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.

Contents

Summary and Highlights

There has been a decline in the number of deceased and living donor transplants performed in 2020 compared to the previous 5 years in Australia. It is the lowest number of total transplants performed since 2013. There were less deceased and living donor transplants performed in 2020 compared to 2019 in New Zealand. All Australian states/territories have seen a decrease in the transplant rate in 2020 from 2019 except South Australia/Northern Territory (Table 7.4). The reduced transplant activity is likely due to the impact of the COVID-19 pandemic (Table 7.1 and figures 7.1.1 and 7.1.12) with an apparent greater impact in precincts with higher case numbers. Of interest no patient in Australia or New Zealand received a transplant overseas in 2020 (Table 7.5)

There is variation in the transplant rate between Australia and New Zealand and between Australian states and territories. The transplant rate declines as age group increases (Figures 7.2-7.4). In Australia the transplant rate for Aboriginal and Torres Strait Islander people on dialysis is lower than for non-Aboriginal and Torres Strait Islander people on dialysis. In New Zealand the transplant rate for Māori people on dialysis is lower than for non-Māori people on dialysis. The proportion of total transplants that were for Aboriginal or Torres Strait Islander people in Australia increased over the last 5 years of reporting (Table 7.3). The proportion of total transplants that were for Māori people in New Zealand increased over the last 5 years of reporting (Table 7.3).

The highest incidence of transplantation per million population occurred in the 55-64 year age group in Australia and in New Zealand in 2020 (Figure 7.6) while the 5-14 year old age group has the highest proportion whose form of kidney replacement therapy is a functioning transplant (>80%) (Figure 7.9). As of 31 December 2020, Australia had 13130 people with a functioning kidney transplant while New Zealand had 2199 people with a functioning kidney transplant. New Zealand and all Australian states and territories have increased their number (pmp) of prevalent functioning transplants over the decade 2011 to 2020 (Table 7.7 and Figure 7.7). South Australia/Northern Territory has the highest number of prevalent transplants per capita in Australia.

In Australia and New Zealand, the rate of graft loss was 4.7 per 100 graft-years. This rate was lower than the average observed over the preceding 9 years (Table 7.10). The leading cause of graft loss in both countries was death with a functioning graft followed by chronic allograft nephropathy (Table 7.11), the latter term has now been replaced and therefore will not feature in future reports. The leading causes of death with function in the first 12 months post-transplant was infection or cardiovascular whilst after the first year death due to malignancy also became more frequent (Table 7.12).

The use of T-cell depleting antibody for transplant immunosuppression induction has increased from 6.6% in 2016 to 14.1% in 2020 in Australia (Table 7.13). The use of these agents has been static however in New Zealand and was 2.1% in 2020. Anti-CD25 induction was used in 98.9% of transplants in New Zealand and 80.0% of transplants in Australia.

Suggested Citation

ANZDATA Registry. 44th Report, Chapter 7: Kidney Transplantation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2021. Available at: http://www.anzdata.org.au

New Transplants

Table 7.1 shows the number of transplants performed in Australia and New Zealand over the last 20 years.

Table 7.1 Number of Grafts Performed by Country 2001-2020

Country	Year	Graft 1	Graft 2	Graft 3	Graft 4	Graft 5	Total Transplants	Living Donor Transplants
Australia	**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	1027	102	19	1	0	1149	238
	2019	987	92	23	2	0	1104	238
	2020	**804**	**70**	**10**	**1**	**0**	**885**	**181**
New Zealand	**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
	2019	196	24	1	0	0	221	91
	2020	**169**	**17**	**1**	**0**	**0**	**187**	**87**

Figure 7.1.1 - Deceased and Living Donor Transplants - Australia 2011-2020

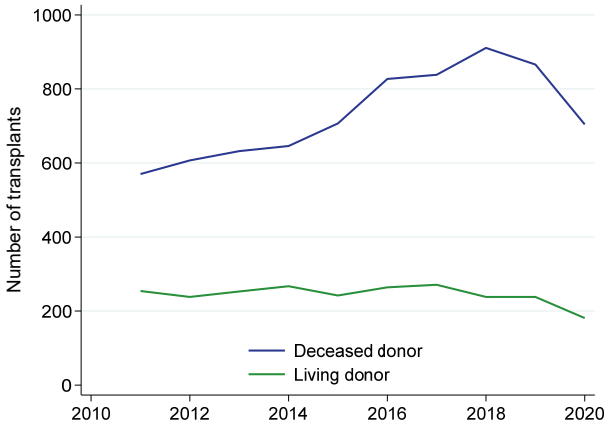
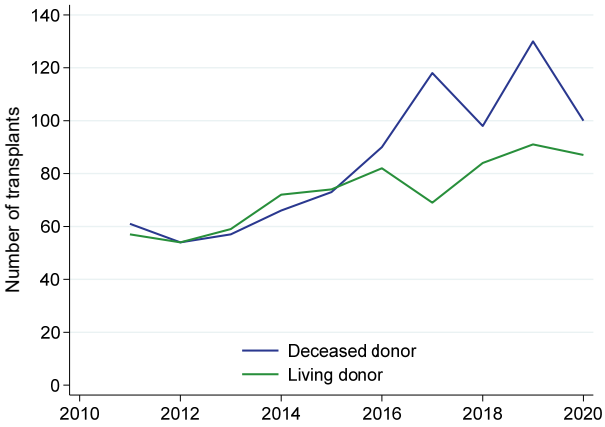


Figure 7.1.2 - Deceased and Living Donor Transplants - New Zealand 2011-2020



The transplant rate for dialysed patients is presented in figure 7.2 (for all dialysis patients) and figure 7.3 (for 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 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 2020 - All Dialysis Patients

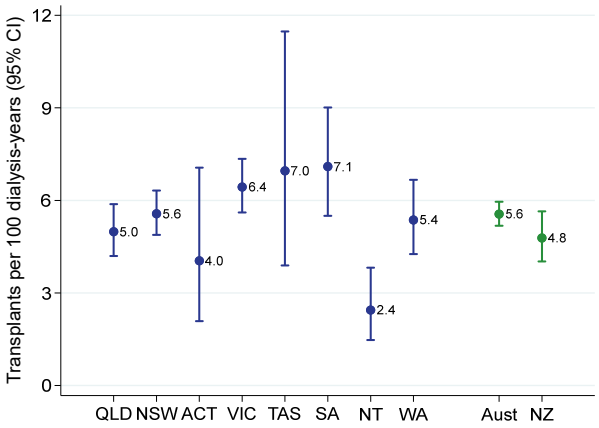


Figure 7.3 - Transplant Rate of Dialysed Patients 2020 - Patients Aged 15-64

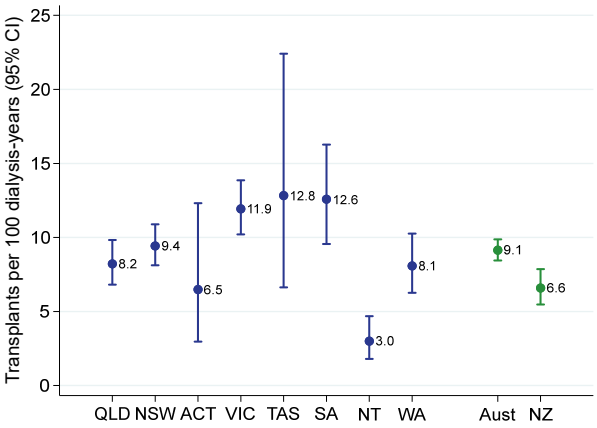


Figure 7.4.1 - Transplant Rate of Dialysed Patients By Age 2020 - Australia

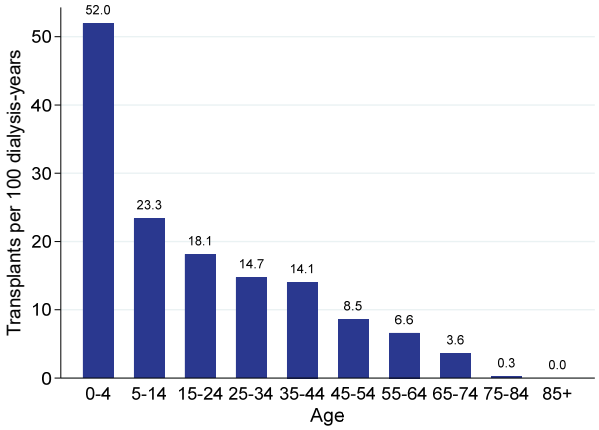


Figure 7.4.2 - Transplant Rate of Dialysed Patients By Age 2020 - New Zealand

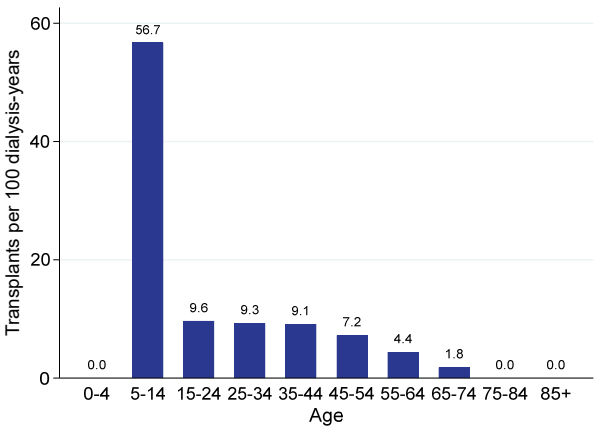


Figure 7.5.1 - Transplant Rate of Dialysed Patients By Ethnicity 2011-2020 - Australia, Patients Aged 15-64

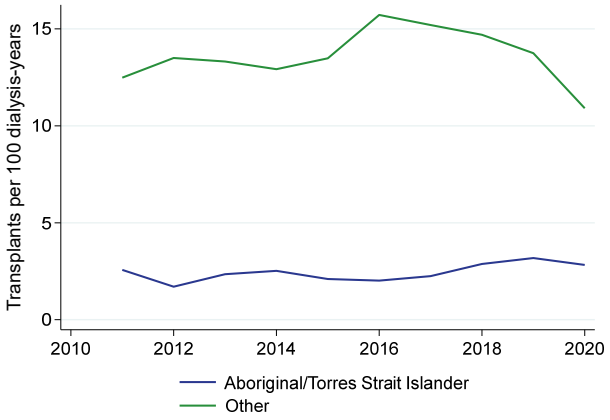


Figure 7.5.2 - Transplant Rate of Dialysed Patients By Ethnicity 2011-2020 - New Zealand, Patients Aged 15-64

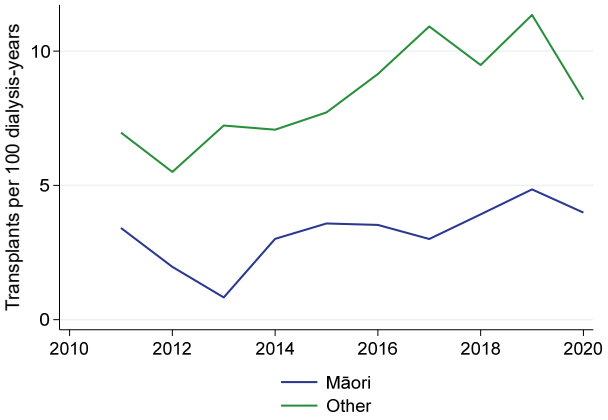


Table 7.2 shows the number of grafts performed according to donor type, graft number and recipient age in 2020. Transplant rates by age, per million population, are presented in figure 7.6.

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 (2020)[1] and Stats NZ (2020)[2].

Table 7.2 Age of Recipients Transplanted in 2020

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	4	5	15	52	104	153	173	123	8
		2	0	0	2	9	16	16	12	3	1
		3	0	0	1	2	1	0	1	2	0
		4	0	0	0	0	0	0	1	0	0
	Living	1	4	6	14	21	29	33	29	29	2
		2	0	1	1	1	1	4	2	1	0
		3	0	0	0	0	1	1	1	0	0
New Zealand	Deceased	1	0	4	0	8	16	21	30	10	0
		2	0	0	0	1	3	2	2	2	0
		3	0	0	0	0	0	1	0	0	0
	Living	1	1	1	8	7	12	22	18	10	1
		2	0	0	0	1	4	1	1	0	0

Figure 7.6.1 - Transplant Operations (Per Million Population) 2020 - Australia

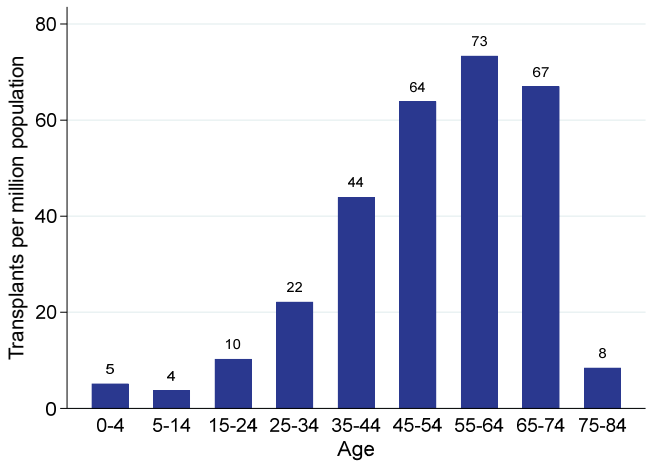


Figure 7.6.2 - Transplant Operations (Per Million Population) 2020 - New Zealand

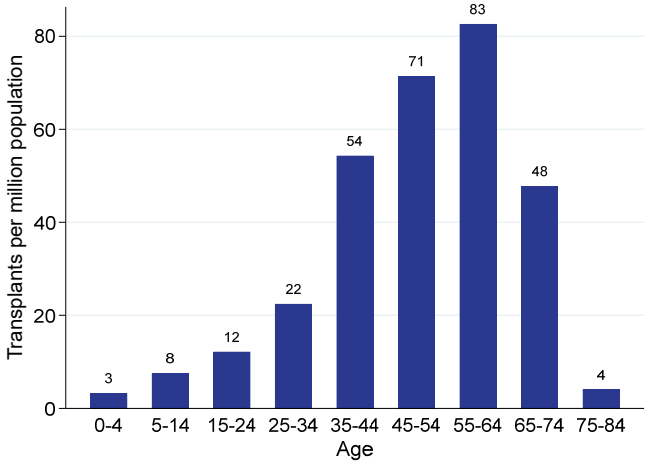


Table 7.3 shows the ethnicity of the recipients transplanted between 2016 and 2020.

Table 7.3 Ethnicity of Recipients Transplanted 2016-2020

Country	Ethnicity	2016	2017	2018	2019	2020
Australia	**Aboriginal/Torres Strait Islander**	34 (3.1%)	35 (3.2%)	52 (4.5%)	56 (5.1%)	48 (5.4%)
	Other	982 (90.0%)	1013 (91.3%)	1003 (87.3%)	977 (88.5%)	796 (89.9%)
	Not reported	75 (6.9%)	61 (5.5%)	94 (8.2%)	71 (6.4%)	41 (4.6%)
	Total	**1091**	**1109**	**1149**	**1104**	**885**
New Zealand	**Māori**	26 (15.1%)	23 (12.3%)	29 (15.9%)	35 (15.8%)	37 (19.8%)
	Other	143 (83.1%)	162 (86.6%)	150 (82.4%)	185 (83.7%)	149 (79.7%)
	Not reported	3 (1.7%)	2 (1.1%)	3 (1.6%)	1 (0.5%)	1 (0.5%)
	Total	**172**	**187**	**182**	**221**	**187**

Table 7.4 shows the number of transplants (per million population) performed by transplanting region over 2016-2020.

Table 7.4 Transplants (pmp) by Transplanting Region and Country 2016-2020

State	2016	2017	2018	2019	2020
NSW/ACT	348 (43)	367 (44)	393 (47)	350 (41)	292 (34)
VIC/TAS	352 (53)	364 (53)	418 (60)	351 (49)	267 (37)
QLD	199 (41)	190 (39)	177 (35)	207 (41)	143 (28)
SA/NT	95 (49)	70 (36)	69 (35)	93 (47)	93 (46)
WA	97 (38)	118 (46)	92 (35)	103 (39)	90 (34)
Australia	**1091 (45)**	**1109 (45)**	**1149 (46)**	**1104 (44)**	**885 (34)**
New Zealand	**172 (36)**	**187 (39)**	**182 (37)**	**221 (44)**	**187 (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 2011-2020 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 2011-2020

Year	Australia	New Zealand
2011	7	2
2012	4	1
2013	3	1
2014	3	0
2015	6	1
2016	3	1
2017	2	1
2018	3	1
2019	4	0
2020	**0**	**0**

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 2020 (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 2020

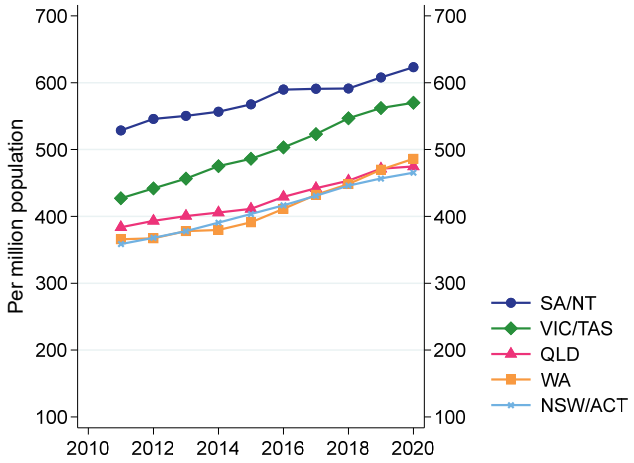
Country	Donor type	Graft number	Performed	Functioning
Australia	Living	1	6208	3856
		2	587	330
		3	86	53
		4	11	6
		5	1	0
	Deceased	1	18775	7809
		2	2634	892
		3	412	128
		4	62	16
		5	6	0
	Unknown	1	0	36
		2	0	4
New Zealand	Living	1	1569	971
		2	127	77
		3	7	4
		4	1	1
	Deceased	1	2945	1011
		2	464	112
		3	80	14
		4	8	1
	Unknown	1	0	8

Table 7.7 presents the number of functioning transplants at the end of 2011-2020 by transplant region, based on the location of the treating hospital. These data are shown graphically in figure 7.7.

Table 7.7 Functioning Transplants (pmp) by Transplanting Region 2011-2020

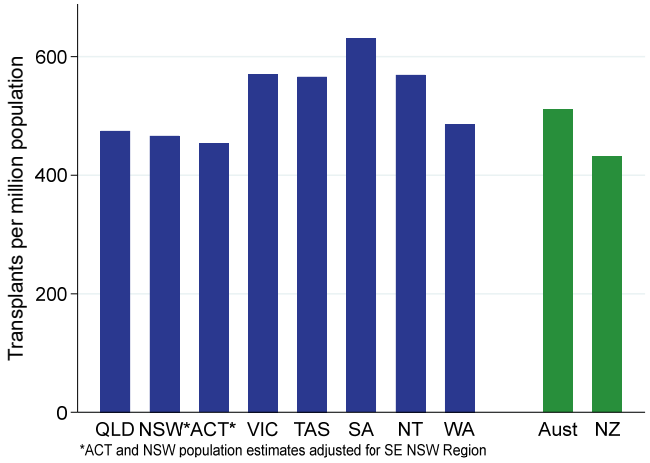
Year	NSW/ACT	VIC/TAS	QLD	SA/NT	WA	Australia	New Zealand
2011	2721 (359)	2584 (427)	1718 (384)	989 (529)	861 (366)	8873 (397)	1489 (340)
2012	2826 (368)	2723 (442)	1797 (393)	1033 (546)	891 (367)	9270 (408)	1527 (346)
2013	2943 (378)	2869 (456)	1864 (401)	1053 (550)	940 (378)	9669 (418)	1578 (355)
2014	3085 (391)	3045 (475)	1915 (406)	1074 (557)	956 (380)	10075 (429)	1631 (361)
2015	3233 (404)	3179 (486)	1965 (411)	1104 (568)	994 (391)	10475 (440)	1709 (371)
2016	3389 (417)	3367 (503)	2080 (429)	1155 (590)	1051 (411)	11042 (457)	1789 (379)
2017	3567 (431)	3580 (523)	2179 (442)	1165 (591)	1113 (432)	11604 (472)	1896 (394)
2018	3747 (446)	3822 (547)	2271 (453)	1173 (591)	1163 (448)	12176 (487)	1977 (403)
2019	3888 (457)	4008 (562)	2401 (471)	1215 (608)	1233 (470)	12745 (503)	2098 (421)
2020	4000 (465)	4124 (570)	2456 (475)	1256 (623)	1294 (486)	13130 (511)	2199 (432)

Figure 7.7 - Functioning Transplants Per Million Population by Transplanting Region - Australia 2011-2020



Prevalence of functioning transplants per million population at 31st December 2020 by state/territory is shown in figure 7.8. State/territory is based on the state of the treating hospital.

Figure 7.8 - Prevalence of Functioning Transplants 31 Dec 2020 - 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 (2021)[3].*

The percentage of prevalent renal replacement therapy 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 2020

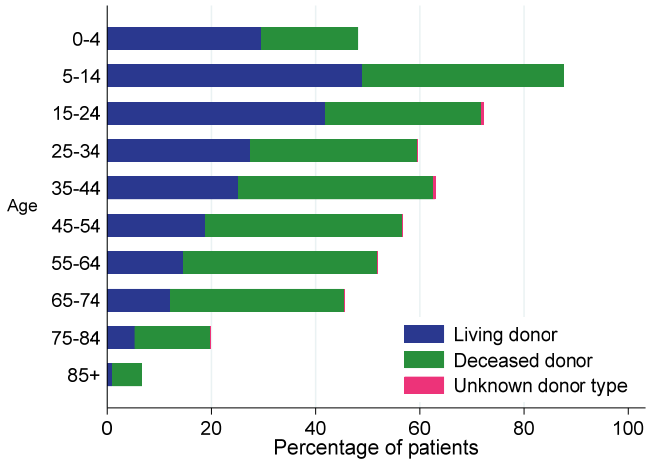


Figure 7.9.2 - Percentage of KRT Patients with a Functioning Transplant - By Age, New Zealand 2020

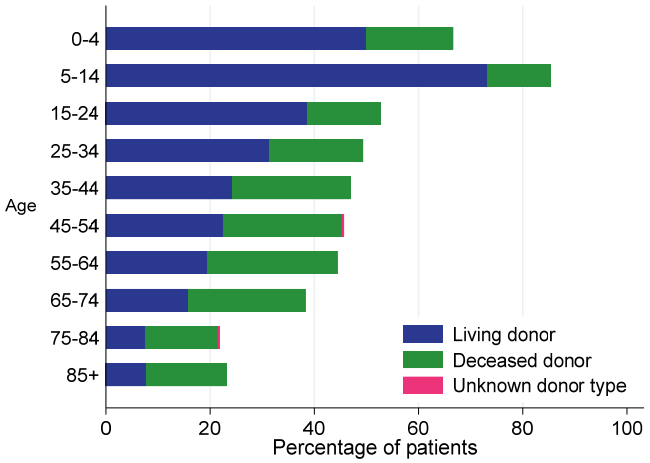


Table 7.8 Age Distribution of Functioning Transplant Patients - 31 Dec 2020

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**	**All**	**13**	**163**	**352**	**786**	**1610**	**2766**	**3486**	**3122**	**784**	**48**	**13130**
Australia	**Unknown**	**1**	-	-	2	2	7	7	9	8	1	-	36
		2	-	-	-	-	3	1	-	-	-	-	4
		All	**-**	**-**	**2**	**2**	**10**	**8**	**9**	**8**	**1**	**-**	**40**
	Deceased	**1**	5	68	125	339	815	1559	2204	2101	553	40	7809
		2	-	4	19	72	123	233	252	166	22	1	892
		3	-	-	2	11	17	42	40	15	1	-	128
		4	-	-	-	-	3	7	6	-	-	-	16
		All	**5**	**72**	**146**	**422**	**958**	**1841**	**2502**	**2282**	**576**	**41**	**8845**
	Living	**1**	8	90	186	332	573	803	890	770	198	6	3856
		2	-	1	17	28	58	89	72	55	9	1	330
		3	-	-	1	2	10	23	11	6	-	-	53
		4	-	-	-	-	1	2	2	1	-	-	6
		All	**8**	**91**	**204**	**362**	**642**	**917**	**975**	**832**	**207**	**7**	**4245**
New Zealand	**All**	**All**	**4**	**35**	**60**	**159**	**273**	**461**	**635**	**465**	**101**	**6**	**2199**
	Unknown	**1**	-	-	-	-	-	3	2	2	1	-	8
		All	**-**	**-**	**-**	**-**	**-**	**3**	**2**	**2**	**1**	**-**	**8**
	Deceased	**1**	1	5	13	50	119	193	314	251	61	4	1011
		2	-	-	3	8	13	30	36	19	3	-	112
		3	-	-	-	-	-	8	4	1	1	-	14
		4	-	-	-	-	-	-	1	-	-	-	1
		All	**1**	**5**	**16**	**58**	**132**	**231**	**355**	**271**	**65**	**4**	**1138**
	Living	**1**	3	30	44	91	124	197	261	184	35	2	971
		2	-	-	-	10	17	27	15	8	-	-	77
		3	-	-	-	-	-	2	2	-	-	-	4
		4	-	-	-	-	-	1	-	-	-	-	1
		All	**3**	**30**	**44**	**101**	**141**	**227**	**278**	**192**	**35**	**2**	**1053**

Figure 7.10.1 - Age Distribution of Functioning Transplants - Australia 2020 (n=13130)

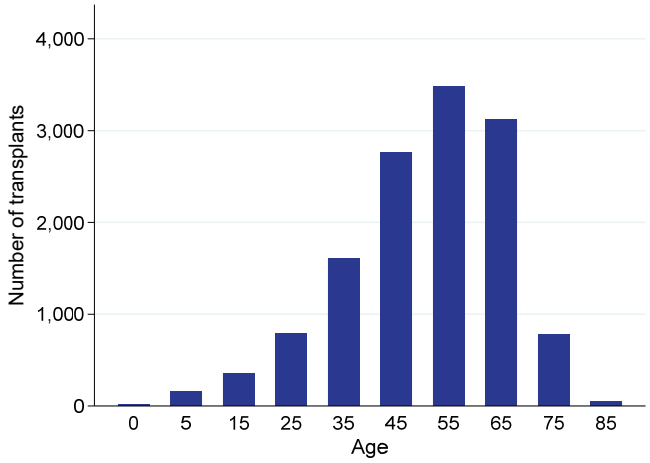


Figure 7.10.2 - Age Distribution of Functioning Transplants - Per Million Population, Australia 2020

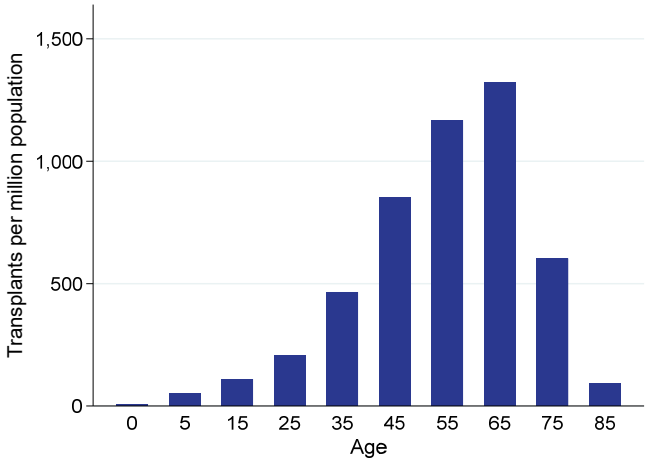


Figure 7.11.1 - Age Distribution of Functioning Transplants - New Zealand 2020 (n=2199)

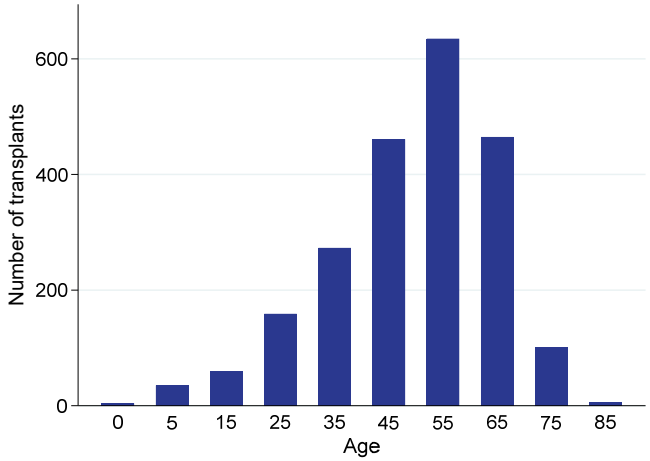


Figure 7.11.2 - Age Distribution of Functioning Transplants - Per Million Population, New Zealand 2020

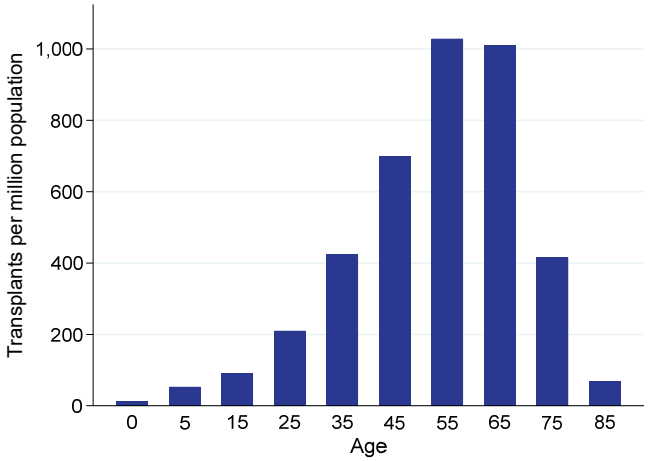


Table 7.9 presents the number of prevalent patients with a functioning transplant by gender, ethnicity and age.

Table 7.9 Functioning Transplant Patients Related to Ethnicity and Age Group - 31 Dec 2020

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**	**13**	**163**	**352**	**786**	**1610**	**2766**	**3486**	**3122**	**784**	**48**	**13130**
	Female	**Aboriginal /Torres Strait Islander**	-	1	8	20	19	47	44	17	1	-	157
		Other	4	46	112	277	591	954	1188	1010	294	21	4497
		Not reported	1	-	5	24	49	79	79	101	23	1	362
		Total	**5**	**47**	**125**	**321**	**659**	**1080**	**1311**	**1128**	**318**	**22**	**5016**
	Male	**Aboriginal /Torres Strait Islander**	-	3	7	21	26	65	54	35	5	-	216
		Other	8	113	200	419	846	1483	1953	1821	427	24	7294
		Not reported	-	-	20	25	79	138	168	138	34	2	604
		Total	**8**	**116**	**227**	**465**	**951**	**1686**	**2175**	**1994**	**466**	**26**	**8114**
New Zealand	**All**	**Total**	**4**	**35**	**60**	**159**	**273**	**461**	**635**	**465**	**101**	**6**	**2199**
	Female	**Māori**	-	3	4	13	26	21	23	11	6	1	108
		Other	1	10	18	63	92	158	224	166	32	3	767
		Not reported	-	-	-	-	-	2	1	-	-	-	3
		Total	**1**	**13**	**22**	**76**	**118**	**181**	**248**	**177**	**38**	**4**	**878**
	Male	**Māori**	-	4	3	8	23	24	58	35	5	-	160
		Other	3	18	33	75	131	253	325	253	58	2	1151
		Not reported	-	-	2	-	1	3	4	-	-	-	10
		Total	**3**	**22**	**38**	**83**	**155**	**280**	**387**	**288**	**63**	**2**	**1321**

Figure 7.12 shows the duration of function of prevalent transplants at the end of 2020. In Australia there were 4887 grafts that had functioned for ≥10 years, 1371 ≥20 years and 327 ≥30 years. In New Zealand there were 797 grafts that had functioned for ≥10 years, 254 ≥20 years and 59 ≥30 years.

Figure 7.12.1 - Number of Functioning Grafts by Graft Duration - Australia 2020 (n=13130)

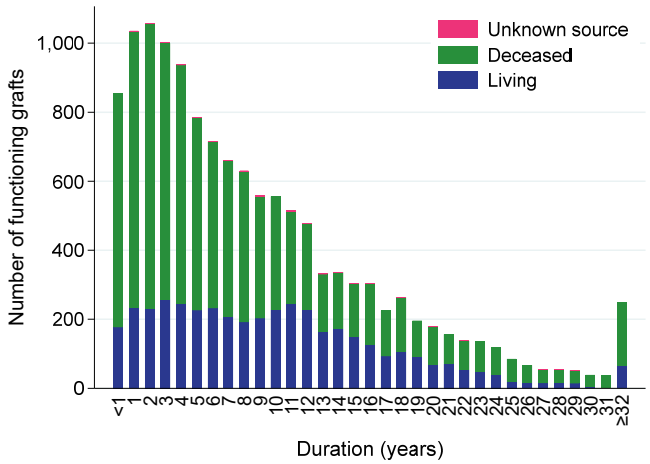
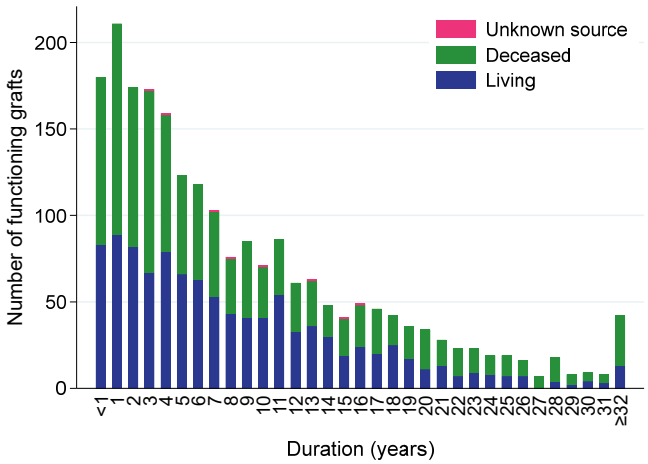


Figure 7.12.2 - Number of Functioning Grafts by Graft Duration - New Zealand 2020 (n=2199)



Graft Loss

Table 7.10 presents the overall graft loss rate in 2011-2020 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 2011-2020

Country	Outcome	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Australia	Graft failure	2.8	3.0	2.6	2.8	3.0	2.7	2.9	3.1	2.6	2.4
	Death with function	2.7	2.1	2.7	2.4	2.5	2.6	2.5	2.5	2.4	2.3
	All losses	**5.5**	**5.1**	**5.3**	**5.2**	**5.6**	**5.2**	**5.3**	**5.6**	**5.0**	**4.7**
New Zealand	Graft failure	2.2	2.6	2.3	2.9	2.0	2.7	2.1	2.8	2.4	2.6
	Death with function	2.9	2.1	2.1	2.9	2.7	3.1	3.0	2.9	3.4	2.1
	All losses	**5.1**	**4.7**	**4.4**	**5.7**	**4.7**	**5.8**	**5.1**	**5.7**	**5.7**	**4.7**

The causes of graft loss over 2011-2020 are presented in table 7.11. The Registry has recently updated the reportable causes of graft loss which will be reflected in future reporting. These data are further categorised by timing post-transplant (first year versus later years) for 2016-2020 in table 7.12.

Table 7.11 Causes of Graft Loss 2011-2020

Country	Cause of graft loss	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Australia	Death with function	223	176	233	216	231	244	243	256	250	241	2313
	Acute rejection	10	10	13	11	16	14	14	18	11	14	131
	Chronic allograft nephropathy	156	177	155	167	189	155	147	182	126	143	1597
	Hyperacute rejection	-	-	-	1	-	1	1	-	2	1	6
	Vascular	6	10	9	7	12	9	4	16	12	10	95
	Technical	5	2	-	6	2	6	6	4	4	6	41
	Glomerulonephritis	15	17	16	12	20	19	18	13	15	12	157
	Non-compliance	6	8	9	14	3	8	16	17	8	7	96
	Other	27	29	22	29	36	34	43	46	49	54	369
	Not reported	-	-	-	-	-	7	33	23	43	9	115
	Total	**448**	**429**	**457**	**463**	**509**	**497**	**525**	**575**	**520**	**497**	**4920**
New Zealand	Death with function	40	30	30	43	42	50	50	50	61	39	435
	Acute rejection	3	1	2	3	1	2	2	4	5	2	25
	Chronic allograft nephropathy	15	26	21	28	22	26	17	31	18	27	231
	Hyperacute rejection	-	-	-	-	-	-	-	-	-	-	0
	Vascular	2	2	2	1	-	3	1	-	2	1	14
	Technical	-	-	-	1	1	2	-	-	1	4	9
	Glomerulonephritis	4	5	1	2	2	2	5	1	3	1	26
	Non-compliance	3	-	4	6	-	-	1	3	4	4	25
	Other	4	3	4	2	5	6	4	8	2	4	42
	Not reported	-	-	-	-	-	3	5	2	8	6	24
	Total	**71**	**67**	**64**	**86**	**73**	**94**	**85**	**99**	**104**	**88**	**831**

Table 7.12 Graft Losses 2016-2020

Country	Outcome	Cause of death or graft failure	First year	Beyond first year	Total
Australia	Death with function	Cardiovascular	24 (29%)	258 (22%)	282 (23%)
		Withdrawal	4 (5%)	67 (6%)	71 (6%)
		Cancer	6 (7%)	330 (29%)	336 (27%)
		Infection	27 (33%)	153 (13%)	180 (15%)
		Other	20 (24%)	319 (28%)	339 (27%)
		Not reported	2 (2%)	24 (2%)	26 (2%)
		Total	**83 (100%)**	**1151 (100%)**	**1234 (100%)**
	Graft Failure	Acute rejection	20 (14%)	51 (4%)	71 (5%)
		Chronic allograft nephropathy	10 (7%)	743 (60%)	753 (55%)
		Hyperacute rejection	5 (3%)	-	5 (<1%)
		Vascular	34 (23%)	17 (1%)	51 (4%)
		Technical	20 (14%)	6 (<1%)	26 (2%)
		Glomerulonephritis	4 (3%)	73 (6%)	77 (6%)
		Non-compliance	3 (2%)	53 (4%)	56 (4%)
		Other	45 (31%)	181 (15%)	226 (16%)
		Not reported	6 (4%)	109 (9%)	115 (8%)
		Total	**147 (100%)**	**1233 (100%)**	**1380 (100%)**
New Zealand	Death with function	Cardiovascular	8 (50%)	73 (31%)	81 (32%)
		Withdrawal	1 (6%)	7 (3%)	8 (3%)
		Cancer	1 (6%)	61 (26%)	62 (25%)
		Infection	4 (25%)	30 (13%)	34 (14%)
		Other	2 (13%)	56 (24%)	58 (23%)
		Not reported	-	7 (3%)	7 (3%)
		Total	**16 (100%)**	**234 (100%)**	**250 (100%)**
	Graft Failure	Acute rejection	1 (4%)	14 (7%)	15 (7%)
		Chronic allograft nephropathy	1 (4%)	118 (61%)	119 (54%)
		Vascular	6 (24%)	1 (1%)	7 (3%)
		Technical	5 (20%)	2 (1%)	7 (3%)
		Glomerulonephritis	3 (12%)	9 (5%)	12 (5%)
		Non-compliance	-	12 (6%)	12 (5%)
		Other	7 (28%)	17 (9%)	24 (11%)
		Not reported	2 (8%)	22 (11%)	24 (11%)
		Total	**25 (100%)**	**195 (100%)**	**220 (100%)**

Immunosuppression

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

Table 7.13 Antibody Use for Induction Immunosuppression 2016-2020; Number of Kidney Transplant Recipients Receiving Each Agent by Year (% Total New Transplants)

Country	Type of agent	2016	2017	2018	2019	2020
Australia	Intravenous immunoglobulin	16 (1.5%)	39 (3.5%)	34 (3.0%)	32 (2.9%)	11 (1.2%)
	Anti-CD25	841 (77.1%)	926 (83.5%)	1043 (90.8%)	872 (79.0%)	708 (80.0%)
	Rituximab	4 (0.4%)	9 (0.8%)	2 (0.2%)	6 (0.5%)	4 (0.5%)
	T cell depleting polyclonal Ab	72 (6.6%)	58 (5.2%)	73 (6.4%)	139 (12.6%)	125 (14.1%)
	Other	-	3 (0.3%)	4 (0.3%)	3 (0.3%)	2 (0.2%)
	Not reported	170 (15.6%)	104 (9.4%)	35 (3.0%)	104 (9.4%)	52 (5.9%)
	Total new transplants	**1091**	**1109**	**1149**	**1104**	**885**
New Zealand	Anti-CD25	167 (97.1%)	185 (98.9%)	182 (100.0%)	217 (98.2%)	185 (98.9%)
	Rituximab	5 (2.9%)	11 (5.9%)	10 (5.5%)	12 (5.4%)	5 (2.7%)
	T cell depleting polyclonal Ab	6 (3.5%)	7 (3.7%)	2 (1.1%)	9 (4.1%)	4 (2.1%)
	Other	-	-	1 (0.5%)	-	-
	Not reported	1 (0.6%)	-	-	4 (1.8%)	-
	Total new transplants	**172**	**187**	**182**	**221**	**187**

Immunosuppressive therapy at baseline, 1 and 2 years post-transplant for primary grafts over 2013-2020 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 2013-2020

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of deceased donor grafts
Initial treatment	**2013**	4 (1%)	11 (2%)	539 (88%)	347 (61%)	207 (37%)	-	-	555 (98%)	567
	2014	2 (<1%)	11 (2%)	534 (89%)	358 (63%)	180 (32%)	1 (<1%)	11 (2%)	548 (96%)	568
	2015	3 (<1%)	5 (1%)	585 (89%)	377 (60%)	209 (33%)	-	9 (1%)	593 (94%)	630
	2016	-	3 (<1%)	611 (81%)	424 (61%)	200 (29%)	-	2 (<1%)	623 (89%)	697
	2017	-	2 (<1%)	677 (90%)	485 (68%)	196 (28%)	-	1 (<1%)	679 (96%)	710
	2018	3 (<1%)	3 (<1%)	758 (88%)	537 (66%)	228 (28%)	1 (<1%)	5 (1%)	773 (96%)	809
	2019	-	3 (<1%)	744 (88%)	506 (65%)	237 (31%)	1 (<1%)	3 (<1%)	738 (95%)	774
	2020	1 (<1%)	6 (1%)	611 (90%)	432 (68%)	181 (28%)	1 (<1%)	6 (1%)	604 (95%)	637
Treatment at 1 year	**2013**	18 (3%)	22 (4%)	474 (83%)	268 (50%)	199 (37%)	11 (2%)	3 (1%)	503 (94%)	535
	2014	23 (4%)	10 (2%)	482 (86%)	274 (52%)	168 (32%)	4 (1%)	22 (4%)	499 (94%)	530
	2015	22 (4%)	11 (2%)	500 (82%)	278 (48%)	189 (33%)	2 (<1%)	17 (3%)	516 (89%)	581
	2016	27 (4%)	20 (3%)	582 (83%)	355 (54%)	208 (32%)	5 (1%)	23 (4%)	606 (93%)	654
	2017	19 (3%)	11 (2%)	584 (80%)	339 (50%)	209 (31%)	9 (1%)	29 (4%)	611 (90%)	678
	2018	32 (4%)	9 (1%)	678 (79%)	418 (54%)	209 (27%)	9 (1%)	30 (4%)	694 (89%)	776
	2019	37 (5%)	12 (2%)	598 (70%)	344 (47%)	190 (26%)	8 (1%)	24 (3%)	614 (84%)	732
Treatment at 2 years	**2013**	21 (4%)	20 (4%)	445 (80%)	256 (49%)	192 (37%)	13 (2%)	7 (1%)	482 (93%)	521
	2014	29 (6%)	13 (3%)	442 (81%)	256 (50%)	155 (30%)	8 (2%)	21 (4%)	464 (90%)	515
	2015	35 (6%)	15 (3%)	492 (83%)	266 (47%)	185 (33%)	8 (1%)	21 (4%)	504 (89%)	566
	2016	32 (5%)	17 (3%)	534 (76%)	318 (50%)	185 (29%)	3 (<1%)	29 (5%)	556 (88%)	631
	2017	26 (4%)	13 (2%)	541 (74%)	304 (46%)	195 (30%)	13 (2%)	27 (4%)	574 (88%)	655
	2018	38 (5%)	7 (1%)	613 (72%)	349 (46%)	199 (26%)	12 (2%)	33 (4%)	627 (83%)	756

Table 7.14.2 Immunosuppressive Therapy - Primary Deceased Donor Grafts New Zealand 2013-2020

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of deceased donor grafts
Initial treatment	2013	-	45 (83%)	9 (17%)	53 (98%)	-	-	-	53 (98%)	54
	2014	-	44 (75%)	13 (21%)	58 (98%)	-	-	-	58 (98%)	59
	2015	-	51 (77%)	16 (25%)	64 (98%)	-	-	-	64 (98%)	65
	2016	1 (1%)	54 (68%)	22 (27%)	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 (39%)	112 (97%)	-	-	-	113 (98%)	115
	2020	-	48 (54%)	42 (47%)	88 (99%)	-	-	-	89 (100%)	89
Treatment at 1 year	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%)	64 (60%)	101 (94%)	-	-	-	105 (98%)	107
	2018	-	38 (45%)	44 (52%)	80 (95%)	-	-	-	82 (98%)	84
	2019	1 (1%)	38 (36%)	66 (61%)	98 (92%)	-	1 (1%)	-	105 (99%)	106
Treatment at 2 years	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	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%)	36 (43%)	45 (54%)	78 (94%)	-	-	-	80 (96%)	83

Table 7.15.1 Immunosuppressive Therapy - Primary Living Donor Grafts Australia 2013-2020

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of living donor grafts
Initial treatment	**2013**	1 (<1%)	10 (4%)	209 (88%)	140 (63%)	77 (34%)	-	-	221 (99%)	224
	2014	-	4 (2%)	216 (85%)	147 (62%)	74 (31%)	-	1 (<1%)	219 (92%)	237
	2015	1 (<1%)	3 (1%)	199 (85%)	122 (58%)	69 (33%)	-	10 (5%)	200 (94%)	212
	2016	-	6 (3%)	212 (82%)	161 (69%)	54 (23%)	-	-	216 (92%)	235
	2017	3 (1%)	1 (<1%)	227 (88%)	173 (72%)	53 (22%)	-	-	224 (93%)	241
	2018	-	2 (1%)	200 (84%)	147 (67%)	54 (25%)	-	1 (<1%)	203 (93%)	218
	2019	-	-	201 (85%)	142 (67%)	64 (30%)	-	1 (<1%)	207 (97%)	213
	2020	-	2 (1%)	162 (92%)	118 (71%)	47 (28%)	-	-	161 (96%)	167
at 1 year Treatment at 1 year	**2013**	9 (4%)	9 (4%)	190 (84%)	115 (53%)	76 (35%)	6 (3%)	2 (1%)	199 (93%)	215
	2014	11 (5%)	10 (4%)	198 (81%)	119 (52%)	69 (30%)	1 (<1%)	8 (4%)	209 (92%)	228
	2015	6 (3%)	3 (1%)	178 (79%)	94 (46%)	66 (32%)	2 (1%)	7 (3%)	174 (85%)	205
	2016	10 (4%)	9 (4%)	204 (79%)	142 (60%)	56 (24%)	3 (1%)	-	209 (89%)	235
	2017	12 (5%)	7 (3%)	193 (76%)	136 (58%)	50 (21%)	3 (1%)	8 (3%)	204 (87%)	234
	2018	11 (5%)	5 (2%)	175 (73%)	112 (53%)	53 (25%)	1 (<1%)	9 (4%)	185 (87%)	212
	2019	3 (1%)	2 (1%)	183 (74%)	113 (54%)	56 (27%)	1 (<1%)	6 (3%)	184 (87%)	211
Treatment at 2 years	**2013**	18 (8%)	9 (4%)	182 (81%)	101 (47%)	68 (32%)	7 (3%)	4 (2%)	187 (88%)	213
	2014	13 (6%)	7 (3%)	182 (75%)	111 (50%)	60 (27%)	1 (<1%)	13 (6%)	194 (87%)	224
	2015	6 (3%)	5 (2%)	172 (77%)	92 (46%)	68 (34%)	4 (2%)	9 (4%)	171 (85%)	201
	2016	14 (6%)	8 (4%)	187 (73%)	128 (56%)	47 (21%)	3 (1%)	4 (2%)	195 (86%)	228
	2017	20 (9%)	8 (3%)	188 (71%)	130 (56%)	50 (22%)	2 (1%)	9 (4%)	199 (86%)	232
	2018	12 (6%)	3 (1%)	175 (70%)	105 (50%)	49 (23%)	2 (1%)	9 (4%)	180 (85%)	212

Table 7.15.2 Immunosuppressive Therapy - Primary Living Donor Grafts New Zealand 2013-2020

Time	Year transplanted	AZA	CYC	TAC	MMF	MPA	SIR	EVE	PRE	Number of living donor grafts
Initial treatment	2013	1 (2%)	30 (53%)	26 (46%)	55 (96%)	1 (2%)	-	-	57 (100%)	57
	2014	-	42 (63%)	24 (35%)	66 (99%)	-	-	-	66 (99%)	67
	2015	1 (1%)	41 (60%)	27 (40%)	67 (99%)	-	1 (1%)	-	67 (99%)	68
	2016	-	47 (63%)	27 (35%)	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 (44%)	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
Treatment at 1 year	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%)	15 (26%)	42 (72%)	52 (90%)	-	-	-	58 (100%)	58
	2018	1 (1%)	28 (35%)	49 (57%)	72 (90%)	-	2 (3%)	-	78 (98%)	80
	2019	2 (3%)	17 (21%)	61 (76%)	73 (91%)	-	-	-	78 (98%)	80
Treatment at 2 years	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%)	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%)	49 (59%)	65 (82%)	-	1 (1%)	-	76 (96%)	79

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. Years shown are those in which 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 2010-2019

Donor Type	Graft Number	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Living donor	First	17.8%	17.5%	14.1%	19.2%	22.4%	17.1%	17.4%	19.1%	14.7%	9.9%
	Second and subsequent	12.9%	19.2%	10.0%	16.1%	28.6%	11.1%	16.7%	21.6%	13.0%	14.3%
Deceased donor	First	19.1%	20.0%	16.8%	18.5%	19.8%	17.7%	15.3%	18.5%	14.7%	13.2%
	Second and subsequent	28.6%	19.4%	24.4%	25.0%	25.9%	24.7%	18.6%	20.1%	22.5%	15.0%

Table 7.17 Antibody-Mediated Rejection Rates at Six Months Post-Transplant 2010-2019

Donor Type	Graft Number	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Living donor	First	3.7%	4.9%	2.3%	5.3%	4.6%	3.9%	3.9%	4.0%	5.0%	1.0%
	Second and subsequent	3.2%	11.5%	6.7%	3.2%	5.7%	5.6%	2.8%	8.1%	0.0%	14.3%
Deceased donor	First	5.4%	5.6%	3.9%	5.0%	5.1%	6.0%	5.8%	4.6%	2.7%	2.9%
	Second and subsequent	13.0%	11.3%	10.3%	10.3%	12.9%	17.6%	8.6%	9.7%	11.7%	7.5%

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 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 at risk during the year is also reported.

Table 7.18 Antibody Therapy for Acute Rejection 2016-2020

Country	Type of agent	2016	2017	2018	2019	2020
Australia	Intravenous immunoglobulin	123 (11.3%)	128 (11.5%)	86 (7.5%)	63 (5.7%)	76 (8.6%)
	Anti-CD25	1 (0.1%)	-	-	1 (0.1%)	-
	Rituximab	4 (0.4%)	7 (0.6%)	15 (1.3%)	8 (0.7%)	4 (0.5%)
	T cell depleting polyclonal Ab	23 (2.1%)	41 (3.7%)	30 (2.6%)	32 (2.9%)	42 (4.7%)
	Not specified	43 (3.9%)	31 (2.8%)	42 (3.7%)	18 (1.6%)	24 (2.7%)
	Total new transplants	1091	1109	1149	1104	885
	Total transplants at risk	11566	12151	12753	13280	13630
New Zealand	Intravenous immunoglobulin	6 (3.5%)	3 (1.6%)	3 (1.6%)	-	4 (2.1%)
	Rituximab	2 (1.2%)	-	-	-	1 (0.5%)
	T cell depleting polyclonal Ab	14 (8.1%)	13 (7.0%)	13 (7.1%)	16 (7.2%)	16 (8.6%)
	Not specified	-	2 (1.1%)	2 (1.1%)	2 (0.9%)	1 (0.5%)
	Total new transplants	172	187	182	221	187
	Total transplants at risk	1881	1976	2078	2198	2285

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

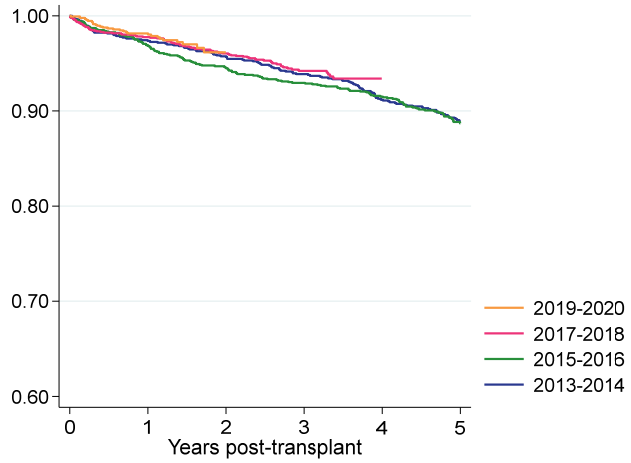


Figure 7.14 - Primary Deceased Donor Grafts - Graft Survival - Australia

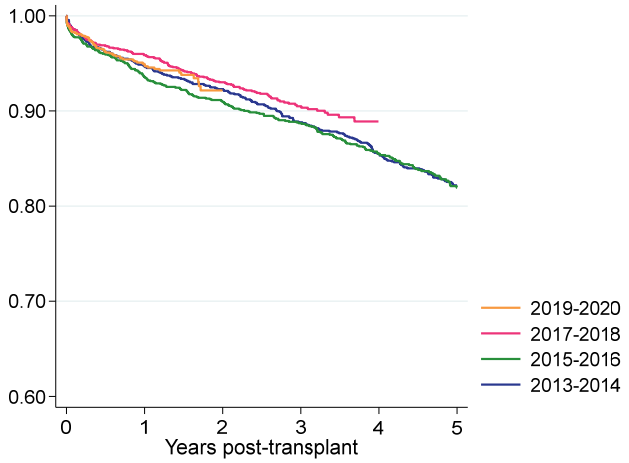


Table 7.19 Primary Deceased Donor Grafts - Australia 2013-2020

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	**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)	89 (87, 90)
	2017-2018 (n=1519)	99 (99, 100)	98 (97, 99)	98 (97, 98)	-
	2019-2020 (n=1411)	100 (99, 100)	99 (98, 99)	98 (97, 99)	-
Graft survival	**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)	82 (80, 84)
	2017-2018 (n=1519)	99 (98, 99)	97 (96, 98)	96 (95, 97)	-
	2019-2020 (n=1411)	98 (97, 99)	96 (95, 97)	95 (93, 96)	-

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

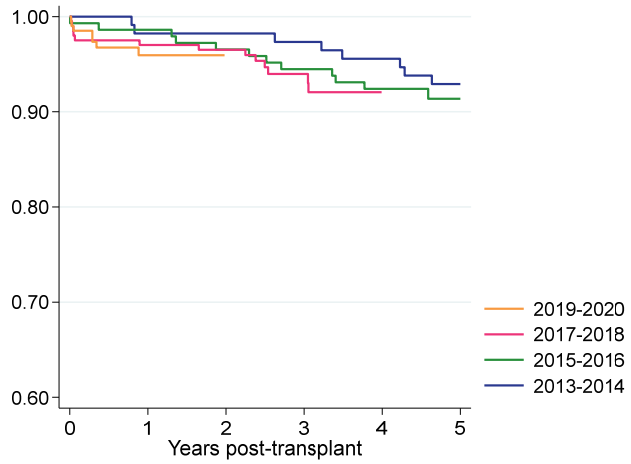


Figure 7.16 - Primary Deceased Donor Grafts - Graft Survival - New Zealand

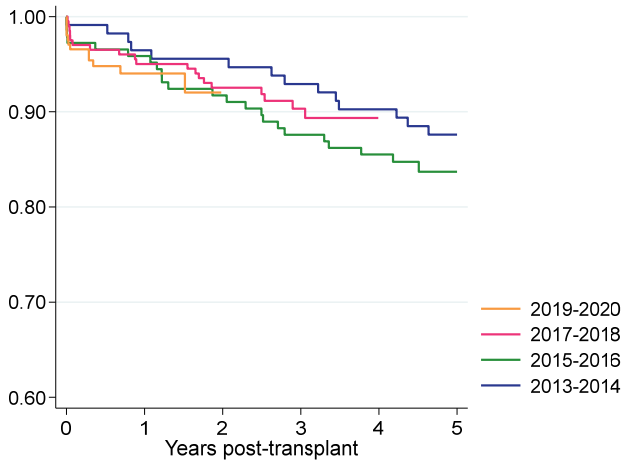


Table 7.20 Primary Deceased Donor Grafts - New Zealand 2013-2020

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	**2013-2014 (n=113)**	100	100	98 (93, 100)	93 (86, 96)
	2015-2016 (n=145)	99 (95, 100)	99 (95, 100)	99 (95, 100)	91 (85, 95)
	2017-2018 (n=201)	98 (94, 99)	98 (94, 99)	97 (93, 99)	-
	2019-2020 (n=204)	99 (95, 100)	97 (93, 99)	96 (92, 98)	-
Graft survival	**2013-2014 (n=113)**	99 (94, 100)	99 (94, 100)	96 (91, 99)	88 (80, 92)
	2015-2016 (n=145)	97 (93, 99)	97 (92, 99)	96 (91, 98)	84 (76, 89)
	2017-2018 (n=201)	97 (93, 99)	97 (93, 98)	95 (91, 97)	-
	2019-2020 (n=204)	97 (93, 98)	95 (91, 97)	94 (89, 97)	-

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

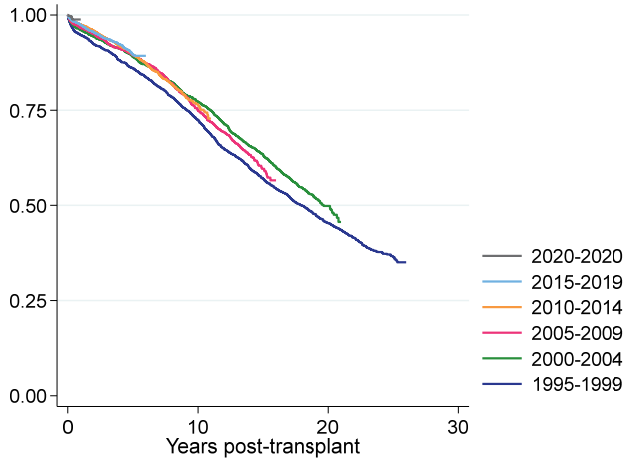


Figure 7.18 - Primary Deceased Donor Grafts - Graft Survival - Australia and New Zealand

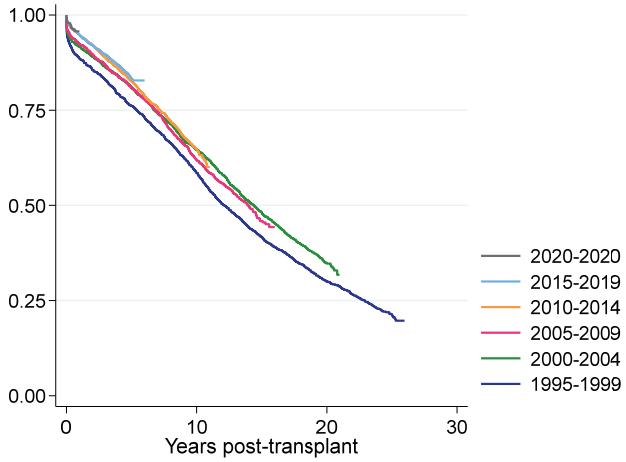


Table 7.21 Primary Deceased Donor Grafts - Australia and New Zealand 1995-2020

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)	50 (47, 52)
	2005-2009 (n=1911)	97 (96, 97)	90 (88, 91)	75 (73, 77)	60 (57, 62)	-
	2010-2014 (n=2923)	98 (97, 98)	90 (88, 91)	76 (74, 78)	-	-
	2015-2019 (n=4081)	97 (97, 98)	90 (88, 91)	-	-	-
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)	35 (32, 37)
	2005-2009 (n=1911)	92 (91, 93)	81 (79, 83)	62 (60, 64)	46 (43, 49)	-
	2010-2014 (n=2923)	95 (94, 96)	83 (81, 84)	65 (62, 67)	-	-
	2015-2019 (n=4081)	95 (94, 95)	83 (82, 85)	-	-	-

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

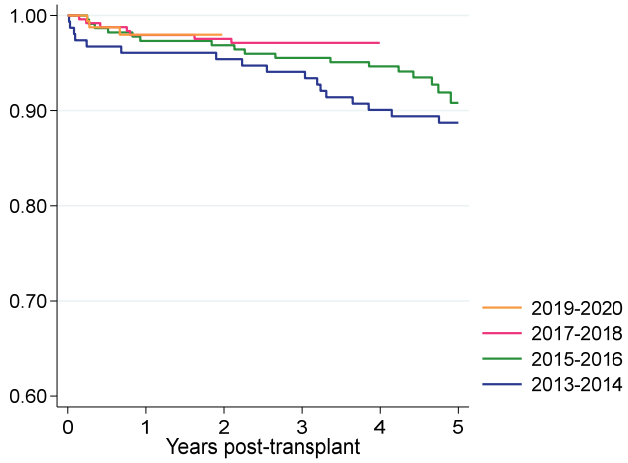


Figure 7.20 - Second and Subsequent Deceased Donor Grafts - Graft Survival - Australia and New Zealand

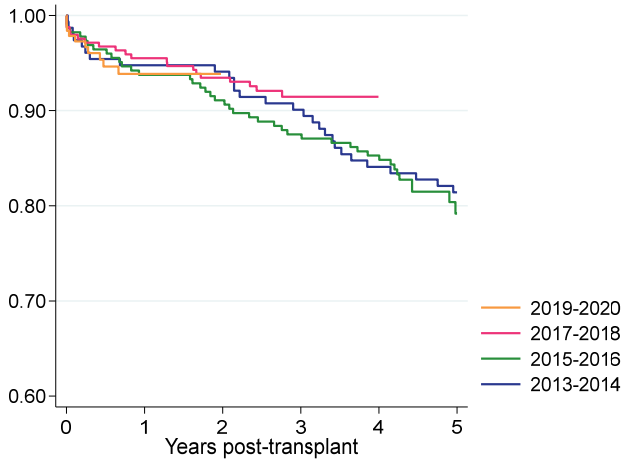


Table 7.22 Second and Subsequent Deceased Donor Grafts - Australia and New Zealand 2013-2020

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2013-2014 (n=153)	98 (94, 99)	97 (92, 99)	96 (91, 98)	89 (83, 93)
	2015-2016 (n=225)	100	99 (96, 100)	97 (94, 99)	91 (85, 94)
	2017-2018 (n=245)	100	99 (96, 100)	98 (95, 99)	-
	2019-2020 (n=185)	100	99 (95, 100)	98 (94, 99)	-
Graft survival	2013-2014 (n=153)	98 (94, 99)	95 (91, 98)	95 (90, 97)	81 (74, 87)
	2015-2016 (n=225)	98 (95, 99)	96 (93, 98)	94 (90, 96)	79 (72, 84)
	2017-2018 (n=245)	98 (95, 99)	97 (94, 98)	96 (92, 97)	-
	2019-2020 (n=185)	98 (94, 99)	95 (90, 97)	94 (89, 97)	-

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

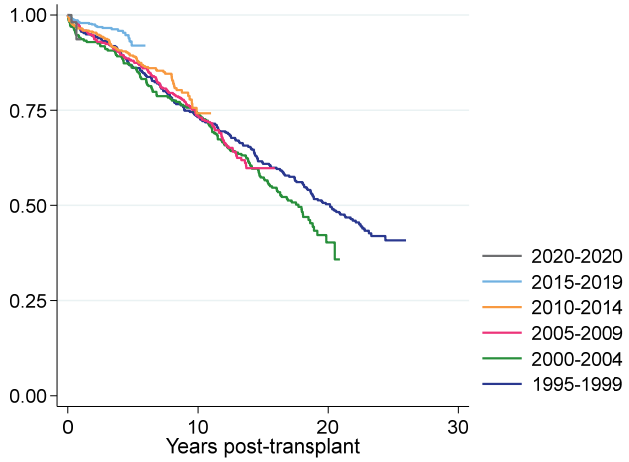


Figure 7.22 - Second and Subsequent Deceased Donor Grafts - Graft Survival - Australia and New Zealand

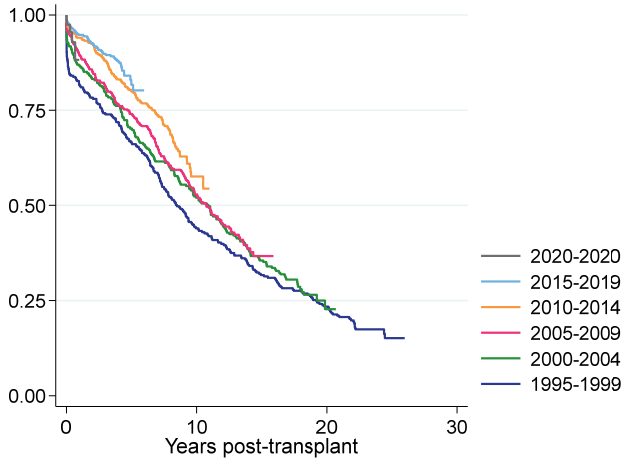


Table 7.23 Second and Subsequent Deceased Donor Grafts - Australia and New Zealand 1995-2020

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)	40 (33, 48)
	2005-2009 (n=343)	96 (94, 98)	88 (84, 91)	74 (69, 78)	60 (54, 65)	-
	2010-2014 (n=370)	96 (94, 98)	89 (86, 92)	74 (67, 80)	-	-
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 (16, 30)
	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)	58 (50, 64)	-	-

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

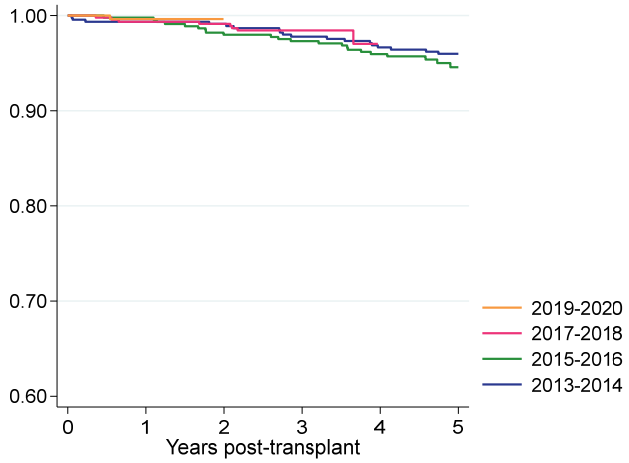


Figure 7.24 - Primary Living Donor Grafts - Graft Survival - Australia

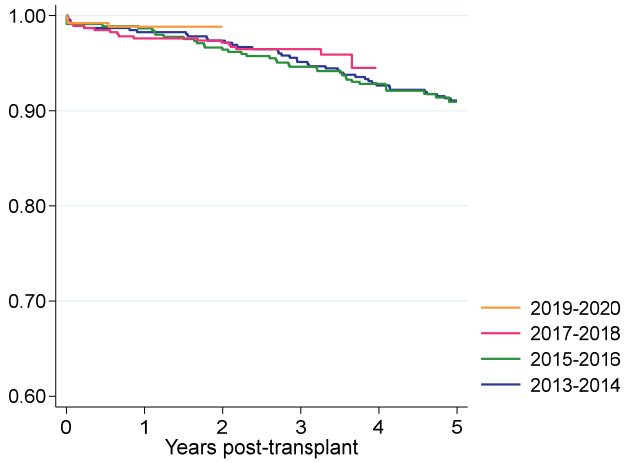


Table 7.24 Primary Living Donor Grafts - Australia 2013-2020

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	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)	95 (92, 96)
	2017-2018 (n=459)	100	100 (98, 100)	99 (98, 100)	-
	2019-2020 (n=380)	100	100	100 (97, 100)	-
Graft survival	2013-2014 (n=461)	99 (98, 100)	99 (97, 99)	98 (97, 99)	91 (88, 93)
	2015-2016 (n=447)	99 (98, 100)	99 (97, 100)	99 (97, 99)	91 (88, 93)
	2017-2018 (n=459)	99 (98, 100)	98 (97, 99)	98 (96, 99)	-
	2019-2020 (n=380)	99 (98, 100)	99 (98, 100)	99 (97, 100)	-

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

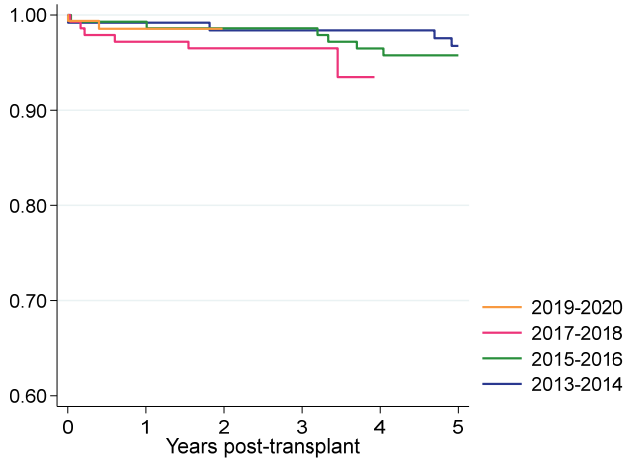


Figure 7.26 - Primary Living Donor Grafts - Graft Survival - New Zealand

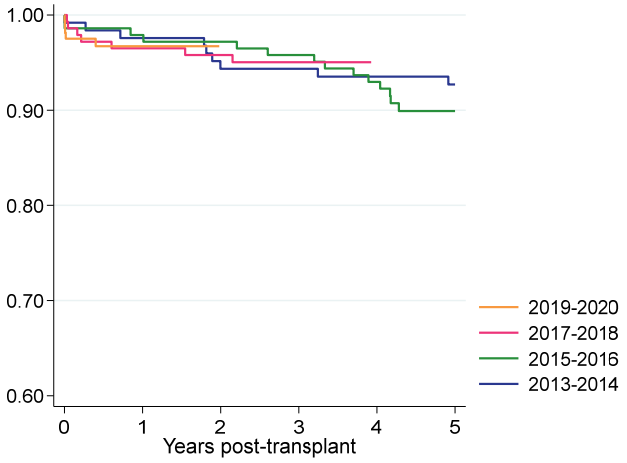


Table 7.25 Primary Living Donor Grafts - New Zealand 2013-2020

Outcome	Era	1 month	6 months	1 year	5 years
Patient survival	2013-2014 (n=124)	99 (94, 100)	99 (94, 100)	99 (94, 100)	97 (92, 99)
	2015-2016 (n=143)	99 (95, 100)	99 (95, 100)	99 (95, 100)	96 (91, 98)
	2017-2018 (n=143)	99 (95, 100)	98 (94, 99)	97 (93, 99)	-
	2019-2020 (n=161)	99 (96, 100)	99 (94, 100)	99 (94, 100)	-
Graft survival	2013-2014 (n=124)	99 (94, 100)	98 (94, 100)	98 (93, 99)	93 (86, 96)
	2015-2016 (n=143)	99 (95, 100)	99 (95, 100)	98 (94, 99)	90 (84, 94)
	2017-2018 (n=143)	99 (95, 100)	97 (93, 99)	97 (92, 99)	-
	2019-2020 (n=161)	98 (94, 99)	97 (92, 99)	97 (92, 99)	-

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

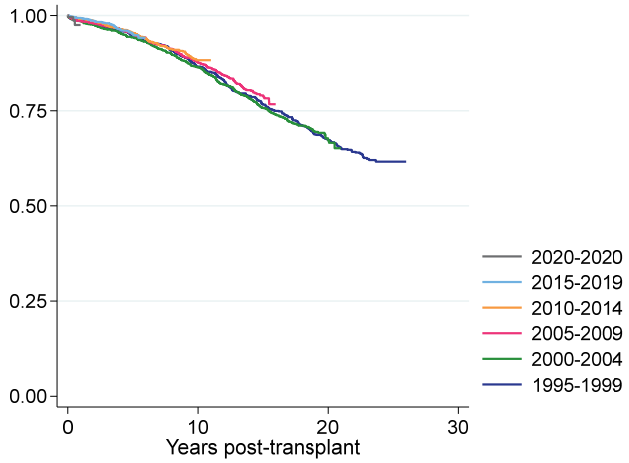


Figure 7.28 - Primary Living Donor Grafts - Graft Survival - Australia and New Zealand

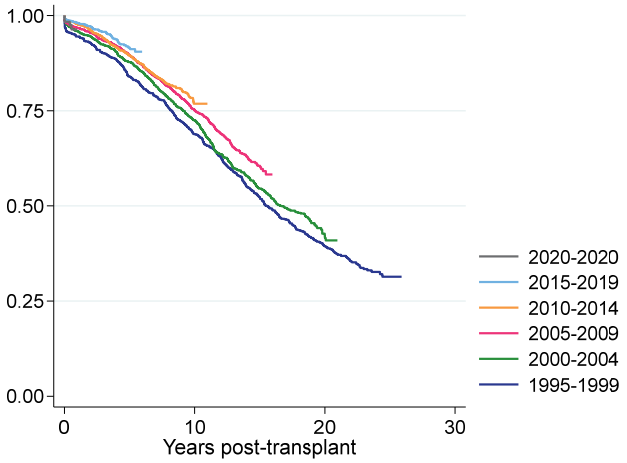


Table 7.26 Primary Living Donor Grafts - Australia and New Zealand 1995-2020

Outcome	Era	1 year	5 years	10 years	15 years	20 years
Patient survival	1995-1999 (n=766)	99 (97, 99)	95 (93, 96)	87 (84, 89)	77 (74, 80)	67 (64, 71)
	2000-2004 (n=1194)	98 (98, 99)	94 (93, 95)	86 (84, 88)	76 (73, 78)	67 (64, 70)
	2005-2009 (n=1585)	99 (98, 99)	95 (94, 96)	88 (86, 89)	79 (76, 81)	-
	2010-2014 (n=1457)	99 (98, 99)	95 (94, 96)	88 (86, 90)	-	-
	2015-2019 (n=1486)	99 (99, 100)	95 (93, 97)	-	-	-
Graft survival	1995-1999 (n=766)	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 (38, 46)
	2005-2009 (n=1585)	97 (96, 97)	90 (88, 91)	75 (73, 77)	61 (57, 63)	-
	2010-2014 (n=1457)	98 (97, 98)	89 (88, 91)	77 (74, 80)	-	-
	2015-2019 (n=1486)	98 (97, 99)	92 (89, 93)	-	-	-

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

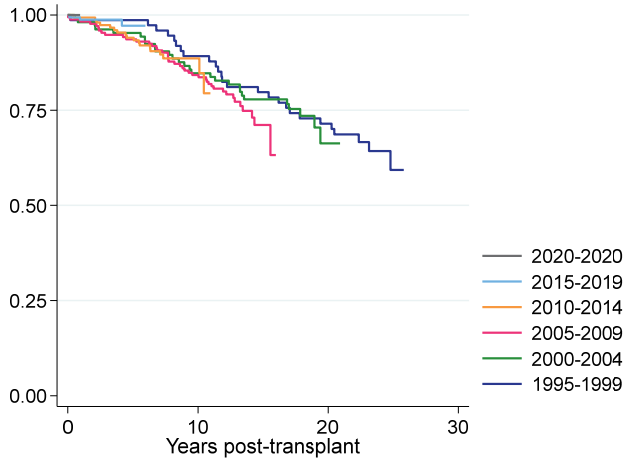


Figure 7.30 - Second and Subsequent Living Donor Grafts - Graft Survival - Australia and New Zealand

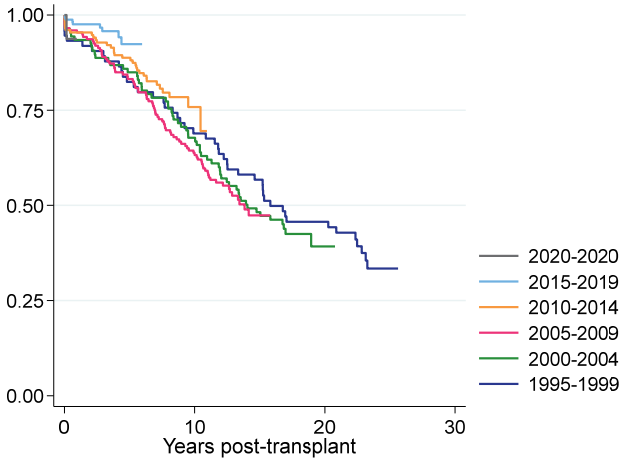


Table 7.27 Second and Subsequent Living Donor Grafts - Australia and New Zealand 1995-2020

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)	66 (52, 77)
	2005-2009 (n=175)	98 (95, 99)	94 (89, 96)	84 (78, 89)	71 (62, 79)	-
	2010-2014 (n=153)	99 (95, 100)	94 (89, 97)	89 (82, 93)	-	-
	2015-2019 (n=167)	99 (95, 100)	97 (90, 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)	39 (28, 50)
	2005-2009 (n=175)	95 (91, 98)	83 (77, 88)	63 (56, 70)	47 (39, 56)	-
	2010-2014 (n=153)	95 (91, 98)	89 (83, 93)	76 (66, 83)	-	-
	2015-2019 (n=167)	98 (94, 99)	92 (84, 96)	-	-	-

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[1] *Australian Bureau of Statistics, 2020, Australian Demographic Statistics, Jun 2020, time series spreadsheets, cat. no. 3101.0, viewed 4 Jan 2021, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Jun%202020?OpenDocument*

[2] *This work is based on/includes Stats NZ's data which are licensjed by Stats NZ for re-use under the Creative Commons Attribution 4.0 International licence. Stats NZ, 2020, Estimated Resident Population by Age and Sex (1991+) (Annual-Jun), NZ Infoshare, viewed 4 Jan 2021, http://archive.stats.govt.nz/infoshare/*

[3] *Australian Bureau of Statistics, 2021, Regional Population by Age and Sex, Australia, 2020, viewed 20 Sep 2021, https*://www.abs.gov.au/statistics/people/population/regional-population-age-and-sex/2020