



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 2018, there were 1149 kidney transplants performed in Australia and 182 performed in New Zealand, with live donor transplants contributing 20.7% and 46.2% of total transplants, respectively. The 29.8% growth in kidney transplants between 2013 and 2018 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 56.9% growth over the same period, with corresponding increases of 71.9% and 42.4% 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 2018. Even though the number of kidney transplants in every ethnic group has increased over time, Caucasian patients contribute to 65.9% and 53.8% of total patients transplanted in Australia and New Zealand, respectively; whereas Aboriginal/Torres Strait Islander and Māori patients contribute 4.3% and 15.9%, respectively (2018 data).

The number of prevalent patients with functioning kidney transplants has grown in the last decade, increasing by 52.2% between 2009 and 2018 (from 8053 to 12,253 recipients) in Australia, and by 39.7% (from 1407 to 1966 recipients) in New Zealand. At the end of 2018, 9.8% and 11.8% 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 were the two most common causes of allograft failure, accounting for 42.1% and 33.0% of all allograft failures in Australia, respectively; and 50.0% and 31.6% in New Zealand, respectively (2018 data). Cancer was the most common cause of death with a functioning graft in Australia, whereas cardiovascular disease remained the most common in New Zealand.

The proportion of first kidney transplant recipients who had experienced acute rejection in the first 6 months has remained similar over the last 5 years, with respective rejection rates of 19.1% and 18.5% for patients who have received primary live and deceased donor kidney transplants during 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 97% (95%, 99%) and 96% (95%, 97%), respectively; and 97% (91%, 99%) and 95% (90%, 97%) in New Zealand, respectively (2017-2018 data).

Suggested Citation

ANZDATA Registry. 42nd Report, Chapter 7: Kidney Transplantation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2019. 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 1149 transplants performed in Australia in 2018 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 increased steadily over 2014-17, driven primarily by strong growth in the number of deceased donor transplants, and plateaued in 2018.

Table 7.1 Number of Grafts Performed by Country 1999-2018

Country	Year	Graft 1	Graft 2	Graft 3	Graft 4	Graft 5	Total Transplants	Living Donor Transplants
Australia	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	538	60	5	2	0	605	231
	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	791	85	7	2	0	885	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	951	136	20	2	0	1109	271
	2018	1028	101	19	1	0	1149	238
New Zealand	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	174	13	0	0	0	187	69
	2018	170	11	0	1	0	182	84

Figure 7.1.1 - Deceased and Living Donor Transplants - Australia 2009-2018

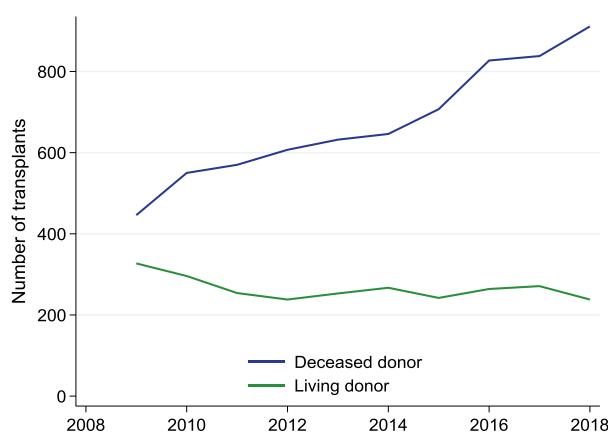
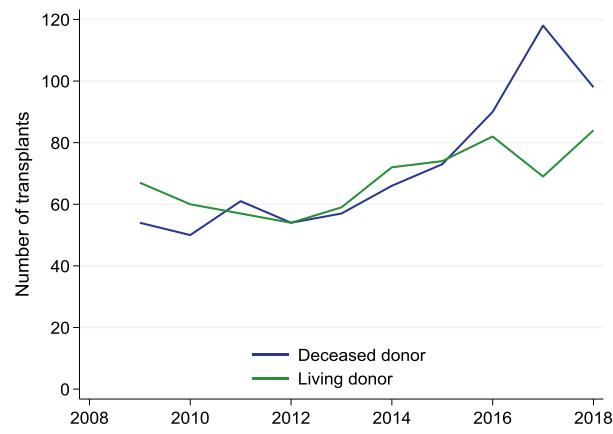


Figure 7.1.2 - Deceased and Living Donor Transplants - New Zealand 2009-2018



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 chapters 10 and 11.

Figure 7.2 - Transplant Rate of Dialysed Patients 2018 - All Dialysis Patients

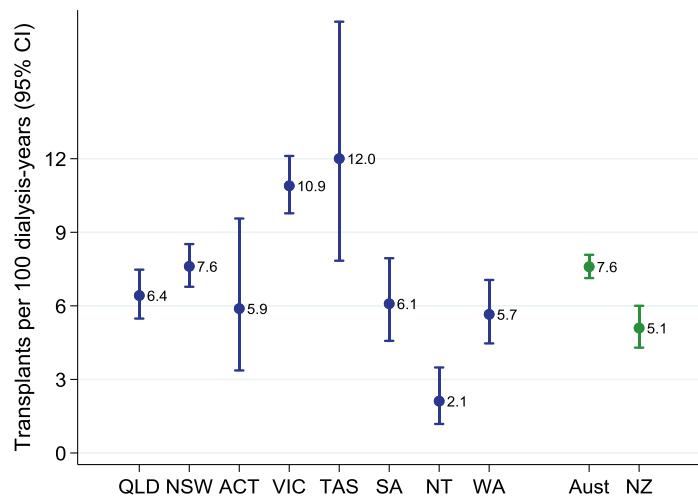


Figure 7.3 - Transplant Rate of Dialysed Patients 2018 - Patients Aged 15-64

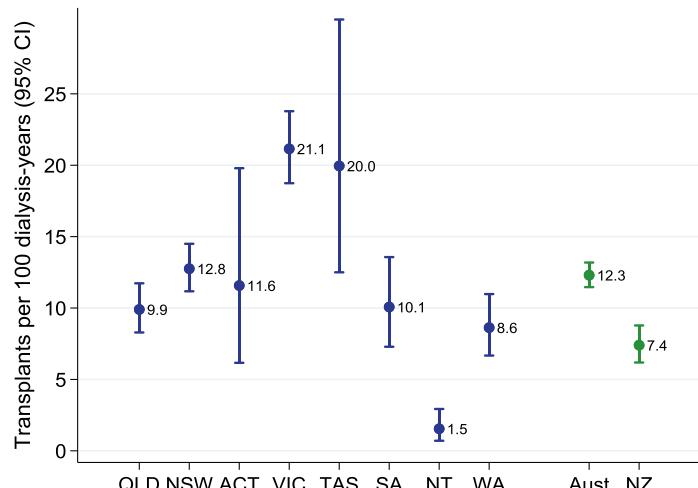


Figure 7.4.1 - Transplant Rate of Dialysed Patients By Age 2018 - Australia

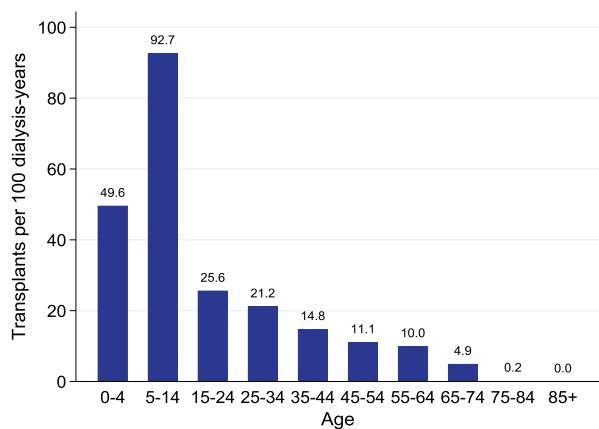


Figure 7.4.2 - Transplant Rate of Dialysed Patients By Age 2018 - New Zealand

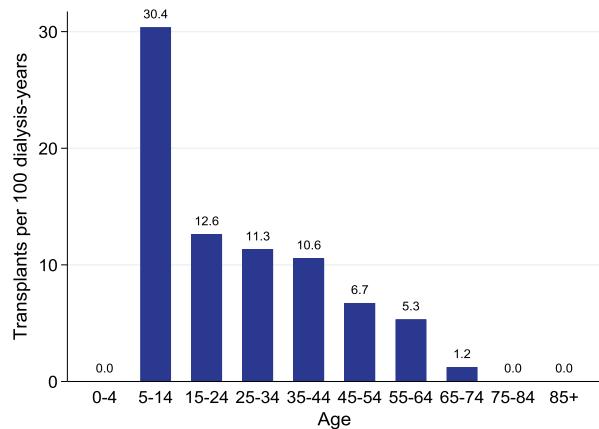


Figure 7.5.1 - Transplant Rate of Dialysed Patients By Ethnicity 2009-2018 - Australia, Patients Aged 15-64

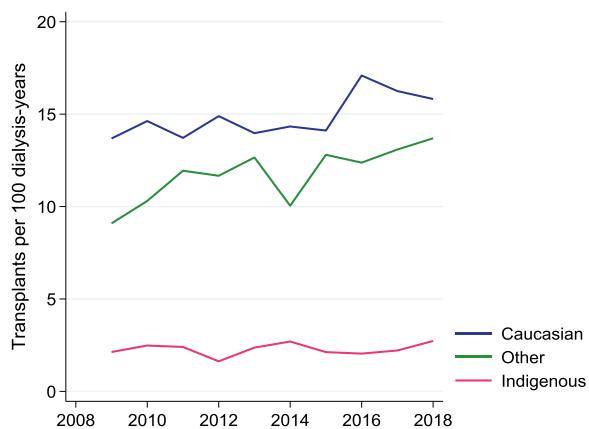


Figure 7.5.2 - Transplant Rate of Dialysed Patients By Ethnicity 2009-2018 - New Zealand, Patients Aged 15-64

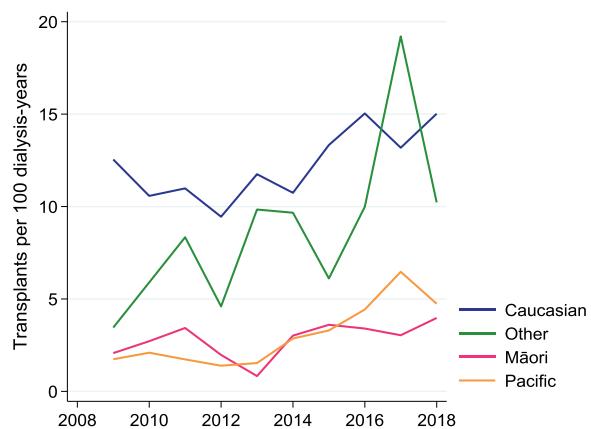


Table 7.2 shows the number of grafts performed according to donor type, graft number and recipient age in 2018. Transplant rates by age, per million population, are presented in figure 7.6.

Table 7.2 Age of Recipients Transplanted in 2018

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	2	17	20	65	106	174	246	171	8
		2	0	0	7	13	17	25	14	10	0
		3	0	0	1	4	1	5	4	1	0
	Living	1	7	9	18	36	41	43	42	22	1
		2	0	1	4	0	5	3	2	0	0
		3	0	0	0	0	2	1	0	0	0
		4	0	0	0	0	0	0	1	0	0
	Deceased	1	0	0	3	8	22	24	26	6	0
		2	0	1	1	2	2	1	0	1	0
		4	0	0	0	0	0	0	1	0	0
New Zealand	Deceased	1	2	3	5	10	10	23	21	7	0
		2	0	0	0	1	0	2	0	0	0
	Living	1	2	3	5	10	10	23	21	7	0
		2	0	0	0	1	0	2	0	0	0

Figure 7.6.1 - Transplant Operations (Per Million) 2018 - Australia

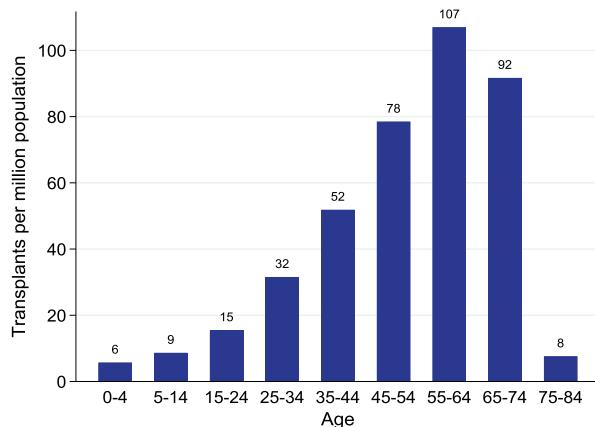


Figure 7.6.2 - Transplant Operations (Per Million) 2018 - New Zealand

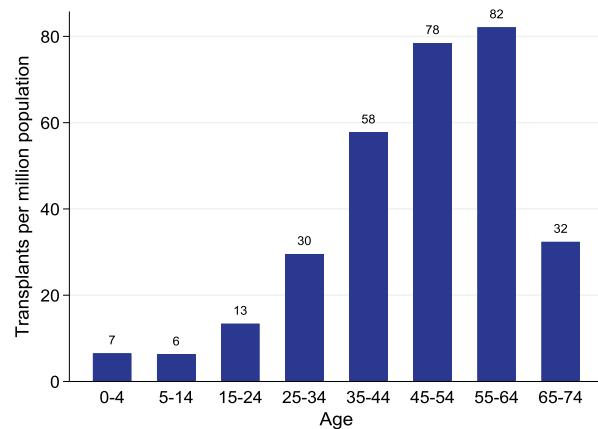


Table 7.3 shows the ethnicity of the recipients transplanted between 2014 and 2018. In both countries, the majority of recipients were Caucasian.

Table 7.3 Ethnicity of Recipients Transplanted 2014-2018

Country	Ethnicity	2014	2015	2016	2017	2018
Australia	Caucasian	697 (76.3%)	694 (73.1%)	806 (73.9%)	783 (70.6%)	757 (65.9%)
	Aboriginal/Torres Strait Islander	41 (4.5%)	35 (3.7%)	34 (3.1%)	34 (3.1%)	49 (4.3%)
	Asian	95 (10.4%)	127 (13.4%)	123 (11.3%)	161 (14.5%)	150 (13.1%)
	Māori	7 (0.8%)	8 (0.8%)	9 (0.8%)	8 (0.7%)	12 (1.0%)
	Pacific	27 (3.0%)	22 (2.3%)	15 (1.4%)	28 (2.5%)	36 (3.1%)
	Other	31 (3.4%)	38 (4.0%)	52 (4.8%)	56 (5.0%)	66 (5.7%)
	Not reported	15 (1.6%)	25 (2.6%)	52 (4.8%)	39 (3.5%)	79 (6.9%)
Total		913	949	1091	1109	1149
New Zealand	Caucasian	81 (58.7%)	84 (57.1%)	94 (54.7%)	85 (45.5%)	98 (53.8%)
	Asian	16 (11.6%)	12 (8.2%)	12 (7.0%)	28 (15.0%)	15 (8.2%)
	Māori	22 (15.9%)	28 (19.0%)	25 (14.5%)	23 (12.3%)	29 (15.9%)
	Pacific	16 (11.6%)	21 (14.3%)	28 (16.3%)	40 (21.4%)	29 (15.9%)
	Other	3 (2.2%)	2 (1.4%)	7 (4.1%)	8 (4.3%)	5 (2.7%)
	Not reported	-	-	6 (3.5%)	3 (1.6%)	6 (3.3%)
	Total	138	147	172	187	182

Table 7.4 shows the number of transplants (per million population) performed by transplanting region over 2014-2018. Transplants performed for patients residing in Tasmania and the Northern Territory are included in the figures for Victoria and South Australia, respectively. These regions share common waiting lists and allocation protocols.

Table 7.4 Transplants (pmp) by Transplanting Region and Country 2014-2018

State	2014	2015	2016	2017	2018
NSW/ACT	300 (38)	331 (41)	348 (43)	367 (44)	393 (47)
VIC/TAS	306 (48)	303 (46)	352 (53)	364 (53)	418 (60)
QLD	145 (31)	139 (29)	199 (41)	190 (39)	177 (35)
SA/NT	85 (44)	89 (46)	95 (49)	70 (36)	69 (35)
WA	77 (31)	87 (34)	97 (38)	118 (46)	92 (35)
Australia	913 (39)	949 (40)	1091 (45)	1109 (45)	1149 (46)
New Zealand	138 (31)	147 (32)	172 (37)	187 (39)	182 (37)

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 2009-2018 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 the ANZDATA Registry as lost to follow-up.

Table 7.5 Transplant Operations Performed Overseas on Australian/NZ Dialysis Patients 2009-2018

Year	Australia	New Zealand
2009	8	1
2010	4	1
2011	7	2
2012	4	1
2013	3	1
2014	3	0
2015	6	1
2016	3	1
2017	1	1
2018	2	1

Prevalent Transplants

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

Table 7.6 presents the total prevalent number of transplants performed (in Australia and New Zealand, categorised by country of transplant) and functioning at the end of 2018 (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 2018

Country	Donor type	Graft number	Performed	Functioning
Australia	Living	1	5829	3716
		2	555	314
		3	78	52
		4	11	6
		5	1	0
	Deceased	1	17364	7150
		2	2503	851
		3	387	119
		4	59	15
		5	6	1
	Unknown	1	0	27
		2	0	2
New Zealand	Living	1	1408	869
		2	110	64
		3	7	4
		4	1	1
	Deceased	1	2741	916
		2	440	92
		3	78	12
		4	8	1
	Unknown	1	0	7

Table 7.7 presents the number of functioning transplants at the end of 2009-2018 by transplant region. In Australia, SA/NT has the highest prevalence of transplant patients per million population (595 pmp) and WA the lowest (450 pmp). These data are shown graphically in figures 7.7 and 7.8.

Table 7.7 Functioning Transplants (pmp) by Transplanting Region 2009-2018

Year	NSW/ACT	VIC/TAS	QLD	SA/NT	WA	Australia	New Zealand
2009	2489 (336)	2261 (385)	1577 (364)	936 (510)	790 (353)	8053 (371)	1407 (327)
2010	2639 (352)	2425 (406)	1650 (375)	974 (524)	821 (358)	8509 (386)	1447 (333)
2011	2718 (358)	2584 (427)	1718 (384)	989 (529)	861 (366)	8870 (397)	1488 (339)
2012	2826 (368)	2723 (442)	1797 (393)	1032 (545)	891 (367)	9269 (408)	1526 (346)
2013	2945 (378)	2870 (457)	1864 (401)	1051 (549)	940 (378)	9670 (418)	1576 (355)
2014	3088 (391)	3046 (475)	1915 (406)	1072 (555)	957 (380)	10078 (429)	1629 (361)
2015	3240 (404)	3181 (487)	1964 (411)	1102 (566)	994 (391)	10481 (440)	1704 (371)
2016	3406 (419)	3366 (503)	2079 (429)	1154 (589)	1051 (411)	11056 (457)	1782 (380)
2017	3591 (434)	3573 (522)	2179 (442)	1164 (590)	1114 (433)	11621 (472)	1888 (394)
2018	3805 (453)	3814 (546)	2287 (456)	1180 (595)	1167 (450)	12253 (490)	1966 (402)

Figure 7.7 - Functioning Transplants by Transplanting Region - Australia 2009-2018

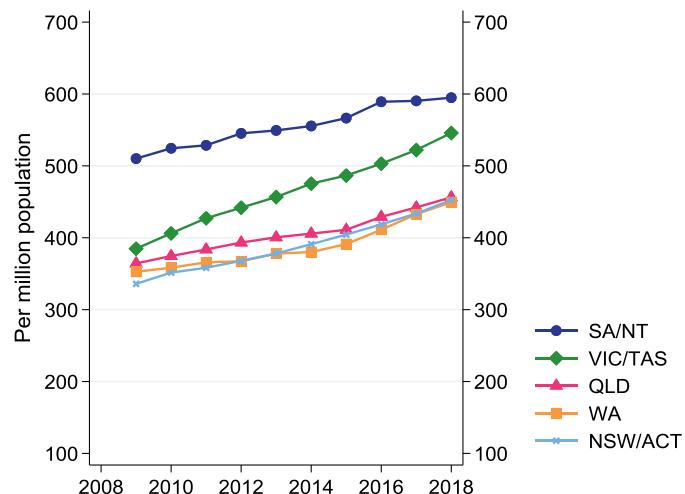


Figure 7.8 - Prevalence of Functioning Transplants 31 Dec 2018 - Per Million Population



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 2018

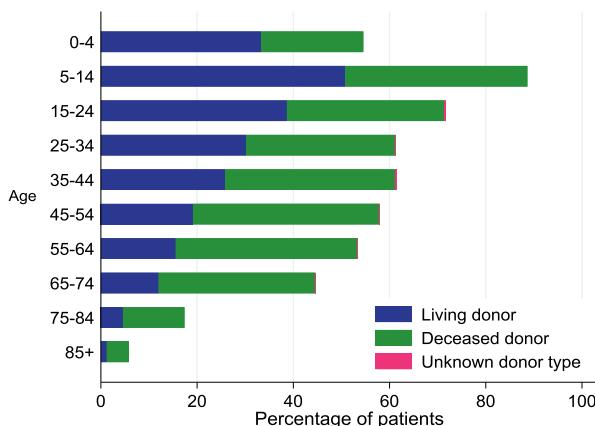


Figure 7.9.2 - Prevalence of Functioning Transplants - as Mode of RRT, New Zealand 2018

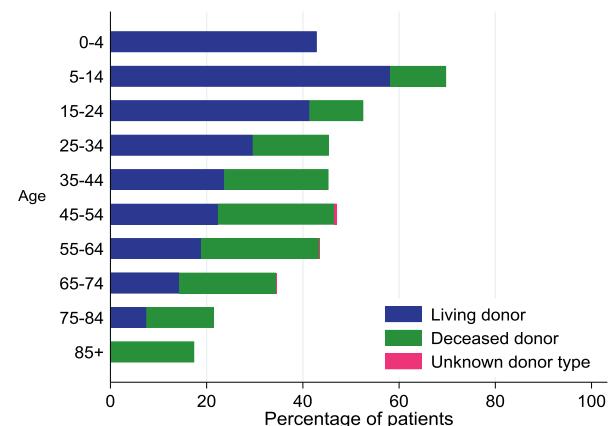


Table 7.8 Age Distribution of Functioning Transplant Patients - 31 Dec 2018

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
	All	All	18	164	376	756	1532	2693	3305	2758	613	38	12253
	1	-	-	1	1	8	6	7	4	-	-	-	27
	Unknown	2	-	-	-	1	-	1	-	-	-	-	2
	All	-	-	1	2	8	7	7	4	-	-	-	29
Australia	Deceased	1	7	66	145	299	742	1502	2071	1857	432	29	7150
		2	-	4	25	73	117	245	225	142	19	1	851
		3	-	-	2	10	19	44	32	12	-	-	119
		4	-	-	-	-	2	7	6	-	-	-	15
		5	-	-	-	-	-	-	1	-	-	-	1
	All	7	70	172	382	880	1798	2335	2011	451	30	38	8136
	1	11	93	184	338	573	784	874	697	155	7	-	3716
	2	-	1	19	29	58	83	76	40	7	1	-	314
	Living	3	-	-	-	5	12	18	12	5	-	-	52
	4	-	-	-	-	1	3	1	1	-	-	-	6
	All	11	94	203	372	644	888	963	743	162	8	-	4088
New Zealand	All	All	3	30	52	138	235	453	569	396	86	4	1966
	Unknown	1	-	-	-	-	-	4	2	1	-	-	7
	All	-	-	-	-	-	4	2	1	-	-	-	7
	1	-	5	9	42	101	197	290	214	54	4	-	916
	2	-	-	2	6	11	31	24	17	1	-	-	92
	Deceased	3	-	-	-	-	-	6	5	-	1	-	12
	4	-	-	-	-	-	-	1	-	-	-	-	1
	All	-	5	11	48	112	234	320	231	56	4	-	1021
	1	3	25	40	83	109	188	233	158	30	-	-	869
	2	-	-	1	7	14	24	12	6	-	-	-	64
	Living	3	-	-	-	-	-	2	2	-	-	-	4
	4	-	-	-	-	-	1	-	-	-	-	-	1
	All	3	25	41	90	123	215	247	164	30	-	-	938

Figure 7.10.1 - Age Distribution of Functioning Transplants - Australia 2018 (n=12253)

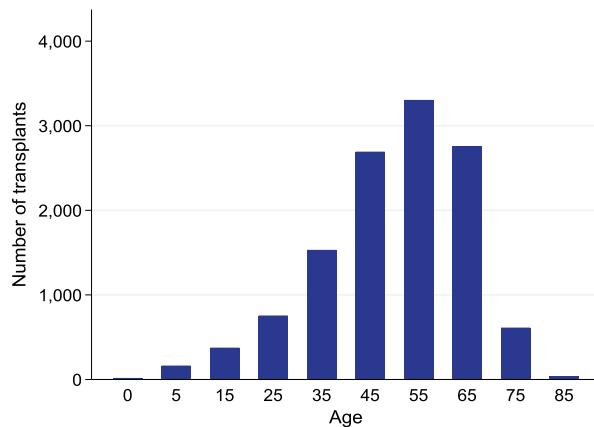


Figure 7.10.2 - Age Distribution of Functioning Transplants - Per Million Population, Australia 2018

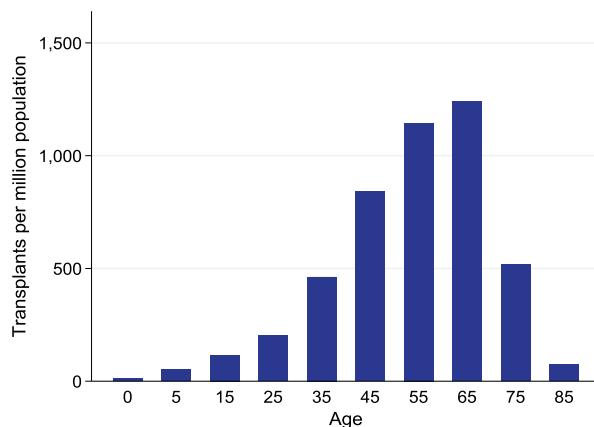


Figure 7.11.1 - Age Distribution of Functioning Transplants - New Zealand 2018 (n=1966)

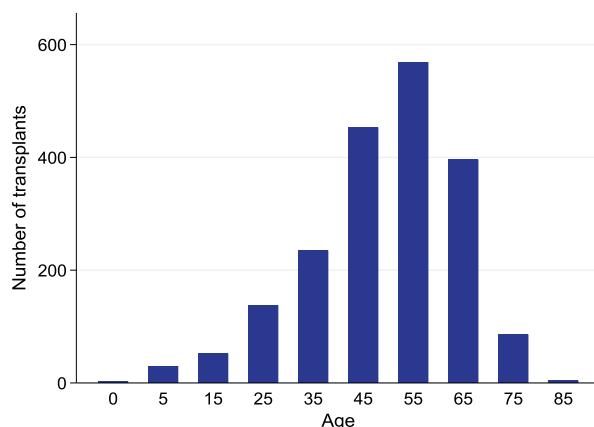


Figure 7.11.2 - Age Distribution of Functioning Transplants - Per Million Population, New Zealand 2018

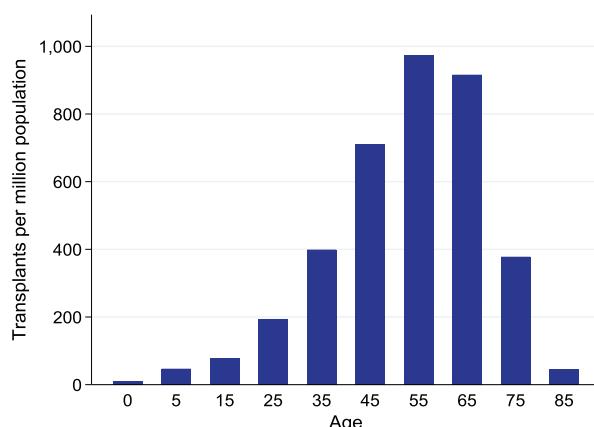


Table 7.9 presents the number of prevalent patients by gender, ethnicity and age; the great majority of prevalent transplant patients in both countries are Caucasian.

Table 7.9 Functioning Transplant Patients Related to Ethnicity and Age Group - 31 Dec 2018

Country	Gender	Ethnicity	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total
	All	Total	18	164	376	756	1532	2693	3305	2758	613	38	12253
Australia		Caucasian	4	39	100	250	452	773	964	819	230	19	3650
		Aboriginal/Torres Strait Islander	-	1	10	7	19	43	30	11	-	-	121
	Female	Asian	1	6	17	24	96	141	198	133	17	-	633
		Other	1	11	9	27	36	51	51	21	5	-	212
		Not reported	-	-	5	11	16	16	25	11	2	-	86
		Total	6	57	141	319	619	1024	1268	995	254	19	4702
		Caucasian	10	79	185	342	700	1328	1612	1456	324	17	6053
		Aboriginal/Torres Strait Islander	-	3	7	14	26	49	48	26	4	-	177
	Male	Asian	-	8	19	44	113	167	243	184	22	1	801
		Other	2	16	18	27	50	77	100	76	7	1	374
		Not reported	-	1	6	10	24	48	34	21	2	-	146
		Total	12	107	235	437	913	1669	2037	1763	359	19	7551
New Zealand	All	Total	3	30	52	138	235	453	569	396	86	4	1966
		Caucasian	-	5	11	37	62	121	140	117	29	2	524
		Asian	-	1	5	3	10	14	22	13	2	-	70
		Māori	-	4	3	13	16	19	19	7	2	-	83
	Female	Pacific	-	2	1	8	15	17	24	11	1	-	79
		Other	-	-	1	-	1	2	4	-	-	-	8
		Not reported	-	-	1	-	1	3	4	1	-	-	10
		Total	-	12	22	61	105	176	213	149	34	2	774
		Caucasian	1	13	20	52	80	194	222	176	38	2	798
		Asian	1	1	1	5	19	26	32	27	4	-	116
		Māori	-	4	4	6	14	23	56	28	7	-	142
	Male	Pacific	1	-	3	11	13	25	39	9	2	-	103
		Other	-	-	-	2	3	6	6	6	1	-	24
		Not reported	-	-	2	1	1	3	1	1	-	-	9
		Total	3	18	30	77	130	277	356	247	52	2	1192

Figure 7.12 shows the duration of function of prevalent transplants at the end of 2018. In Australia there were 4293 grafts that had functioned for ≥ 10 years, 1202 ≥ 20 years and 292 ≥ 30 years. In New Zealand there were 742 grafts that had functioned for ≥ 10 years, 232 ≥ 20 years and 54 ≥ 30 years.

Figure 7.12.1 - Number and Duration of Functioning Grafts - Australia 2018 (n=12253)

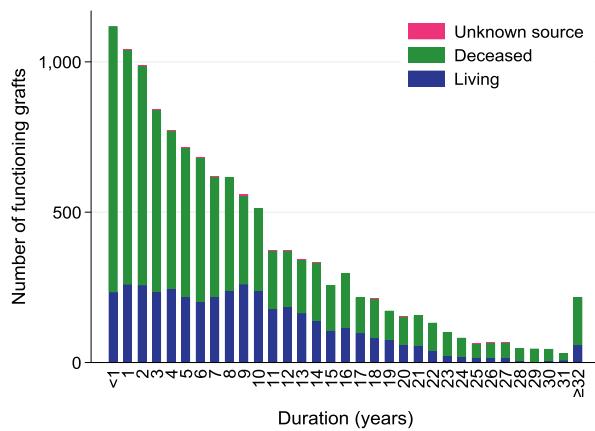
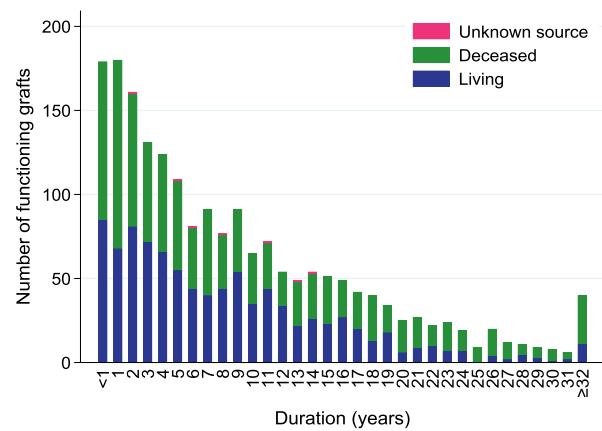


Figure 7.12.2 - Number and Duration of Functioning Grafts - New Zealand 2018 (n=1966)



Graft Loss

Table 7.10 presents the overall graft loss rate in 2009-2018 by country, stratified into graft failure and death with a functioning graft. These rates are expressed as graft losses per 100 graft-years. Approximately half of grafts are lost due to graft failure and half due to patient death.

Table 7.10 Graft Loss Rate 2009-2018

Country	Outcome	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Australia	Graft failure	3.2	2.8	2.8	3.1	2.6	2.8	3.1	2.7	2.9	3.0
	Death with function	2.0	2.3	2.8	2.1	2.7	2.4	2.5	2.6	2.5	2.2
	All losses	5.2	5.1	5.6	5.2	5.3	5.3	5.6	5.3	5.4	5.2
New Zealand	Graft failure	2.8	2.2	2.3	2.7	2.4	2.9	2.0	2.7	2.1	2.9
	Death with function	2.6	2.5	2.9	2.2	2.1	2.9	2.8	3.2	3.1	2.9
	All losses	5.4	4.7	5.2	4.8	4.5	5.8	4.8	5.9	5.1	5.8

The causes of graft loss over 2009-2018 are presented in table 7.11. The Registry is in the process of revising the reportable causes of graft loss. Chronic allograft nephropathy dominates the causes of graft failure, whilst graft failure due to acute rejection is an uncommon event. These data are further categorised by timing post-transplant (first year versus later years) for 2014-2018 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 2009-2018

Country	Cause of graft loss	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Australia	Death with function	149	178	223	174	232	215	229	241	240	221	2102
	Acute rejection	16	8	10	10	13	11	16	14	13	19	130
	Chronic allograft nephropathy	153	147	156	177	155	167	189	155	147	173	1619
	Hyperacute rejection	-	-	-	-	-	1	-	1	1	-	3
	Vascular	15	13	6	10	9	7	12	9	4	16	101
	Technical	3	4	5	2	-	6	2	6	6	3	37
	Glomerulonephritis	15	17	15	17	16	12	20	19	17	13	161
	Non-compliance	14	6	6	8	9	14	3	8	16	17	101
	Other	15	17	27	29	22	29	36	34	43	44	296
	Not reported	-	-	-	-	-	-	-	5	33	19	57
Total		380	390	448	427	456	462	507	492	520	525	4607
New Zealand	Death with function	34	33	40	30	30	43	42	50	50	49	401
	Acute rejection	1	-	3	1	2	3	1	2	2	4	19
	Chronic allograft nephropathy	29	17	15	26	21	28	22	26	17	31	232
	Hyperacute rejection	-	-	-	-	-	-	-	-	-	-	0
	Vascular	2	2	2	2	2	1	-	3	1	-	15
	Technical	-	-	-	-	-	1	1	2	-	-	4
	Glomerulonephritis	-	4	4	5	1	2	2	2	5	1	26
	Non-compliance	1	5	3	-	4	6	-	-	1	3	23
	Other	3	2	4	3	4	2	5	6	4	8	41
	Not reported	-	-	-	-	-	-	-	2	4	2	8
Total		70	63	71	67	64	86	73	93	84	98	769

Table 7.12 Graft Losses 2014-2018

Country	Outcome	Cause of death or graft failure	First year	Beyond first year	Total
Australia	Death with function	Cardiovascular	30 (34%)	244 (23%)	274 (24%)
		Withdrawal	4 (4%)	75 (7%)	79 (7%)
		Cancer	3 (3%)	307 (29%)	310 (27%)
		Infection	27 (30%)	124 (12%)	151 (13%)
		Other	24 (27%)	295 (28%)	319 (28%)
		Not reported	1 (1%)	12 (1%)	13 (1%)
	Graft Failure	Total	89 (100%)	1057 (100%)	1146 (100%)
		Acute rejection	23 (17%)	50 (4%)	73 (5%)
		Chronic allograft nephropathy	8 (6%)	823 (67%)	831 (61%)
		Hyperacute rejection	3 (2%)	-	3 (<1%)
New Zealand	Death with function	Vascular	37 (27%)	11 (1%)	48 (4%)
		Technical	19 (14%)	4 (<1%)	23 (2%)
		Glomerulonephritis	5 (4%)	76 (6%)	81 (6%)
		Non-compliance	2 (1%)	56 (5%)	58 (4%)
		Other	35 (26%)	151 (12%)	186 (14%)
		Not reported	3 (2%)	54 (4%)	57 (4%)
	Graft Failure	Total	135 (100%)	1225 (100%)	1360 (100%)
		Cardiovascular	9 (69%)	75 (34%)	84 (36%)
		Withdrawal	1 (8%)	8 (4%)	9 (4%)
		Cancer	-	65 (29%)	65 (28%)
Australia	Death with function	Infection	-	29 (13%)	29 (12%)
		Other	3 (23%)	42 (19%)	45 (19%)
		Not reported	-	2 (1%)	2 (1%)
		Total	13 (100%)	221 (100%)	234 (100%)
	Graft Failure	Acute rejection	1 (6%)	11 (6%)	12 (6%)
		Chronic allograft nephropathy	1 (6%)	123 (67%)	124 (62%)
		Vascular	4 (24%)	1 (1%)	5 (3%)
		Technical	3 (18%)	1 (1%)	4 (2%)
New Zealand	Death with function	Glomerulonephritis	2 (12%)	10 (5%)	12 (6%)
		Non-compliance	-	10 (5%)	10 (5%)
		Other	6 (35%)	19 (10%)	25 (13%)
		Not reported	-	8 (4%)	8 (4%)
		Total	17 (100%)	183 (100%)	200 (100%)

Immunosuppression

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

Table 7.13 Antibody Use for Induction Immunosuppression 2014-2018; Number of Kidney Transplant Recipients Receiving Each Agent by Year (% Total New Transplants)

Country	Type of agent	2014	2015	2016	2017	2018
Australia	Intravenous immunoglobulin	27 (3.0%)	14 (1.5%)	16 (1.5%)	39 (3.5%)	34 (3.0%)
	Anti-CD25	787 (86.2%)	765 (80.6%)	832 (76.3%)	921 (83.0%)	1028 (89.5%)
	Rituximab	2 (0.2%)	6 (0.6%)	4 (0.4%)	9 (0.8%)	2 (0.2%)
	T cell depleting polyclonal Ab	42 (4.6%)	60 (6.3%)	72 (6.6%)	57 (5.1%)	70 (6.1%)
	Other	8 (0.9%)	-	-	3 (0.3%)	4 (0.3%)
	Not reported	2 (0.2%)	3 (0.3%)	182 (16.7%)	105 (9.5%)	57 (5.0%)
New Zealand	Total new transplants	913	949	1091	1109	1149
	Intravenous immunoglobulin	-	1 (0.7%)	-	-	-
	Anti-CD25	133 (96.4%)	142 (96.6%)	167 (97.1%)	185 (98.9%)	182 (100.0%)
	Rituximab	9 (6.5%)	9 (6.1%)	5 (2.9%)	11 (5.9%)	10 (5.5%)
	T cell depleting polyclonal Ab	2 (1.4%)	1 (0.7%)	6 (3.5%)	7 (3.7%)	2 (1.1%)
	Other	-	1 (0.7%)	-	-	1 (0.5%)
	Not reported	-	-	1 (0.6%)	-	-
	Total new transplants	138	147	172	187	182

Immunosuppressive therapy at baseline, 1 and 2 years post-transplant for primary grafts over 2011-2018 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 2011-2018

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of deceased donor grafts
Initial treatment	2011	1 (<1%)	57 (11%)	447 (85%)	298 (58%)	210 (41%)	-	-	509 (100%)	511
	2012	1 (<1%)	27 (5%)	480 (90%)	278 (52%)	243 (46%)	-	-	519 (97%)	533
	2013	4 (1%)	11 (2%)	539 (92%)	347 (61%)	207 (37%)	-	-	555 (98%)	567
	2014	2 (<1%)	11 (2%)	533 (94%)	357 (63%)	180 (32%)	1 (<1%)	11 (2%)	547 (96%)	568
	2015	3 (<1%)	5 (1%)	583 (92%)	376 (60%)	208 (33%)	-	9 (1%)	591 (94%)	630
	2016	-	3 <td>609 (85%)</td> <td>422 (61%)</td> <td>200 (29%)</td> <td>-</td> <td>2 (<1%)</td> <td>621 (89%)</td> <td>697</td>	609 (85%)	422 (61%)	200 (29%)	-	2 (<1%)	621 (89%)	697
	2017	-	2 (<1%)	676 (94%)	485 (68%)	196 (28%)	1 (<1%)	1 (<1%)	679 (96%)	710
	2018	3 (<1%)	3 (<1%)	755 (92%)	534 (66%)	228 (28%)	1 (<1%)	5 (1%)	769 (95%)	809
Treatment at 1 year	2011	26 (5%)	36 (7%)	421 (85%)	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 (86%)	267 (50%)	199 (37%)	11 (2%)	3 (1%)	502 (94%)	535
	2014	23 (4%)	10 (2%)	481 (90%)	273 (51%)	168 (32%)	4 (1%)	22 (4%)	498 (94%)	531
	2015	22 (4%)	11 (2%)	496 (85%)	274 (47%)	188 (32%)	2 (<1%)	16 (3%)	511 (88%)	580
	2016	27 (4%)	19 (3%)	580 (86%)	352 (54%)	208 (32%)	5 (1%)	23 (4%)	603 (92%)	654
	2017	18 (3%)	11 (2%)	571 (83%)	332 (49%)	203 (30%)	6 (1%)	29 (4%)	596 (88%)	674
	2011	31 (7%)	35 (7%)	396 (82%)	198 (42%)	211 (45%)	8 (2%)	20 (4%)	445 (94%)	471
Treatment at 2 years	2012	26 (5%)	23 (5%)	415 (84%)	184 (38%)	240 (49%)	11 (2%)	19 (4%)	457 (93%)	489
	2013	21 (4%)	20 (4%)	444 (83%)	255 (49%)	192 (37%)	13 (3%)	7 (1%)	481 (93%)	520
	2014	28 (5%)	13 (3%)	438 (85%)	254 (49%)	155 (30%)	8 (2%)	21 (4%)	460 (89%)	515
	2015	35 (6%)	15 (3%)	487 (86%)	262 (46%)	184 (33%)	8 (1%)	20 (4%)	499 (88%)	564
	2016	31 (5%)	15 (2%)	524 (78%)	311 (49%)	182 (29%)	2 (<1%)	29 (5%)	544 (86%)	630

Table 7.14.2 Immunosuppressive Therapy - Primary Deceased Donor Grafts New Zealand 2011-2018

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of deceased donor grafts
Initial treatment	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
	2018	-	58 (65%)	31 (35%)	89 (100%)	-	-	-	89 (100%)	89
Treatment at 1 year	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%)	35 (47%)	69 (92%)	1 (1%)	-	-	74 (99%)	75
	2017	4 (4%)	41 (38%)	60 (56%)	97 (91%)	-	-	-	101 (94%)	107
	2011	4 (7%)	25 (46%)	29 (54%)	45 (83%)	-	-	-	51 (94%)	54
Treatment at 2 years	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
	2016	4 (6%)	32 (44%)	34 (47%)	59 (82%)	1 (1%)	-	-	66 (92%)	72

Table 7.15.1 Immunosuppressive Therapy - Primary Living Donor Grafts Australia 2011-2018

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of living donor grafts
Initial treatment	2011	2 (1%)	31 (13%)	200 (83%)	151 (65%)	78 (33%)	-	-	229 (98%)	233
	2012	4 (2%)	11 (5%)	193 (90%)	120 (56%)	82 (38%)	1 <td>-</td> <td>205 (96%)</td> <td>213</td>	-	205 (96%)	213
	2013	1 <td>10 (4%)</td> <td>209 (92%)</td> <td>139 (62%)</td> <td>78 (35%)</td> <td>-</td> <td>-</td> <td>221 (99%)</td> <td>224</td>	10 (4%)	209 (92%)	139 (62%)	78 (35%)	-	-	221 (99%)	224
	2014	-	4 (2%)	216 (91%)	147 (62%)	74 (31%)	-	1 <td>219 (92%)</td> <td>237</td>	219 (92%)	237
	2015	1 <td>3 (1%)</td> <td>199 (90%)</td> <td>122 (58%)</td> <td>69 (33%)</td> <td>-</td> <td>10 (5%)</td> <td>200 (94%)</td> <td>212</td>	3 (1%)	199 (90%)	122 (58%)	69 (33%)	-	10 (5%)	200 (94%)	212
	2016	-	6 (3%)	212 (88%)	161 (69%)	54 (23%)	-	-	216 (92%)	235
	2017	3 (1%)	1 <td>227 (93%)</td> <td>173 (72%)</td> <td>53 (22%)</td> <td>-</td> <td>-</td> <td>223 (93%)</td> <td>241</td>	227 (93%)	173 (72%)	53 (22%)	-	-	223 (93%)	241
	2018	-	2 (1%)	200 (88%)	147 (67%)	54 (25%)	-	1 <td>203 (93%)</td> <td>219</td>	203 (93%)	219
Treatment at 1 year	2011	11 (5%)	26 (11%)	185 (78%)	121 (53%)	87 (38%)	9 (4%)	6 (3%)	224 (97%)	230
	2012	7 (3%)	9 (4%)	186 (90%)	96 (47%)	86 (42%)	3 (1%)	4 (2%)	195 (95%)	205
	2013	9 (4%)	9 (4%)	189 (87%)	113 (53%)	77 (36%)	6 (3%)	2 (1%)	198 (92%)	215
	2014	11 (5%)	10 (4%)	198 (87%)	119 (52%)	69 (30%)	1 <td>8 (4%)</td> <td>209 (92%)</td> <td>228</td>	8 (4%)	209 (92%)	228
	2015	5 (2%)	3 (1%)	175 (82%)	92 (45%)	66 (32%)	2 (1%)	7 (3%)	171 (83%)	206
	2016	10 (4%)	9 (4%)	203 (84%)	141 (60%)	56 (24%)	3 (1%)	-	208 (89%)	235
	2017	11 (5%)	7 (3%)	190 (79%)	136 (58%)	50 (21%)	3 (1%)	8 (3%)	201 (86%)	234
	2011	17 (7%)	28 (12%)	175 (74%)	113 (50%)	87 (38%)	10 (4%)	9 (4%)	218 (96%)	228
Treatment at 2 years	2012	8 (4%)	5 (3%)	177 (88%)	88 (44%)	82 (41%)	4 (2%)	9 (5%)	181 (91%)	200
	2013	18 (8%)	9 (4%)	181 (84%)	99 (46%)	69 (32%)	7 (3%)	4 (2%)	186 (87%)	213
	2014	13 (6%)	7 (3%)	182 (81%)	111 (49%)	60 (27%)	1 <td>13 (6%)</td> <td>194 (86%)</td> <td>225</td>	13 (6%)	194 (86%)	225
	2015	6 (3%)	5 (2%)	172 (82%)	92 (46%)	68 (34%)	4 (2%)	9 (4%)	171 (85%)	202
	2016	13 (6%)	8 (3%)	185 (76%)	126 (55%)	48 (21%)	3 (1%)	4 (2%)	194 (85%)	229

Table 7.15.2 Immunosuppressive Therapy - Primary Living Donor Grafts New Zealand 2011-2018

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of living donor grafts
Initial treatment	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%)	27 (40%)	67 (99%)	-	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
	2018	1 (1%)	44 (54%)	37 (46%)	79 (98%)	1 (1%)	-	-	81 (100%)	81
Treatment at 1 year	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
	2017	4 (7%)	13 (22%)	42 (71%)	50 (85%)	-	-	-	56 (95%)	59
	2018	-	-	-	-	-	-	-	-	-
Treatment at 2 years	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%)	28 (42%)	36 (55%)	60 (91%)	-	-	-	64 (97%)	66
	2016	3 (4%)	30 (42%)	35 (49%)	61 (85%)	-	-	-	65 (90%)	72
	2017	-	-	-	-	-	-	-	-	-
	2018	-	-	-	-	-	-	-	-	-

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 were performed.

Table 7.16 Rejection Rates at Six Months Post-Transplant 2008-2017

Donor Type	Graft Number	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Living donor	First	17.0%	16.8%	17.8%	17.5%	14.1%	19.2%	22.4%	17.1%	17.4%	19.1%
	Second and subsequent	30.0%	24.3%	12.9%	19.2%	10.0%	16.1%	28.6%	11.1%	16.7%	21.6%
Deceased donor	First	22.0%	21.1%	19.1%	20.0%	16.8%	18.5%	19.8%	17.7%	15.3%	18.5%
	Second and subsequent	32.9%	37.8%	28.6%	19.4%	24.4%	25.0%	25.9%	24.7%	18.6%	20.1%

Table 7.17 Antibody-Mediated Rejection Rates at Six Months Post-Transplant 2008-2017

Donor Type	Graft Number	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Living donor	First	3.1%	4.5%	3.7%	4.9%	2.3%	5.0%	4.6%	3.9%	3.9%	4.0%
	Second and subsequent	12.5%	13.5%	3.2%	11.5%	6.7%	3.2%	5.7%	5.6%	2.8%	8.1%
Deceased donor	First	4.8%	5.6%	5.4%	5.6%	3.9%	5.0%	5.1%	6.0%	5.8%	4.6%
	Second and subsequent	15.8%	24.3%	13.0%	11.3%	10.3%	10.3%	12.9%	17.6%	8.6%	9.7%

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 2014-2018

Country	Type of agent	2014	2015	2016	2017	2018
Australia	Intravenous immunoglobulin	96 (10.5%)	163 (17.2%)	123 (11.3%)	128 (11.5%)	83 (7.2%)
	Anti-CD25	1 (0.1%)	2 (0.2%)	1 (0.1%)	-	-
	Rituximab	12 (1.3%)	12 (1.3%)	4 (0.4%)	7 (0.6%)	15 (1.3%)
	T cell depleting polyclonal Ab	37 (4.1%)	30 (3.2%)	23 (2.1%)	41 (3.7%)	28 (2.4%)
	Not specified	28 (3.1%)	24 (2.5%)	43 (3.9%)	30 (2.7%)	38 (3.3%)
	Total new transplants	913	949	1091	1109	1149
New Zealand	Total transplants at risk	10583	11027	11572	12165	12770
	Intravenous immunoglobulin	8 (5.8%)	1 (0.7%)	6 (3.5%)	3 (1.6%)	3 (1.6%)
	Rituximab	7 (5.1%)	-	2 (1.2%)	-	-
	T cell depleting polyclonal Ab	7 (5.1%)	3 (2.0%)	14 (8.1%)	13 (7.0%)	13 (7.1%)
	Not specified	3 (2.2%)	5 (3.4%)	-	2 (1.1%)	1 (0.5%)
	Total new transplants	138	147	172	187	182
	Total transplants at risk	1714	1776	1876	1969	2070

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

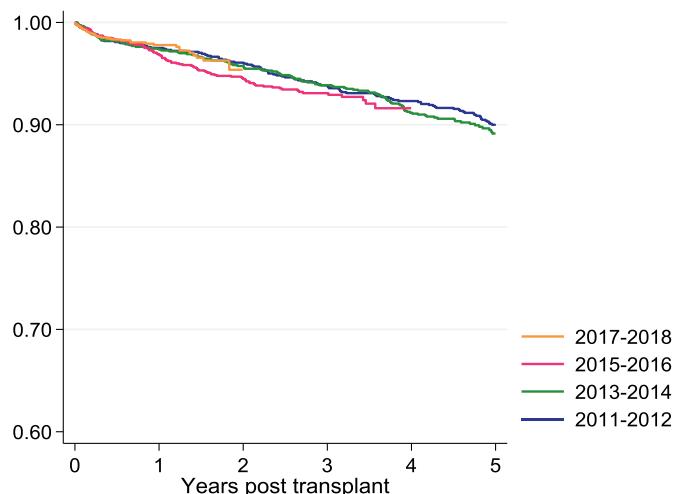


Figure 7.14 - Primary Deceased Donor Grafts - Graft Survival – Australia

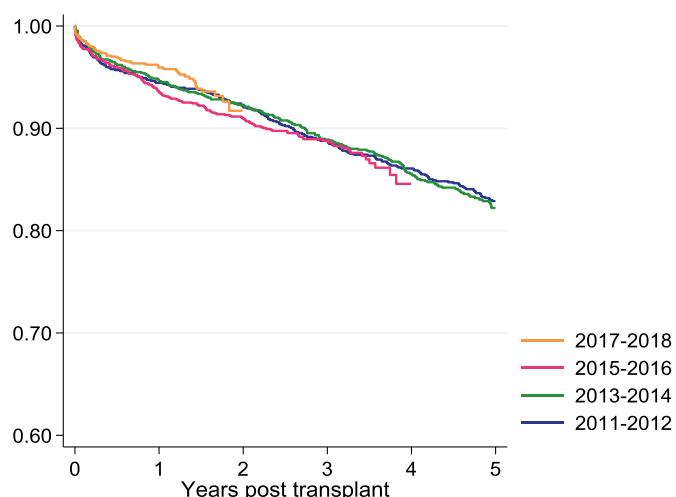


Table 7.19 Primary Deceased Donor Grafts - Australia 2011-2018

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2011-2012 (n=1044)	100 (99, 100)	98 (97, 99)	98 (96, 98)	90 (88, 92)
	2013-2014 (n=1135)	100 (99, 100)	98 (97, 99)	97 (96, 98)	89 (87, 91)
	2015-2016 (n=1327)	100 (99, 100)	98 (97, 99)	97 (96, 98)	-
	2017-2018 (n=1519)	99 (99, 100)	98 (98, 99)	98 (97, 98)	-
Graft survival	2011-2012 (n=1044)	98 (97, 99)	96 (94, 97)	94 (93, 96)	83 (80, 85)
	2013-2014 (n=1135)	99 (98, 99)	96 (95, 97)	95 (93, 96)	82 (80, 84)
	2015-2016 (n=1327)	98 (97, 99)	96 (95, 97)	94 (92, 95)	-
	2017-2018 (n=1519)	99 (98, 99)	97 (96, 98)	96 (95, 97)	-

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

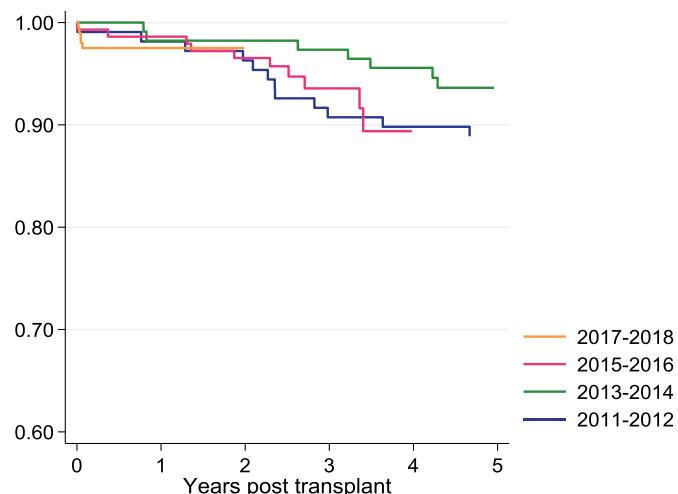


Figure 7.16 - Primary Deceased Donor Grafts - Graft Survival - New Zealand

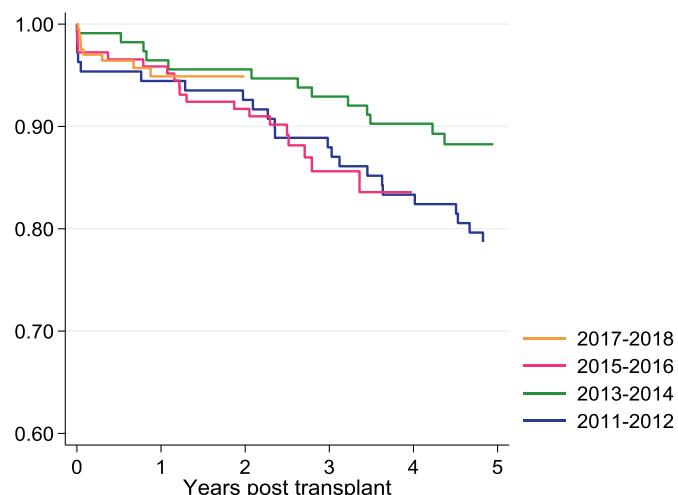


Table 7.20 Primary Deceased Donor Grafts - New Zealand 2011-2018

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2011-2012 (n=108)	99 (94, 100)	99 (94, 100)	98 (93, 100)	89 (81, 94)
	2013-2014 (n=113)	100	100	98 (93, 100)	94 (87, 97)
	2015-2016 (n=145)	99 (95, 100)	99 (95, 100)	99 (95, 100)	-
	2017-2018 (n=201)	98 (94, 99)	98 (94, 99)	98 (94, 99)	-
Graft survival	2011-2012 (n=108)	95 (89, 98)	95 (89, 98)	94 (88, 97)	79 (70, 85)
	2013-2014 (n=113)	99 (94, 100)	99 (94, 100)	96 (91, 99)	88 (81, 93)
	2015-2016 (n=145)	97 (93, 99)	97 (92, 99)	96 (91, 98)	-
	2017-2018 (n=201)	97 (93, 99)	96 (93, 98)	95 (90, 97)	-

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

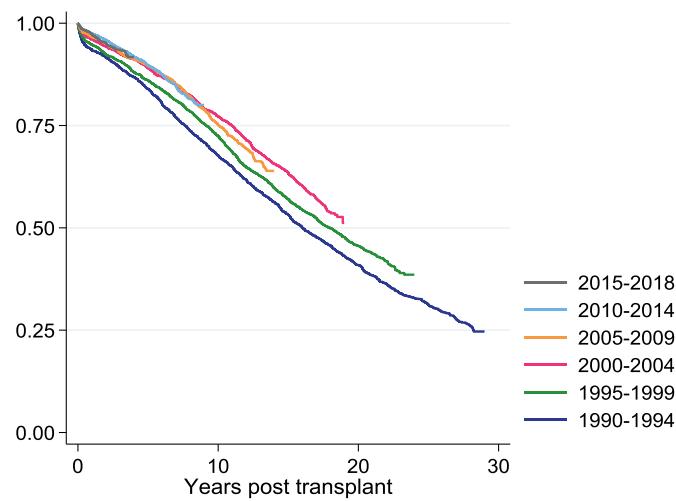


Figure 7.18 - Primary Deceased Donor Grafts - Graft Survival - Australia and New Zealand

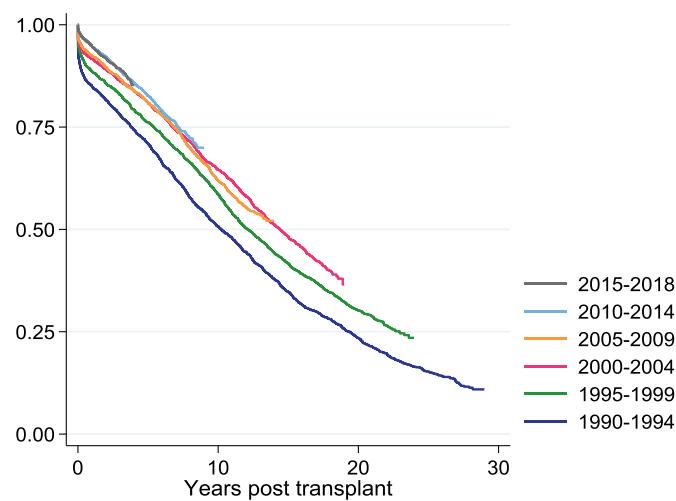


Table 7.21 Primary Deceased Donor Grafts - Australia and New Zealand 1990-2018

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=2923)	98 (97, 98)	90 (88, 91)	-	-	-
	2015-2018 (n=3192)	97 (97, 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)	30 (28, 32)
	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 (60, 64)	-	-
	2010-2014 (n=2923)	95 (94, 96)	83 (81, 84)	-	-	-
	2015-2018 (n=3192)	95 (94, 95)	-	-	-	-

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

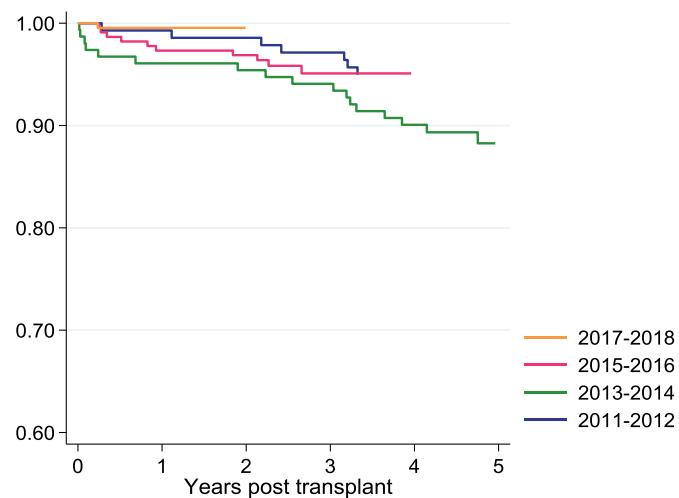


Figure 7.20 - Second and Subsequent Deceased Donor Grafts - Graft Survival - Australia and New Zealand

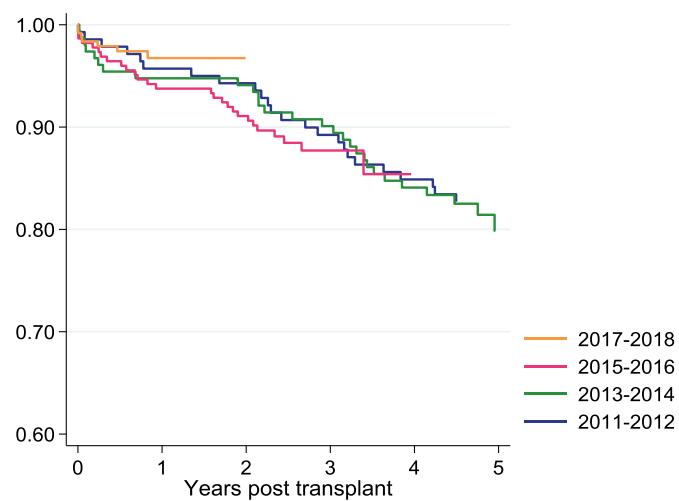


Table 7.22 Second and Subsequent Deceased Donor Grafts - Australia and New Zealand 2011-2018

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2011-2012 (n=140)	100	99 (95, 100)	99 (95, 100)	95 (90, 98)
	2013-2014 (n=153)	98 (94, 99)	97 (92, 99)	96 (91, 98)	88 (82, 93)
	2015-2016 (n=225)	100	99 (96, 100)	97 (94, 99)	-
	2017-2018 (n=245)	100	100 (97, 100)	100 (97, 100)	-
Graft survival	2011-2012 (n=140)	99 (94, 100)	98 (94, 99)	96 (91, 98)	83 (75, 88)
	2013-2014 (n=153)	98 (94, 99)	95 (91, 98)	95 (90, 97)	80 (72, 86)
	2015-2016 (n=225)	98 (95, 99)	96 (93, 98)	94 (90, 96)	-
	2017-2018 (n=245)	98 (96, 99)	97 (94, 99)	97 (93, 98)	-

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

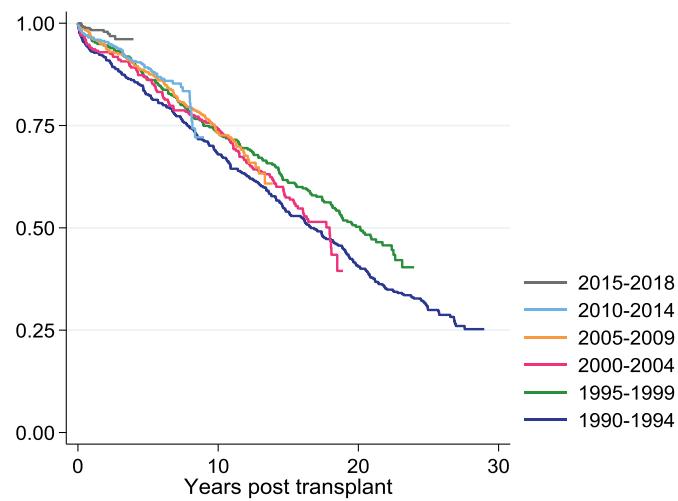


Figure 7.22 - Second and Subsequent Deceased Donor Grafts - Graft Survival - Australia and New Zealand

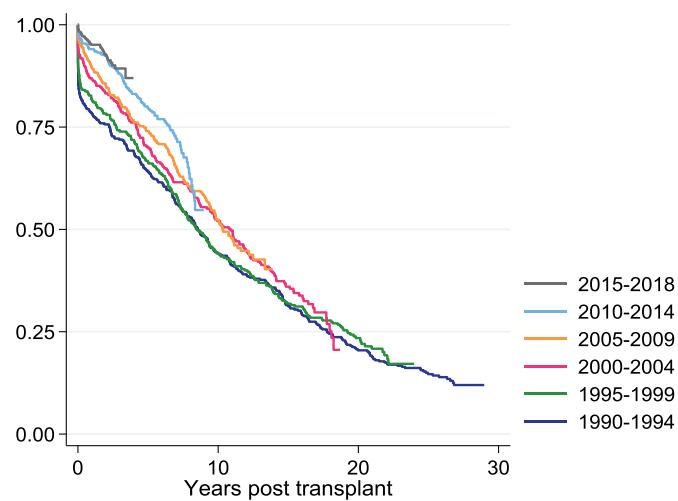


Table 7.23 Second and Subsequent Deceased Donor Grafts - Australia and New Zealand 1990-2018

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)	73 (68, 78)	-	-
	2010-2014 (n=370)	96 (94, 98)	89 (85, 92)	-	-	-
	2015-2018 (n=470)	98 (96, 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 (19, 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)	52 (47, 58)	-	-
	2010-2014 (n=370)	94 (91, 96)	80 (75, 84)	-	-	-
	2015-2018 (n=470)	95 (93, 97)	-	-	-	-

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

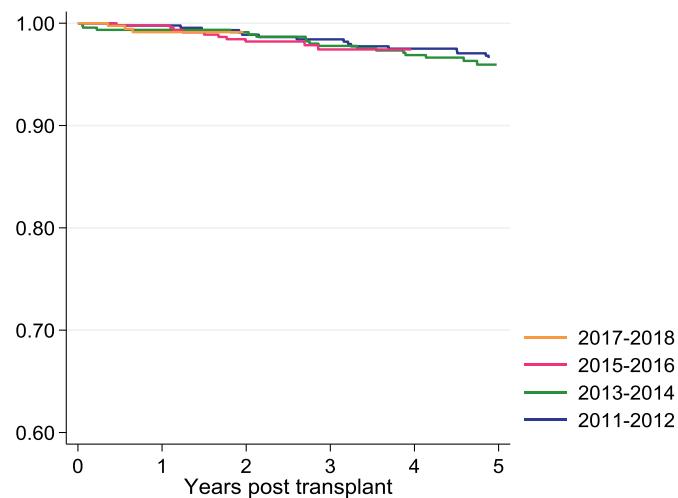


Figure 7.24 - Primary Living Donor Grafts - Graft Survival – Australia

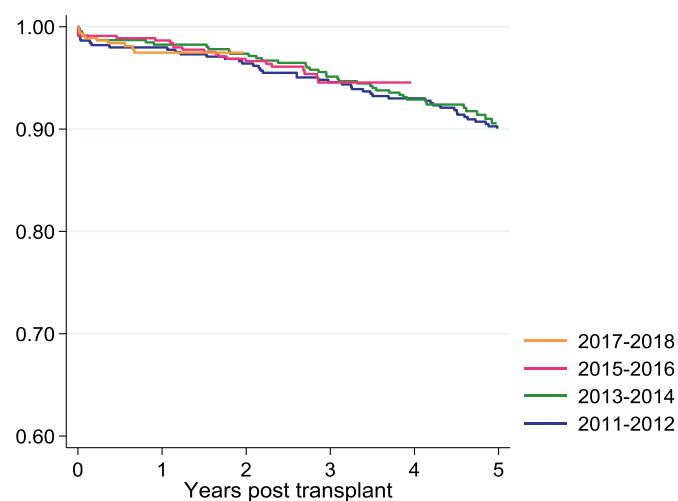


Table 7.24 Primary Living Donor Grafts - Australia 2011-2018

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2011-2012 (n=446)	100	100 (98, 100)	100 (98, 100)	97 (94, 98)
	2013-2014 (n=461)	100 (98, 100)	99 (98, 100)	99 (98, 100)	96 (94, 97)
	2015-2016 (n=447)	100	100 (98, 100)	100 (98, 100)	-
	2017-2018 (n=460)	100	100 (98, 100)	99 (97, 100)	-
Graft survival	2011-2012 (n=446)	99 (97, 99)	98 (96, 99)	98 (96, 99)	90 (87, 92)
	2013-2014 (n=461)	99 (98, 100)	99 (97, 99)	98 (97, 99)	91 (87, 93)
	2015-2016 (n=447)	99 (98, 100)	99 (97, 100)	99 (97, 99)	-
	2017-2018 (n=460)	99 (98, 100)	98 (97, 99)	97 (95, 99)	-

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

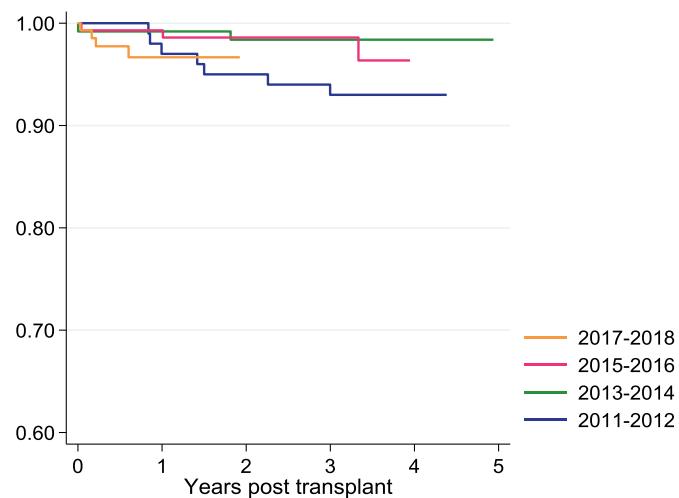


Figure 7.26 - Primary Living Donor Grafts - Graft Survival - New Zealand

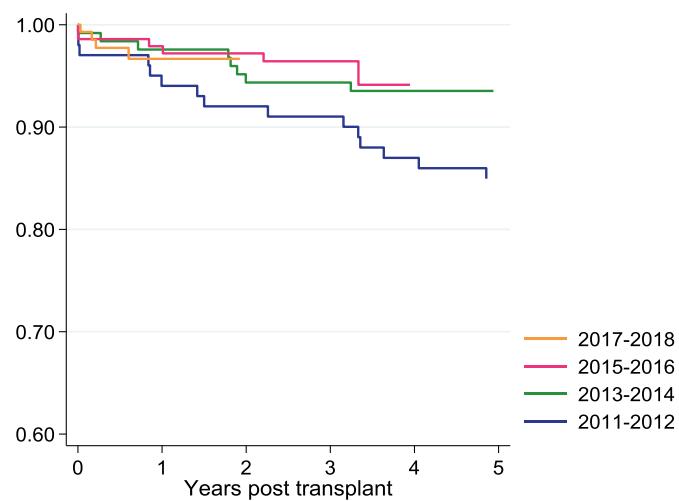


Table 7.25 Primary Living Donor Grafts - New Zealand 2011-2018

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2011-2012 (n=101)	100	100	97 (91, 99)	93 (86, 97)
	2013-2014 (n=124)	99 (94, 100)	99 (94, 100)	99 (94, 100)	98 (94, 100)
	2015-2016 (n=143)	99 (95, 100)	99 (95, 100)	99 (95, 100)	-
	2017-2018 (n=143)	99 (95, 100)	98 (93, 99)	97 (91, 99)	-
Graft survival	2011-2012 (n=101)	97 (91, 99)	97 (91, 99)	94 (87, 97)	85 (76, 91)
	2013-2014 (n=124)	99 (94, 100)	98 (94, 100)	98 (93, 99)	94 (87, 97)
	2015-2016 (n=143)	99 (95, 100)	99 (95, 100)	98 (94, 99)	-
	2017-2018 (n=143)	99 (95, 100)	98 (93, 99)	97 (91, 99)	-

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

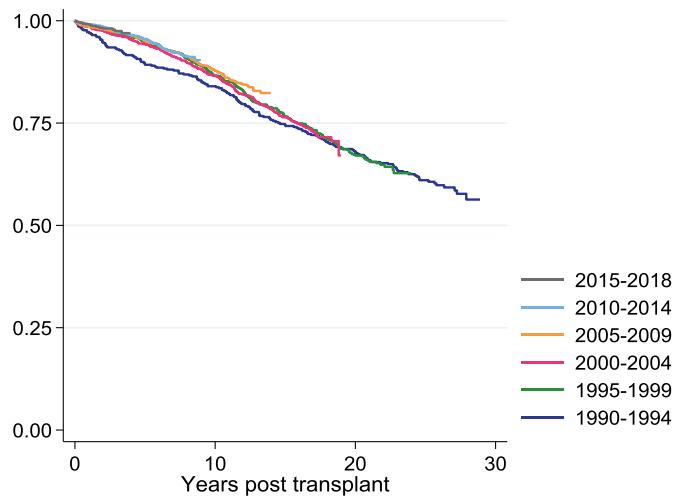


Figure 7.28 - Primary Living Donor Grafts - Graft Survival - Australia and New Zealand

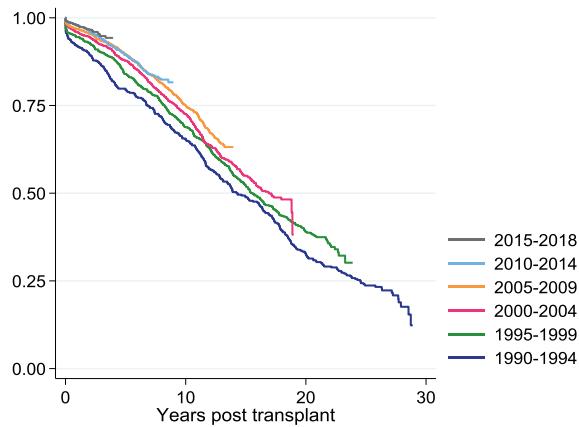


Table 7.26 Primary Living Donor Grafts - Australia and New Zealand 1990-2018

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 (64, 71)
	2000-2004 (n=1194)	98 (98, 99)	94 (93, 95)	86 (84, 88)	76 (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)	-	-	-
	2015-2018 (n=1193)	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=1194)	96 (95, 97)	88 (86, 90)	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)	89 (88, 91)	-	-	-
	2015-2018 (n=1193)	98 (97, 99)	-	-	-	-

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

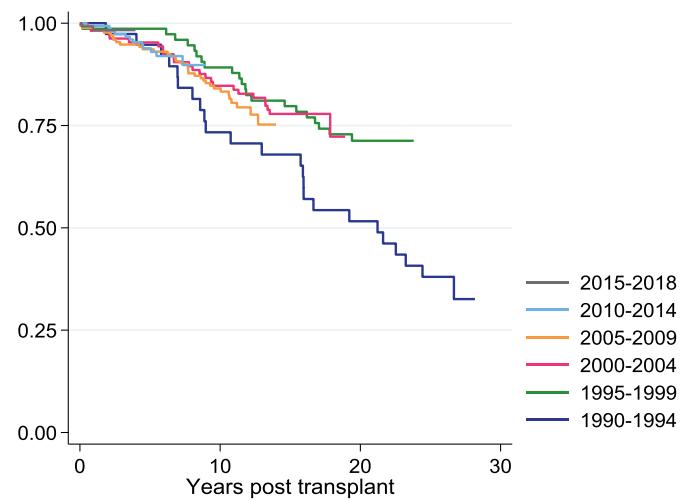


Figure 7.30 - Second and Subsequent Living Donor Grafts - Graft Survival - Australia and New Zealand

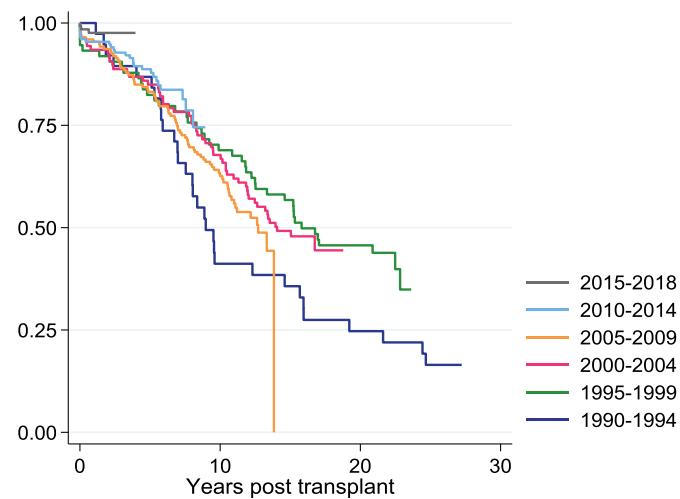


Table 7.27 Second and Subsequent Living Donor Grafts - Australia and New Zealand 1990-2018

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)	84 (78, 89)	-	-
	2010-2014 (n=153)	99 (95, 100)	94 (89, 97)	-	-	-
	2015-2018 (n=131)	98 (93, 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, 90)	68 (58, 76)	49 (39, 58)	-
	2005-2009 (n=175)	95 (91, 98)	83 (77, 88)	63 (55, 69)	-	-
	2010-2014 (n=153)	95 (91, 98)	89 (82, 93)	-	-	-
	2015-2018 (n=131)	98 (93, 99)	-	-	-	-