available at: <http://www.anzdata.org.au>

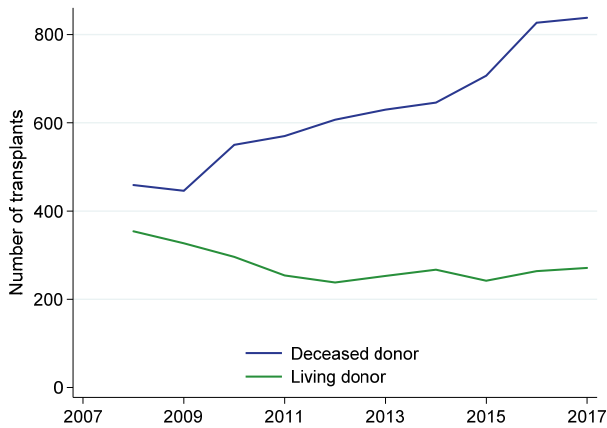
## New Transplants

Table 7.1 shows the number of transplants performed in each country over the last 20 years. The 1109 transplants performed in Australia in 2017 represent the highest number ever performed. This is predominantly driven by large growth in deceased donor kidney transplants (figure 7.1); after a peak in 2008, living donor numbers have returned to pre-2008 levels. In New Zealand total transplant activity has increased in the last four years, driven primarily by strong growth in the number of deceased donor transplants.

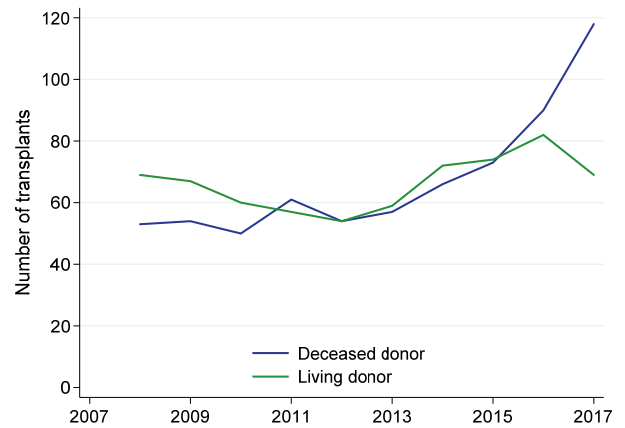
**Table 7.1 Number of Grafts Performed by Country 1998-2017**

Country	Year	Graft 1	Graft 2	Graft 3	Graft 4	Graft 5	Total Transplants	Living Donor Transplants
Australia	1998	443	62	10	2	0	517	161
	1999	403	43	9	0	0	455	169
	2000	476	47	7	1	0	531	181
	2001	487	45	6	2	0	540	213
	2002	537	60	5	2	0	604	230
	2003	472	60	10	1	0	543	218
	2004	583	53	11	3	0	650	244
	2005	539	67	15	2	0	623	246
	2006	549	70	17	5	0	641	273
	2007	527	75	11	0	2	615	271
	2008	708	84	16	5	0	813	354
	2009	674	88	11	0	0	773	327
	2010	744	83	18	1	0	846	296
	2011	744	68	9	3	0	824	254
	2012	746	81	15	1	2	845	238
	2013	789	85	7	2	0	883	253
	2014	805	100	5	3	0	913	267
	2015	842	93	12	2	0	949	242
2016	932	138	19	2	0	1091	264	
2017	<b>951</b>	<b>136</b>	<b>20</b>	<b>2</b>	<b>0</b>	<b>1109</b>	<b>271</b>	
New Zealand	1998	95	10	1	0	0	106	31
	1999	97	11	4	0	0	112	42
	2000	91	13	2	0	0	106	31
	2001	101	9	0	0	0	110	43
	2002	103	12	2	0	0	117	48
	2003	94	13	4	0	0	111	44
	2004	98	7	0	0	0	105	48
	2005	87	5	0	1	0	93	46
	2006	80	8	2	0	0	90	49
	2007	112	9	2	0	0	123	58
	2008	111	10	1	0	0	122	69
	2009	109	12	0	0	0	121	67
	2010	104	5	1	0	0	110	60
	2011	110	7	1	0	0	118	57
	2012	99	9	0	0	0	108	54
	2013	111	5	0	0	0	116	59
	2014	126	12	0	0	0	138	72
	2015	133	10	3	1	0	147	74
2016	155	17	0	0	0	172	82	
2017	<b>174</b>	<b>13</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>187</b>	<b>69</b>	

**Figure 7.1.1 - Deceased and Living Donor Transplants - Australia 2008-2017**

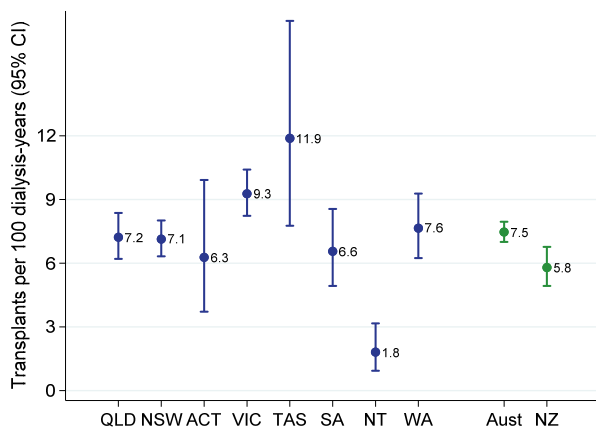


**Figure 7.1.2 - Deceased and Living Donor Transplants - New Zealand 2008-2017**

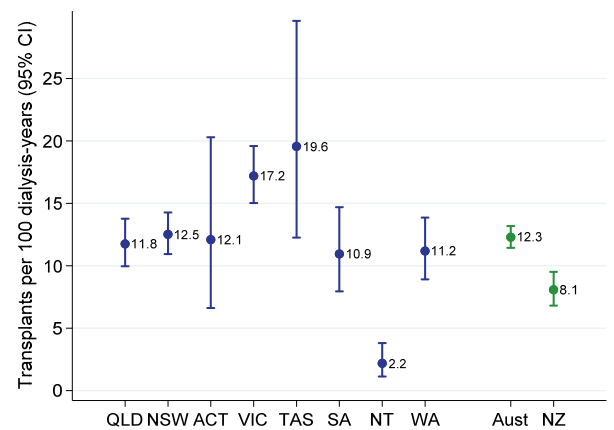


The transplant rate of dialysed patients is presented in figure 7.2 (for all dialysis patients) and figure 7.3 (for patients aged 15-64 years). Note that the denominator for these rates is dialysis-years. Differences in the rates between states and countries depend on a number of factors including the casemix of the dialysis patients and the local deceased donation rate. These rates are presented by age in figure 7.4, and by ethnicity in patients aged 15-64 years in figure 7.5. In both countries, the transplant rate of indigenous patients is lower than in other ethnic groups; see also chapter 10.

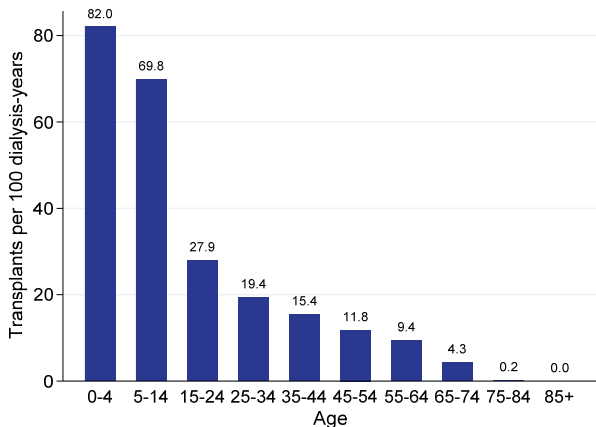
**Figure 7.2 - Transplant Rate of Dialysed Patients 2017 - All Dialysis Patients**



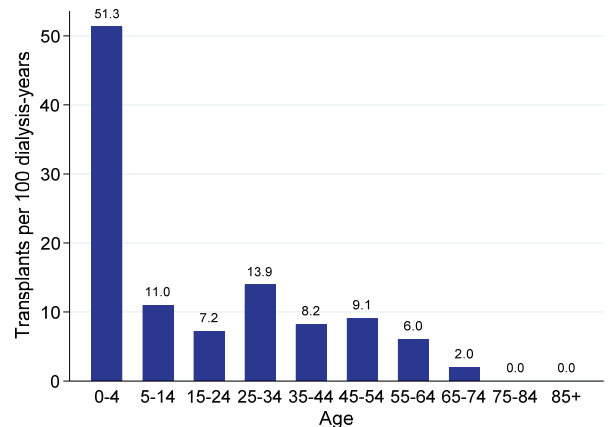
**Figure 7.3 - Transplant Rate of Dialysed Patients 2017 - Patients Aged 15-64**



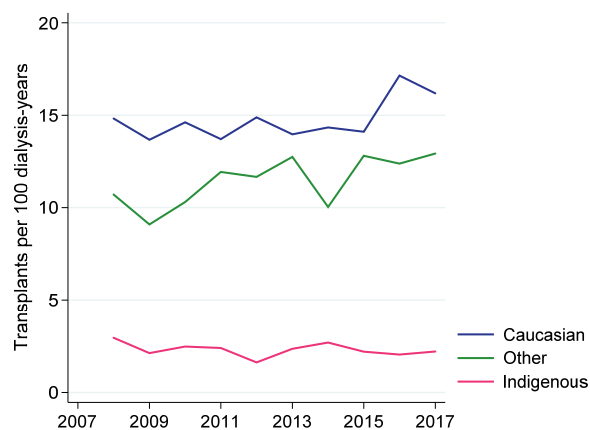
**Figure 7.4.1 - Transplant Rate of Dialysed Patients By Age 2017 - Australia**



**Figure 7.4.2 - Transplant Rate of Dialysed Patients By Age 2017 - New Zealand**



**Figure 7.5.1 - Transplant Rate of Dialysed Patients By Ethnicity 2008-2017 - Australia, Patients Aged 15-64**



**Figure 7.5.2 - Transplant Rate of Dialysed Patients By Ethnicity 2008-2017 - New Zealand, Patients Aged 15-64**

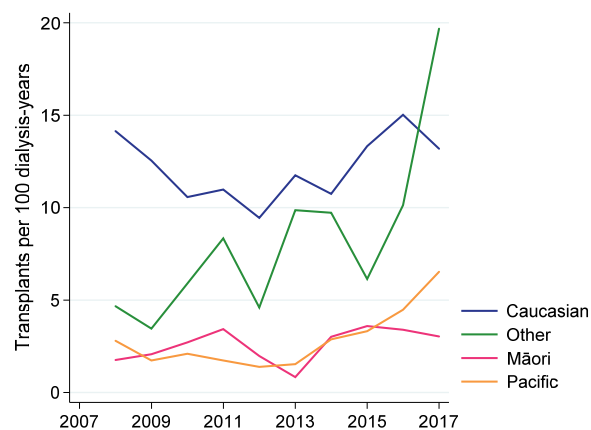
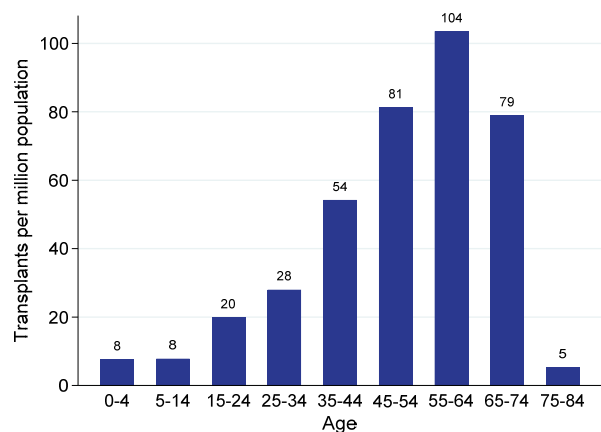


Table 7.2 shows the number of grafts performed according to donor type, graft number and recipient age in 2017. Transplant rates by age, per million population, are presented in figure 7.6.

**Table 7.2 Age of Recipients Transplanted in 2017**

Country	Donor type	Graft number	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84
Australia	Deceased	1	5	12	25	50	103	165	215	130	5
		2	0	4	7	17	24	34	20	6	0
		3	0	0	0	1	3	6	2	2	0
		4	0	0	0	0	1	0	1	0	0
	Living	1	7	7	30	30	40	44	52	30	1
		2	0	1	2	3	5	7	4	2	0
		3	0	0	0	2	1	3	0	0	0
		4	0	0	0	0	0	0	0	0	0
New Zealand	Deceased	1	0	0	0	11	16	36	36	13	0
		2	0	0	0	1	3	1	1	0	0
	Living	1	2	3	4	12	4	15	14	8	0
		2	0	0	1	1	2	2	1	0	0
		3	0	0	0	0	0	0	0	0	0
		4	0	0	0	0	0	0	0	0	0

**Figure 7.6.1 - Transplant Operations (Per Million) 2017 - Australia**



**Figure 7.6.2 - Transplant Operations (Per Million) 2017 - New Zealand**

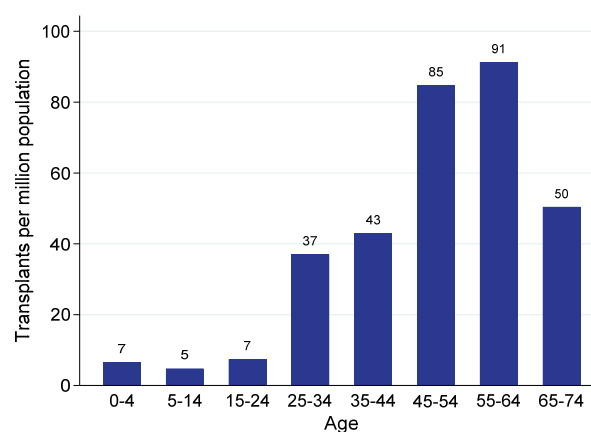


Table 7.3 shows the ethnicity of the recipients transplanted between 2013 and 2017. In both countries, the largest ethnic group of recipients was Caucasian.

**Table 7.3 Ethnicity of Recipients Transplanted 2013-2017**

Country	Ethnicity	2013	2014	2015	2016	2017
Australia	Caucasian	682 (77.2%)	697 (76.3%)	692 (72.9%)	804 (73.7%)	779 (70.2%)
	Aboriginal/Torres Strait Islander	31 (3.5%)	41 (4.5%)	36 (3.8%)	34 (3.1%)	34 (3.1%)
	Asian	109 (12.3%)	95 (10.4%)	127 (13.4%)	123 (11.3%)	160 (14.4%)
	Māori	8 (0.9%)	7 (0.8%)	8 (0.8%)	9 (0.8%)	8 (0.7%)
	Pacific	26 (2.9%)	27 (3.0%)	22 (2.3%)	15 (1.4%)	27 (2.4%)
	Other	22 (2.5%)	31 (3.4%)	38 (4.0%)	52 (4.8%)	55 (5.0%)
	Not reported	5 (0.6%)	15 (1.6%)	26 (2.7%)	54 (4.9%)	46 (4.1%)
	<b>Total</b>	<b>883</b>	<b>913</b>	<b>949</b>	<b>1091</b>	<b>1109</b>
New Zealand	Caucasian	81 (69.8%)	81 (58.7%)	84 (57.1%)	94 (54.7%)	85 (45.5%)
	Asian	16 (13.8%)	16 (11.6%)	12 (8.2%)	12 (7.0%)	28 (15.0%)
	Māori	9 (7.8%)	22 (15.9%)	28 (19.0%)	25 (14.5%)	23 (12.3%)
	Pacific	8 (6.9%)	16 (11.6%)	21 (14.3%)	28 (16.3%)	40 (21.4%)
	Other	1 (0.9%)	3 (2.2%)	2 (1.4%)	7 (4.1%)	8 (4.3%)
	Not reported	1 (0.9%)	-	-	6 (3.5%)	3 (1.6%)
	<b>Total</b>	<b>116</b>	<b>138</b>	<b>147</b>	<b>172</b>	<b>187</b>

Table 7.4 shows the number of transplants (per million population) performed by transplanting region over 2013-2017. Transplants performed for patients residing in Tasmania and the Northern Territory are included in the figures for Victoria and South Australia regions, respectively. These regions share common waiting lists and allocation protocols.

**Table 7.4 Transplants (pmp) by Transplanting Region and Country 2013-2017**

State	2013	2014	2015	2016	2017
NSW/ACT	288 (37)	300 (38)	331 (41)	348 (43)	367 (44)
VIC/TAS	267 (42)	306 (48)	303 (46)	352 (53)	364 (53)
QLD	149 (32)	145 (31)	139 (29)	199 (41)	190 (39)
SA/NT	81 (42)	85 (44)	89 (46)	95 (48)	70 (36)
WA	98 (39)	77 (31)	87 (34)	97 (38)	118 (46)
<b>Australia</b>	<b>883 (38)</b>	<b>913 (39)</b>	<b>949 (40)</b>	<b>1091 (45)</b>	<b>1109 (45)</b>
<b>New Zealand</b>	<b>116 (26)</b>	<b>138 (31)</b>	<b>147 (32)</b>	<b>172 (37)</b>	<b>187 (39)</b>

Each year a small number of Australian and New Zealand dialysis patients travel overseas to receive a kidney transplant. The numbers of such procedures over 2008-2017 are presented in table 7.5. It is possible that these numbers are an underestimate of the true number, since some patients may not return to Australia/New Zealand and hence be reported to ANZDATA registry as lost to follow-up.

**Table 7.5 Transplant Operations Performed Overseas on Australian/NZ Dialysis Patients 2008-2017**

Year	Australia	New Zealand
2008	4	0
2009	8	1
2010	4	1
2011	7	2
2012	4	1
2013	3	1
2014	3	0
2015	6	1
2016	2	1
2017	1	1

## Prevalent Transplants

This section presents the number of prevalent (functioning) transplants according to various categories.

Table 7.6 presents the total number of transplants performed (in Australia and New Zealand, categorised by country of transplant) and functioning at the end of 2017 (categorised by country of residence). The patients with transplants of “unknown” source were transplanted outside Australia/New Zealand.

**Table 7.6 Total Number of Transplants Performed and Functioning at End of 2017**

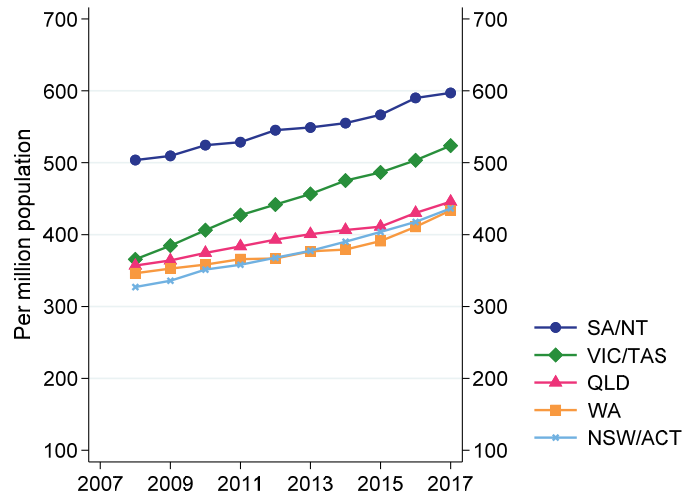
Country	Donor type	Graft number	Performed	Functioning
Australia	Living	1	5609	3626
		2	540	319
		3	75	54
		4	10	7
		5	1	0
	Deceased	1	16553	6717
		2	2417	817
		3	371	108
		4	59	17
		5	6	1
Unknown	1	0	19	
	2	0	2	
New Zealand	Living	1	1327	825
		2	107	64
		3	7	4
		4	1	1
	Deceased	1	2652	886
		2	432	89
		3	78	14
		4	7	0
	Unknown	1	0	7

Table 7.7 presents the number of functioning transplants at the end of 2008-2017 by transplant regions. In Australia, SA/NT has the highest prevalence of transplant patients per million population (597 pmp) and WA the lowest (434 pmp). These data are shown graphically in figures 7.7 and 7.8.

**Table 7.7 Functioning Transplants (pmp) by Transplanting Region 2008-2017**

Year	NSW/ACT	VIC/TAS	QLD	SA/NT	WA	Australia	New Zealand
2008	2385 (327)	2104 (366)	1506 (357)	911 (504)	752 (346)	7658 (360)	1354 (318)
2009	2488 (336)	2260 (385)	1576 (364)	935 (510)	790 (353)	8049 (371)	1407 (327)
2010	2637 (351)	2425 (406)	1650 (375)	974 (524)	821 (358)	8507 (386)	1447 (333)
2011	2717 (358)	2584 (427)	1718 (384)	989 (529)	861 (366)	8869 (397)	1488 (339)
2012	2826 (368)	2724 (442)	1796 (393)	1032 (545)	890 (367)	9268 (408)	1526 (346)
2013	2942 (378)	2871 (457)	1865 (401)	1051 (549)	939 (377)	9668 (418)	1576 (355)
2014	3085 (390)	3049 (475)	1920 (406)	1072 (555)	957 (379)	10083 (429)	1629 (361)
2015	3239 (404)	3186 (487)	1967 (411)	1103 (567)	995 (391)	10490 (440)	1703 (371)
2016	3401 (418)	3371 (503)	2086 (430)	1156 (590)	1051 (411)	11065 (457)	1781 (379)
2017	3610 (436)	3585 (524)	2197 (446)	1176 (597)	1119 (434)	11687 (475)	1890 (394)

**Figure 7.7 - Functioning Transplants by Transplanting Region - Australia 2008-2017**

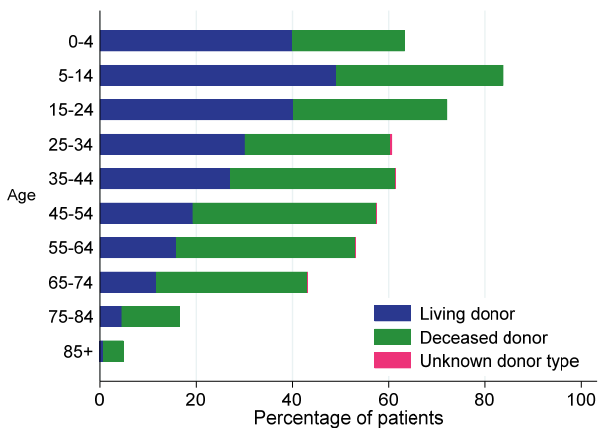


**Figure 7.8 - Prevalence of Functioning Transplants 31 Dec 2017 - Per Million Population**

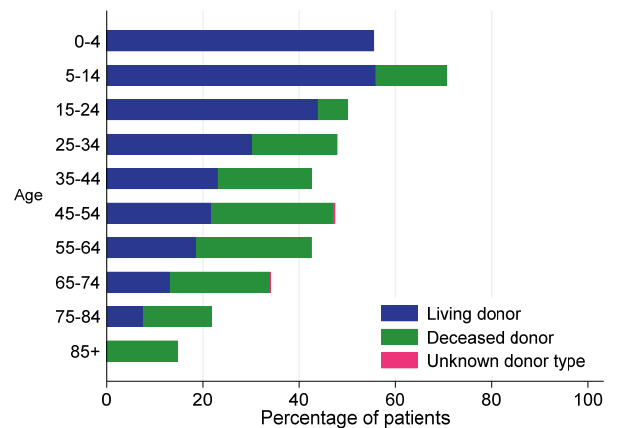


The age distribution of prevalent transplant patients as a proportion of patients on renal replacement therapy is shown in figure 7.9. There is a greater proportion of functioning live-donor grafts in younger patients. The number of prevalent transplant patients by age and donor source is shown in table 7.8. Finally, the age distribution, and distribution per million population, are shown in figures 7.10 and 7.11 for Australia and New Zealand, respectively.

**Figure 7.9.1 - Prevalence of Functioning Transplants - As Mode of RRT, Australia 2017**



**Figure 7.9.2 - Prevalence of Functioning Transplants - As Mode of RRT, New Zealand 2017**

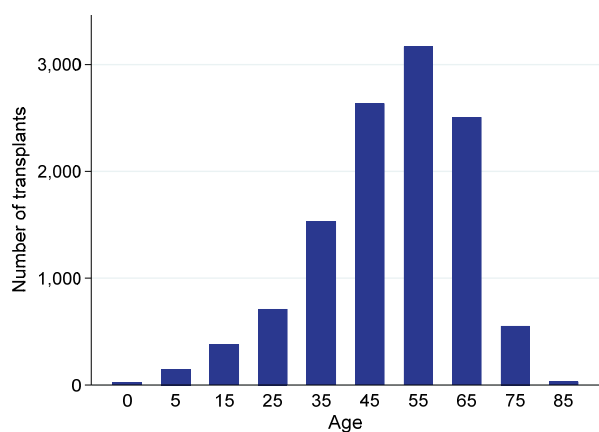




**Table 7.8 Age Distribution of Functioning Transplant Patients - 31 Dec 2017**

Country	Donor source	Graft number	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total	
Australia	All	All	19	150	378	712	1533	2637	3167	2507	553	31	11687	
	Unknown	1	-	-	-	2	4	5	5	3	-	-	-	19
		2	-	-	-	1	-	1	-	-	-	-	-	2
		All	-	-	-	3	4	6	5	3	-	-	-	21
	Deceased	1	7	57	143	281	709	1471	1955	1686	383	25	-	6717
		2	-	5	23	66	117	229	229	127	19	2	-	817
		3	-	-	1	8	21	42	25	11	-	-	-	108
		4	-	-	-	1	3	8	5	-	-	-	-	17
		5	-	-	-	-	-	-	1	-	-	-	-	1
		All	7	62	167	356	850	1750	2215	1824	402	27	-	7660
	Living	1	12	88	188	321	605	773	852	639	145	3	-	3626
		2	-	-	22	28	63	84	80	35	6	1	-	319
		3	-	-	1	4	10	21	13	5	-	-	-	54
		4	-	-	-	-	1	3	2	1	-	-	-	7
All		12	88	211	353	679	881	947	680	151	4	-	4006	
New Zealand	All	All	5	24	49	150	208	455	539	379	77	4	1890	
	Unknown	1	-	-	-	-	-	4	2	1	-	-	-	7
		All	-	-	-	-	-	4	2	1	-	-	-	7
	Deceased	1	-	5	6	48	86	199	273	217	48	4	-	886
		2	-	-	-	7	9	36	22	14	1	-	-	89
		3	-	-	-	-	-	7	6	-	1	-	-	14
		All	-	5	6	55	95	242	301	231	50	4	-	989
	Living	1	5	19	41	88	99	184	218	144	27	-	-	825
		2	-	-	2	7	14	22	16	3	-	-	-	64
		3	-	-	-	-	-	2	2	-	-	-	-	4
4		-	-	-	-	-	1	-	-	-	-	-	1	
All		5	19	43	95	113	209	236	147	27	-	-	894	

**Figure 7.10.1 - Age Distribution of Functioning Transplants - Australia 2017 (n=11687)**



**Figure 7.10.2 - Age Distribution of Functioning Transplants - Per Million Population, Australia 2017**

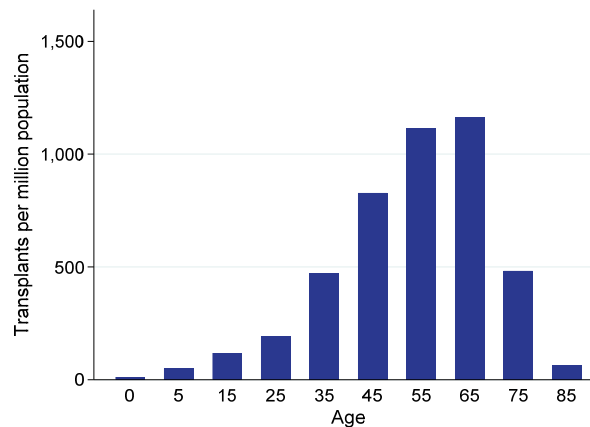


Figure 7.11.1 - Age Distribution of Functioning Transplants - New Zealand 2017 (n=1890)

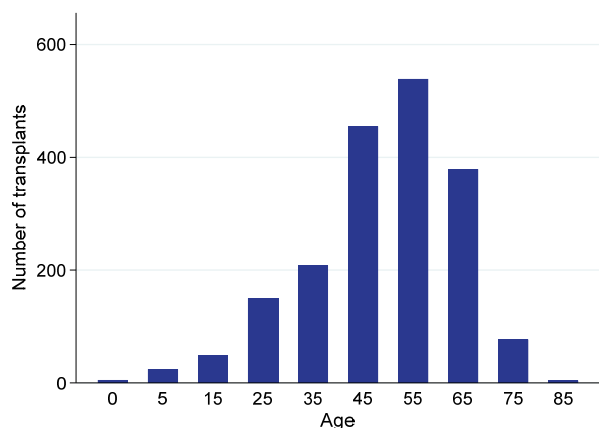


Figure 7.11.2 - Age Distribution of Functioning Transplants - Per Million Population, New Zealand 2017

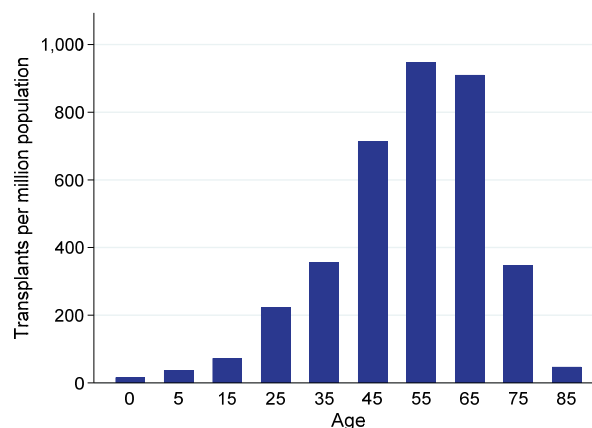


Table 7.9 presents the number of prevalent patients by gender, ethnicity and age; the great majority of prevalent transplant patients in both countries are Caucasian.

Table 7.9 Functioning Transplant Patients Related to Ethnicity and Age Group - 31 Dec 2017

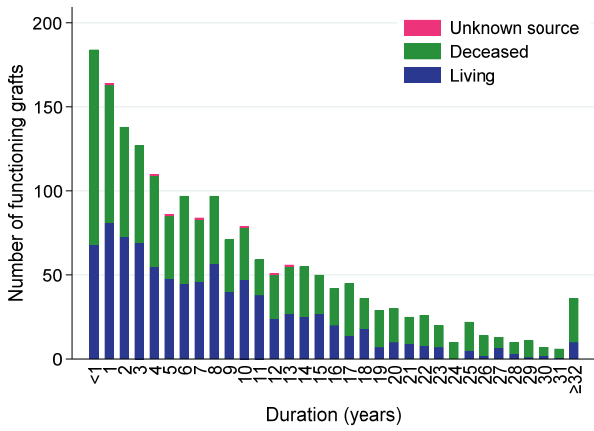
Country	Gender	Ethnicity	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total	
Australia	All	<b>Total</b>	<b>19</b>	<b>150</b>	<b>378</b>	<b>712</b>	<b>1533</b>	<b>2637</b>	<b>3167</b>	<b>2507</b>	<b>553</b>	<b>31</b>	<b>11687</b>	
		Caucasian	3	41	96	227	478	765	952	750	215	14	3541	
	Female	Aboriginal/Torres Strait Islander	-	1	8	7	24	36	27	10	-	-	-	113
		Asian	1	4	15	23	87	131	187	117	15	-	-	580
		Other	1	11	13	21	34	42	46	21	3	-	-	192
		Not reported	-	-	4	11	8	11	17	9	1	-	-	61
		<b>Total</b>	<b>5</b>	<b>57</b>	<b>136</b>	<b>289</b>	<b>631</b>	<b>985</b>	<b>1229</b>	<b>907</b>	<b>234</b>	<b>14</b>	<b>4487</b>	
	Male	Caucasian	12	69	195	332	699	1346	1563	1349	287	15	-	5867
		Aboriginal/Torres Strait Islander	-	3	5	14	26	40	47	22	3	-	-	160
		Asian	-	8	20	44	105	164	229	158	23	1	-	752
		Other	2	12	18	25	53	66	77	60	5	1	-	319
		Not reported	-	1	4	8	19	36	22	11	1	-	-	102
		<b>Total</b>	<b>14</b>	<b>93</b>	<b>242</b>	<b>423</b>	<b>902</b>	<b>1652</b>	<b>1938</b>	<b>1600</b>	<b>319</b>	<b>17</b>	<b>7200</b>	
New Zealand	All	<b>Total</b>	<b>5</b>	<b>24</b>	<b>49</b>	<b>150</b>	<b>208</b>	<b>455</b>	<b>539</b>	<b>379</b>	<b>77</b>	<b>4</b>	<b>1890</b>	
		Caucasian	-	3	14	39	61	121	135	116	28	2	-	519
	Female	Asian	-	-	7	4	10	11	23	12	1	-	-	68
		Māori	1	3	3	14	14	16	16	6	4	-	-	77
		Pacific	1	1	1	11	10	17	20	7	1	-	-	69
		Other	-	-	1	-	1	2	3	-	-	-	-	7
		Not reported	-	-	-	1	-	2	3	1	-	-	-	7
	<b>Total</b>	<b>2</b>	<b>7</b>	<b>26</b>	<b>69</b>	<b>96</b>	<b>169</b>	<b>200</b>	<b>142</b>	<b>34</b>	<b>2</b>	<b>747</b>		
	Male	Caucasian	1	14	18	52	77	206	208	170	33	2	-	781
		Asian	-	1	-	8	12	26	36	26	2	-	-	111
		Māori	2	2	2	8	11	22	51	25	6	-	-	129
		Pacific	-	-	2	10	12	22	38	9	2	-	-	95
		Other	-	-	-	3	-	7	5	6	-	-	-	21
Not reported		-	-	1	-	-	3	1	1	-	-	-	6	
<b>Total</b>	<b>3</b>	<b>17</b>	<b>23</b>	<b>81</b>	<b>112</b>	<b>286</b>	<b>339</b>	<b>237</b>	<b>43</b>	<b>2</b>	<b>1143</b>			

Figure 7.12 shows the duration of function of prevalent transplants at the end of 2017. In Australia there were 4038 grafts that had functioned for ≥10 years, 1140 ≥20 years and 265 ≥30 years. In New Zealand there were 732 grafts that had functioned for ≥10 years, 230 ≥20 years and 49 ≥30 years.

**Figure 7.12.1 - Number and Duration of Functioning Grafts - Australia 2017 (n=11687)**



**Figure 7.12.2 - Number and Duration of Functioning Grafts - New Zealand 2017 (n=1890)**



## Graft Loss

Table 7.10 presents the overall graft loss rate in 2008-2017 by country, stratified into graft failure and death with a functioning graft. These rates are expressed as graft losses per 100 graft-years. In general, around half of grafts are lost due to graft failure and half due to patient death.

**Table 7.10 Graft Loss Rate 2008-2017**

Country	Outcome	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australia	Graft failure	3.4	3.2	2.7	2.8	3.1	2.7	2.8	3.1	2.7	2.9
	Death with function	2.5	2.1	2.3	2.8	2.1	2.7	2.5	2.5	2.6	2.2
	<b>All losses</b>	<b>5.9</b>	<b>5.3</b>	<b>5.1</b>	<b>5.7</b>	<b>5.2</b>	<b>5.4</b>	<b>5.3</b>	<b>5.7</b>	<b>5.3</b>	<b>5.0</b>
New Zealand	Graft failure	2.4	2.8	2.3	2.3	2.7	2.4	3.0	2.1	2.8	2.0
	Death with function	2.0	2.7	2.5	3.0	2.2	2.1	3.0	2.8	3.2	3.0
	<b>All losses</b>	<b>4.4</b>	<b>5.5</b>	<b>4.7</b>	<b>5.3</b>	<b>4.9</b>	<b>4.5</b>	<b>5.9</b>	<b>4.9</b>	<b>6.0</b>	<b>5.1</b>

The causes of graft loss over 2008-2017 are presented in table 7.11. Chronic allograft nephropathy dominates the causes of graft failure, whilst graft failure due to acute rejection is an uncommon event (<3%). These data are further categorised by timing post-transplant (first year versus later years) for 2013-2017 in table 7.12. Cancer and cardiovascular disease are the most common causes of death with a functioning graft in both Australia and New Zealand.

**Table 7.11 Causes of Graft Loss 2008-2017**

Country	Cause of graft loss	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Australia	Death with function	175	149	178	223	175	232	215	227	239	211	2024
	Acute rejection	10	16	8	10	10	13	11	16	14	15	123
	Chronic allograft nephropathy	174	153	147	156	176	156	164	189	157	141	1613
	Hyperacute rejection	2	-	-	-	-	-	1	-	1	1	5
	Vascular	14	17	11	6	10	9	7	12	9	4	99
	Technical	4	3	4	5	2	-	6	3	6	6	39
	Glomerulonephritis	10	15	16	15	17	16	12	20	19	17	157
	Non-compliance	6	14	6	6	8	9	14	3	8	15	89
	Other	16	15	17	27	29	22	29	36	34	43	268
	<b>Total</b>	<b>411</b>	<b>382</b>	<b>387</b>	<b>448</b>	<b>427</b>	<b>457</b>	<b>459</b>	<b>506</b>	<b>487</b>	<b>453</b>	<b>4417</b>
New Zealand	Death with function	26	34	33	41	30	30	43	42	50	49	378
	Acute rejection	1	1	-	3	1	2	3	1	2	2	16
	Chronic allograft nephropathy	20	29	17	15	26	21	28	22	27	17	222
	Hyperacute rejection	-	-	-	-	-	-	-	-	-	-	0
	Vascular	1	2	2	2	2	2	1	-	3	1	16
	Technical	-	-	-	-	-	-	1	1	2	-	4
	Glomerulonephritis	5	-	4	4	5	1	2	2	2	5	30
	Non-compliance	1	1	5	3	-	4	6	-	-	1	21
	Other	1	3	2	4	3	4	2	5	6	4	34
<b>Total</b>	<b>55</b>	<b>70</b>	<b>63</b>	<b>72</b>	<b>67</b>	<b>64</b>	<b>86</b>	<b>73</b>	<b>92</b>	<b>79</b>	<b>721</b>	

Table 7.12 Graft Losses 2013-2017

Country	Outcome	Cause of death	Cause of graft failure	First year	Beyond first year	Total	
Australia	Death with function	Cardiovascular		33 (36%)	241 (23%)	274 (24%)	
		Withdrawal		4 (4%)	64 (6%)	68 (6%)	
		Cancer		3 (3%)	310 (30%)	313 (28%)	
		Infection		25 (27%)	128 (12%)	153 (14%)	
		Other		26 (28%)	282 (27%)	308 (27%)	
		Not reported		1 (1%)	7 (1%)	8 (1%)	
		<b>Total</b>			<b>92 (100%)</b>	<b>1032 (100%)</b>	<b>1124 (100%)</b>
	Graft Failure		Acute rejection		28 (22%)	41 (4%)	69 (6%)
			Chronic allograft nephropathy		6 (5%)	801 (72%)	807 (65%)
			Hyperacute rejection		3 (2%)	-	3 (<1%)
			Vascular		30 (24%)	11 (1%)	41 (3%)
		Technical		18 (14%)	3 (<1%)	21 (2%)	
		Glomerulonephritis		5 (4%)	79 (7%)	84 (7%)	
		Non-compliance		1 (1%)	48 (4%)	49 (4%)	
		Other		35 (28%)	129 (12%)	164 (13%)	
	<b>Total</b>			<b>126 (100%)</b>	<b>1112 (100%)</b>	<b>1238 (100%)</b>	
New Zealand	Death with function	Cardiovascular		7 (64%)	70 (34%)	77 (36%)	
		Withdrawal		1 (9%)	6 (3%)	7 (3%)	
		Cancer		-	65 (32%)	65 (30%)	
		Infection		-	25 (12%)	25 (12%)	
		Other		3 (27%)	36 (18%)	39 (18%)	
		Not reported		-	1 (<1%)	1 (<1%)	
		<b>Total</b>			<b>11 (100%)</b>	<b>203 (100%)</b>	<b>214 (100%)</b>
	Graft Failure		Acute rejection		2 (14%)	8 (5%)	10 (6%)
			Chronic allograft nephropathy		-	115 (69%)	115 (64%)
			Vascular		4 (29%)	3 (2%)	7 (4%)
			Technical		3 (21%)	1 (1%)	4 (2%)
		Glomerulonephritis		2 (14%)	10 (6%)	12 (7%)	
		Non-compliance		-	11 (7%)	11 (6%)	
		Other		3 (21%)	18 (11%)	21 (12%)	
	<b>Total</b>			<b>14 (100%)</b>	<b>166 (100%)</b>	<b>180 (100%)</b>	

## Immunosuppression

The use of antibodies for induction immunosuppression is shown in table 7.13.

Table 7.13 Antibody Use for Induction Immunosuppression 2013-2017; Number of Kidney Transplant Recipients Receiving Each Agent by Year (% Total New Transplants)

Country	Type of agent	2013	2014	2015	2016	2017
Australia	Intravenous immunoglobulin	44 (5.0%)	27 (3.0%)	14 (1.5%)	15 (1.4%)	39 (3.5%)
	Anti-CD25	792 (89.7%)	787 (86.2%)	762 (80.3%)	823 (75.4%)	867 (78.2%)
	Rituximab	3 (0.3%)	2 (0.2%)	6 (0.6%)	4 (0.4%)	9 (0.8%)
	T cell depleting polyclonal Ab	36 (4.1%)	43 (4.7%)	59 (6.2%)	72 (6.6%)	50 (4.5%)
	Other	3 (0.3%)	7 (0.8%)	-	-	3 (0.3%)
	Not reported	-	2 (0.2%)	3 (0.3%)	190 (17.4%)	167 (15.1%)
	<b>Total new transplants</b>		<b>883</b>	<b>913</b>	<b>949</b>	<b>1091</b>
New Zealand	Intravenous immunoglobulin	-	-	1 (0.7%)	-	-
	Anti-CD25	115 (99.1%)	133 (96.4%)	142 (96.6%)	167 (97.1%)	185 (98.9%)
	Rituximab	6 (5.2%)	9 (6.5%)	9 (6.1%)	5 (2.9%)	11 (5.9%)
	T cell depleting polyclonal Ab	2 (1.7%)	2 (1.4%)	1 (0.7%)	6 (3.5%)	7 (3.7%)
	Other	-	-	1 (0.7%)	-	-
	Not reported	-	-	-	1 (0.6%)	-
	<b>Total new transplants</b>		<b>116</b>	<b>138</b>	<b>147</b>	<b>172</b>

Immunosuppressive therapy at baseline, 1 and 2 years post-transplant for primary grafts over 2010-2017 is presented for deceased and living donors in tables 7.14 and 7.15, respectively. Tacrolimus is the most commonly prescribed calcineurin inhibitor in Australia, whereas in New Zealand cyclosporin predominates.

**Table 7.14.1 Immunosuppressive Therapy - Primary Deceased Donor Grafts Australia 2010-2017**

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of deceased donor grafts
<b>Initial treatment</b>	2010	-	66 (14%)	409 (86%)	426 (89%)	37 (8%)	1 (<1%)	3 (1%)	477 (100%)	478
	2011	1 (<1%)	57 (11%)	447 (87%)	298 (58%)	210 (41%)	-	-	509 (100%)	511
	2012	1 (<1%)	27 (5%)	480 (90%)	276 (52%)	243 (46%)	2 (<1%)	-	519 (97%)	533
	2013	4 (1%)	11 (2%)	537 (95%)	345 (61%)	207 (37%)	-	-	553 (98%)	565
	2014	2 (<1%)	11 (2%)	533 (94%)	357 (63%)	180 (32%)	1 (<1%)	11 (2%)	547 (96%)	568
	2015	3 (<1%)	5 (1%)	582 (92%)	375 (60%)	207 (33%)	1 (<1%)	9 (1%)	590 (94%)	630
	2016	-	4 (1%)	607 (87%)	422 (61%)	198 (28%)	-	2 (<1%)	618 (89%)	697
2017	-	2 (<1%)	671 (95%)	481 (68%)	195 (27%)	1 (<1%)	1 (<1%)	674 (95%)	710	
<b>Treatment at 1 year</b>	2010	24 (5%)	53 (12%)	371 (82%)	323 (71%)	84 (18%)	16 (4%)	11 (2%)	442 (97%)	455
	2011	26 (5%)	36 (7%)	421 (87%)	223 (46%)	214 (44%)	8 (2%)	13 (3%)	472 (98%)	483
	2012	21 (4%)	25 (5%)	437 (87%)	196 (39%)	251 (50%)	12 (2%)	17 (3%)	480 (96%)	502
	2013	18 (3%)	22 (4%)	473 (88%)	267 (50%)	199 (37%)	11 (2%)	3 (1%)	502 (94%)	535
	2014	23 (4%)	10 (2%)	481 (91%)	272 (51%)	168 (32%)	4 (1%)	22 (4%)	498 (94%)	531
	2015	22 (4%)	11 (2%)	495 (85%)	274 (47%)	187 (32%)	2 (<1%)	16 (3%)	510 (88%)	579
	2016	25 (4%)	16 (2%)	552 (85%)	346 (53%)	188 (29%)	3 (<1%)	22 (3%)	572 (88%)	652
<b>Treatment at 2 years</b>	2010	25 (6%)	46 (11%)	344 (79%)	305 (70%)	79 (18%)	21 (5%)	15 (3%)	411 (94%)	435
	2011	31 (7%)	35 (7%)	396 (84%)	199 (42%)	210 (45%)	8 (2%)	20 (4%)	445 (94%)	471
	2012	26 (5%)	23 (5%)	415 (85%)	184 (38%)	240 (49%)	11 (2%)	19 (4%)	457 (93%)	489
	2013	21 (4%)	20 (4%)	443 (85%)	255 (49%)	191 (37%)	13 (3%)	7 (1%)	480 (92%)	520
	2014	28 (5%)	13 (3%)	437 (85%)	253 (49%)	155 (30%)	8 (2%)	21 (4%)	459 (89%)	515
	2015	35 (6%)	14 (2%)	473 (84%)	261 (46%)	171 (30%)	8 (1%)	20 (4%)	491 (87%)	566

**Table 7.14.2 Immunosuppressive Therapy - Primary Deceased Donor Grafts New Zealand 2010-2017**

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of deceased donor grafts
<b>Initial treatment</b>	2010	-	32 (71%)	13 (29%)	45 (100%)	-	-	-	45 (100%)	45
	2011	-	41 (71%)	17 (29%)	58 (100%)	-	-	-	58 (100%)	58
	2012	-	36 (72%)	13 (26%)	49 (98%)	-	-	-	49 (98%)	50
	2013	-	45 (83%)	9 (17%)	53 (98%)	-	-	-	53 (98%)	54
	2014	-	44 (75%)	13 (22%)	58 (98%)	-	-	-	58 (98%)	59
	2015	-	51 (77%)	16 (25%)	64 (98%)	-	-	-	64 (98%)	65
	2016	1 (1%)	54 (68%)	22 (28%)	79 (99%)	-	-	-	79 (99%)	80
	2017	-	81 (72%)	31 (28%)	111 (99%)	-	-	-	111 (99%)	112
<b>Treatment at 1 year</b>	2010	2 (5%)	16 (37%)	27 (63%)	41 (95%)	-	-	-	42 (98%)	43
	2011	2 (4%)	25 (46%)	29 (54%)	50 (93%)	-	-	-	52 (96%)	54
	2012	2 (4%)	27 (56%)	21 (44%)	45 (94%)	-	-	-	47 (98%)	48
	2013	2 (4%)	34 (65%)	18 (35%)	50 (96%)	-	-	-	52 (100%)	52
	2014	2 (4%)	32 (56%)	25 (44%)	55 (96%)	-	-	-	57 (100%)	57
	2015	1 (2%)	27 (41%)	31 (48%)	55 (86%)	-	-	-	60 (94%)	64
	2016	3 (4%)	38 (51%)	34 (45%)	68 (91%)	1 (1%)	-	-	73 (97%)	75
<b>Treatment at 2 years</b>	2010	2 (5%)	17 (40%)	25 (60%)	39 (93%)	-	-	-	39 (93%)	42
	2011	4 (7%)	25 (46%)	29 (54%)	45 (83%)	-	-	-	51 (94%)	54
	2012	1 (2%)	24 (52%)	20 (43%)	42 (91%)	-	1 (2%)	-	43 (93%)	46
	2013	2 (4%)	34 (65%)	18 (35%)	48 (92%)	-	-	-	52 (100%)	52
	2014	2 (4%)	29 (52%)	25 (45%)	53 (95%)	-	-	-	55 (98%)	56
	2015	3 (5%)	24 (40%)	34 (58%)	52 (88%)	-	-	-	59 (100%)	59

**Table 7.15.1 Immunosuppressive Therapy - Primary Living Donor Grafts Australia 2010-2017**

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of living donor grafts
Initial treatment	2010	-	28 (11%)	232 (87%)	219 (82%)	30 (11%)	1 (<1%)	5 (2%)	265 (100%)	266
	2011	2 (1%)	31 (13%)	200 (86%)	151 (65%)	78 (33%)	-	-	229 (98%)	233
	2012	4 (2%)	11 (5%)	193 (91%)	120 (56%)	82 (38%)	1 (<1%)	-	205 (96%)	213
	2013	1 (<1%)	10 (4%)	209 (93%)	139 (62%)	78 (35%)	-	-	221 (99%)	224
	2014	-	4 (2%)	216 (91%)	147 (62%)	74 (31%)	-	1 (<1%)	219 (92%)	237
	2015	1 (<1%)	3 (1%)	199 (94%)	122 (58%)	69 (33%)	-	10 (5%)	200 (94%)	212
	2016	-	6 (3%)	212 (90%)	161 (69%)	54 (23%)	-	-	216 (92%)	235
	2017	3 (1%)	1 (<1%)	223 (93%)	172 (71%)	50 (21%)	-	-	219 (91%)	241
Treatment at 1 year	2010	15 (6%)	19 (7%)	214 (83%)	169 (65%)	54 (21%)	16 (6%)	10 (4%)	245 (95%)	259
	2011	11 (5%)	26 (11%)	185 (80%)	121 (53%)	87 (38%)	9 (4%)	6 (3%)	224 (97%)	230
	2012	7 (3%)	9 (4%)	186 (91%)	96 (47%)	86 (42%)	3 (1%)	4 (2%)	195 (95%)	205
	2013	9 (4%)	9 (4%)	189 (88%)	113 (53%)	77 (36%)	6 (3%)	2 (1%)	198 (92%)	215
	2014	11 (5%)	10 (4%)	198 (87%)	119 (52%)	69 (30%)	1 (<1%)	8 (4%)	209 (92%)	228
	2015	5 (2%)	3 (1%)	174 (84%)	92 (45%)	66 (32%)	2 (1%)	7 (3%)	170 (83%)	206
	2016	10 (4%)	9 (4%)	197 (84%)	140 (60%)	52 (22%)	3 (1%)	-	204 (87%)	235
Treatment at 2 years	2010	15 (6%)	14 (5%)	205 (80%)	166 (65%)	59 (23%)	20 (8%)	10 (4%)	226 (89%)	255
	2011	17 (7%)	28 (12%)	175 (77%)	113 (50%)	87 (38%)	10 (4%)	9 (4%)	218 (96%)	228
	2012	8 (4%)	5 (3%)	177 (89%)	88 (44%)	82 (41%)	4 (2%)	9 (5%)	181 (91%)	200
	2013	18 (8%)	9 (4%)	181 (85%)	99 (46%)	69 (32%)	7 (3%)	4 (2%)	186 (87%)	213
	2014	13 (6%)	7 (3%)	181 (80%)	111 (49%)	59 (26%)	1 (<1%)	13 (6%)	193 (86%)	225
	2015	6 (3%)	5 (2%)	164 (81%)	92 (46%)	60 (30%)	3 (1%)	9 (4%)	165 (82%)	202



**Table 7.15.2 Immunosuppressive Therapy - Primary Living Donor Grafts New Zealand 2010-2017**

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of living donor grafts
<b>Initial treatment</b>	2010	-	31 (53%)	28 (47%)	59 (100%)	-	-	-	58 (98%)	59
	2011	1 (2%)	32 (62%)	20 (38%)	51 (98%)	-	-	-	52 (100%)	52
	2012	1 (2%)	26 (51%)	21 (43%)	47 (96%)	-	-	-	47 (96%)	49
	2013	1 (2%)	30 (53%)	26 (46%)	55 (96%)	1 (2%)	-	-	57 (100%)	57
	2014	-	42 (63%)	24 (36%)	66 (99%)	-	-	-	66 (99%)	67
	2015	1 (1%)	41 (60%)	28 (41%)	66 (97%)	-	1 (1%)	-	67 (99%)	68
	2016	-	47 (63%)	27 (36%)	74 (99%)	-	-	-	74 (99%)	75
	2017	3 (5%)	27 (44%)	35 (56%)	58 (94%)	1 (2%)	-	-	62 (100%)	62
<b>Treatment at 1 year</b>	2010	3 (5%)	14 (25%)	41 (72%)	50 (88%)	-	1 (2%)	-	54 (95%)	57
	2011	2 (4%)	22 (47%)	25 (53%)	44 (94%)	-	1 (2%)	-	46 (98%)	47
	2012	2 (4%)	18 (37%)	28 (60%)	44 (94%)	-	-	-	46 (98%)	47
	2013	2 (4%)	25 (45%)	31 (55%)	51 (91%)	1 (2%)	-	-	56 (100%)	56
	2014	3 (5%)	23 (35%)	37 (57%)	61 (94%)	-	-	-	64 (98%)	65
	2015	2 (3%)	29 (43%)	34 (51%)	61 (91%)	-	1 (1%)	-	63 (94%)	67
	2016	1 (1%)	33 (45%)	39 (53%)	71 (97%)	-	-	-	72 (99%)	73
<b>Treatment at 2 years</b>	2010	4 (8%)	13 (25%)	38 (72%)	46 (87%)	-	1 (2%)	-	50 (94%)	53
	2011	2 (4%)	18 (40%)	24 (53%)	39 (87%)	-	1 (2%)	-	40 (89%)	45
	2012	2 (4%)	18 (37%)	28 (60%)	41 (87%)	-	-	-	45 (96%)	47
	2013	6 (11%)	23 (43%)	29 (55%)	44 (83%)	1 (2%)	-	-	52 (98%)	53
	2014	3 (5%)	24 (38%)	37 (58%)	59 (92%)	-	-	-	63 (98%)	64
	2015	4 (6%)	27 (41%)	36 (55%)	59 (89%)	-	-	-	63 (95%)	66

## Rejection

The proportion of patients experiencing any rejection episode by 6 months post-transplant, stratified by donor type and graft number, is presented in table 7.16. Antibody-mediated rejection rates are presented in table 7.17; rates are notably higher in re-grafts. Years shown are those in which the transplants took place.

**Table 7.16 Rejection Rates at Six Months Post Transplant 2007-2016**

Donor Type	Graft Number	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Living donor	First	21.4%	17.0%	16.8%	17.8%	17.5%	14.1%	19.2%	22.4%	17.1%	17.4%
	Second and subsequent	34.3%	30.0%	24.3%	12.9%	19.2%	10.0%	16.1%	28.6%	11.1%	16.7%
Deceased donor	First	17.7%	22.0%	21.1%	19.1%	20.0%	16.8%	18.6%	19.8%	17.7%	15.2%
	Second and subsequent	32.8%	32.9%	37.8%	28.6%	19.4%	24.4%	25.0%	25.9%	24.7%	18.6%

**Table 7.17 Antibody-Mediated Rejection Rates at Six Months Post Transplant 2007-2016**

Donor Type	Graft Number	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Living donor	First	3.4%	3.1%	4.5%	3.7%	4.9%	2.3%	5.0%	4.6%	3.9%	3.9%
	Second and subsequent	20.0%	12.5%	13.5%	3.2%	11.5%	6.7%	3.2%	5.7%	5.6%	2.8%
Deceased donor	First	5.8%	4.8%	5.6%	5.4%	5.6%	3.9%	5.0%	5.1%	6.0%	5.8%
	Second and subsequent	10.9%	15.8%	24.3%	13.0%	11.3%	10.3%	10.3%	12.9%	17.6%	8.6%

Table 7.18 shows the number of people who received antibody agents for treating acute rejection by calendar year. The number is also reported as a proportion of new transplant recipients in each calendar year, but readers should be aware that although the large majority of people experiencing acute rejection do so within the first six months of transplantation, some experience rejection after this time (when they would not necessarily be counted as a new transplant). For this reason the total number of transplant recipients treated during the year is also reported.

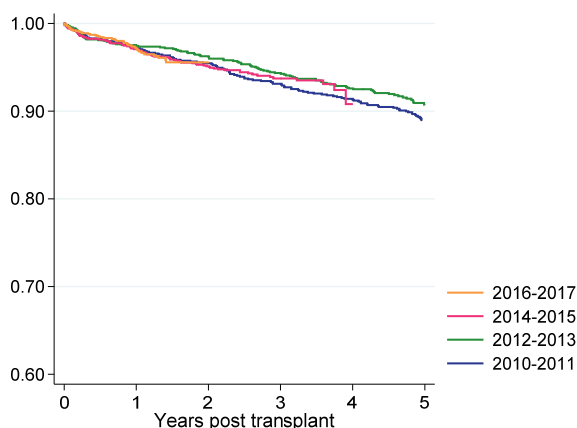
**Table 7.18 Antibody Therapy for Acute Rejection 2013-2017**

Country	Type of agent	2013	2014	2015	2016	2017
Australia	Intravenous immunoglobulin	104 (11.8%)	96 (10.5%)	163 (17.2%)	119 (10.9%)	118 (10.6%)
	Anti-CD25	1 (0.1%)	1 (0.1%)	2 (0.2%)	1 (0.1%)	-
	Rituximab	11 (1.2%)	12 (1.3%)	12 (1.3%)	4 (0.4%)	7 (0.6%)
	T cell depleting polyclonal Ab	51 (5.8%)	37 (4.1%)	31 (3.3%)	23 (2.1%)	40 (3.6%)
	Not specified	15 (1.7%)	28 (3.1%)	24 (2.5%)	45 (4.1%)	32 (2.9%)
	Total new transplants	883	913	949	1091	1109
	Total transplants at risk	10151	10581	11032	11581	12174
NZ	Intravenous immunoglobulin	2 (1.7%)	8 (5.8%)	1 (0.7%)	6 (3.5%)	3 (1.6%)
	Anti-CD25	1 (0.9%)	-	-	-	-
	Rituximab	1 (0.9%)	7 (5.1%)	-	2 (1.2%)	-
	T cell depleting polyclonal Ab	4 (3.4%)	7 (5.1%)	3 (2.0%)	14 (8.1%)	13 (7.0%)
	Not specified	1 (0.9%)	3 (2.2%)	5 (3.4%)	-	2 (1.1%)
	Total new transplants	116	138	147	172	187
	Total transplants at risk	1642	1714	1776	1875	1968

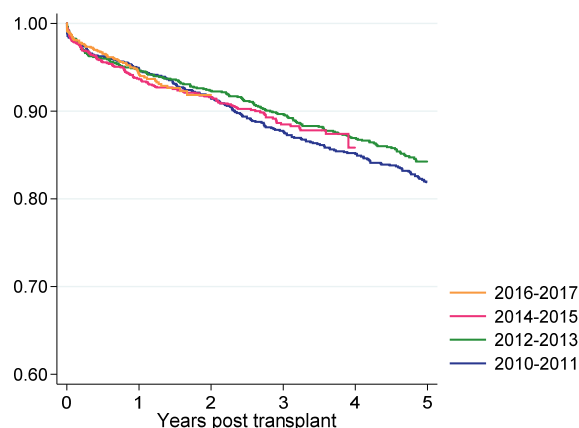
## Patient and Graft Survival

The remainder of the chapter presents patient and graft survival by transplant era and within a number of different categories combining country, graft number and donor type. Each page shows the patient and graft survival graphically, and in tabular form (with 95% confidence intervals) at selected time-points post-transplant. In each case the survivor function is calculated using the Kaplan-Meier method. Graft survival is not censored for death. All of these survival statistics are unadjusted. Note that in the survival graphs out to 5 years, the y axis ranges from 0.60 to 1.00 in order to show the differences between the eras more clearly, whereas in the long-term graphs (out to 30 years) the y axis starts at 0.

**Figure 7.13 - Primary Deceased Donor Grafts - Patient Survival - Australia**



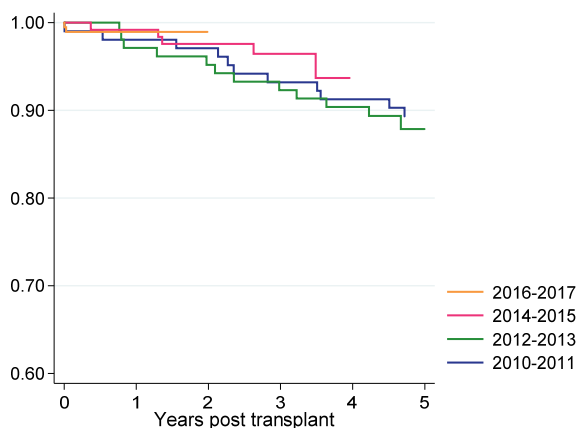
**Figure 7.14 - Primary Deceased Donor Grafts - Graft Survival - Australia**



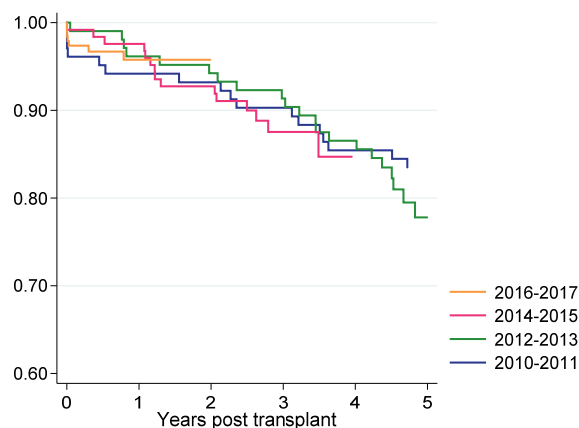
**Table 7.19 Primary Deceased Donor Grafts - Australia 2010-2017**

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2010-2011 (n=989)	99 (99, 100)	98 (97, 99)	97 (96, 98)	89 (87, 91)
	2012-2013 (n=1098)	100 (99, 100)	98 (97, 99)	97 (96, 98)	91 (89, 92)
	2014-2015 (n=1198)	99 (99, 100)	98 (97, 99)	97 (96, 98)	-
	2016-2017 (n=1407)	99 (99, 100)	98 (98, 99)	97 (96, 98)	-
Graft survival	2010-2011 (n=989)	98 (97, 99)	96 (95, 97)	95 (93, 96)	82 (79, 84)
	2012-2013 (n=1098)	98 (97, 99)	96 (95, 97)	95 (93, 96)	84 (82, 86)
	2014-2015 (n=1198)	98 (97, 99)	96 (94, 97)	94 (92, 95)	-
	2016-2017 (n=1407)	98 (97, 99)	97 (95, 97)	94 (93, 96)	-

**Figure 7.15 - Primary Deceased Donor Grafts - Patient Survival - New Zealand**



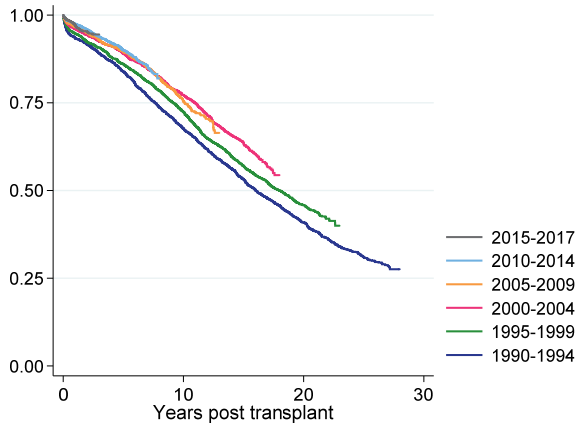
**Figure 7.16 - Primary Deceased Donor Grafts - Graft Survival - New Zealand**



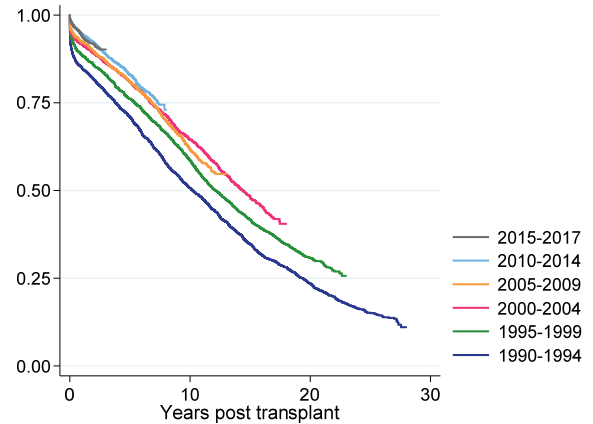
**Table 7.20 Primary Deceased Donor Grafts - New Zealand 2010-2017**

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2010-2011 (n=103)	99 (93, 100)	99 (93, 100)	98 (92, 100)	89 (82, 94)
	2012-2013 (n=104)	100	100	97 (91, 99)	88 (79, 93)
	2014-2015 (n=124)	100	99 (94, 100)	99 (94, 100)	-
	2016-2017 (n=192)	99 (96, 100)	99 (96, 100)	99 (96, 100)	-
Graft survival	2010-2011 (n=103)	96 (90, 99)	95 (89, 98)	94 (87, 97)	83 (75, 89)
	2012-2013 (n=104)	99 (93, 100)	99 (93, 100)	96 (90, 99)	78 (68, 85)
	2014-2015 (n=124)	99 (94, 100)	98 (94, 100)	98 (93, 99)	-
	2016-2017 (n=192)	97 (94, 99)	97 (93, 99)	96 (91, 98)	-

**Figure 7.17 - Primary Deceased Donor Grafts - Patient Survival - Australia and New Zealand**



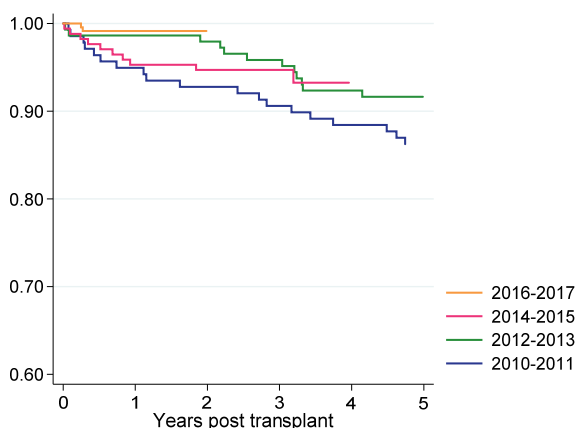
**Figure 7.18 - Primary Deceased Donor Grafts - Graft Survival - Australia and New Zealand**



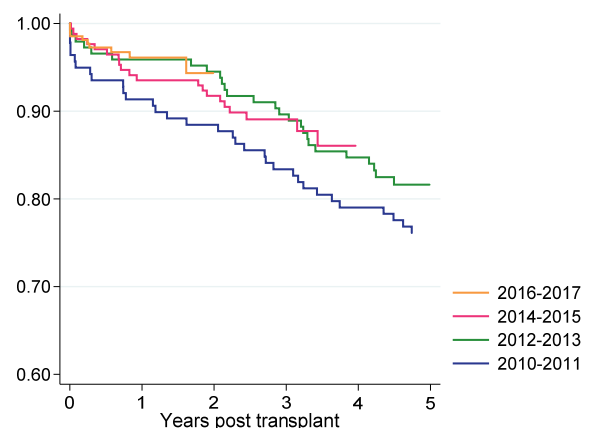
**Table 7.21 Primary Deceased Donor Grafts - Australia and New Zealand 1990-2017**

Outcome	Era	1 year	5 years	10 years	15 years	20 years
Patient survival	1990-1994 (n=1906)	93 (92, 94)	84 (82, 85)	68 (66, 70)	53 (51, 55)	41 (39, 43)
	1995-1999 (n=1779)	95 (94, 96)	86 (84, 88)	72 (70, 74)	57 (55, 59)	46 (43, 48)
	2000-2004 (n=1849)	96 (95, 97)	89 (88, 90)	77 (75, 79)	64 (61, 66)	-
	2005-2009 (n=1911)	97 (96, 97)	90 (88, 91)	75 (73, 77)	-	-
	2010-2014 (n=2921)	98 (97, 98)	90 (89, 91)	-	-	-
	2015-2017 (n=2294)	97 (96, 98)	-	-	-	-
Graft survival	1990-1994 (n=1906)	85 (83, 87)	71 (69, 73)	51 (48, 53)	35 (33, 37)	23 (22, 25)
	1995-1999 (n=1779)	89 (87, 90)	76 (74, 78)	59 (56, 61)	42 (39, 44)	31 (29, 33)
	2000-2004 (n=1849)	92 (90, 93)	81 (79, 83)	65 (62, 67)	48 (46, 51)	-
	2005-2009 (n=1911)	92 (91, 93)	81 (79, 83)	62 (59, 64)	-	-
	2010-2014 (n=2921)	95 (94, 96)	83 (81, 84)	-	-	-
	2015-2017 (n=2294)	94 (93, 95)	-	-	-	-

**Figure 7.19 - Second and Subsequent Deceased Donor Grafts - Patient Survival - Australia and New Zealand**



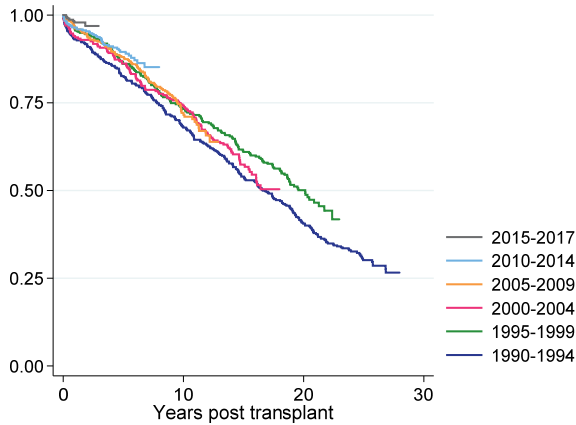
**Figure 7.20 - Second and Subsequent Deceased Donor Grafts - Graft Survival - Australia and New Zealand**



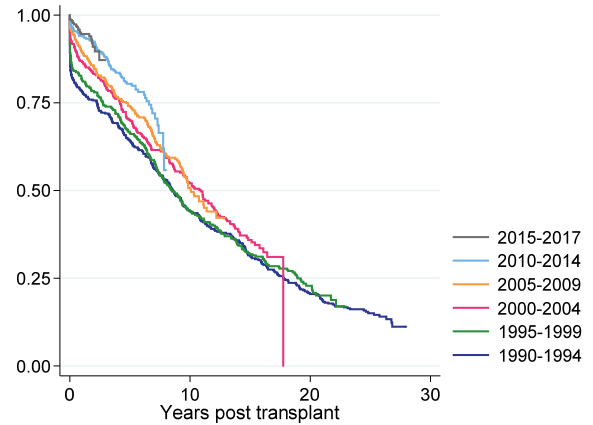
**Table 7.22 Second and Subsequent Deceased Donor Grafts - Australia and New Zealand 2010-2017**

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2010-2011 (n=139)	99 (95, 100)	96 (92, 98)	95 (90, 98)	86 (79, 91)
	2012-2013 (n=146)	99 (95, 100)	99 (95, 100)	99 (95, 100)	92 (86, 95)
	2014-2015 (n=170)	99 (96, 100)	98 (94, 99)	95 (91, 98)	-
	2016-2017 (n=274)	100	99 (97, 100)	99 (97, 100)	-
Graft survival	2010-2011 (n=139)	95 (90, 98)	94 (88, 97)	91 (85, 95)	76 (68, 82)
	2012-2013 (n=146)	98 (94, 99)	97 (92, 99)	96 (91, 98)	82 (74, 87)
	2014-2015 (n=170)	99 (95, 100)	97 (93, 99)	94 (89, 96)	-
	2016-2017 (n=274)	99 (96, 99)	97 (94, 99)	96 (93, 98)	-

**Figure 7.21 - Second and Subsequent Deceased Donor Grafts - Patient Survival - Australia and New Zealand**



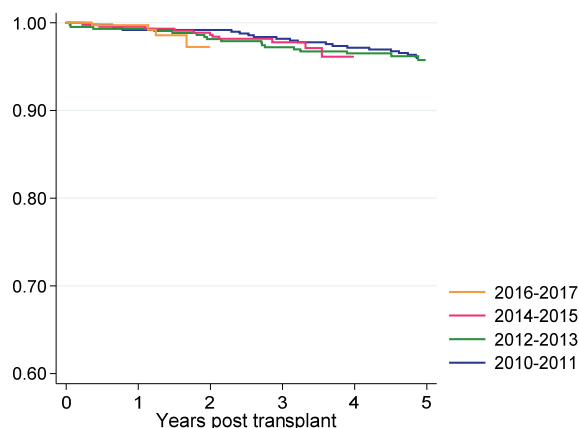
**Figure 7.22 - Second and Subsequent Deceased Donor Grafts - Graft Survival - Australia and New Zealand**



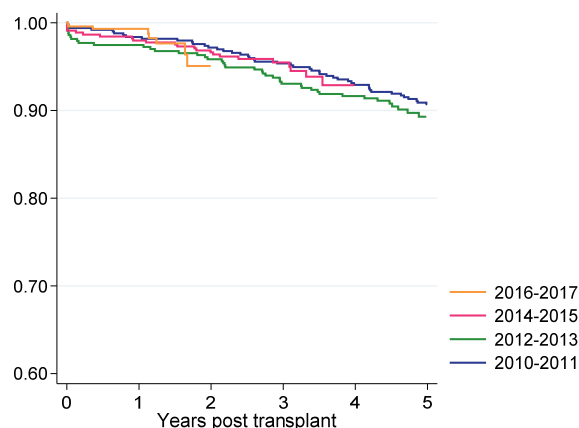
**Table 7.23 Second and Subsequent Deceased Donor Grafts - Australia and New Zealand 1990-2017**

Outcome	Era	1 year	5 years	10 years	15 years	20 years
Patient survival	1990-1994 (n=374)	93 (90, 95)	83 (78, 86)	68 (63, 72)	54 (49, 59)	41 (36, 45)
	1995-1999 (n=295)	96 (93, 98)	86 (82, 90)	73 (68, 78)	61 (55, 66)	50 (44, 56)
	2000-2004 (n=268)	94 (90, 96)	86 (81, 90)	74 (68, 79)	57 (51, 63)	-
	2005-2009 (n=343)	96 (94, 98)	88 (84, 91)	72 (67, 77)	-	-
	2010-2014 (n=370)	96 (94, 98)	90 (86, 92)	-	-	-
	2015-2017 (n=359)	98 (95, 99)	-	-	-	-
Graft survival	1990-1994 (n=374)	78 (74, 82)	64 (59, 69)	44 (39, 49)	31 (27, 36)	20 (17, 25)
	1995-1999 (n=295)	82 (77, 86)	66 (61, 72)	44 (38, 50)	32 (27, 37)	23 (18, 28)
	2000-2004 (n=268)	87 (82, 90)	70 (64, 75)	52 (46, 58)	36 (30, 42)	-
	2005-2009 (n=343)	90 (86, 92)	74 (69, 78)	51 (45, 56)	-	-
	2010-2014 (n=370)	94 (91, 96)	80 (76, 84)	-	-	-
	2015-2017 (n=359)	95 (91, 97)	-	-	-	-

**Figure 7.23 - Primary Living Donor Grafts - Patient Survival - Australia**



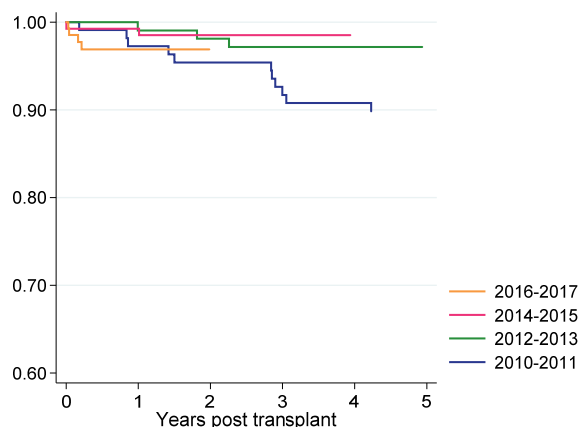
**Figure 7.24 - Primary Living Donor Grafts - Graft Survival - Australia**



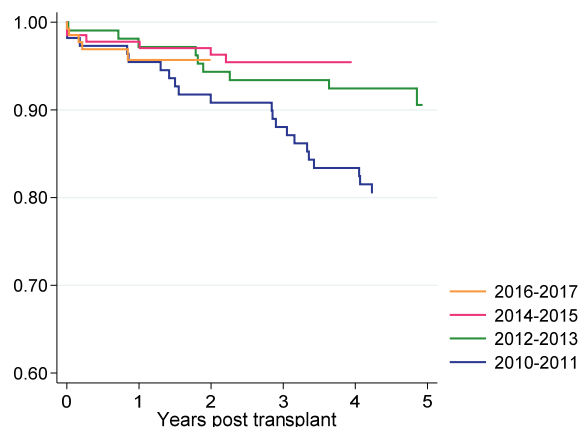
**Table 7.24 Primary Living Donor Grafts - Australia 2010-2017**

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2010-2011 (n=499)	100	100 (99, 100)	99 (98, 100)	96 (94, 97)
	2012-2013 (n=437)	100 (98, 100)	99 (98, 100)	99 (98, 100)	96 (93, 97)
	2014-2015 (n=449)	100	100 (98, 100)	100 (98, 100)	-
	2016-2017 (n=476)	100	100 (98, 100)	100 (98, 100)	-
Graft survival	2010-2011 (n=499)	99 (98, 100)	99 (98, 100)	98 (97, 99)	91 (88, 93)
	2012-2013 (n=437)	98 (96, 99)	97 (95, 99)	97 (95, 99)	89 (86, 92)
	2014-2015 (n=449)	99 (98, 100)	98 (97, 99)	98 (96, 99)	-
	2016-2017 (n=476)	100 (98, 100)	99 (98, 100)	99 (98, 100)	-

**Figure 7.25 - Primary Living Donor Grafts - Patient Survival - New Zealand**



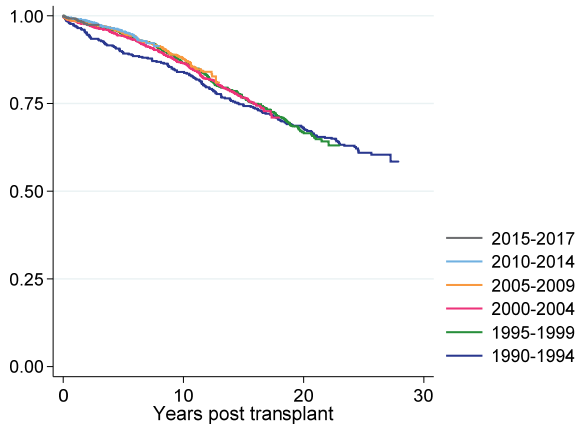
**Figure 7.26 - Primary Living Donor Grafts - Graft Survival - New Zealand**



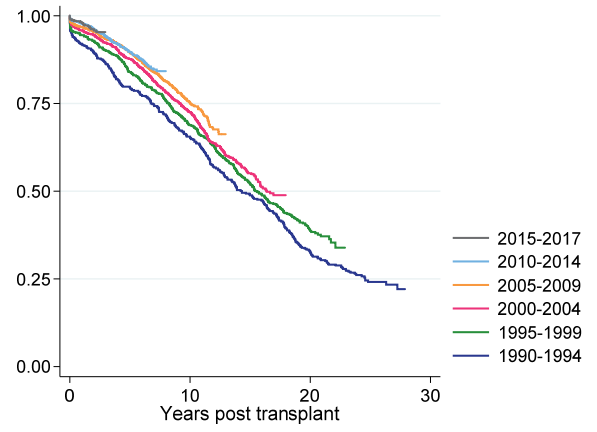
**Table 7.25 Primary Living Donor Grafts - New Zealand 2010-2017**

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2010-2011 (n=111)	100	99 (94, 100)	97 (92, 99)	90 (82, 94)
	2012-2013 (n=106)	100	100	99 (93, 100)	97 (91, 99)
	2014-2015 (n=135)	99 (95, 100)	99 (95, 100)	99 (95, 100)	-
	2016-2017 (n=137)	99 (94, 100)	97 (92, 99)	97 (92, 99)	-
Graft survival	2010-2011 (n=111)	98 (93, 100)	97 (92, 99)	95 (89, 98)	81 (72, 87)
	2012-2013 (n=106)	99 (93, 100)	99 (93, 100)	97 (91, 99)	91 (82, 95)
	2014-2015 (n=135)	99 (94, 100)	98 (93, 99)	98 (93, 99)	-
	2016-2017 (n=137)	99 (94, 100)	97 (92, 99)	96 (90, 98)	-

**Figure 7.27 - Primary Living Donor Grafts - Patient Survival - Australia and New Zealand**



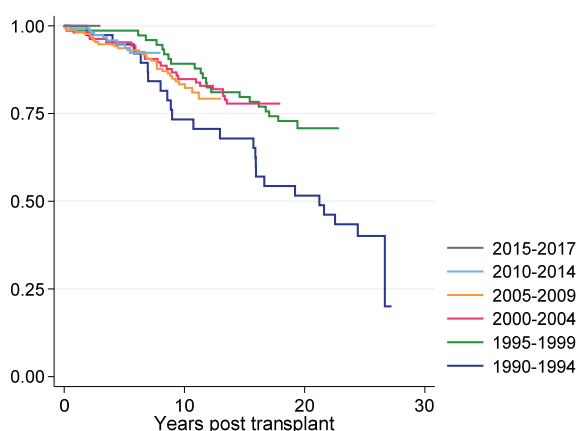
**Figure 7.28 - Primary Living Donor Grafts - Graft Survival - Australia and New Zealand**



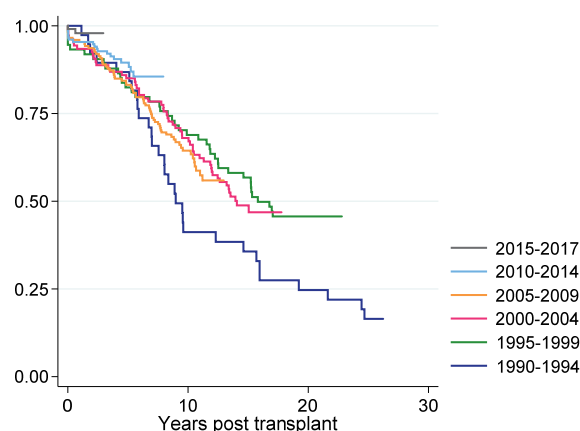
**Table 7.26 Primary Living Donor Grafts - Australia and New Zealand 1990-2017**

Outcome	Era	1 year	5 years	10 years	15 years	20 years
Patient survival	1990-1994 (n=431)	97 (95, 98)	89 (86, 92)	84 (80, 87)	75 (70, 78)	68 (63, 72)
	1995-1999 (n=766)	99 (97, 99)	95 (93, 96)	87 (84, 89)	77 (73, 80)	67 (63, 70)
	2000-2004 (n=1193)	98 (98, 99)	94 (93, 95)	86 (84, 88)	77 (74, 79)	-
	2005-2009 (n=1585)	99 (98, 99)	95 (94, 96)	88 (86, 89)	-	-
	2010-2014 (n=1457)	99 (98, 99)	96 (94, 97)	-	-	-
	2015-2017 (n=893)	99 (98, 100)	-	-	-	-
Graft survival	1990-1994 (n=431)	92 (89, 94)	80 (75, 83)	65 (61, 70)	49 (44, 54)	33 (28, 37)
	1995-1999 (n=766)	95 (93, 96)	84 (81, 86)	69 (65, 72)	52 (49, 56)	39 (35, 42)
	2000-2004 (n=1193)	96 (95, 97)	88 (86, 89)	73 (70, 75)	55 (52, 58)	-
	2005-2009 (n=1585)	97 (96, 97)	90 (88, 91)	75 (73, 77)	-	-
	2010-2014 (n=1457)	98 (97, 98)	90 (88, 91)	-	-	-
	2015-2017 (n=893)	98 (97, 99)	-	-	-	-

**Figure 7.29 - Second and Subsequent Living Donor Grafts - Patient Survival - Australia and New Zealand**



**Figure 7.30 - Second and Subsequent Living Donor Grafts - Graft Survival - Australia and New Zealand**



**Table 7.27 Second and Subsequent Living Donor Grafts - Australia and New Zealand 1990-2017**

Outcome	Era	1 year	5 years	10 years	15 years	20 years
Patient survival	1990-1994 (n=38)	100	95 (81, 99)	73 (56, 85)	68 (50, 80)	52 (35, 66)
	1995-1999 (n=74)	99 (91, 100)	99 (91, 100)	89 (80, 94)	80 (69, 87)	71 (59, 80)
	2000-2004 (n=107)	98 (93, 100)	95 (89, 98)	85 (76, 90)	78 (69, 85)	-
	2005-2009 (n=175)	98 (95, 99)	94 (89, 96)	83 (77, 88)	-	-
	2010-2014 (n=153)	99 (95, 100)	95 (89, 98)	-	-	-
	2015-2017 (n=109)	100	-	-	-	-
Graft survival	1990-1994 (n=38)	100	87 (71, 94)	41 (25, 56)	36 (21, 51)	25 (12, 39)
	1995-1999 (n=74)	93 (85, 97)	82 (72, 89)	69 (57, 78)	57 (45, 67)	46 (34, 57)
	2000-2004 (n=107)	93 (87, 97)	85 (77, 91)	68 (58, 76)	49 (39, 58)	-
	2005-2009 (n=175)	95 (91, 98)	83 (77, 88)	64 (57, 71)	-	-
	2010-2014 (n=153)	95 (91, 98)	90 (83, 94)	-	-	-
	2015-2017 (n=109)	98 (92, 99)	-	-	-	-