



CHAPTER 7

Kidney Transplantation

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

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Summary and Highlights

The current report, assessing transplantation until the end of 2021, demonstrates a fall in the total number of kidney transplants performed across Australia and New Zealand for the third consecutive year. In 2021 there were 1044 kidney transplants performed which was substantially below the peak of 1331 in 2018 (Table 7.1 and Figure 7.1). The number of new transplants has fallen since the COVID-19 pandemic commenced and the proportion reduction appears greater in precincts which experienced higher COVID-19 infection rates (Table 7.4). It remains to be seen how the numbers will change in the next 2 annual reports as we emerge from pandemic restrictions. Of note, there has been only 1 report of a transplant occurring abroad for a recipient from Australia and New Zealand during 2020 and 2021 compared with 9 reports in the 2 years preceding this.

Despite the reduced numbers of new transplants performed, there was steady growth in the number of prevalent transplant recipients with a functioning graft over the last decade. The prevalence rates in Australia and New Zealand in 2021 were 519 and 444 per million population respectively compared with 408 and 347 per million population a decade prior (2012) (Table and Figure 7.7). New to this year's report are Figures 7.12.1 and 7.12.2 which display the change in the age mix of prevalent transplant recipients over time (2002 to 2021). In Australia and New Zealand, there has been a surge in older transplant recipients with the 65–74-year age group being the second most prevalent while the 75–84-year age group also demonstrates a substantial increase.

T-cell depleting antibody use for transplant induction immunosuppression has seen a further increase in 2021 in Australia (Table 7.13), continuing the trend highlighted in the 2020 report. These agents were used in 19.5% of new transplants in 2021 up from 14.1% in 2020 and 5.2% in 2017. This has led to a consequent reduction in the use of anti-CD25 agents which were employed in 76.5% of new transplants, down from a peak of 90.8% in 2018. This trend is not seen in New Zealand with T-cell depletion used in only 2 (1.1%) new transplants with anti-CD25 agents continuing to predominate (used in 99.5%). Of note, a coding error has been rectified in this year's report relating to maintenance immunosuppression (Tables 7.14 and 7.15). In previous years' reports, extended-release tacrolimus had not been included in the reporting of percentage tacrolimus use, leading to an underestimate of the tacrolimus use percentage. After including extended-release tacrolimus, 97% of people receiving primary deceased grafts and 98% of people receiving primary living donor grafts in Australia in 2021 were commenced on Tacrolimus whilst, in New Zealand, cyclosporine was initiated in 46% of primary deceased donor transplants and tacrolimus in 54%.

Early graft loss for second and subsequent kidney transplants was more pronounced in 2020/21 than in the recent past (Figures 7.21 and 7.31). By log-rank test the graft survival in the 2020/21 cohort was significantly worse than the 2016-17 cohort for deceased donor grafts (Figure 7.21) and significantly worse than the 2015-2019 graft survival for living donor grafts (Figure 7.31). There is an apparent increase in early recipient mortality which accounts for some of the early graft loss. The numbers for the 2020/2021 cohort are relatively small and this results in reduced precision around these estimates. Further years of data will help to establish whether the second and subsequent transplant group is undergoing any real change in patient and graft survival. There will be many possible explanatory

hypotheses for this, if found to be the case, including the possible impact of COVID-19 and for deceased donor transplants, changes to organ allocation which prioritise highly sensitised wait-listed people.

Since 2020, chronic allograft nephropathy (CAN) has been removed as a cause for graft loss and has been replaced by: “chronic antibody-mediated rejection” (cAMR); “interstitial fibrosis and tubular atrophy” (not due to rejection); and “gradual graft loss” (where a biopsy has not been performed to confirm a specific diagnosis). This report is the first to assess the impact of these changes. CAN had been the most frequently cited cause of graft loss not due to death in the last decade, accounting for between 121 - 190 graft losses annually in Australia and 17 - 31 graft losses annually in New Zealand (excluding 2020 which was the transition year) (Table 7.11). In 2021, “gradual graft loss without a biopsy being performed” and cAMR were frequent causes of graft loss not due to death. Whilst in Australia there was a larger than usual number of “other” and “unknown” causes of graft loss noted (combined total n=66). These findings suggest that CAN had previously served to house a variety of conditions including cAMR and graft losses where the cause was not established.

Suggested Citation

ANZDATA Registry. 45th Report, Chapter 7: Kidney Transplantation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2022. 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.

Table 7.1 Number of Grafts Performed by Country 2002-2021

Country	Year	Graft 1	Graft 2	Graft 3	Graft 4	Graft 5	Total Transplants	Living Donor Transplants
Australia	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	675	88	11	0	0	774	328
	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	792	85	7	2	0	886	254
	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	1027	102	19	1	0	1149	238
	2019	987	92	23	2	0	1104	238
	2020	804	70	10	1	0	885	181
	2021	737	106	12	2	0	857	202
New Zealand	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
	2019	196	24	1	0	0	221	91
	2020	169	17	1	0	0	187	87
	2021	173	14	0	0	0	187	85

Figure 7.1.1 - Deceased and Living Donor Transplants - Australia 2012-2021

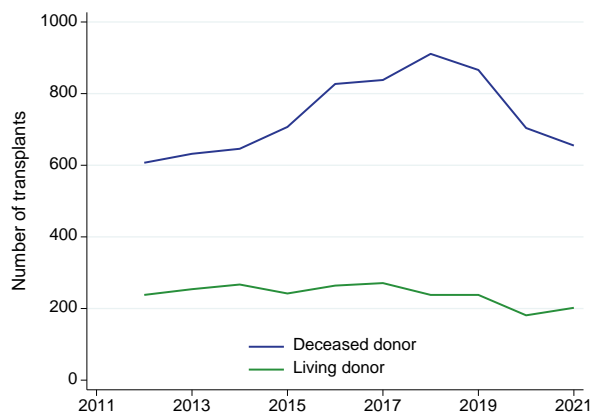
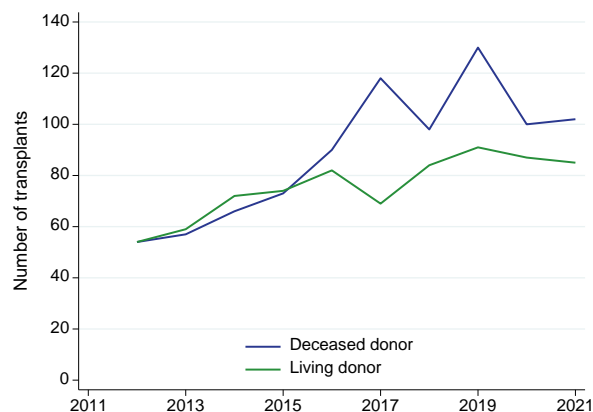


Figure 7.1.2 - Deceased and Living Donor Transplants - New Zealand 2012-2021



The transplant rate for dialysed patients is presented in figure 7.2 (for all dialysis patients) and figure 7.3 (for dialysis patients aged 15-64 years). This represents the number of transplants performed per 100 years of dialysis. Differences in the rates between states/territories and countries depends on several factors including the case-mix 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 2021 - All Dialysis Patients

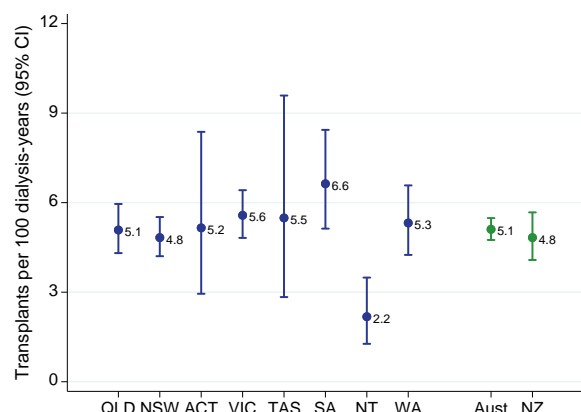


Figure 7.3 - Transplant Rate of Dialysed Patients 2021 - Patients Aged 15-64

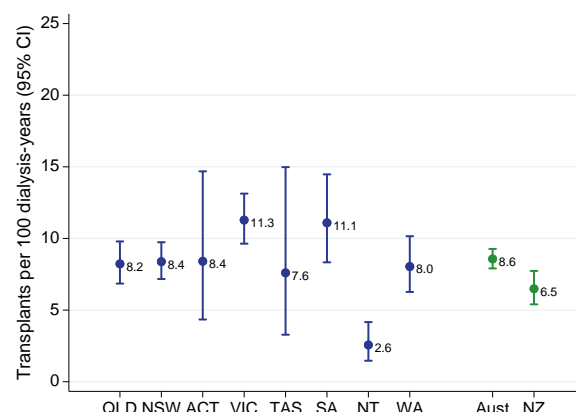


Figure 7.4.1 - Transplant Rate of Dialysed Patients By Age 2021 - Australia

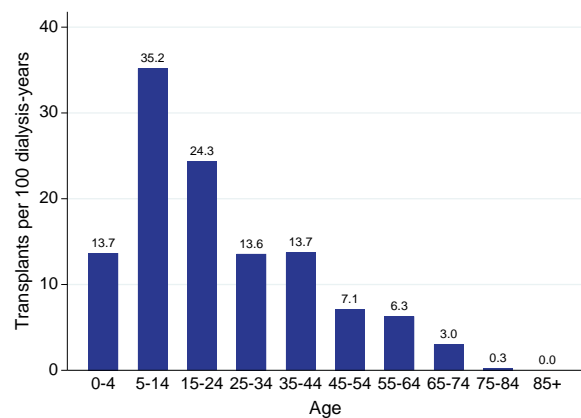


Figure 7.4.2 - Transplant Rate of Dialysed Patients By Age 2021 - New Zealand

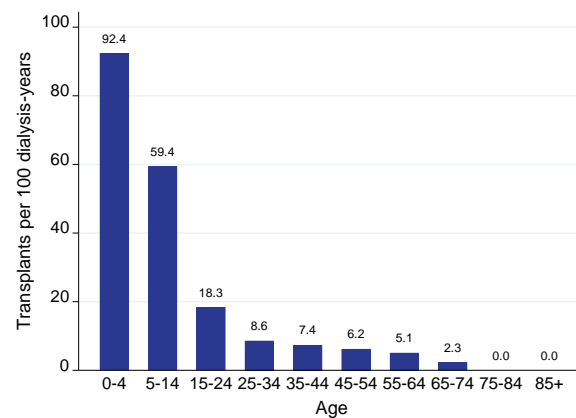


Figure 7.5.1 - Transplant Rate of Dialysed Patients By Ethnicity 2012-2021 - Australia, Patients Aged 15-64

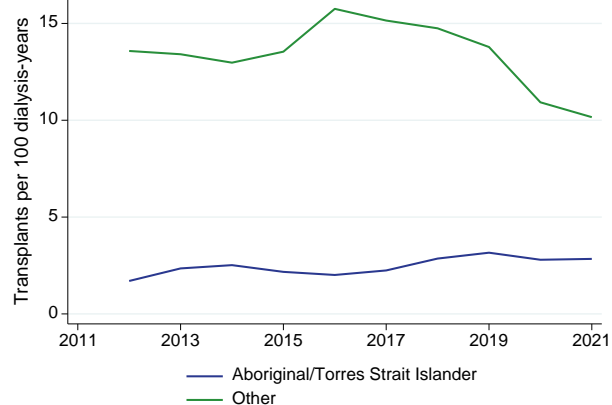


Figure 7.5.2 - Transplant Rate of Dialysed Patients By Ethnicity 2012-2021 - New Zealand, Patients Aged 15-64

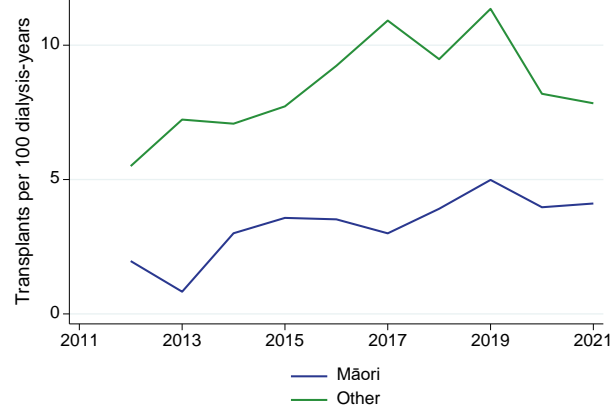


Table 7.2 shows the number of grafts performed according to donor type, graft number and recipient age in 2021. Transplant rates by age, per million population, are presented in figure 7.6.

Population estimates for Australia and New Zealand used throughout this chapter for the calculation of prevalence per million population were sourced from the Australian Bureau of Statistics (2021)¹ and Stats NZ (2021)².

Table 7.2 Age of Recipients Transplanted in 2021

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	7	17	52	98	114	159	103	8
		2	0	0	11	3	15	27	20	9	0
		3	0	0	1	1	2	2	2	0	0
	Living	4	0	0	0	0	0	1	1	0	0
		1	1	7	17	23	35	31	42	20	1
		2	0	1	4	3	4	5	4	0	0
New Zealand	Deceased	3	0	0	0	1	1	0	2	0	0
		1	2	2	4	7	12	21	35	13	0
	Living	2	0	0	1	0	2	1	1	1	0
		1	0	2	5	14	12	16	16	10	2
		2	0	0	0	1	3	4	0	0	0

Figure 7.6.1 - Transplant Operations pmp 2021 - Australia

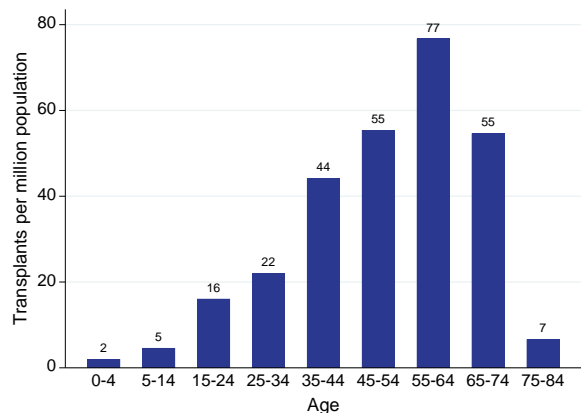


Figure 7.6.2 - Transplant Operations pmp 2021 - New Zealand

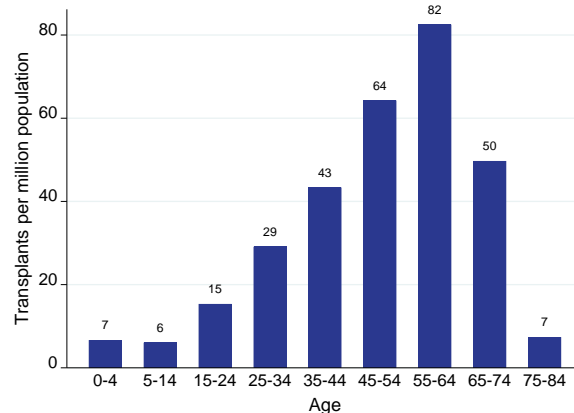


Table 7.3 shows the ethnicity of the recipients transplanted between 2017 and 2021.

Table 7.3 Ethnicity of Recipients Transplanted 2017-2021

Country	Ethnicity	2017	2018	2019	2020	2021
Australia	Aboriginal/Torres Strait Islander	35 (3.2%)	52 (4.5%)	56 (5.1%)	48 (5.4%)	52 (6.1%)
	Other	1015 (91.5%)	1011 (88.0%)	986 (89.3%)	798 (90.2%)	767 (89.5%)
	Not reported	59 (5.3%)	86 (7.5%)	62 (5.6%)	39 (4.4%)	38 (4.4%)
	Total	1109	1149	1104	885	857
New Zealand	Māori	23 (12.3%)	29 (15.9%)	35 (15.8%)	37 (19.8%)	37 (19.8%)
	Other	162 (86.6%)	150 (82.4%)	185 (83.7%)	148 (79.1%)	148 (79.1%)
	Not reported	2 (1.1%)	3 (1.6%)	1 (0.5%)	2 (1.1%)	2 (1.1%)
	Total	187	182	221	187	187

Table 7.4 shows the number of transplants (per million population) performed by transplanting region over 2017-2021.

Table 7.4 Transplants (pmp) by Transplanting Region and Country 2017-2021

State	2017	2018	2019	2020	2021
NSW/ACT	367 (44)	393 (47)	350 (41)	292 (34)	267 (31)
VIC/TAS	364 (53)	418 (60)	351 (49)	267 (37)	234 (33)
QLD	190 (39)	177 (35)	207 (41)	143 (28)	164 (31)
SA/NT	70 (36)	69 (35)	93 (47)	93 (46)	99 (49)
WA	118 (46)	92 (35)	103 (39)	90 (34)	93 (35)
Australia	1109 (45)	1149 (46)	1104 (44)	885 (34)	857 (33)
New Zealand	187 (39)	182 (37)	221 (44)	187 (37)	187 (36)

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 2012-2021 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 2012-2021

Year	Australia	New Zealand
2012	4	1
2013	3	1
2014	3	0
2015	6	1
2016	3	1
2017	2	1
2018	4	1
2019	4	0
2020	0	0
2021	1	0

Prevalent Transplants

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

Table 7.6 presents the number of transplants performed and functioning at the end of 2021, categorised by country of transplantation and 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 2021

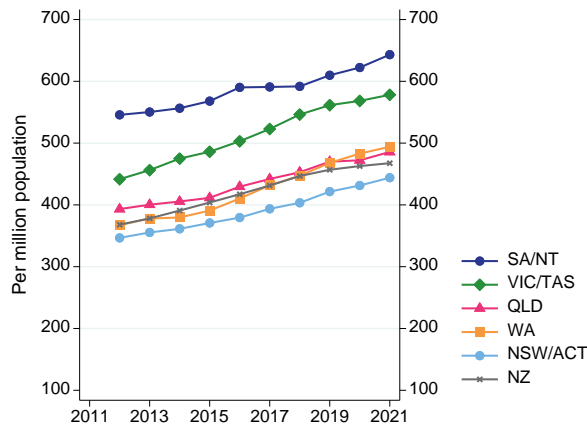
Country	Donor type	Graft number	Performed	Functioning
Australia	Living	1	6388	3893
		2	608	336
		3	90	51
		4	11	5
		5	1	1
	Deceased	1	19335	7947
		2	2719	925
		3	420	131
		4	64	17
		5	6	0
Unknown	1	0	39	
	2	0	4	
New Zealand	Living	1	1646	1007
		2	135	80
		3	7	4
		4	1	1
	Deceased	1	3041	1069
		2	470	110
		3	80	14
		4	8	1
	Unknown	1	0	10
		2	0	1

Table 7.7 presents the number of functioning transplants at the end of 2012-2021 by transplant region. These data are shown graphically in figure 7.7.

Table 7.7 Functioning Transplants (pmp) by Transplanting Region 2012-2021

Year	NSW/ACT	VIC/TAS	QLD	SA/NT	WA	Australia	New Zealand
2012	2827 (368)	2722 (442)	1797 (393)	1033 (546)	891 (367)	9270 (408)	1528 (347)
2013	2945 (378)	2868 (456)	1863 (400)	1053 (550)	940 (378)	9669 (418)	1579 (355)
2014	3087 (391)	3044 (475)	1914 (406)	1074 (557)	956 (380)	10075 (429)	1632 (361)
2015	3236 (404)	3178 (486)	1966 (411)	1105 (568)	993 (391)	10478 (440)	1709 (371)
2016	3395 (417)	3366 (503)	2081 (430)	1156 (590)	1049 (410)	11047 (457)	1789 (379)
2017	3572 (431)	3579 (523)	2178 (442)	1165 (591)	1111 (432)	11605 (472)	1895 (394)
2018	3753 (447)	3819 (546)	2269 (453)	1174 (592)	1160 (447)	12175 (487)	1977 (403)
2019	3890 (457)	4004 (561)	2394 (470)	1219 (610)	1228 (468)	12735 (502)	2099 (422)
2020	3980 (463)	4112 (568)	2444 (472)	1255 (622)	1287 (483)	13078 (509)	2196 (431)
2021	4031 (468)	4158 (578)	2536 (486)	1299 (643)	1325 (494)	13349 (519)	2297 (444)

Figure 7.7 - Functioning Transplants Per Million Population by Transplanting Region – Australia and New Zealand 2012-2021



The prevalence of functioning transplants per million population at 31 December 2021 by state/territory is shown in figure 7.8. State/territory is based on the location of the treating hospital.*

Figure 7.8 - Prevalence of Functioning Transplants 31 Dec 2021 - Per Million Population



*NSW population estimates exclude residents of the NSW South Eastern region which includes the local government areas of Bega Valley, Eurobodalla, Goulburn Mulwaree, Hilltops, Queanbeyan-Palerang Regional, Snowy Monaro Regional, Upper Lachlan Shire and Yass Valley. ACT population includes residents of the NSW South Eastern region. The population base for the NSW South Eastern region is based on the estimated resident population by local government area from the Australian Bureau of Statistics (2022)³.

The percentage of prevalent patients with a functioning transplant is shown in figure 7.9 by age group. 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 - Percentage of KRT Patients with a Functioning Transplant - By Age, Australia 2021

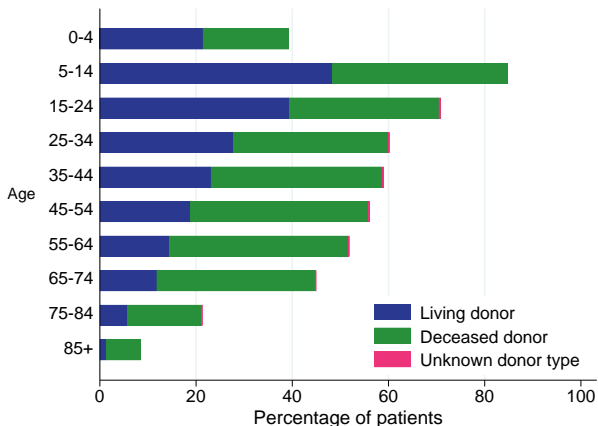


Figure 7.9.2 - Percentage of KRT Patients with a Functioning Transplant - By Age, New Zealand 2021

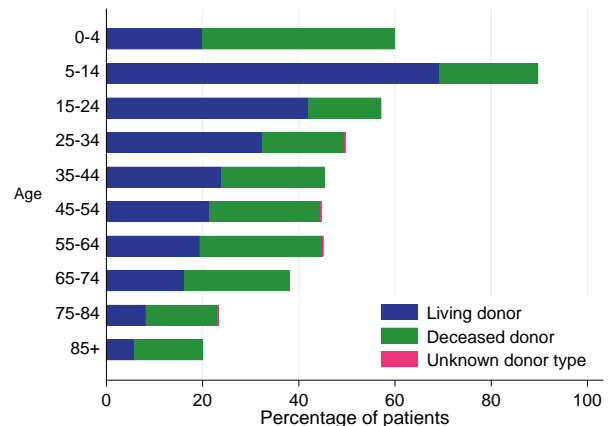


Table 7.8 Age Distribution of Functioning Transplant Patients - 31 Dec 2021

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	11	151	360	804	1568	2792	3542	3161	893	67	13349	
	Unknown	1	-	-	2	1	7	11	7	9	2	-	-	39
		2	-	-	-	-	3	-	1	-	-	-	-	4
		All	-	-	2	1	10	11	8	9	2	-	-	43
	Deceased	1	5	62	131	358	801	1545	2234	2135	621	55	-	7947
		2	-	3	26	61	127	246	265	170	26	1	-	925
		3	-	-	1	12	16	42	43	15	2	-	-	131
		4	-	-	-	-	1	10	5	1	-	-	-	17
		All	5	65	158	431	945	1843	2547	2321	649	56	-	9020
	Living	1	6	84	182	338	549	827	894	769	235	9	-	3893
		2	-	2	17	32	53	89	79	55	7	2	-	336
		3	-	-	1	2	10	21	11	6	-	-	-	51
		4	-	-	-	-	1	1	2	1	-	-	-	5
		5	-	-	-	-	-	-	1	-	-	-	-	1
	All	6	86	200	372	613	938	987	831	242	11	-	4286	
New Zealand	All	All	3	35	68	167	279	450	677	494	117	7	2297	
	Unknown	1	-	-	-	-	-	4	3	2	1	-	-	10
		2	-	-	-	1	-	-	-	-	-	-	-	1
		All	-	-	-	1	-	4	3	2	1	-	-	11
	Deceased	1	2	8	15	49	120	195	343	262	70	5	-	1069
		2	-	-	3	8	12	28	37	18	4	-	-	110
		3	-	-	-	-	-	8	3	2	1	-	-	14
		4	-	-	-	-	-	-	-	1	-	-	-	1
		All	2	8	18	57	132	231	383	283	75	5	-	1194
	Living	1	1	27	50	99	128	184	272	203	41	2	-	1007
		2	-	-	-	10	19	28	17	6	-	-	-	80
		3	-	-	-	-	-	2	2	-	-	-	-	4
		4	-	-	-	-	-	1	-	-	-	-	-	1
		All	1	27	50	109	147	215	291	209	41	2	-	1092

Figure 7.10.1 - Age Distribution of Functioning Transplants - Australia 2021

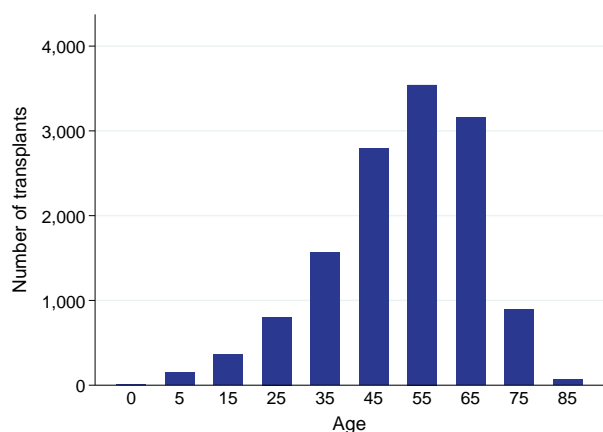


Figure 7.10.2 - Age Distribution of Functioning Transplants - pmp Australia 2021

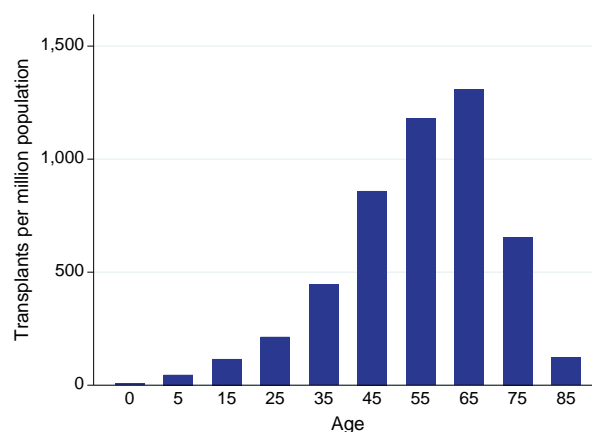


Figure 7.11.1 - Age Distribution of Functioning Transplants - New Zealand 2021

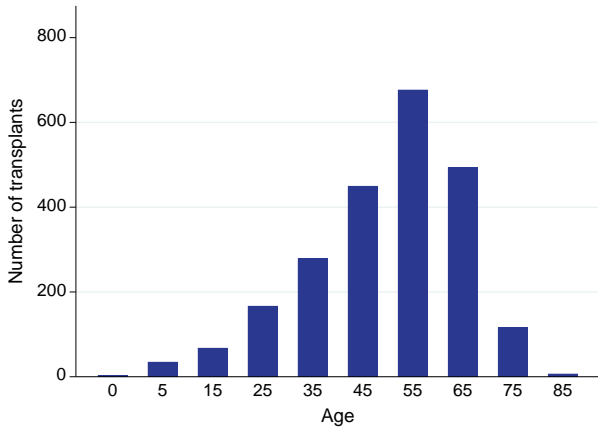
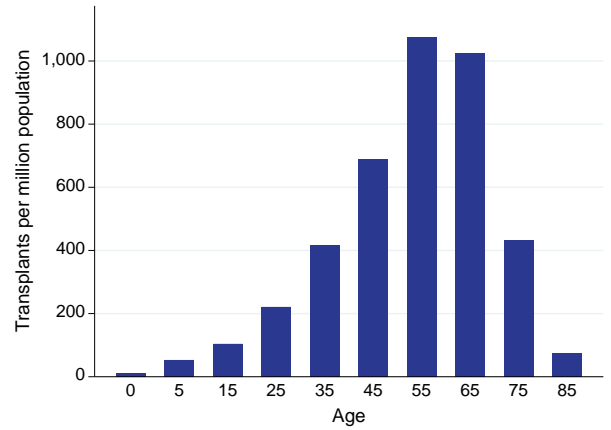


Figure 7.11.2 - Age Distribution of Functioning Transplants - pmp, New Zealand 2021



The trends in the age of prevalent transplant recipients are illustrated in figure 7.12.

Figure 7.12.1 - Prevalent Transplant Recipients by Age Group 2002-2021 - Australia

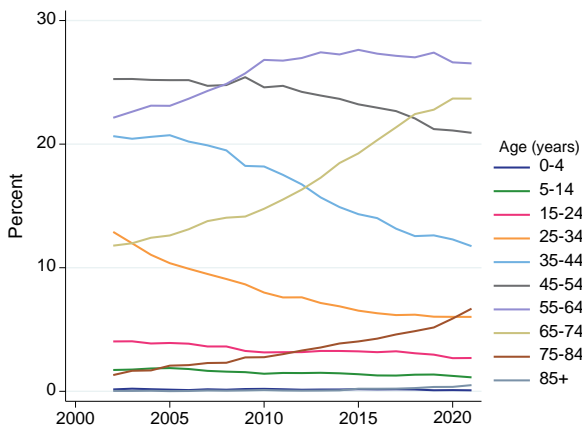


Figure 7.12.2 - Prevalent Transplant Recipients by Age Group 2002-2021 - New Zealand

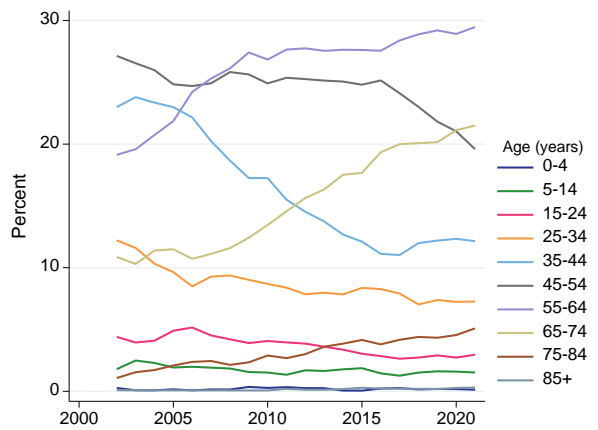


Table 7.9 presents the number of prevalent patients with a functioning transplant by gender, ethnicity and age.

Table 7.9 Functioning Transplant Patients Related to Ethnicity and Age Group - 31 Dec 2021

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	Total	11	151	360	804	1568	2792	3542	3161	893	67	13349
	Female	Aboriginal/Torres Strait Islander	-	1	8	17	22	48	53	16	1	-	166
		Other	3	42	117	277	588	979	1195	1073	322	28	4624
		Not reported	1	-	4	17	45	73	78	88	27	1	334
		Total	4	43	129	311	655	1100	1326	1177	350	29	5124
	Male	Aboriginal/Torres Strait Islander	-	4	8	23	31	61	59	42	4	-	232
		Other	7	104	205	443	820	1501	2005	1818	502	34	7439
		Not reported	-	-	18	27	62	130	152	124	37	4	554
		Total	7	108	231	493	913	1692	2216	1984	543	38	8225
	New Zealand	All	Total	3	35	68	167	279	450	677	494	117	7
Female		Māori	1	3	4	15	25	22	26	12	3	-	111
		Other	-	11	24	64	91	154	238	168	37	4	791
		Not reported	-	-	-	1	-	2	1	-	-	-	4
		Total	1	14	28	80	116	178	265	180	40	4	906
Male		Māori	-	3	3	12	24	29	59	37	5	-	172
		Other	2	18	35	74	138	240	349	277	72	3	1208
		Not reported	-	-	2	1	1	3	4	-	-	-	11
		Total	2	21	40	87	163	272	412	314	77	3	1391

Figure 7.13 shows the duration of function of prevalent transplants at the end of 2021. In Australia there were 5111 grafts that had functioned for ≥10 years, 1457 ≥20 years and 352 ≥30 years. In New Zealand there were 834 grafts that had functioned for ≥10 years, 270 ≥20 years and 61 ≥30 years.

Figure 7.13.1 - Number of Functioning Grafts by Graft Duration - Australia 2021 (n=13349)

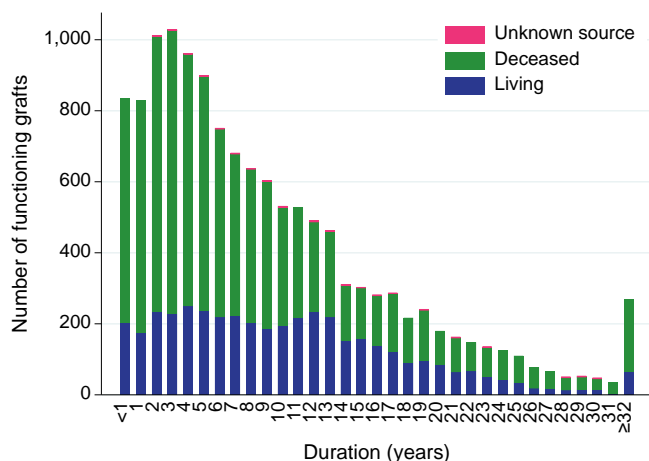


Figure 7.13.2 - Number of Functioning Grafts by Graft Duration - New Zealand 2021 (n=2297)



Graft Loss

Table 7.10 presents the overall graft loss rate in 2012-2021 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 2012-2021

Country	Outcome	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Australia	Graft failure	3.0	2.6	2.8	3.0	2.7	2.9	3.1	2.6	2.5	2.6
	Death with function	2.1	2.7	2.4	2.5	2.5	2.4	2.5	2.5	2.5	2.9
	All losses	5.1	5.3	5.2	5.5	5.2	5.3	5.6	5.1	5.0	5.5
New Zealand	Graft failure	2.6	2.3	2.9	2.1	2.7	2.1	2.8	2.4	2.6	2.4
	Death with function	2.1	2.1	2.9	2.7	3.1	3.0	2.9	3.3	2.2	2.2
	All losses	4.7	4.4	5.7	4.8	5.8	5.1	5.7	5.7	4.8	4.7

The causes of graft loss over 2012-2021 are presented in table 7.11. Since 2020 chronic allograft nephropathy has been removed as a cause for graft loss and has been replaced by other options. “Chronic antibody mediated rejection”, “interstitial fibrosis and tubular atrophy” (not due to rejection) and “gradual graft loss” (where a biopsy has not been performed to confirm a specific diagnosis) have been added. These data are further categorised by timing post-transplant (first year versus later years) for 2017-2021 in table 7.12.

Table 7.11 Causes of Graft Loss 2012-2021

Country	Cause of graft loss	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Australia	Death with function	176	233	216	231	243	244	258	262	272	312	2447
	Acute rejection	10	13	11	16	14	15	18	11	15	22	145
	Chronic allograft nephropathy	177	155	167	190	155	147	177	121	31	-	1320
	Chronic antibody mediated rejection	-	-	-	-	-	-	1	2	30	55	88
	Interstitial fibrosis/tubular atrophy - not due to rejection	-	-	-	-	-	-	1	-	9	8	18
	Gradual graft failure - biopsy not performed	-	-	-	-	-	-	4	3	76	78	161
	Hyperacute rejection	-	-	1	-	1	1	-	2	1	-	6
	Vascular	10	9	7	12	10	5	16	13	10	7	99
	Technical	3	-	6	2	6	6	4	4	6	3	40
	Glomerular Disease	17	16	12	20	19	19	13	16	13	15	160
	Non-compliance	8	9	14	3	8	16	17	8	7	14	104
	BK Virus Nephropathy	6	5	7	6	1	3	10	4	6	5	53
	Unknown	-	-	-	1	-	-	-	1	14	26	42
	Other	22	17	22	29	33	41	36	44	35	40	319
Not reported	-	-	-	-	7	31	23	44	12	9	126	
	Total	429	457	463	510	497	528	578	535	537	594	5128
New Zealand	Death with function	30	30	43	42	50	50	50	61	42	44	442
	Acute rejection	1	2	3	1	2	2	4	5	2	5	27
	Chronic allograft nephropathy	26	21	28	22	26	17	31	18	4	-	193
	Chronic antibody mediated rejection	-	-	-	-	-	-	-	-	2	7	9
	Interstitial fibrosis/tubular atrophy - not due to rejection	-	-	-	-	-	-	-	-	3	2	5
	Gradual graft failure - biopsy not performed	-	-	-	-	-	-	-	-	18	14	32
	Hyperacute rejection	-	-	-	-	-	-	-	-	-	-	0
	Vascular	2	2	1	-	3	1	-	2	1	4	16
	Technical	-	-	1	1	2	-	-	1	4	-	9
	Glomerular Disease	5	1	2	2	2	5	1	3	1	7	29
	Non-compliance	-	4	6	-	-	1	3	4	5	2	25
	BK Virus Nephropathy	-	1	-	2	-	1	-	-	-	1	5
	Unknown	-	-	-	-	-	-	-	-	-	-	0
	Other	3	3	2	3	6	3	8	2	4	5	39
Not reported	-	-	-	1	3	5	2	8	5	1	25	
	Total	67	64	86	74	94	85	99	104	91	92	856

Table 7.12 Graft Losses 2017-2021

Country	Outcome	Cause of death or graft failure	First year	Beyond first year	Total	
Australia	Death with function	Cardiovascular	22 (26%)	286 (23%)	308 (23%)	
		Withdrawal	3 (3%)	68 (5%)	71 (5%)	
		Cancer	5 (6%)	348 (28%)	353 (26%)	
		Infection	32 (37%)	186 (15%)	218 (16%)	
		Other	22 (26%)	348 (28%)	370 (27%)	
		Not reported	2 (2%)	26 (2%)	28 (2%)	
	Total			86 (100%)	1262 (100%)	1348 (100%)
	Graft Failure	Acute rejection	20 (15%)	61 (5%)	81 (6%)	
		Chronic allograft nephropathy	7 (5%)	469 (36%)	476 (33%)	
		Chronic antibody mediated rejection	1 (1%)	87 (7%)	88 (6%)	
		Interstitial fibrosis/tubular atrophy - not due to rejection	1 (1%)	17 (1%)	18 (1%)	
		Gradual graft failure - biopsy not performed	2 (1%)	159 (12%)	161 (11%)	
		Hyperacute rejection	4 (3%)	-	4 (<1%)	
		Vascular	35 (26%)	16 (1%)	51 (4%)	
		Technical	15 (11%)	8 (1%)	23 (2%)	
Glomerular Disease		4 (3%)	72 (6%)	76 (5%)		
Non-compliance		3 (2%)	59 (5%)	62 (4%)		
BK Virus Nephropathy		3 (2%)	25 (2%)	28 (2%)		
Unknown		1 (1%)	40 (3%)	41 (3%)		
Other		34 (25%)	162 (13%)	196 (14%)		
Not reported		4 (3%)	115 (9%)	119 (8%)		
Total			134 (100%)	1290 (100%)	1424 (100%)	
New Zealand	Death with function	Cardiovascular	8 (50%)	69 (30%)	77 (31%)	
		Withdrawal	1 (6%)	6 (3%)	7 (3%)	
		Cancer	1 (6%)	63 (27%)	64 (26%)	
		Infection	4 (25%)	32 (14%)	36 (15%)	
		Other	2 (13%)	54 (23%)	56 (23%)	
		Not reported	-	7 (3%)	7 (3%)	
	Total			16 (100%)	231 (100%)	247 (100%)
	Graft Failure	Acute rejection	1 (4%)	17 (9%)	18 (8%)	
		Chronic allograft nephropathy	1 (4%)	69 (35%)	70 (31%)	
		Chronic antibody mediated rejection	-	9 (5%)	9 (4%)	
		Interstitial fibrosis/tubular atrophy - not due to rejection	-	5 (3%)	5 (2%)	
Gradual graft failure - biopsy not performed		-	32 (16%)	32 (14%)		
Vascular		7 (29%)	1 (1%)	8 (4%)		
Technical		4 (17%)	1 (1%)	5 (2%)		
Glomerular Disease		3 (13%)	14 (7%)	17 (8%)		
Non-compliance		-	15 (8%)	15 (7%)		
BK Virus Nephropathy		-	2 (1%)	2 (1%)		
Other	6 (25%)	16 (8%)	22 (10%)			
Not reported	2 (8%)	19 (10%)	21 (9%)			
Total			24 (100%)	200 (100%)	224 (100%)	

Immunosuppression

The induction immunosuppression is shown in table 7.13.

Table 7.13 Induction Immunosuppression 2017-2021; Number of Kidney Transplant Recipients Receiving Each Agent by Year (% Total New Transplants)

Country	Type of agent	2017	2018	2019	2020	2021
Australia	Intravenous immunoglobulin	39 (3.5%)	34 (3.0%)	32 (2.9%)	11 (1.2%)	13 (1.5%)
	Anti-CD25	926 (83.5%)	1043 (90.8%)	872 (79.0%)	711 (80.3%)	656 (76.5%)
	Rituximab	7 (0.6%)	2 (0.2%)	6 (0.5%)	4 (0.5%)	4 (0.5%)
	T cell depleting polyclonal Ab	58 (5.2%)	73 (6.4%)	139 (12.6%)	125 (14.1%)	167 (19.5%)
	Other	3 (0.3%)	4 (0.3%)	3 (0.3%)	2 (0.2%)	3 (0.4%)
	Not reported	104 (9.4%)	35 (3.0%)	104 (9.4%)	49 (5.5%)	43 (5.0%)
	Total new transplants	1109	1149	1104	885	857
New Zealand	Anti-CD25	185 (98.9%)	182 (100.0%)	217 (98.2%)	185 (98.9%)	186 (99.5%)
	Rituximab	11 (5.9%)	10 (5.5%)	12 (5.4%)	5 (2.7%)	5 (2.7%)
	T cell depleting polyclonal Ab	7 (3.7%)	2 (1.1%)	9 (4.1%)	4 (2.1%)	1 (0.5%)
	Other	-	1 (0.5%)	-	-	-
	Not reported	-	-	4 (1.8%)	-	-
	Total new transplants	187	182	221	187	187

Immunosuppressive therapy at baseline, 1 and 2 years post-transplant for primary grafts over 2014-2021 is presented for deceased and living donors in tables 7.14 and 7.15, respectively. (AZA azathioprine; CYC cyclosporine; TAC tacrolimus; MMF mycophenolate mofetil; MPA mycophenolic acid; SIR sirolimus; EVE everolimus; PRE prednisolone)

Table 7.14.1 Immunosuppressive Therapy - Primary Deceased Donor Grafts Australia 2014-2021

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of deceased donor grafts
Initial treatment	2014	2 (<1%)	11 (2%)	534 (94%)	358 (63%)	180 (32%)	1 (<1%)	11 (2%)	548 (96%)	568
	2015	3 (<1%)	5 (1%)	585 (93%)	377 (60%)	209 (33%)	-	9 (1%)	593 (94%)	630
	2016	-	3 (<1%)	612 (88%)	424 (61%)	201 (29%)	-	2 (<1%)	623 (89%)	697
	2017	-	2 (<1%)	677 (95%)	485 (68%)	196 (28%)	-	1 (<1%)	679 (96%)	710
	2018	3 (<1%)	3 (<1%)	758 (94%)	537 (66%)	228 (28%)	1 (<1%)	5 (1%)	773 (96%)	809
	2019	-	3 (<1%)	746 (96%)	506 (65%)	237 (31%)	1 (<1%)	3 (<1%)	739 (95%)	774
	2020	1 (<1%)	6 (1%)	612 (96%)	433 (68%)	181 (28%)	1 (<1%)	6 (1%)	606 (95%)	637
	2021	2 (<1%)	-	544 (97%)	377 (67%)	165 (29%)	-	2 (<1%)	538 (96%)	560
Treatment at 1 year	2014	23 (4%)	10 (2%)	483 (91%)	275 (52%)	168 (32%)	4 (1%)	22 (4%)	500 (94%)	530
	2015	22 (4%)	11 (2%)	502 (86%)	279 (48%)	189 (33%)	2 (<1%)	17 (3%)	517 (89%)	581
	2016	27 (4%)	20 (3%)	584 (89%)	355 (54%)	209 (32%)	5 (1%)	24 (4%)	607 (93%)	654
	2017	19 (3%)	11 (2%)	591 (87%)	345 (51%)	210 (31%)	9 (1%)	29 (4%)	618 (91%)	678
	2018	33 (4%)	11 (1%)	689 (89%)	425 (55%)	212 (27%)	9 (1%)	31 (4%)	705 (91%)	776
	2019	38 (5%)	13 (2%)	613 (84%)	352 (48%)	196 (27%)	8 (1%)	25 (3%)	633 (86%)	732
	2020	14 (2%)	15 (2%)	491 (81%)	277 (46%)	175 (29%)	9 (1%)	20 (3%)	499 (82%)	607
Treatment at 2 years	2014	29 (6%)	13 (3%)	445 (86%)	260 (50%)	155 (30%)	8 (2%)	21 (4%)	468 (91%)	516
	2015	35 (6%)	15 (3%)	493 (87%)	266 (47%)	185 (33%)	8 (1%)	21 (4%)	504 (89%)	566
	2016	32 (5%)	18 (3%)	543 (86%)	323 (51%)	186 (29%)	5 (1%)	30 (5%)	563 (89%)	631
	2017	28 (4%)	14 (2%)	555 (85%)	313 (48%)	197 (30%)	13 (2%)	27 (4%)	587 (90%)	654
	2018	39 (5%)	11 (1%)	637 (84%)	367 (49%)	205 (27%)	13 (2%)	35 (5%)	653 (86%)	755
	2019	37 (5%)	16 (2%)	570 (80%)	323 (45%)	195 (27%)	12 (2%)	30 (4%)	592 (83%)	712

Table 7.14.2 Immunosuppressive Therapy - Primary Deceased Donor Grafts New Zealand 2014-2021

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of deceased donor grafts
Initial treatment	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
	2019	1 (1%)	66 (57%)	47 (41%)	112 (97%)	-	-	-	113 (98%)	115
	2020	-	48 (54%)	42 (47%)	88 (99%)	-	-	-	89 (100%)	89
	2021	-	44 (46%)	52 (54%)	96 (100%)	-	-	-	96 (100%)	96
Treatment at 1 year	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%)	64 (60%)	101 (94%)	-	-	-	105 (98%)	107
	2018	-	38 (45%)	44 (52%)	80 (95%)	-	-	-	82 (98%)	84
	2019	1 (1%)	38 (36%)	66 (62%)	98 (92%)	-	1 (1%)	-	105 (99%)	106
	2020	1 (1%)	23 (26%)	61 (70%)	79 (91%)	-	-	-	84 (97%)	87
Treatment at 2 years	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	5 (7%)	36 (49%)	37 (50%)	65 (88%)	1 (1%)	-	-	73 (99%)	74
	2017	6 (6%)	36 (35%)	66 (64%)	95 (92%)	-	-	-	101 (98%)	103
	2018	1 (1%)	37 (45%)	45 (54%)	79 (95%)	-	-	-	81 (98%)	83
	2019	2 (2%)	34 (33%)	67 (65%)	89 (86%)	-	1 (1%)	-	100 (97%)	103

Table 7.15.1 Immunosuppressive Therapy - Primary Living Donor Grafts Australia 2014-2021

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of living donor grafts
Initial treatment	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%)	227 (94%)	173 (72%)	53 (22%)	-	-	224 (93%)	241
	2018	-	2 (1%)	200 (92%)	147 (67%)	54 (25%)	-	1 (<1%)	203 (93%)	218
	2019	-	-	201 (94%)	142 (67%)	64 (30%)	-	1 (<1%)	207 (97%)	213
	2020	-	2 (1%)	162 (97%)	118 (71%)	47 (28%)	-	-	162 (97%)	167
	2021	-	-	173 (98%)	118 (67%)	54 (31%)	-	1 (1%)	168 (95%)	177
Treatment at 1 year	2014	11 (5%)	10 (4%)	198 (87%)	119 (52%)	69 (30%)	1 (<1%)	8 (4%)	209 (92%)	228
	2015	6 (3%)	3 (1%)	179 (87%)	95 (46%)	66 (32%)	2 (1%)	7 (3%)	175 (85%)	205
	2016	10 (4%)	9 (4%)	206 (88%)	142 (60%)	56 (24%)	3 (1%)	-	209 (89%)	235
	2017	12 (5%)	7 (3%)	196 (84%)	138 (59%)	50 (21%)	3 (1%)	9 (4%)	206 (88%)	234
	2018	11 (5%)	5 (2%)	176 (83%)	113 (53%)	53 (25%)	1 (<1%)	9 (4%)	186 (88%)	212
	2019	3 (1%)	2 (1%)	185 (88%)	114 (54%)	57 (27%)	1 (<1%)	6 (3%)	185 (88%)	211
	2020	6 (4%)	3 (2%)	139 (84%)	85 (52%)	42 (25%)	-	8 (5%)	143 (87%)	165
Treatment at 2 years	2014	13 (6%)	7 (3%)	183 (82%)	112 (50%)	60 (27%)	1 (<1%)	13 (6%)	194 (87%)	224
	2015	6 (3%)	5 (2%)	172 (86%)	93 (46%)	68 (34%)	5 (2%)	10 (5%)	172 (86%)	201
	2016	14 (6%)	8 (4%)	191 (84%)	130 (57%)	47 (21%)	3 (1%)	4 (2%)	197 (86%)	228
	2017	20 (9%)	8 (3%)	191 (82%)	133 (57%)	50 (22%)	2 (1%)	9 (4%)	201 (87%)	232
	2018	12 (6%)	3 (1%)	177 (83%)	107 (50%)	49 (23%)	2 (1%)	9 (4%)	182 (86%)	212
	2019	5 (2%)	3 (1%)	167 (79%)	96 (45%)	51 (24%)	3 (1%)	8 (4%)	163 (77%)	211

Table 7.15.2 Immunosuppressive Therapy - Primary Living Donor Grafts New Zealand 2014-2021

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of living donor grafts
Initial treatment	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
	2019	-	25 (31%)	56 (69%)	81 (100%)	-	-	-	81 (100%)	81
	2020	1 (1%)	42 (53%)	37 (46%)	79 (99%)	-	-	-	80 (100%)	80
	2021	-	29 (38%)	48 (62%)	76 (99%)	1 (1%)	-	-	77 (100%)	77
Treatment at 1 year	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%)	15 (26%)	42 (72%)	52 (90%)	-	-	-	58 (100%)	58
	2018	1 (1%)	28 (35%)	49 (61%)	72 (90%)	-	2 (3%)	-	78 (98%)	80
	2019	2 (3%)	17 (21%)	61 (76%)	73 (91%)	-	-	-	78 (98%)	80
	2020	4 (5%)	29 (39%)	43 (57%)	70 (93%)	-	-	-	74 (99%)	75
Treatment at 2 years	2014	3 (5%)	24 (38%)	37 (58%)	59 (92%)	-	-	-	63 (98%)	64
	2015	4 (6%)	28 (42%)	37 (56%)	60 (91%)	-	-	-	65 (98%)	66
	2016	3 (4%)	32 (44%)	39 (54%)	67 (93%)	-	-	-	71 (99%)	72
	2017	10 (17%)	16 (28%)	42 (72%)	46 (79%)	-	-	-	58 (100%)	58
	2018	6 (8%)	26 (33%)	50 (63%)	65 (82%)	-	1 (1%)	-	76 (96%)	79
	2019	5 (6%)	15 (19%)	63 (79%)	68 (85%)	-	-	-	76 (95%)	80

Rejection

The proportion of patients experiencing a rejection episode within 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. The years shown, are the year that the transplants were performed. Variability is noted year on year and with a small number of reported episodes some years, these tables represent the Australia and Aotearoa New Zealand cohort combined.

Table 7.16 Rejection Rates at Six Months Post-Transplant 2011-2020

Donor Type	Graft Number	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Living donor	First	17.5%	14.1%	19.1%	22.4%	17.1%	17.4%	19.1%	14.7%	10.2%	11.3%
	Second and subsequent	19.2%	10.0%	16.1%	28.6%	11.1%	16.7%	21.6%	13.0%	14.3%	14.3%
Deceased donor	First	20.0%	16.8%	18.5%	19.8%	17.7%	15.3%	18.5%	14.7%	13.2%	14.7%
	Second and subsequent	19.4%	24.4%	25.0%	25.9%	24.7%	18.6%	20.1%	22.5%	15.0%	11.5%

Table 7.17 Antibody-Mediated Rejection Rates at Six Months Post-Transplant 2011-2020

Donor Type	Graft Number	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Living donor	First	4.9%	2.3%	5.3%	4.6%	3.9%	3.9%	4.0%	5.0%	1.0%	1.6%
	Second and subsequent	11.5%	6.7%	3.2%	5.7%	5.6%	2.8%	8.1%	0.0%	14.3%	4.8%
Deceased donor	First	5.6%	3.9%	5.0%	5.1%	6.0%	5.8%	4.6%	2.7%	2.9%	4.0%
	Second and subsequent	11.3%	10.3%	10.3%	12.9%	17.6%	8.6%	9.7%	11.7%	7.5%	5.1%

Table 7.18 shows the number of people who received antibody agents for treating acute rejection by calendar year. The percentage shown represents the number of rejection episodes treated with antibodies divided by the number of new transplant recipients in each calendar year, but readers should be aware that although the 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 at risk during the year is also reported.

Table 7.18 Antibody Therapy for Acute Rejection 2017-2021

Country	Type of agent	2017	2018	2019	2020	2021	
Australia	Intravenous immunoglobulin	128 (11.5%)	86 (7.5%)	63 (5.7%)	78 (8.8%)	56 (6.5%)	
	Anti-CD25	-	-	1 (0.1%)	-	-	
	Rituximab	7 (0.6%)	15 (1.3%)	9 (0.8%)	4 (0.5%)	5 (0.6%)	
	T cell depleting polyclonal Ab	41 (3.7%)	30 (2.6%)	32 (2.9%)	43 (4.9%)	47 (5.5%)	
	Not specified	31 (2.8%)	42 (3.7%)	18 (1.6%)	24 (2.7%)	16 (1.9%)	
	Total new transplants		1109	1149	1104	885	857
	Total transplants at risk		12156	12754	13279	13620	13935
New Zealand	Intravenous immunoglobulin	3 (1.6%)	3 (1.6%)	-	4 (2.1%)	9 (4.8%)	
	Rituximab	-	-	-	1 (0.5%)	3 (1.6%)	
	T cell depleting polyclonal Ab	13 (7.0%)	13 (7.1%)	16 (7.2%)	16 (8.6%)	14 (7.5%)	
	Not specified	2 (1.1%)	2 (1.1%)	2 (0.9%)	1 (0.5%)	3 (1.6%)	
	Total new transplants		187	182	221	187	187
	Total transplants at risk		1976	2077	2198	2286	2383

Patient and Graft Survival

The remainder of the chapter presents patient and graft survival by transplant era and by 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 7.14 - Primary Deceased Donor Grafts - Patient Survival - Australia

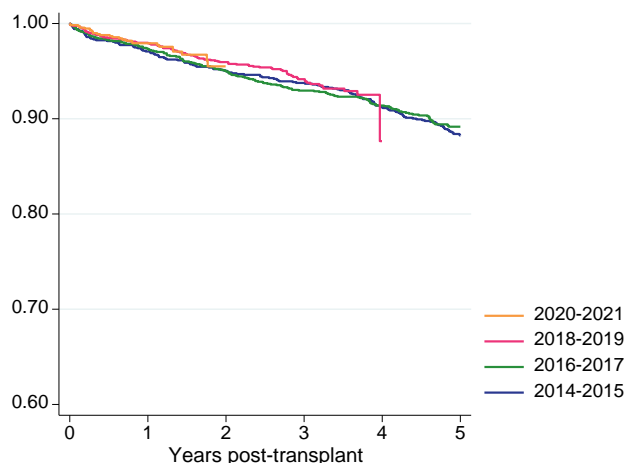


Figure 7.15 - Primary Deceased Donor Grafts - Graft Survival - Australia

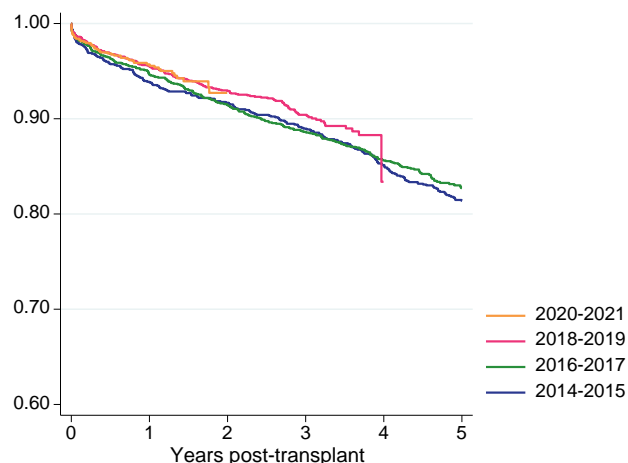


Table 7.19 Primary Deceased Donor Grafts - Australia 2014-2021 (95% Confidence Intervals)

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2014-2015 (n=1198)	99 (99, 100)	98 (97, 99)	97 (96, 98)	88 (86, 90)
	2016-2017 (n=1407)	99 (99, 100)	98 (97, 99)	97 (96, 98)	89 (87, 91)
	2018-2019 (n=1583)	100 (99, 100)	98 (98, 99)	98 (97, 99)	-
	2020-2021 (n=1197)	100 (99, 100)	99 (98, 99)	98 (97, 99)	-
Graft survival	2014-2015 (n=1198)	98 (97, 99)	96 (94, 97)	94 (92, 95)	81 (79, 83)
	2016-2017 (n=1407)	98 (97, 99)	96 (95, 97)	95 (93, 96)	83 (81, 85)
	2018-2019 (n=1583)	99 (98, 99)	97 (96, 98)	96 (94, 96)	-
	2020-2021 (n=1197)	98 (98, 99)	97 (96, 98)	96 (94, 97)	-

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

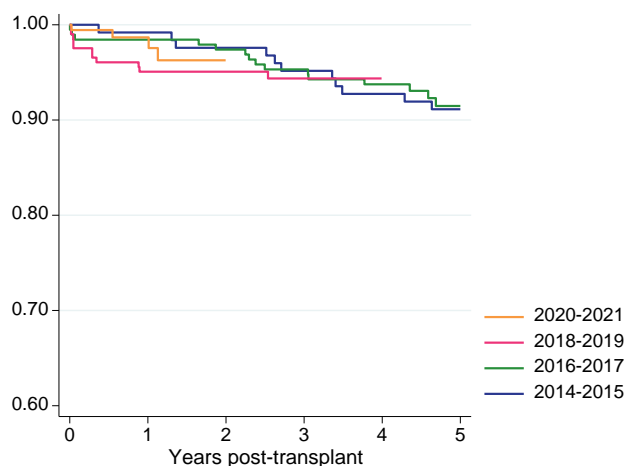


Figure 7.17 - Primary Deceased Donor Grafts - Graft Survival - New Zealand

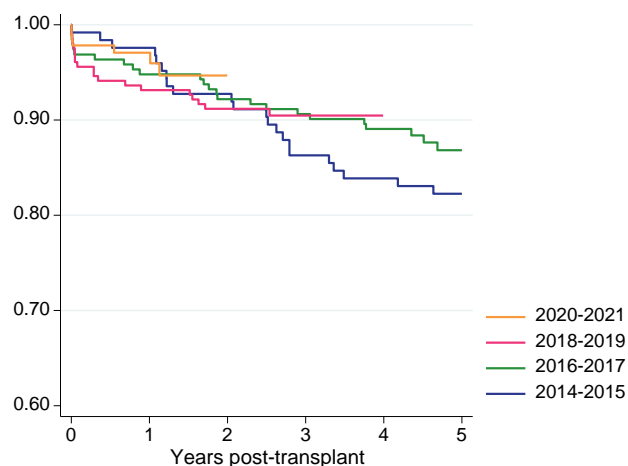


Table 7.20 Primary Deceased Donor Grafts - New Zealand 2014-2021

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2014-2015 (n=124)	100	99 (94, 100)	99 (94, 100)	91 (85, 95)
	2016-2017 (n=192)	98 (95, 99)	98 (95, 99)	98 (95, 99)	91 (86, 95)
	2018-2019 (n=204)	98 (94, 99)	96 (92, 98)	95 (91, 97)	-
	2020-2021 (n=185)	99 (96, 100)	99 (96, 100)	99 (95, 100)	-
Graft survival	2014-2015 (n=124)	99 (94, 100)	98 (94, 100)	98 (93, 99)	82 (74, 88)
	2016-2017 (n=192)	97 (93, 99)	96 (93, 98)	95 (91, 97)	87 (81, 91)
	2018-2019 (n=204)	96 (92, 98)	94 (90, 97)	93 (89, 96)	-
	2020-2021 (n=185)	98 (94, 99)	98 (94, 99)	97 (93, 99)	-

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

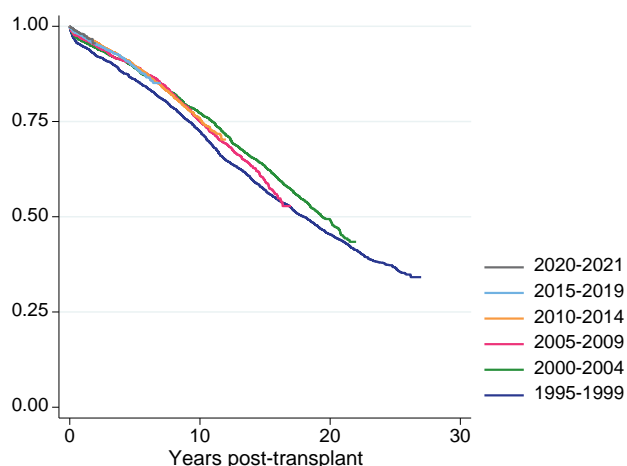


Figure 7.19 - Primary Deceased Donor Grafts - Graft Survival - Australia and New Zealand

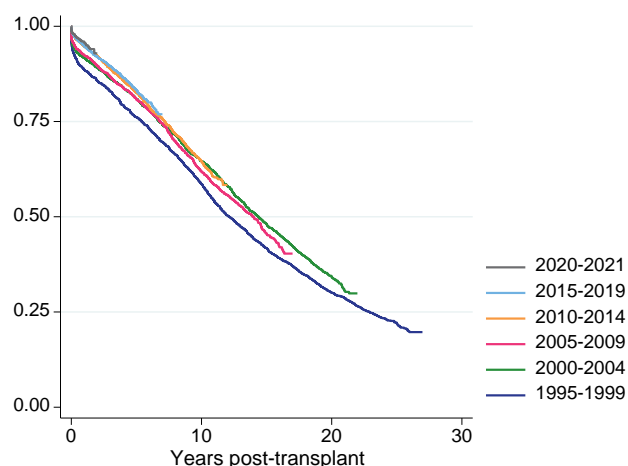


Table 7.21 Primary Deceased Donor Grafts - Australia and New Zealand 1995-2021

Outcome	Era	1 year	5 years	10 years	15 years	20 years
Patient survival	1995-1999 (n=1779)	95 (94, 96)	86 (84, 88)	72 (70, 74)	57 (55, 59)	45 (43, 48)
	2000-2004 (n=1849)	96 (95, 97)	89 (88, 90)	77 (75, 79)	63 (61, 66)	49 (47, 52)
	2005-2009 (n=1911)	97 (96, 97)	90 (88, 91)	75 (73, 77)	59 (57, 62)	-
	2010-2014 (n=2923)	98 (97, 98)	90 (88, 91)	76 (74, 77)	-	-
	2015-2019 (n=4081)	97 (97, 98)	89 (88, 90)	-	-	-
	2020-2021 (n=1382)	98 (97, 99)	-	-	-	-
Graft survival	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, 50)	34 (32, 37)
	2005-2009 (n=1911)	92 (91, 93)	81 (79, 83)	62 (60, 64)	46 (43, 48)	-
	2010-2014 (n=2923)	95 (94, 96)	83 (81, 84)	65 (63, 66)	-	-
	2015-2019 (n=4081)	95 (94, 95)	83 (82, 85)	-	-	-
	2020-2021 (n=1382)	96 (95, 97)	-	-	-	-

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

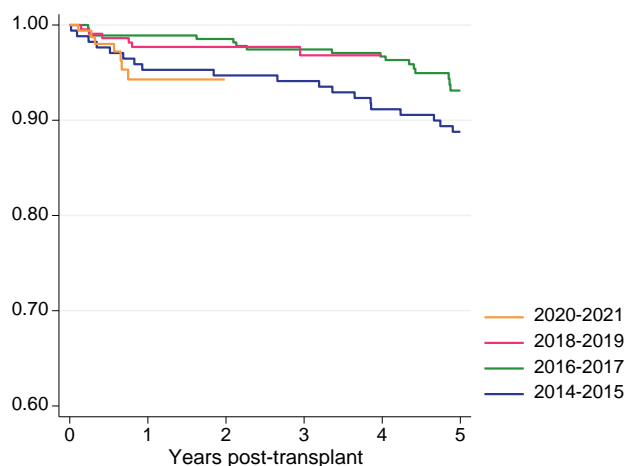


Figure 7.21 - Second and Subsequent Deceased Donor Grafts - Graft Survival - Australia and New Zealand

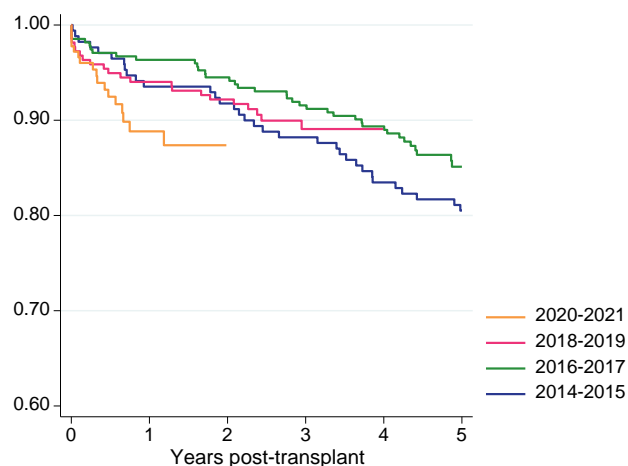


Table 7.22 Second and Subsequent Deceased Donor Grafts - Australia and New Zealand 2014-2021

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2014-2015 (n=170)	99 (96, 100)	98 (94, 99)	95 (91, 98)	89 (83, 93)
	2016-2017 (n=274)	100	99 (97, 100)	99 (97, 100)	93 (89, 96)
	2018-2019 (n=218)	100	99 (96, 100)	98 (95, 99)	-
	2020-2021 (n=179)	100	98 (94, 99)	94 (88, 97)	-
Graft survival	2014-2015 (n=170)	99 (95, 100)	97 (93, 99)	94 (89, 96)	81 (74, 86)
	2016-2017 (n=274)	99 (96, 99)	97 (94, 99)	96 (93, 98)	85 (80, 89)
	2018-2019 (n=218)	97 (94, 99)	95 (91, 97)	94 (90, 96)	-
	2020-2021 (n=179)	97 (93, 99)	92 (87, 96)	89 (82, 93)	-

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

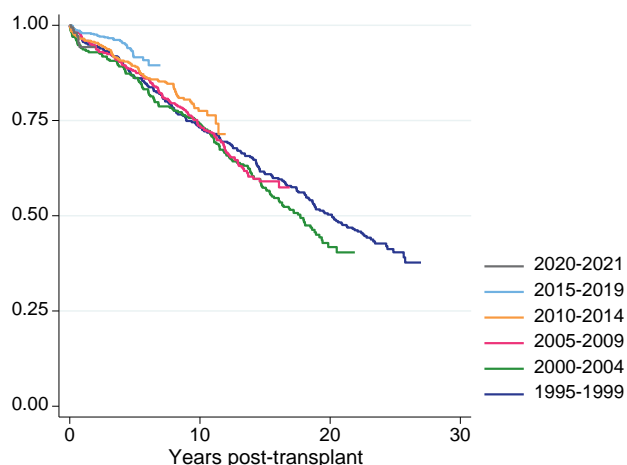


Figure 7.23 - Second and Subsequent Deceased Donor Grafts - Graft Survival - Australia and New Zealand

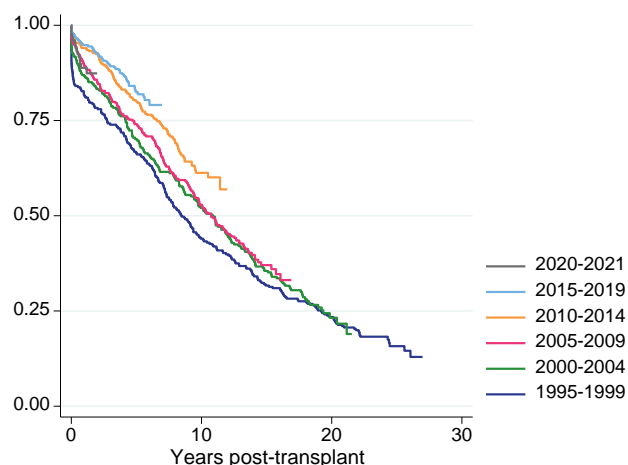


Table 7.23 Second and Subsequent Deceased Donor Grafts - Australia and New Zealand 1995-2021 (95% Confidence Intervals)

Outcome	Era	1 year	5 years	10 years	15 years	20 years
Patient survival	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)	42 (35, 48)
	2005-2009 (n=343)	96 (94, 98)	88 (84, 91)	74 (69, 78)	59 (53, 64)	-
	2010-2014 (n=370)	96 (94, 98)	89 (86, 92)	78 (72, 82)	-	-
	2015-2019 (n=577)	98 (96, 99)	92 (88, 94)	-	-	-
	2020-2021 (n=179)	94 (88, 97)	-	-	-	-
Graft survival	1995-1999 (n=295)	82 (77, 86)	66 (61, 72)	44 (38, 50)	32 (26, 37)	23 (19, 28)
	2000-2004 (n=268)	87 (82, 90)	70 (64, 75)	52 (46, 58)	36 (30, 41)	23 (18, 29)
	2005-2009 (n=343)	90 (86, 92)	74 (69, 78)	53 (47, 58)	37 (31, 43)	-
	2010-2014 (n=370)	94 (91, 96)	80 (76, 84)	61 (55, 67)	-	-
	2015-2019 (n=577)	95 (93, 96)	82 (78, 86)	-	-	-
	2020-2021 (n=179)	89 (82, 93)	-	-	-	-

Figure 7.24 - Primary Living Donor Grafts - Patient Survival - Australia

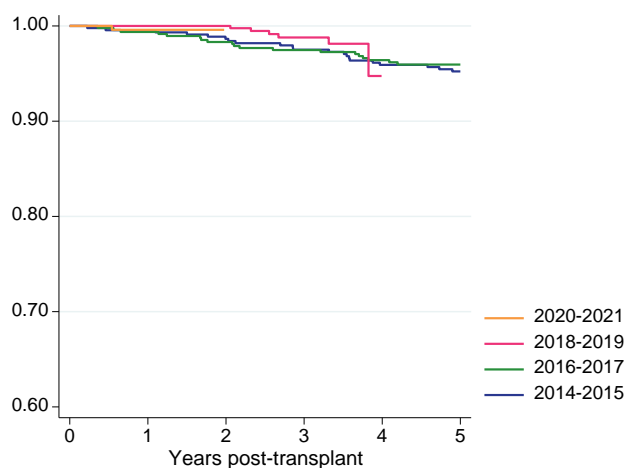


Figure 7.25 - Primary Living Donor Grafts - Graft Survival - Australia

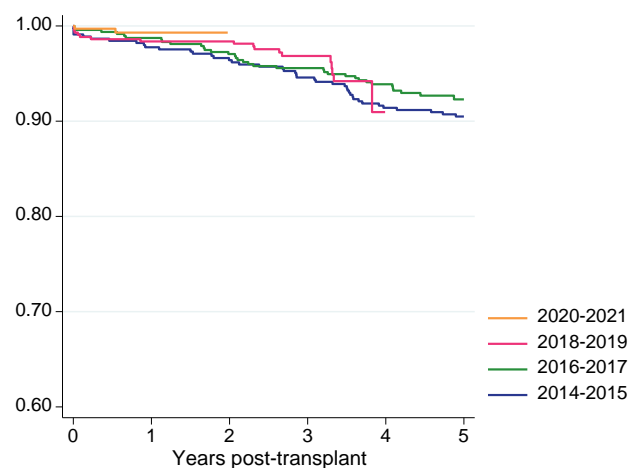


Table 7.24 Primary Living Donor Grafts - Australia 2014-2021 (95% Confidence Intervals)

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2014-2015 (n=449)	100	100 (98, 100)	100 (98, 100)	95 (93, 97)
	2016-2017 (n=476)	100	100 (99, 100)	99 (98, 100)	96 (94, 97)
	2018-2019 (n=431)	100	100	100	-
	2020-2021 (n=344)	100	100	100 (97, 100)	-
Graft survival	2014-2015 (n=449)	99 (98, 100)	98 (97, 99)	98 (96, 99)	90 (87, 93)
	2016-2017 (n=476)	100 (98, 100)	99 (98, 100)	99 (97, 99)	92 (89, 94)
	2018-2019 (n=431)	99 (98, 100)	99 (97, 99)	98 (97, 99)	-
	2020-2021 (n=344)	100 (98, 100)	100 (98, 100)	99 (97, 100)	-

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

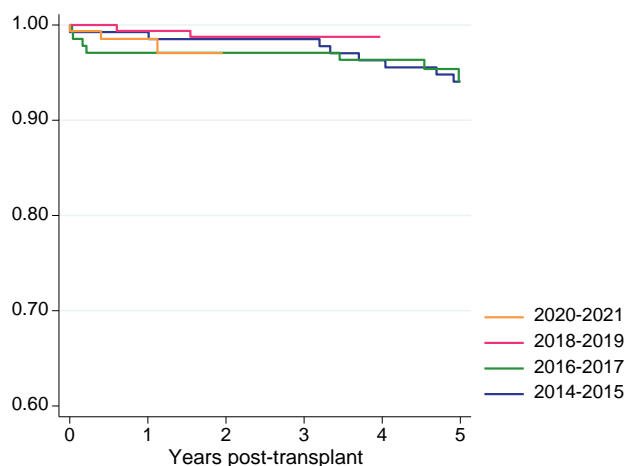


Figure 7.27 - Primary Living Donor Grafts - Graft Survival - New Zealand

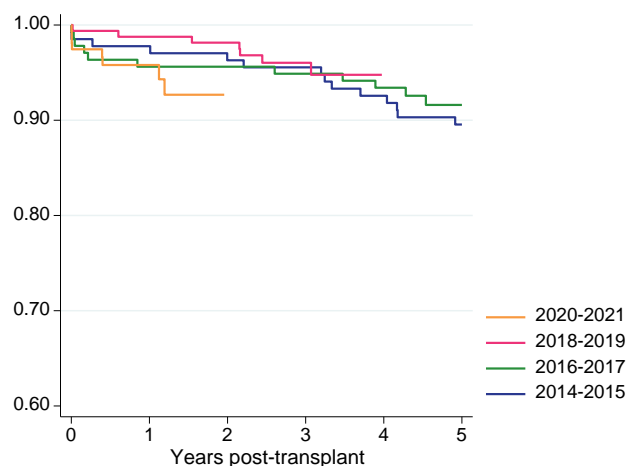


Table 7.25 Primary Living Donor Grafts - New Zealand 2014-2021 (95% Confidence Intervals)

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2014-2015 (n=135)	99 (95, 100)	99 (95, 100)	99 (95, 100)	94 (88, 97)
	2016-2017 (n=137)	99 (94, 100)	97 (92, 99)	97 (92, 99)	94 (88, 97)
	2018-2019 (n=162)	100	100	99 (96, 100)	-
	2020-2021 (n=157)	99 (96, 100)	99 (94, 100)	99 (94, 100)	-
Graft survival	2014-2015 (n=135)	99 (94, 100)	98 (93, 99)	98 (93, 99)	90 (83, 94)
	2016-2017 (n=137)	98 (93, 99)	96 (91, 98)	96 (91, 98)	92 (85, 95)
	2018-2019 (n=162)	99 (96, 100)	99 (96, 100)	99 (95, 100)	-
	2020-2021 (n=157)	97 (93, 99)	96 (91, 98)	96 (91, 98)	-

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

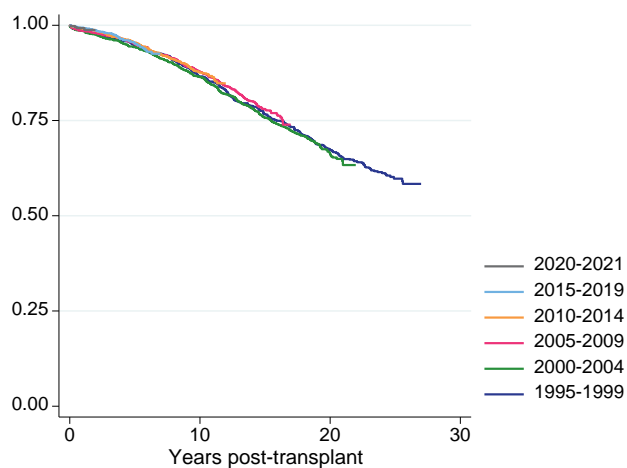


Figure 7.29 - Primary Living Donor Grafts - Graft Survival - Australia and New Zealand

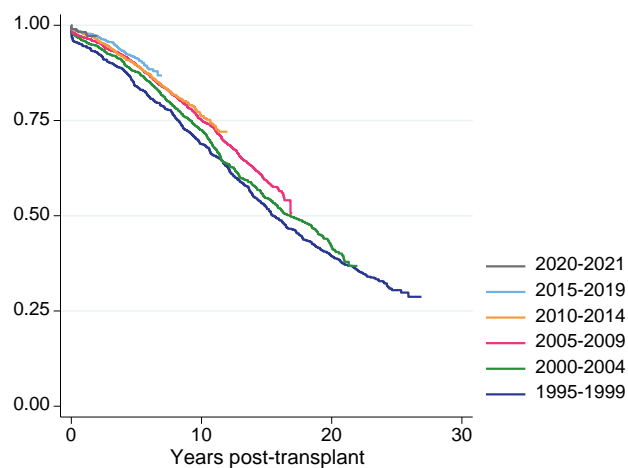


Table 7.26 Primary Living Donor Grafts - Australia and New Zealand 1995-2021 (95% Confidence Intervals)

Outcome	Era	1 year	5 years	10 years	15 years	20 years
Patient survival	1995-1999 (n=767)	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 (73, 78)	66 (63, 69)
	2005-2009 (n=1586)	99 (98, 99)	95 (94, 96)	88 (86, 89)	78 (76, 80)	-
	2010-2014 (n=1458)	99 (98, 99)	95 (94, 96)	88 (86, 89)	-	-
	2015-2019 (n=1486)	99 (99, 100)	95 (94, 96)	-	-	-
	2020-2021 (n=501)	99 (98, 100)	-	-	-	-
Graft survival	1995-1999 (n=767)	95 (93, 96)	84 (81, 86)	69 (65, 72)	52 (49, 56)	39 (36, 43)
	2000-2004 (n=1194)	96 (95, 97)	88 (86, 90)	72 (70, 75)	55 (52, 57)	42 (39, 45)
	2005-2009 (n=1586)	97 (96, 97)	90 (88, 91)	75 (73, 77)	59 (56, 62)	-
	2010-2014 (n=1458)	98 (97, 98)	90 (88, 91)	76 (74, 79)	-	-
	2015-2019 (n=1486)	98 (97, 99)	91 (90, 93)	-	-	-
	2020-2021 (n=501)	98 (96, 99)	-	-	-	-

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

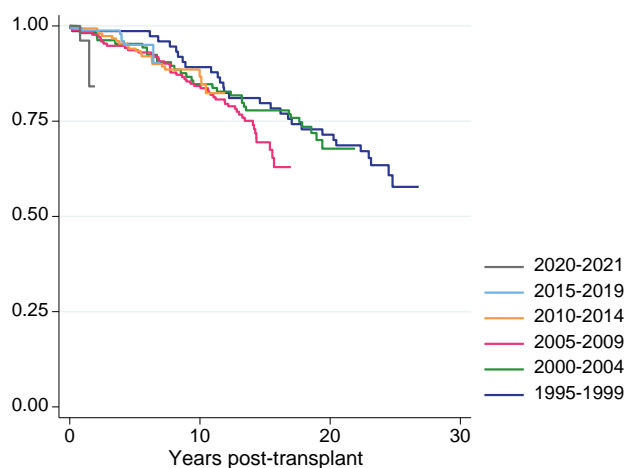


Figure 7.31 - Second and Subsequent Living Donor Grafts - Graft Survival - Australia and New Zealand

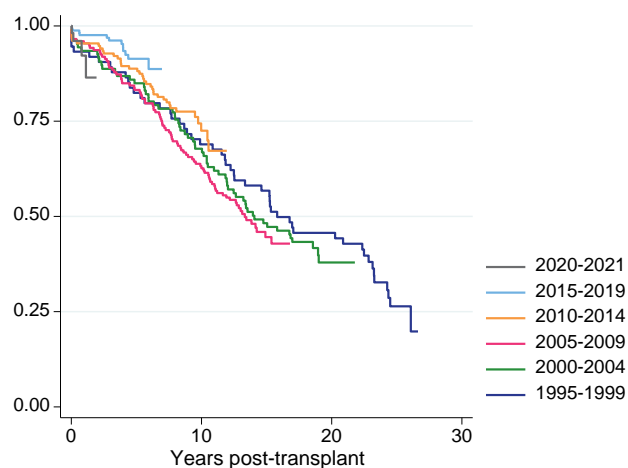


Table 7.27 Second and Subsequent Living Donor Grafts - Australia and New Zealand 1995-2021 (95% Confidence Intervals)

Outcome	Era	1 year	5 years	10 years	15 years	20 years
Patient survival	1995-1999 (n=74)	99 (91, 100)	99 (91, 100)	89 (80, 94)	80 (69, 87)	71 (60, 80)
	2000-2004 (n=107)	98 (93, 100)	95 (89, 98)	85 (76, 90)	78 (69, 85)	68 (56, 77)
	2005-2009 (n=175)	98 (95, 99)	94 (89, 96)	84 (78, 89)	69 (61, 77)	-
	2010-2014 (n=153)	99 (95, 100)	94 (89, 97)	87 (79, 92)	-	-
	2015-2019 (n=167)	99 (95, 100)	95 (89, 98)	-	-	-
	2020-2021 (n=54)	96 (76, 99)	-	-	-	-
Graft survival	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)	48 (38, 57)	38 (28, 48)
	2005-2009 (n=175)	95 (91, 98)	83 (77, 88)	63 (55, 69)	45 (36, 53)	-
	2010-2014 (n=153)	95 (91, 98)	89 (83, 93)	73 (63, 80)	-	-
	2015-2019 (n=167)	98 (94, 99)	91 (85, 95)	-	-	-
	2020-2021 (n=54)	92 (76, 98)	-	-	-	-

References

¹ Australian Bureau of Statistics, 2021, Quarterly Population Estimates (ERP), by State/Territory, Sex and Age, Jun 2021, viewed 22 Dec 2021, <https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/jun-2021>

² This work is based on/includes Stats NZ's data which are licensed by Stats NZ for re-use under the Creative Commons Attribution 4.0 International licence. Stats NZ, 2021, Estimated Resident Population by Age and Sex (1991+) (Annual-Jun), NZ Infoshare, viewed 5 Jan 2022, <http://infoshare.stats.govt.nz/>

³ Australian Bureau of Statistics, 2022, Regional Population by Age and Sex, Australia, 2021, viewed 14 Sep 2022, <https://www.abs.gov.au/statistics/people/population/regional-population-age-and-sex/2021>