CHAPTER 8

TRANSPLANTATION

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2012 Annual Report—35th Edition

TRANSPLANTS PERFORMED IN 2011

Figure 8.1

Number of Kidney Transplant Operations
Total (Living Donors)

Year	Australia						New Zealand				
	1st	2nd	3rd	4th	5th	Total	1st	2nd	3rd	4th	Total
1963	5	1	0	0	0	**6 (0)**	0	0	0	0	**0**
1964	2	0	0	0	0	**2 (0)**	0	0	0	0	**0**
1965	12	1	1	0	0	**14 (3)**	1	0	0	0	**1 (1)**
1966	18	2	0	0	0	**20 (5)**	10	3	0	0	**13 (0)**
1967	69	2	0	0	0	**71 (2)**	18	4	1	0	**23 (1)**
1968	97	10	0	0	0	**107 (0)**	17	4	0	0	**21 (2)**
1969	149	12	0	0	0	**161 (0)**	39	5	0	0	**44 (0)**
1970	168	12	2	0	0	**182 (1)**	21	3	1	0	**25 (0)**
1971	207	22	1	0	0	**230 (1)**	26	6	0	0	**32 (1)**
1972	183	16	0	0	0	**199 (2)**	43	8	0	0	**51 (1)**
1973	213	30	1	0	0	**244 (7)**	50	10	2	0	**62 (0)**
1974	224	35	4	0	0	**263 (6)**	35	5	1	0	**41 (3)**
1975	271	29	3	1	0	**304 (7)**	61	13	0	0	**74 (2)**
1976	223	41	4	0	0	**268 (10)**	38	13	1	0	**52 (1)**
1977	265	57	4	0	0	**326 (16)**	46	10	2	0	**58 (4)**
1978	269	43	2	0	0	**314 (17)**	43	11	3	0	**57 (11)**
1979	293	35	5	0	0	**333 (34)**	61	13	3	2	**79 (16)**
1980	287	63	9	0	0	**359 (36)**	57	13	4	0	**74 (18)**
1981	306	58	9	1	0	**374 (35)**	51	8	1	0	**60 (10)**
1982	321	72	6	0	0	**399 (53)**	48	17	0	0	**65 (8)**
1983	272	63	10	2	0	**347 (48)**	69	25	4	0	**98 (11)**
1984	362	72	10	1	0	**445 (48)**	63	11	0	0	**74 (16)**
1985	318	79	17	1	0	**415 (36)**	60	25	3	0	**88 (6)**
1986	366	63	7	2	0	**438 (32)**	79	19	6	1	**105 (13)**
1987	310	58	21	3	0	**392 (40)**	57	17	4	1	**79 (20)**
1988	391	62	10	2	1	**466 (46)**	61	11	6	0	**78 (8)**
1989	433	46	10	2	0	**491 (48)**	71	11	1	0	**83 (12)**
1990	387	45	9	2	0	**443 (59)**	86	14	2	0	**102 (23)**
1991	386	70	11	3	0	**470 (78)**	62	10	4	1	**77 (13)**
1992	404	57	13	3	0	**477 (70)**	105	5	5	0	**115 (17)**
1993	385	63	6	4	1	**459 (66)**	68	13	2	0	**83 (20)**
1994	384	41	12	2	1	**440 (103)**	70	11	1	1	**83 (20)**
1995	371	60	11	0	0	**442 (94)**	84	7	3	0	**94 (24)**
1996	416	50	9	0	0	**475 (115)**	88	7	1	0	**96 (26)**
1997	447	51	6	1	0	**505 (147)**	101	10	1	0	**112 (31)**
1998	443	62	11	2	0	**518 (161)**	95	10	1	0	**106 (31)**
1999	403	43	9	0	0	**455 (168)**	97	11	4	0	**112 (42)**
2000	476	47	7	1	0	**531 (181)**	91	13	2	0	**106 (31)**
2001	488	45	6	2	0	**541 (213)**	101	9	0	0	**110 (43)**
2002	537	60	5	2	0	**604 (230)**	103	12	2	0	**117 (48)**
2003	472	60	10	1	0	**543 (218)**	94	13	4	0	**111 (44)**
2004	583	53	11	3	0	**650 (244)**	98	7	0	0	**105 (48)**
2005	539	67	15	2	0	**623 (246)**	87	5	0	1	**93 (46)**
2006	549	70	17	5	0	**641 (273)**	80	8	2	0	**90 (49)**
2007	527	75	11	0	2	**615 (271)**	112	9	2	0	**123 (58)**
2008	708	84	16	5	0	**813 (354)**	111	10	1	0	**122 (69)**
2009	673	88	11	0	0	**773 (327)**	109	12	0	0	**121 (67)**
2010	744	83	18	1	0	**846 (296)**	104	5	1	0	**110 (60)**
2011	744	68	10	3	0	**825 (255)**	110	7	1	0	**118 (57)**

AUSTRALIA

The 825 transplant operations performed in 2011 represent a decrease over 2010. This was primarily driven by a 14% decrease in the number of live donor transplants performed compared with 2011, and a 28% decrease compared with 2008.

The 2011 numbers represents a transplant rate of 37 per million population per year, compared with 38 per million in 2010. There has been a progressive increase in the number of kidney transplants from non-heart beating donors; in 2011 such kidneys accounted for 26% of deceased donor kidney transplants. The number of kidney transplants from heart beating donors has remained constant (Figure 8.4).

For more up to date figures on the deceased organ donor rate, see www.anzdata.org.au/anzod/updates/anzodupdate.htm

Living donor transplants accounted for 31% (255 grafts) in 2011, down from 35% in 2010 (296 grafts) and 42% in 2009 (327 grafts).

Primary recipients (those receiving a first transplant) received 90% of all kidneys transplanted in 2011, similar to recent years.

NEW ZEALAND

The number of transplant operations (118) performed in 2011 represents a transplant rate of 27 per million population per year compared with 25 in 2010 (Figure 8.1).

The percentage of living donors remained steady at 48% of all operations in 2011 (Figure 8.3). There were no transplants from non-heart beating donors in 2011.

Of the grafts performed in 2011, 93% were to primary recipients, reflecting a reduced number of subsequent grafts in 2011.

Figure 8.2

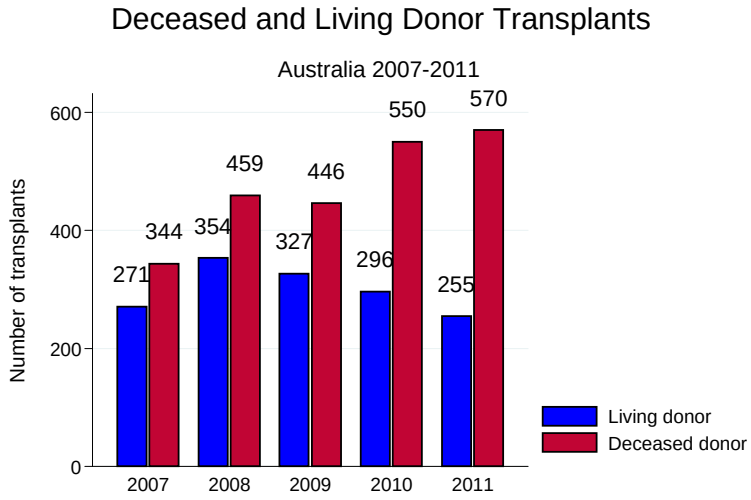


Figure 8.3

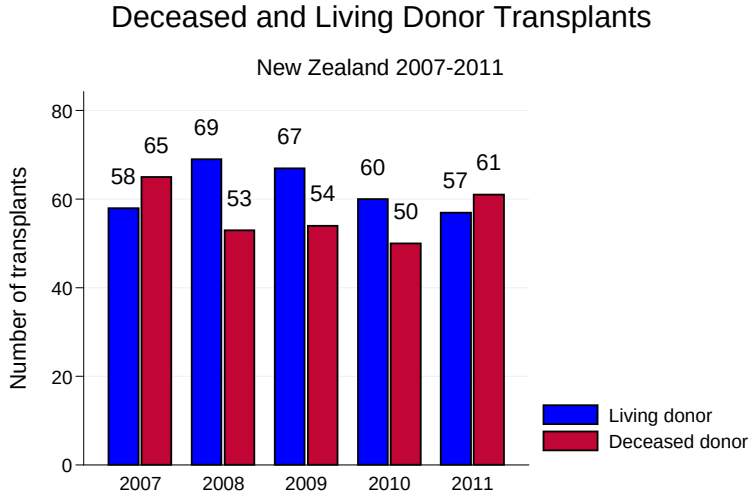
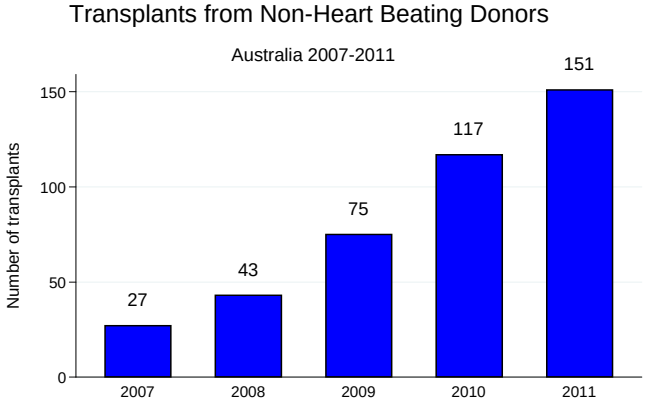
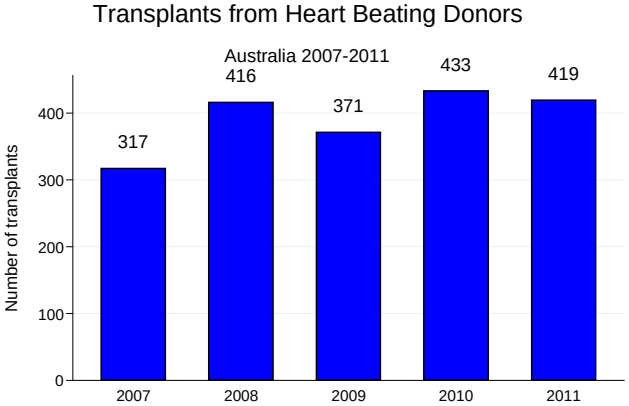


Figure 8.4





TRANSPLANT RATE OF PATIENTS DIALYSED

In Australia transplantation was performed in 6% of patients who received dialysis in 2011.

Of all patients in the 15-64 year age group who received dialysis treatment during 2011, 10% were transplanted in 2011, compared with 11% in 2010 (Figure 8.6).

The ratio of transplantation to numbers dialysing in Australia was the highest in the age groups 5-14 years (49%) and 0-4 years of age (32%) and declined with increasing age (Figure 8.7).

In New Zealand transplantation was performed for 4% of patients, the same percentage as 2010 (Figure 8.5).

As in Australia, the rate of transplantation for New Zealand patients was highest among those less than 14 years old (Figure 8.8).

Figure 8.5

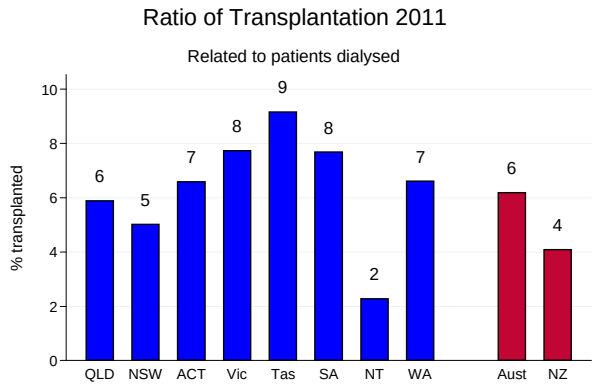


Figure 8.6

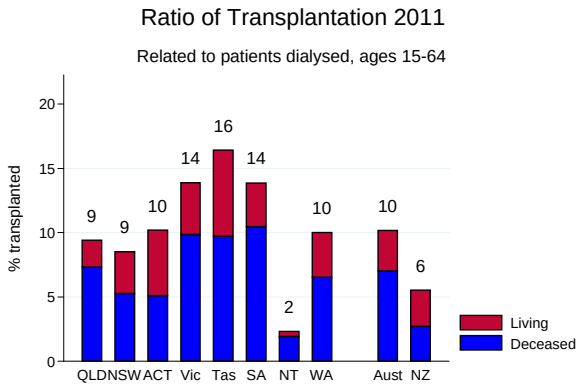


Figure 8.7

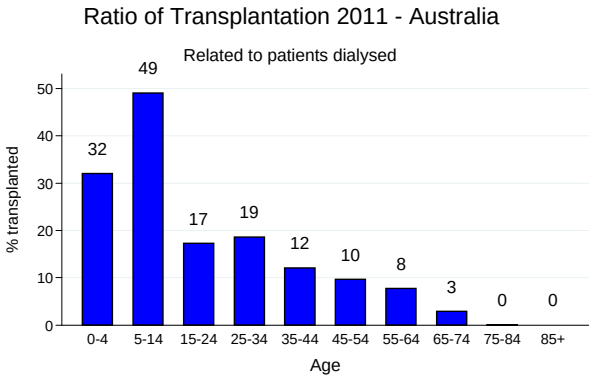
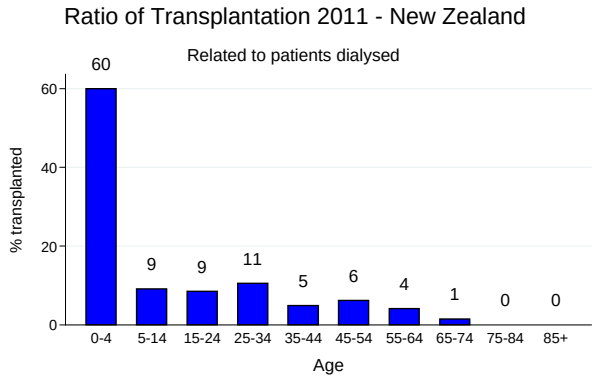


Figure 8.8



* Pre-emptive transplant patients included

AGE OF RECIPIENTS TRANSPLANTED IN 2011

Figure 8.9

Graft Number and Age of Patients Transplanted 2011

Donor Source	Graft No.	Age Groups									Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
Australia											
Deceased	1	4	13	12	48	79	136	152	66	1	**511**
	2	0	1	2	8	7	15	11	6	0	**50**
	3	0	0	1	0	2	3	1	0	0	**7**
	4	0	0	0	0	2	0	0	0	0	**2**
Living Donor	1	4	12	17	33	44	41	59	22	1	**233**
	2	0	0	3	5	5	1	4	0	0	**18**
	3	0	0	1	0	0	2	0	0	0	**3**
	4	0	0	0	0	0	0	1	0	0	**1**
Total		**8**	**26**	**36**	**94**	**139**	**198**	**228**	**94**	**2**	**825**
New Zealand											
Deceased	1	2	1	2	9	5	14	18	7	0	**58**
	2	0	0	0	0	0	2	0	0	0	**2**
	3	0	0	0	0	1	0	0	0	0	**1**
Living Donor	1	1	0	5	6	7	17	13	3	0	**52**
	2	0	0	0	0	1	2	2	0	0	**5**
Total		**3**	**1**	**7**	**15**	**14**	**35**	**33**	**10**	**0**	**118**

AUSTRALIA

The median age of transplant recipients in 2011 was 50 years, the same as in 2010. The age range was 1 to 76 years (Figures 8.9 and 8.10).

The transplantation rate per million for each age group and as a percentage of dialysed patients for each age group are shown in Figures 8.7 and 8.10.

NEW ZEALAND

The 2011 median age of transplant recipients in 2011 was 50 years. The age range was 1 to 73 years (Figures 8.8 and 8.11).

Recipients aged between 35 and 54 years comprised 42% of the total. Thirty -six percent of recipients were over 54 years of age in 2011.

Figure 8.10

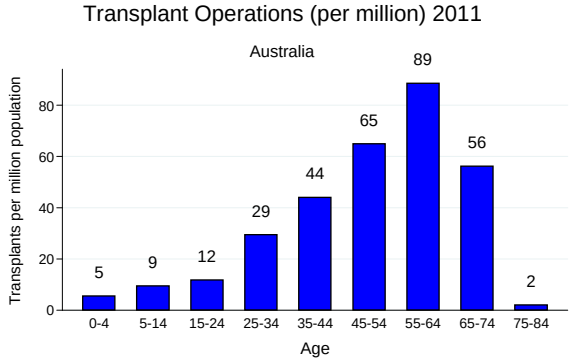
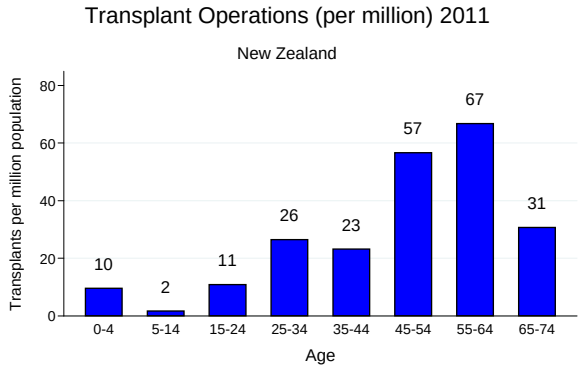


Figure 8.11



ETHNICITY OF TRANSPLANT RECIPIENTS

AUSTRALIA

Figure 8.12.

For the 15-64 year age group in 2011, 12.4% of dialysed Caucasian patients were transplanted. For Australian Aboriginals and Torres Strait Islanders (ATSI), the numbers receiving transplants remains low.

In contrast, the number of ATSI patients dialysed continues to increase each year.

Figure 8.12 Australia

Transplantation Rate - Age Group 15-64 years
2002 - 2011

Year	Caucasian			Aboriginal and Torres St. Islanders			All Patients		
	Tx	Dialysed	Rate	Tx	Dialysed	Rate	Tx	Dialysed	Rate
2002	479	3724	12.9%	17	729	2.3%	549	5088	10.8%
2003	414	3789	10.9&	12	783	1.5%	478	5250	9.1%
2004	491	3873	12.7%	25	856	2.9%	581	5436	10.7%
2005	460	4040	11.4%	20	930	2.2%	548	5714	9.6%
2006	480	4241	11.3%	27	989	2.7%	578	6037	9.6%
2007	471	4381	10.8%	17	1065	1.6%	557	6330	8.8%
2008	602	4487	13.4%	29	1175	2.5%	724	6628	10.9%
2009	574	4493	12.8%	23	1198	1.9%	687	6709	10.2%
2010	607	4432	13.7%	27	1212	2.2%	734	6711	10.9%
2011	551	4460	12.4%	25	1264	2.0%	695	6840	10.2%

NEW ZEALAND

Figure 8.13.

Amongst the 15-64 year age group, the proportion of Maori and Pacific People who received a renal transplant in 2011 was substantially lower than other groups.

Figure 8.13 New Zealand

Transplantation Rate - Age Group 15-64 years 2002 - 2011

Year	Caucasian			Maori			Pacific People			All Patients		
	Tx	Dialysed	Rate	Tx	Dialysed	Rate	Tx	Dialysed	Rate	Tx	Dialysed	Rate
2002	70	541	12.9%	12	494	2.4%	15	267	5.6%	102	1397	7.3%
2003	64	545	11.7%	16	531	3.0%	13	271	4.8%	101	1442	7.0%
2004	65	542	12.0%	10	558	1.8%	12	285	4.2%	96	1483	6.5%
2005	73	568	12.9%	3	563	0.5%	3	303	1.0%	82	1523	5.4%
2006	59	567	10.4%	9	606	1.5%	5	322	1.6%	80	1599	5.0%
2007	82	576	14.2%	15	616	2.4%	6	344	1.7%	111	1648	6.7%
2008	84	586	14.3%	12	620	1.9%	9	376	2.4%	112	1699	6.6%
2009	77	599	12.9%	13	636	2.0%	6	405	1.5%	101	1782	5.7%
2010	62	591	10.5%	17	661	2.6%	8	444	1.8%	95	1856	5.1%
2011	67	601	11.1%	18	648	2.8%	7	466	1.5%	104	1877	5.5%

AUSTRALIA AND NEW ZEALAND

Figure 8.14 shows these data in another format.

In Australia in 2011, 3.4% of transplant recipients were of Aboriginal/TSI ethnicity.

In New Zealand, 16.9% of transplant recipients were Maoris and 7.6% were Pacific People.

Figure 8.14

New Transplanted Patients 2007 - 2011
Related to Ethnicity

Race	2007	2008	2009	2010	2011
Australia	**615 (100.0%)**	**813 (100.0%)**	**773 (100.0%)**	**846 (100.0%)**	**825 (100.0%)**
Caucasian	524 (85.2%)	675 (83.0%)	651 (84.2%)	706 (83.5%)	658 (79.8%)
Aboriginal/Torres St. Islanders	18 (2.9%)	31 (3.8%)	24 (3.1%)	28 (3.3%)	28 (3.4%)
Asian	56 (9.1%)	83 (10.2%)	75 (9.7%)	83 (9.8%)	97 (11.8%)
Other	17 (2.8%)	24 (3.0%)	23 (3.0%)	29 (3.4%)	42 (5.1%)
New Zealand	**123 (100.0%)**	**122 (100.0%)**	**121 (100.0%)**	**110 (100.0%)**	**118 (100.0%)**
Caucasian	91 (74.0%)	93 (76.2%)	91 (75.2%)	71 (64.5%)	77 (65.3%)
Asian	9 (7.3%)	7 (5.7%)	5 (4.1%)	8 (7.3%)	11 (9.3%)
Maori	17 (13.8%)	12 (9.8%)	19 (15.7%)	20 (18.2%)	20 (16.9%)
Pacific	6 (4.9%)	10 (8.2%)	6 (5.0%)	9 (8.2%)	9 (7.6%)
Other	-	-	-	2 (1.8%)	1 (0.8%)

AUSTRALIAN REGIONAL TRANSPLANTATION ACTIVITY

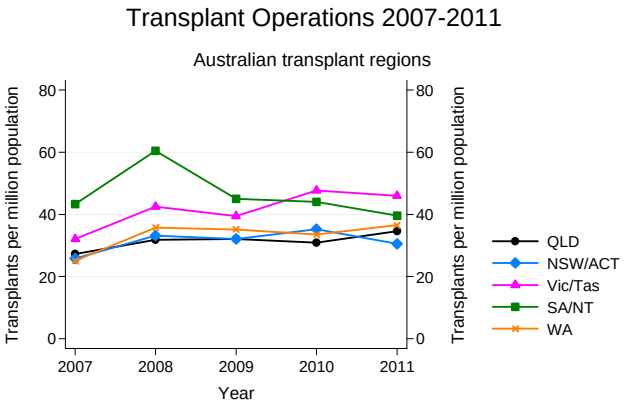
Figure 8.15

Transplants in each Region 2007 - 2011
Number of Operations
(per Million Population per year)

State	2007	2008	2009	2010	2011
Queensland	114 (27)	136 (32)	140 (32)	137 (31)	155 (35)
New South Wales / ACT *	187 (26)	243 (33)	238 (32)	265 (35)	232 (31)
Victoria / Tasmania *	183 (32)	246 (42)	233 (39)	285 (48)	278 (46)
South Australia / NT *	78 (43)	110 (60)	83 (45)	82 (44)	74 (40)
Western Australia	53 (25)	78 (36)	79 (35)	77 (34)	86 (37)
Australia	**615 (29)**	**813 (38)**	**773 (35)**	**846 (38)**	**825 (37)**

* For calculation of population related totals, the populations of these States were summed

Figure 8.16



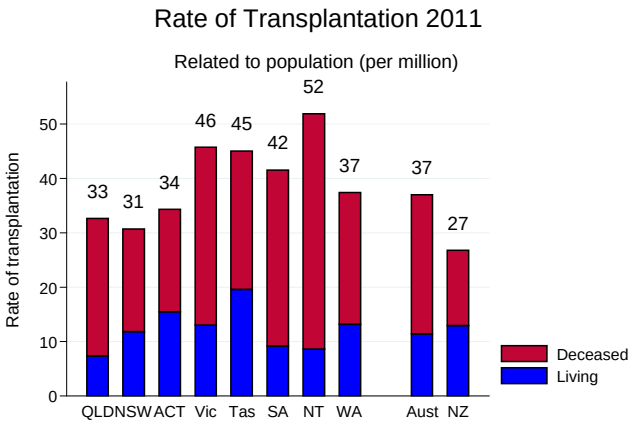
The rate of transplantation for each transplant region is shown in Figures 8.15 and 8.16.

Transplants performed for people resident in Tasmania and the Northern Territory patients are included in figures for Victoria and South Australia regions. These regions share common waiting lists and allocation protocols.

The transplant rates for residents of each State and New Zealand are shown in Figure 8.17.

The highest rate (52 per million) occurred in Northern Territory followed by Victoria (46 per million) and Tasmania (45 per million). The lowest rate (31 per million) was in New South Wales.

Figure 8.17



NSW population excludes residents of the Southern Area Health Service
ACT population includes residents of the Southern Area Health Service
Medical services in the ACT service the Southern Area Region

FUNCTIONING TRANSPLANTS AT 31ST DECEMBER 2011

AUSTRALIA

There have been 19,859 transplant operations performed on 17,135 patients since 1963. Of these, 8,753 grafts were functioning at 31st December 2011.

Fourteen percent of transplanted kidneys and 11% of functioning grafts were regrafts. Living donor transplants accounted for 24% of operations and 37% of functioning grafts (Figure 8.18). The number of kidney transplant operations performed by each hospital during this period is shown in Appendix I, available on the Web.

The number of functioning grafts at the end of 2011 represents a 4.8% increase over the previous year. The annual rate of increase has remained steady (Figure 8.20 and 8.21).

The prevalence of functioning grafts in each State is shown in Figures 8.20 and 8.21. South Australia/Northern Territory has the highest prevalence of functioning renal transplants (546 per million). The lowest prevalence was in Western Australia (349 per million).

The age distribution of functioning transplants as a proportion of patients on renal replacement therapy is shown in Figure 8.23. The proportion depending on living donor grafts is greater in the younger age groups (Figures 8.23 and 8.24).

The details of age are shown Figure 8.25, and details of age, gender and ethnicity are shown in figure 8.28.

The majority of recipients with functioning grafts were male (61%). The ethnic origin of recipients was Caucasian 87%, Asian 8%, Aboriginal and Torres Strait Islanders 2% and Others 3% (Figure 8.28).

The 8,753 grafts functioning at the end of 2011 represent 44% of all kidneys transplanted since 1963. Thirty-four percent of grafts were functioning ten or more years and 9% for 20 or more years. There were 171 recipients with grafts functioning 30 years or longer (Figure 8.29). The longest graft had functioned for 43 years at 31st December, 2011.

Figure 8.18

Summary of Kidney Transplantation
Australia 1963 - 2011

		Performed	Functioning*
Deceased Donor	First	12853	4818
	Second	1936	582
	Third	315	96
	Fourth	48	15
	Fifth	4	1
	Total	**15156**	**5512**
Living Donor	First	4248	2951
	Second	390	243
	Third	55	41
	Fourth	9	6
	Fifth	1	0
	Total	**4703**	**3241**
Total		**19859**	**8753**

* Lost to follow up not included

NEW ZEALAND

There have been 3,746 operations performed on 3,188 patients since 1965 with 1,481 grafts still functioning at 31st December 2011 (Figure 8.19). Fifteen percent of operations and 9.6% of functioning grafts were regrafts. Kidneys from living donors accounted for 28% of operations and 44% of functioning grafts.

The number of operations performed by individual hospitals is shown in Appendix I at the end of this Report.

The age relationship and donor source are shown in Figure 8.25. The majority were male (58%) and the racial distribution was Caucasian 76%, Maori 10%, Pacific People 6% and Asian 7% (Figure 8.28).

The majority (69%) of functioning grafts were in the 35-64 year age group and the mean and median ages were 51 and 52 years respectively. The modal age group was 55-64 years (Figure 8.25).

The 1,481 grafts functioning at the end of 2011 represent 40% of all kidneys transplanted since 1965. The longest surviving graft had functioned for 41 years at 31st December 2011. There were 138 grafts functioning for 20 or more years and 23 for 30 or more years (Figure 8.30).

Figure 8.19

Summary of Kidney Transplantation
New Zealand 1965 - 2011

		Performed	Functioning*
Deceased Donor	First	2232	734
	Second	396	77
	Third	76	17
	Fourth	7	0
	Total	**2711**	**828**
Living Donor	First	949	605
	Second	77	44
	Third	6	4
	Total	**1032**	**653**
Total		**3743**	**1481**

* Lost to follow up not included

Figure 8.20

Functioning Transplants 2002 - 2011
Transplanting Region, Australia and New Zealand
(Number Per Million Population)

Year	QLD	NSW/ACT *	VIC/Tas *	SA/NT *	WA	Australia	NZ
2002	1109 (299)	1907 (274)	1538 (288)	702 (408)	528 (274)	**5784 (294)**	**1116 (283)**
2003	1150 (302)	2008 (287)	1581 (293)	737 (426)	530 (271)	**6006 (302)**	**1168 (290)**
2004	1185 (304)	2106 (299)	1651 (302)	791 (454)	562 (283)	**6295 (313)**	**1221 (299)**
2005	1220 (305)	2179 (307)	1721 (311)	811 (461)	617 (306)	**6548 (321)**	**1239 (300)**
2006	1257 (307)	2271 (318)	1830 (326)	847 (476)	657 (319)	**6862 (332)**	**1247 (298)**
2007	1313 (314)	2317 (321)	1925 (338)	882 (491)	678 (321)	**7115 (339)**	**1283 (303)**
2008	1372 (321)	2422 (331)	2057 (355)	934 (514)	716 (329)	**7501 (351)**	**1348 (316)**
2009	1447 (331)	2530 (341)	2203 (373)	963 (523)	748 (333)	**7891 (362)**	**1399 (324)**
2010	1517 (343)	2676 (357)	2374 (397)	1006 (541)	777 (338)	**8350 (378)**	**1437 (329)**
2011	1597 (357)	2773 (366)	2542 (420)	1021 (546)	820 (349)	**8753 (392)**	**1481 (336)**

* For calculation of population related totals, the population of these States were combined
Patients lost to follow up are not included

Figure 8.21

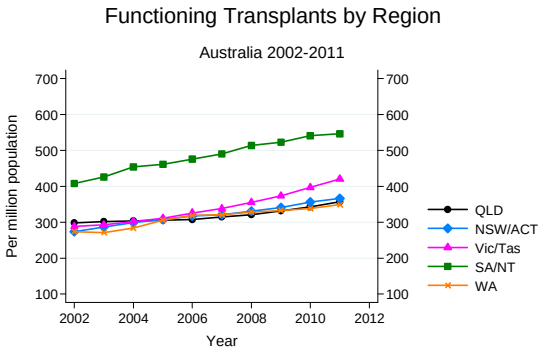


Figure 8.22

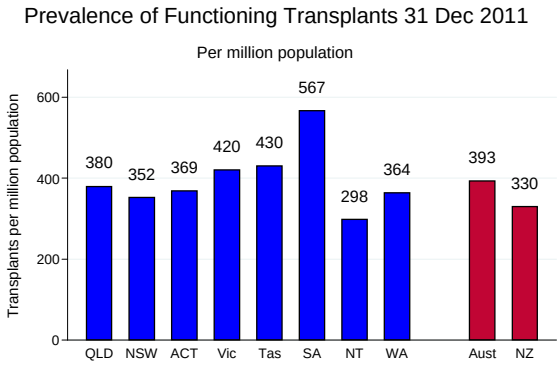


Figure 8.23

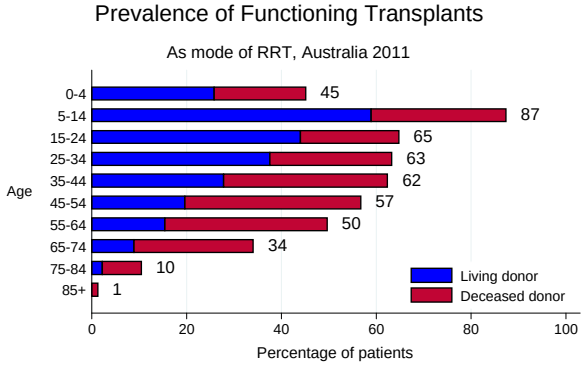


Figure 8.24

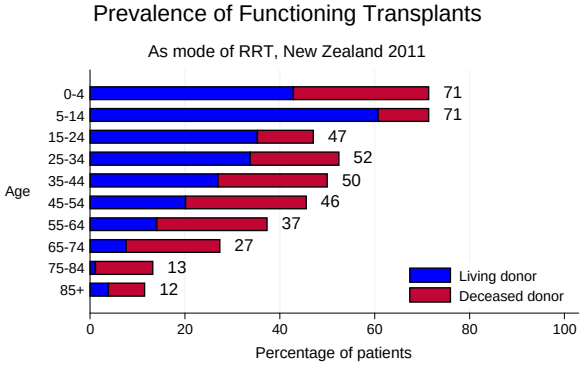
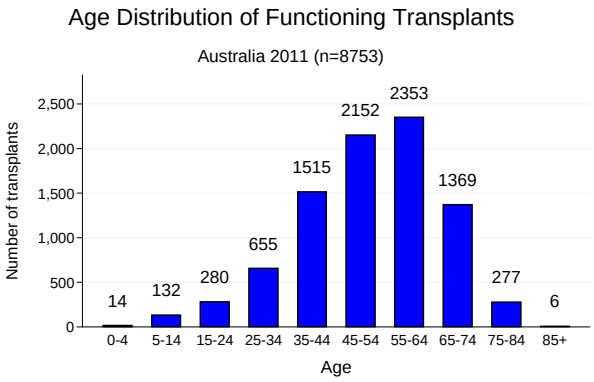


Figure 8.25

Age of All Functioning Transplant Patients
Resident Country at Transplant 31-Dec-2011

Donor Source	Graft No.	Age Groups 00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85-94	Total
Australia		**14**	**132**	**280**	**655**	**1515**	**2152**	**2353**	**1369**	**277**	**6**	**8753**
Deceased Donor	1	6	39	83	216	702	1186	1447	930	204	5	4818
	2	-	4	6	43	104	181	155	73	15	1	582
	3	-	-	1	7	27	34	17	10	-	-	96
	4	-	-	-	-	6	7	2	-	-	-	15
	5	-	-	-	-	-	-	1	-	-	-	1
	Total	**6**	**43**	**90**	**266**	**839**	**1408**	**1622**	**1013**	**219**	**6**	**5512**
Living Donor	1	8	86	175	360	593	673	660	343	53	-	2951
	2	-	3	13	28	69	54	61	10	5	-	243
	3	-	-	2	-	12	16	8	3	-	-	41
	4	-	-	-	1	2	1	2	-	-	-	6
	Total	**8**	**89**	**190**	**389**	**676**	**744**	**731**	**356**	**58**	**-**	**3241**
New Zealand		**5**	**20**	**56**	**129**	**230**	**380**	**408**	**214**	**36**	**3**	**1481**
Deceased Donor	1	2	3	13	44	83	179	228	147	33	2	734
	2	-	-	1	2	17	29	22	6	-	-	77
	3	-	-	-	-	6	4	5	2	-	-	17
	Total	**2**	**3**	**14**	**46**	**106**	**212**	**255**	**155**	**33**	**2**	**828**
Living Donor	1	3	17	41	76	110	150	145	59	3	1	605
	2	-	-	1	7	13	15	8	-	-	-	44
	3	-	-	-	-	1	3	-	-	-	-	4
	Total	**3**	**17**	**42**	**83**	**124**	**168**	**153**	**59**	**3**	**1**	**653**

Figure 8.26



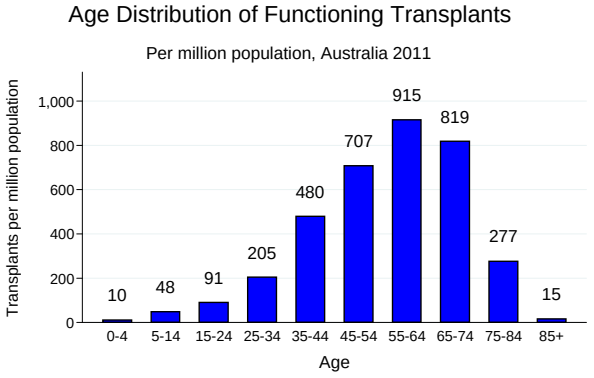
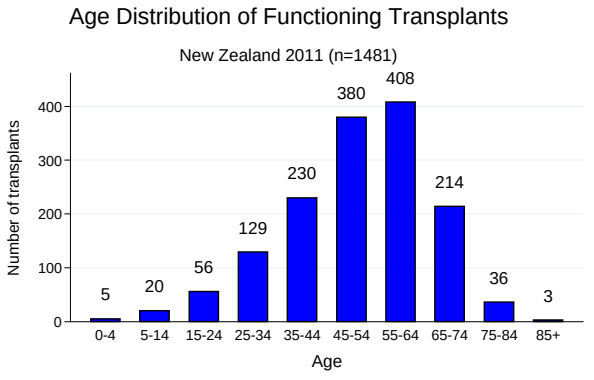


Figure 8.27



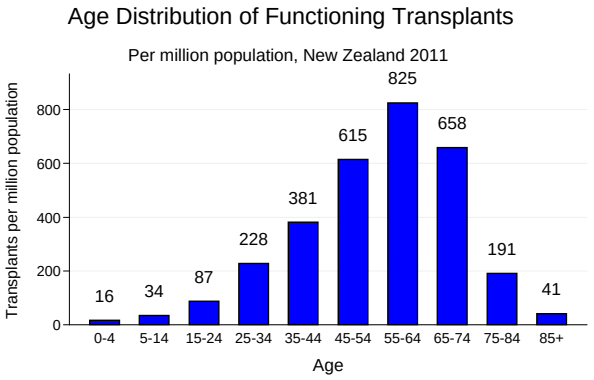


Figure 8.28

Functioning Transplant Patients - Resident Country at Transplant Related to Ethnicity and Age Group 31-Dec-2011

Gender	Racial Origin	Prevalent Age Groups										Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85-94	
Australia		**14**	**132**	**280**	**655**	**1515**	**2152**	**2353**	**1369**	**277**	**6**	**8753**
Female	Caucasian	2	37	100	215	498	673	741	492	126	3	2887
	Aboriginal/TSI	-	1	2	8	16	26	19	3	-	-	75
	Asian	1	4	9	22	70	99	115	34	5	-	359
	Other	1	5	7	14	21	24	17	9	1	-	99
	Total	**4**	**47**	**118**	**259**	**605**	**822**	**892**	**538**	**132**	**3**	**3420**
Male	Caucasian	7	69	138	343	809	1171	1264	767	136	3	4707
	Aboriginal/TSI	-	3	6	9	18	36	30	11	1	-	114
	Asian	-	9	10	30	62	96	126	42	6	-	381
	Other	3	4	8	14	21	27	41	11	2	-	131
	Total	**10**	**85**	**162**	**396**	**910**	**1330**	**1461**	**831**	**145**	**3**	**5333**
New Zealand		**5**	**20**	**56**	**129**	**230**	**380**	**408**	**214**	**36**	**3**	**1481**
Female	Caucasian	-	6	22	35	75	111	130	69	19	1	468
	Asian	-	-	3	7	2	19	11	2	-	-	44
	Maori	-	4	5	7	13	16	8	7	3	-	63
	Pacific	-	1	-	9	8	12	7	2	1	-	40
	Other	-	-	-	1	-	-	-	-	-	-	1
	Total	**-**	**11**	**30**	**59**	**98**	**158**	**156**	**80**	**23**	**1**	**616**
Male	Caucasian	5	7	20	49	109	175	191	94	9	2	661
	Asian	-	-	1	8	5	10	19	12	2	-	57
	Maori	-	1	5	9	7	26	21	18	1	-	88
	Pacific	-	1	-	3	8	11	17	10	1	-	51
	Other	-	-	-	1	3	-	4	-	-	-	8
	Total	**5**	**9**	**26**	**70**	**132**	**222**	**252**	**134**	**13**	**2**	**865**

Figure 8.29

Number and Duration of Functioning Grafts

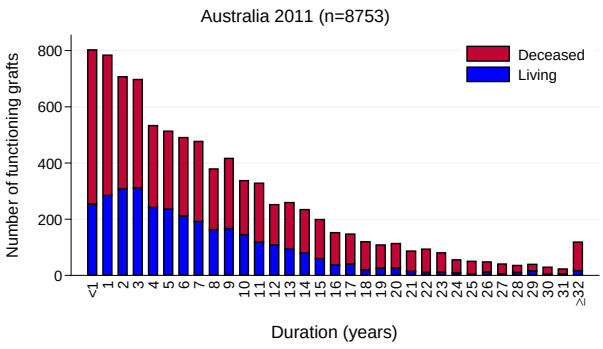
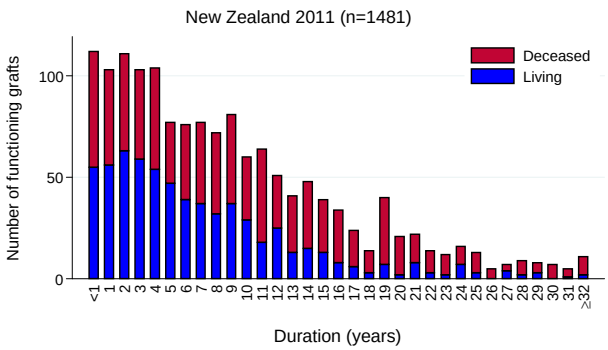


Figure 8.30

Number and Duration of Functioning Grafts



RATES OF GRAFT LOSS

The rates of loss of graft function and death with a functioning graft in Australia in 2011 were 2.3% and 2.2% per patient year respectively; in total 4.5% of grafts at risk were lost. The rate of loss of graft function (but not deaths with functioning graft) was the same as 2010 (Figure 8.31).

In 2011, the rate of loss of graft function in New Zealand was 2.0% and death with functioning graft was 2.6%; in total 4.6% of grafts at risk were lost (Figure 8.31).

The causes of graft failure from 2002 to 2011 are shown in Figure 8.32.

Chronic allograft nephropathy and death with function remain the key impediments to long term graft survival.

The importance of death with function, chronic allograft nephropathy and other causes of graft loss after one year is evident in Figure 8.33.

Among the causes of death with functioning graft, cardiovascular disease and malignancy were predominant. (Figure 8.33)

Figure 8.31

Graft Loss Rate 2002 - 2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Australia	**6113**	**6327**	**6656**	**6918**	**7189**	**7477**	**7928**	**8274**	**8737**	**9175**
Death with Function	2.3%	2.3%	2.2%	2.4%	2.0%	2.2%	2.2%	1.8%	2.0%	2.2%
Loss of Graft Function	2.9%	2.7%	3.1%	2.8%	2.5%	2.5%	2.9%	2.8%	2.3%	2.3%
All Losses	5.2%	4.9%	5.3%	5.1%	4.5%	4.7%	5.1%	4.5%	4.3%	4.5%
New Zealand	**1180**	**1227**	**1273**	**1314**	**1329**	**1370**	**1405**	**1469**	**1509**	**1555**
Death with Function	2.7%	2.2%	2.2%	2.3%	2.6%	3.2%	1.9%	2.3%	2.3%	2.6%
Loss of Graft Function	2.7%	2.5%	1.8%	3.3%	3.5%	2.9%	2.1%	2.4%	2.1%	2.0%
All Losses	5.4%	4.7%	4.0%	5.6%	6.0%	6.1%	3.9%	4.7%	4.4%	4.6%

Figure 8.32

Year of Graft Loss Due to Death or Failure 2002 - 2011

Loss	Cause of Failure	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Australia												
Failed	Death with Function	138	144	144	163	144	162	172	146	171	201	**1585**
	Rejection - Acute	8	3	5	3	7	11	10	16	8	10	**81**
	Chronic Allograft (CAN)	108	113	143	134	105	131	172	151	145	144	**1346**
	Rejection - Hyperacute	-	-	-	-	1	-	2	-	-	-	**3**
	Vascular	16	15	18	13	14	8	14	17	11	6	**132**
	Technical Problems	3	3	2	4	5	2	4	3	3	3	**32**
	Glomerulonephritis	15	12	13	16	23	15	9	15	14	15	**147**
	Non Compliance	11	10	8	6	3	8	6	12	6	6	**76**
	Other	16	13	19	15	19	15	16	14	18	31	**176**
Total		**315**	**313**	**352**	**354**	**321**	**352**	**405**	**374**	**376**	**416**	**3578**
New Zealand												
Failed	Death with Function	32	27	28	30	34	44	26	34	34	41	**330**
	Rejection - Acute	1	1	-	2	2	1	1	1	-	3	**12**
	Chronic Allograft (CAN)	22	16	15	24	31	21	20	29	17	14	**209**
	Rejection - Hyperacute	-	-	1	-	-	-	-	-	-	-	**1**
	Vascular	1	1	-	4	-	3	1	2	3	2	**17**
	Technical Problems	1	2	-	2	3	1	-	-	-	-	**9**
	Glomerulonephritis	1	4	2	3	6	4	5	-	5	4	**34**
	Non Compliance	3	3	1	1	1	6	1	1	5	3	**25**
	Other	3	4	4	8	4	4	1	2	2	5	**37**
Total		**64**	**58**	**51**	**74**	**81**	**84**	**55**	**69**	**66**	**72**	**674**

Figure 8.33

Graft Losses 2007 - 2011

Cause of Loss	Australia			New Zealand		
	Graft Function			Graft Function		
	<1 year	>= 1 year	Any Time	<1 year	>= 1 year	Any Time
Death with functioning Graft						
Cardiac	21 (30%)	191 (24%)	212 (25%)	4 (36%)	47 (28%)	51 (28%)
Vascular	5 (7%)	70 (9%)	75 (9%)	1 (9%)	7 (4%)	8 (4%)
Infection	29 (42%)	130 (17%)	159 (19%)	1 (9%)	27 (16%)	28 (16%)
Social	3 (4%)	53 (7%)	56 (7%)	1 (9%)	8 (5%)	9 (5%)
Malignancy	5 (7%)	262 (33%)	267 (31%)	3 (27%)	60 (36%)	63 (35%)
Miscellaneous	6 (9%)	77 (10%)	83 (10%)	1 (9%)	19 (11%)	20 (11%)
Total	**69 (100%)**	**783 (100%)**	**852 (100%)**	**11 (100%)**	**168 (100%)**	**179 (100%)**
Graft Failure						
Rejection - Acute	30 (23%)	25 (3%)	55 (5%)	-	6 (4%)	6 (4%)
Rejection - Chronic Allograft (CAN)	9 (7%)	734 (78%)	743 (69%)	1 (6%)	100 (67%)	101 (60%)
Rejection - Hyperacute	2 (2%)	-	2 (<1%)	-	-	-
Vascular	41 (31%)	15 (2%)	56 (5%)	8 (44%)	3 (2%)	11 (7%)
Technical Problems	10 (8%)	5 (1%)	15 (1%)	1 (6%)	-	1 (1%)
Glomerulonephritis	9 (7%)	59 (6%)	68 (6%)	3 (17%)	15 (10%)	18 (11%)
Non Compliance	1 (1%)	37 (4%)	38 (4%)	1 (6%)	15 (10%)	16 (10%)
Other	30 (23%)	64 (7%)	94 (9%)	4 (22%)	10 (7%)	14 (8%)
Total	**132 (100%)**	**939 (100%)**	**1071 (100%)**	**18 (100%)**	**149 (100%)**	**167 (100%)**

IMMUNOSUPPRESSION

AUSTRALIA

In Australia in 2011 Tacrolimus was used initially in 87% and Cyclosporine in 10% of primary deceased donor grafts. The proportion of patients initially using Tacrolimus has increased since 2004, as shown in Figure 8.34. The number of patients still taking Prednisolone two years after transplantation has increased since 2004 and is now 94%, for patients transplanted in 2009.

Caution is necessary in the interpretation of small changes in clinical practice with immunosuppressive therapy. A number of large research trials are undertaken in Australia. The drug protocol used in those studies can potentially skew the number of patients taking specific drugs in any given year.

Figure 8.34 Australia

Immunosuppressive Therapy - Primary Deceased Donor Graft 2004 - 2011

	Year	Aza	CyA	Tacrol	MMF	MPA	Sirol	Everolimus	Pred	Number of Deceased Donor Grafts
Initial treatment	2004	6 (2%)	212 (59%)	136 (38%)	309 (85%)	25 (7%)	10 (3%)	1 (<1%)	360 (99%)	**362**
	2005	9 (3%)	131 (41%)	172 (54%)	299 (94%)	4 (1%)	17 (5%)	-	308 (97%)	**319**
	2006	-	155 (51%)	139 (45%)	260 (85%)	24 (8%)	3 (1%)	19 (6%)	296 (97%)	**306**
	2007	2 (1%)	139 (48%)	140 (49%)	244 (85%)	36 (13%)	-	5 (2%)	285 (99%)	**287**
	2008	2 (1%)	137 (35%)	240 (61%)	364 (93%)	22 (6%)	-	-	389 (99%)	**391**
	2009	4 (1%)	62 (16%)	310 (82%)	356 (95%)	13 (3%)	-	3 (1%)	375 (100%)	**376**
	2010	-	66 (14%)	409 (86%)	426 (89%)	37 (8%)	1 (<1%)	3 (1%)	477 (100%)	**478**
	2011	1 (<1%)	51 (10%)	443 (87%)	309 (60%)	189 (37%)	-	-	498 (97%)	**511**
Treatment at 12 months	2004	23 (7%)	129 (39%)	162 (49%)	236 (72%)	46 (14%)	31 (9%)	1 (<1%)	304 (93%)	**328**
	2005	23 (8%)	83 (29%)	172 (59%)	229 (79%)	21 (7%)	29 (10%)	3 (1%)	262 (90%)	**291**
	2006	12 (4%)	94 (34%)	145 (52%)	216 (78%)	27 (10%)	21 (8%)	20 (7%)	259 (93%)	**278**
	2007	13 (5%)	86 (32%)	149 (56%)	189 (71%)	51 (19%)	12 (5%)	14 (5%)	252 (95%)	**265**
	2008	17 (5%)	84 (23%)	251 (70%)	288 (80%)	37 (10%)	12 (3%)	9 (2%)	345 (96%)	**361**
	2009	18 (5%)	40 (11%)	283 (80%)	282 (80%)	39 (11%)	18 (5%)	9 (3%)	341 (96%)	**354**
	2010	24 (5%)	51 (11%)	364 (81%)	332 (73%)	65 (14%)	16 (4%)	10 (2%)	430 (95%)	**452**
Treatment at 24 months	2004	30 (9%)	116 (36%)	154 (48%)	219 (68%)	45 (14%)	41 (13%)	5 (2%)	283 (88%)	**320**
	2005	23 (8%)	76 (27%)	156 (55%)	220 (78%)	23 (8%)	45 (16%)	5 (2%)	238 (84%)	**282**
	2006	15 (6%)	81 (30%)	144 (53%)	207 (76%)	31 (11%)	23 (8%)	25 (9%)	248 (92%)	**271**
	2007	12 (5%)	79 (31%)	152 (59%)	181 (70%)	54 (21%)	14 (5%)	13 (5%)	243 (94%)	**259**
	2008	20 (6%)	80 (23%)	238 (68%)	275 (79%)	39 (11%)	12 (3%)	9 (3%)	324 (93%)	**350**
	2009	22 (6%)	36 (10%)	268 (78%)	257 (75%)	43 (13%)	18 (5%)	11 (3%)	322 (94%)	**343**

Aza = Azathioprine
CyA = Cyclosporine
Tacrol = Tacrolimus
MMF = Mycophenolate Mofetil
MPA = Mycophenolic Acid (Enteric Coated)
Sirol = Sirolimus
Pred = Prednisolone

IMMUNOSUPPRESSION

NEW ZEALAND

In New Zealand in 2011, 71% of new primary deceased donor transplant recipients received Cyclosporine and 29% received Tacrolimus (Figure 8.35). No transplant recipients commenced Azathioprine at the time of transplantation.

There are very few patients in New Zealand receiving TOR-inhibitors (Sirolimus or Everolimus). Whereas only 67% of the 2004 cohort remained on Mycophenolate two years post transplant, 96% of the 2009 cohort were still taking Mycophenolate preparations two years later.

Caution is necessary in the interpretation of differences in practice between Australia and New Zealand. The funding of different pharmaceutical agents is quite different in the two countries.

Figure 8.35 New Zealand

Immunosuppressive Therapy - Primary Deceased Donor Graft 2004 - 2011

	Year	Aza	CyA	Tacrol	MMF	MPA	Sirol	Everolimus	Pred	Number of Deceased Donor Grafts
Initial treatment	2004	-	47 (94%)	3 (6%)	49 (98%)	-	-	-	50 (100%)	**50**
	2005	-	32 (76%)	8 (19%)	41 (98%)	-	-	-	41 (98%)	**42**
	2006	-	26 (68%)	11 (30%)	34 (92%)	-	-	3 (8%)	37 (100%)	**37**
	2007	-	43 (74%)	15 (26%)	57 (98%)	-	-	1 (2%)	58 (100%)	**58**
	2008	-	30 (67%)	15 (33%)	42 (93%)	3 (7%)	-	-	45 (100%)	**45**
	2009	-	39 (78%)	10 (20%)	49 (98%)	-	-	-	49 (98%)	**50**
	2010	-	32 (71%)	13 (29%)	45 (100%)	-	-	-	45 (100%)	**45**
	2011	-	41 (71%)	17 (29%)	58 (100%)	-	-	-	58 (100%)	**58**
Treatment at 12 months	2004	9 (19%)	30 (64%)	17 (36%)	37 (79%)	-	-	-	45 (96%)	**47**
	2005	2 (5%)	21 (55%)	16 (42%)	33 (87%)	1 (3%)	2 (5%)	1 (3%)	35 (92%)	**38**
	2006	-	18 (53%)	15 (45%)	29 (88%)	-	-	3 (9%)	32 (97%)	**33**
	2007	3 (6%)	31 (60%)	20 (38%)	43 (83%)	-	2 (4%)	1 (2%)	48 (92%)	**52**
	2008	2 (5%)	21 (48%)	23 (52%)	39 (89%)	1 (2%)	-	-	41 (93%)	**44**
	2009	-	24 (50%)	23 (48%)	48 (100%)	-	1 (2%)	-	45 (94%)	**48**
	2010	2 (5%)	16 (37%)	26 (60%)	40 (93%)	-	-	-	41 (95%)	**43**
Treatment at 24 months	2004	12 (27%)	27 (60%)	18 (40%)	30 (67%)	-	-	-	41 (91%)	**45**
	2005	2 (6%)	18 (50%)	17 (47%)	30 (83%)	1 (3%)	2 (6%)	1 (3%)	29 (81%)	**36**
	2006	-	16 (50%)	16 (50%)	28 (88%)	-	-	2 (6%)	30 (94%)	**32**
	2007	3 (6%)	29 (58%)	20 (40%)	41 (82%)	-	2 (4%)	1 (2%)	45 (90%)	**50**
	2008	2 (5%)	20 (48%)	22 (52%)	37 (88%)	-	1 (2%)	-	40 (95%)	**42**
	2009	-	20 (43%)	24 (52%)	44 (96%)	-	1 (2%)	-	41 (89%)	**46**

Aza = Azathioprine
CyA = Cyclosporine
Tacrol = Tacrolimus
MMF = Mycophenolate Mofetil
MPA = Mycophenolic Acid (Enteric Coated)
Sirol = Sirolimus
Pred = Prednisolone

USE OF ANTIBODY THERAPY FOR INDUCTION IMMUNOSUPPRESSION

AUSTRALIA AND NEW ZEALAND

The use of mono and polyclonal antibody agents for induction immunosuppression has changed through time and use and differs among centres and between Australia and New Zealand. The changes in use of these agents in recent years are reported here. Readers should note that differences between Australia and New Zealand are likely to reflect case mix and also drug availability. For this Report induction therapy is defined as treatment given pre-transplant or up to two weeks post transplant in the absence of rejection.

Figure 8.36 shows the use of induction agents over the last five years.

In Australia in 2011 8% of recipients received an alternative agent either in addition to, or instead of Basiliximab and Daclizumab. There has been a small recent increase in the use of Intravenous Immunoglobulin and T cell depleting polyclonal Ab, probably reflecting an increase in desensitisation regimens and ABO incompatible transplants.

In New Zealand, agents other than the interleukin 2 receptor antagonists Basiliximab and Daclizumab are very uncommon.

Figure 8.36

Antibody Use for Induction Immunosuppression
Australia and New Zealand 2007 - 2011

Number of Kidney Transplant Recipients
Receiving Each Agent by Year
(% Total New Transplants)

	2007	2008	2009	2010	2011
Australia					
Muromonab-CD3	2 (0.3%)	-	1 (0.1%)	-	-
Intravenous immunoglobulin	14 (2.3%)	25 (3.1%)	28 (3.6%)	39 (4.6%)	40 (4.8%)
Anti-CD25	532 (86.5%)	740 (91.0%)	715 (92.5%)	798 (94.3%)	748 (90.7%)
Rituximab	7 (1.1%)	21 (2.6%)	17 (2.2%)	9 (1.1%)	9 (1.1%)
T cell depleting polyclonal Ab	17 (2.8%)	22 (2.7%)	40 (5.2%)	52 (6.1%)	33 (4.0%)
Total new transplants	**615**	**813**	**773**	**846**	**825**
New Zealand					
T cell depleting polyclonal Ab	-	-	-	1 (0.9%)	1 (0.8%)
Anti-CD25	47 (38.2%)	74 (60.7%)	63 (52.1%)	65 (59.1%)	110 (93.2%)
Rituximab	-	1 (0.8%)	2 (1.7%)	1 (0.9%)	3 (2.5%)
Intravenous Immunoglobulin	-	-	-	-	-
Muromonab-CD3	-	-	-	-	-
Total new transplants	**123**	**122**	**121**	**110**	**118**

USE OF ANTIBODY THERAPY FOR TREATMENT OF REJECTION

AUSTRALIA AND NEW ZEALAND

Figure 8.37 shows the number of people who received antibody agents for treating acute rejection by calendar year. The number is also reported as a proportion of new transplant recipients in each calendar year, but readers should be aware that although the large majority of people experiencing acute rejection do so within the first six months of transplantation, some experience rejection after this time (when they would not necessarily be counted as a new transplant). For this reason the total number of transplant recipients treated during the year is also reported.

Muromonab-CD3 has now been withdrawn from sale and was unavailable in 2011. The use of T cell depleting polyclonal Ab and Intravenous Immunoglobulin has increased recently.

Figure 8.37

Antibody Use as Treatment for Acute Rejection
Australia and New Zealand 2007 - 2011

Number of Kidney Transplant Recipients
Receiving Each Agent by Year
(% Total New Transplants)

	2007	2008	2009	2010	2011
Australia					
Muromonab-CD3	9 (1.5%)	10 (1.2%)	12 (1.6%)	2 (0.2%)	-
Intravenous immunoglobulin	70 (11.4%)	89 (10.9%)	105 (13.6%)	92 (10.9%)	104 (12.6%)
Anti-CD25	-	1 (0.1%)	1 (0.1%)	-	-
Rituximab	16 (2.6%)	24 (3.0%)	26 (3.4%)	15 (1.8%)	11 (1.3%)
T cell depleting polyclonal Ab	14 (2.3%)	19 (2.3%)	27 (3.5%)	41 (4.8%)	42 (5.1%)
Total new transplants	**615**	**813**	**773**	**846**	**825**
Total transplants at risk	**7477**	**7928**	**8274**	**8737**	**9175**
New Zealand					
Muromonab-CD3	10 (8.1%)	10 (8.2%)	8 (6.6%)	4 (3.6%)	-
Intravenous immunoglobulin	3 (2.4%)	2 (1.6%)	7 (5.8%)	3 (2.7%)	3 (2.5%)
Anti-CD25	1 (0.8%)	1 (0.8%)	-	-	1 (0.8%)
Rituximab	-	-	3 (2.5%)	-	-
T cell depleting polyclonal Ab	3 (2.4%)	3 (2.5%)	2 (1.7%)	12 (10.9%)	11 (9.3%)
Total new transplants	**123**	**122**	**121**	**110**	**118**
Total transplants at risk	**1370**	**1405**	**1469**	**1509**	**1555**

REJECTION RATES

AUSTRALIA AND NEW ZEALAND

Figure 8.38 shows the proportion of patients experiencing rejection in the first six months after transplant. For both living and deceased donor primary grafts, the six month incidence of rejection has fallen over the last decade.

Rejection rates in subsequent grafts are more variable due to the lower number of recipients, but have not clearly fallen in either living or deceased donors.

Figure 8.38

Australia and New Zealand
Rejection Rates at Six Months Post Transplant

Donor Source	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Living Donor										
First graft	27.5%	27.7%	21.6%	19.6%	19.6%	21.1%	17.0%	16.8%	17.8%	16.1%
Second and subsequent grafts	13.0%	33.3%	34.8%	18.5%	33.3%	34.3%	30.0%	24.3%	12.9%	18.5%
Deceased Donor										
First graft	22.9%	26.8%	22.8%	18.6%	16.3%	17.7%	22.0%	20.9%	18.7%	17.9%
Second and subsequent grafts	24.1%	25.0%	27.5%	31.7%	36.4%	32.8%	32.9%	36.5%	27.3%	16.1%

SHORT TERM SURVIVAL - PRIMARY DECEASED DONOR GRAFTS

AUSTRALIA

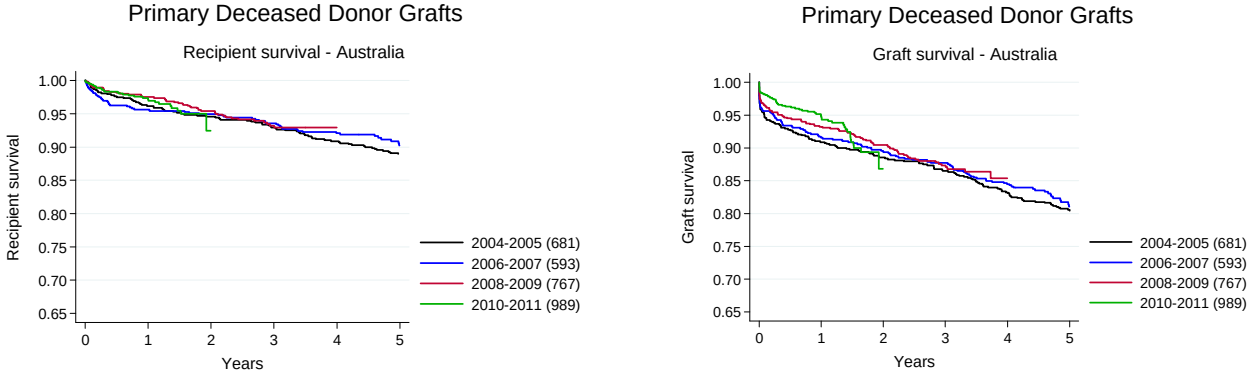
Graft and patient survival for primary deceased donor grafts performed in Australia, calculated by the Kaplan-Meier method, is shown in Figure 8.39. The figures include graft losses or deaths on the day of transplant, and graft survival is not censored for death. Unadjusted one year patient and graft survival for primary deceased donor grafts in Australia have stabilised in the past ten years. Kaplan-Meier graphs illustrating this are shown in Figure 8.40.

Figure 8.39

Primary Deceased Donor - Australia
Recipient and Graft Survival 1992 - 2011
% [95% Confidence Interval]

Year of Transplant	Survival			
	1 month	6 months	1 year	5 years
Recipient Survival				
1992-1993 (n=665)	99 (98, 99)	95 (94, 97)	94 (92, 96)	85 (82, 87)
1994-1995 (n=576)	99 (98, 100)	96 (94, 97)	96 (94, 97)	86 (83, 88)
1996-1997 (n=624)	99 (97, 99)	96 (94, 97)	95 (93, 97)	86 (83, 89)
1998-1999 (n=541)	99 (98, 100)	97 (95, 98)	95 (93, 96)	86 (83, 89)
2000-2001 (n=600)	99 (98, 100)	97 (96, 98)	95 (93, 97)	89 (87, 92)
2002-2003 (n=600)	100 (99, 100)	98 (96, 99)	97 (95, 98)	89 (87, 92)
2004-2005 (n=681)	99 (98, 100)	98 (96, 99)	96 (94, 97)	89 (86, 91)
2006-2007 (n=593)	99 (97, 99)	96 (94, 98)	96 (94, 97)	90 (87, 92)
2008-2009 (n=767)	99 (99, 100)	98 (97, 99)	98 (96, 98)	-
2010-2011 (n=989)	99 (99, 100)	98 (97, 99)	97 (96, 98)	-
Graft Survival				
1992-1993 (n=665)	91 (89, 93)	87 (85, 90)	86 (83, 88)	73 (69, 76)
1994-1995 (n=576)	95 (93, 97)	91 (89, 93)	90 (87, 92)	74 (70, 78)
1996-1997 (n=624)	94 (91, 95)	90 (87, 92)	89 (86, 91)	78 (74, 81)
1998-1999 (n=541)	96 (94, 97)	93 (90, 95)	91 (88, 93)	77 (73, 80)
2000-2001 (n=600)	97 (95, 98)	94 (92, 96)	92 (90, 94)	82 (79, 85)
2002-2003 (n=600)	95 (93, 97)	94 (91, 95)	93 (90, 94)	81 (77, 84)
2004-2005 (n=681)	95 (93, 97)	93 (91, 95)	91 (88, 93)	80 (77, 83)
2006-2007 (n=593)	96 (94, 97)	93 (91, 95)	92 (89, 94)	81 (77, 84)
2008-2009 (n=767)	97 (95, 98)	95 (93, 96)	93 (91, 95)	-
2010-2011 (n=989)	98 (97, 99)	96 (95, 97)	95 (93, 96)	-

Figure 8.40



SHORT TERM SURVIVAL - PRIMARY DECEASED DONOR GRAFTS

NEW ZEALAND

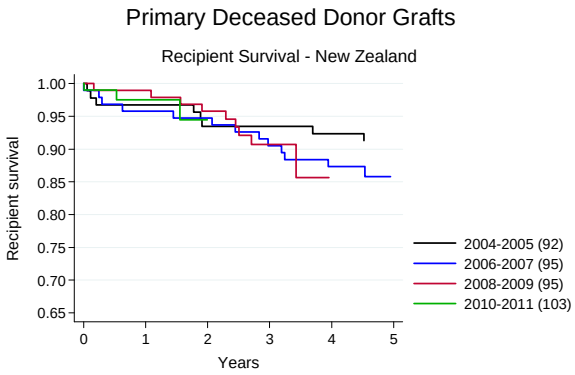
Graft and patient survival for primary deceased donor grafts performed in New Zealand, calculated by the Kaplan-Meier method, is shown in Figure 8.41. Like Australia, the improvement in unadjusted one year patient and graft survival have stabilised in the past ten years, although there is greater random variation due to smaller overall numbers. Figure 8.42 presents these data as Kaplan-Meier curves.

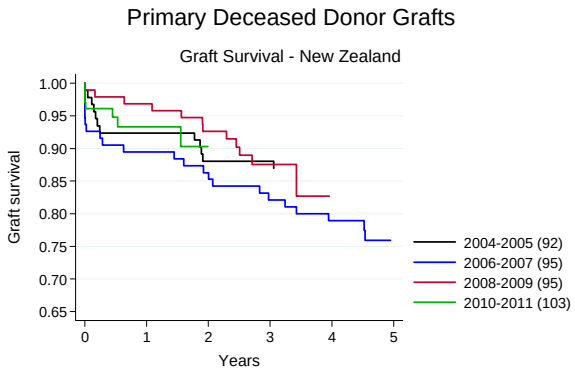
Figure 8.41

Primary Deceased Donor - New Zealand
Recipient and Graft Survival 1992 - 2011
% [95% Confidence Interval]

Year of Transplant	Survival			
	1 month	6 months	1 year	5 years
Recipient Survival				
1992-1993 (n=142)	98 (94, 99)	93 (87, 96)	89 (82, 93)	79 (71, 85)
1994-1995 (n=114)	97 (92, 99)	92 (85, 96)	91 (84, 95)	88 (80, 93)
1996-1997 (n=135)	99 (94, 100)	95 (89, 97)	94 (89, 97)	84 (76, 89)
1998-1999 (n=126)	96 (91, 98)	91 (85, 95)	90 (83, 94)	79 (71, 85)
2000-2001 (n=125)	100	96 (91, 98)	96 (91, 98)	86 (79, 91)
2002-2003 (n=113)	98 (93, 100)	94 (87, 97)	94 (87, 97)	87 (79, 92)
2004-2005 (n=92)	99 (93, 100)	97 (90, 99)	97 (90, 99)	91 (83, 96)
2006-2007 (n=95)	99 (93, 100)	97 (91, 99)	96 (89, 98)	86 (77, 92)
2008-2009 (n=95)	100	99 (93, 100)	99 (93, 100)	-
2010-2011 (n=103)	99 (93, 100)	99 (93, 100)	98 (90, 99)	-
Graft Survival				
1992-1993 (n=142)	89 (82, 93)	82 (74, 87)	77 (70, 83)	67 (59, 74)
1994-1995 (n=114)	88 (80, 93)	84 (76, 90)	80 (71, 86)	69 (60, 77)
1996-1997 (n=135)	90 (83, 94)	87 (80, 91)	84 (77, 90)	72 (63, 79)
1998-1999 (n=126)	91 (85, 95)	86 (78, 91)	83 (75, 88)	69 (60, 76)
2000-2001 (n=125)	94 (89, 97)	90 (84, 94)	90 (84, 94)	78 (70, 85)
2002-2003 (n=113)	90 (83, 94)	88 (80, 92)	88 (80, 92)	75 (66, 82)
2004-2005 (n=92)	98 (92, 99)	92 (85, 96)	92 (85, 96)	87 (78, 92)
2006-2007 (n=95)	93 (85, 96)	91 (83, 95)	89 (81, 94)	76 (66, 84)
2008-2009 (n=95)	99 (93, 100)	98 (92, 99)	97 (91, 99)	-
2010-2011 (n=103)	96 (90, 99)	95 (88, 98)	93 (85, 97)	-

Figure 8.42





LONG TERM SURVIVAL - PRIMARY DECEASED DONOR GRAFTS
AUSTRALIA AND NEW ZEALAND

The aim of this section is to summarise the longer term outcomes of kidney transplants in a survival metric rather than as rates - that is, to describe the proportion of grafts surviving at particular time points.

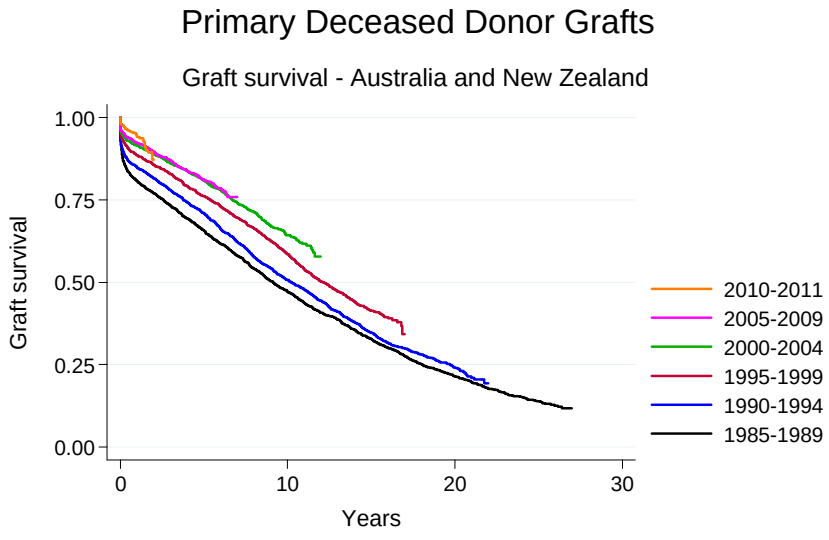
As can be seen from the tables and figures, the graft survival advantage of living over deceased donor recipients and first over subsequent grafts is consistent over time. The considerable jump in survival from the 1980-84 cohort to 1985-89 coincides with the introduction of Cyclosporin into routine clinical practice in Australia. Since that time there have been lesser but consistent improvements in graft survival.

Figure 8.43

Graft and Patient Survival of Primary Grafts
Deceased Donors - Australia and New Zealand

	Graft Survival					Patient Survival				
Time Period	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**
1970-1974 (n=1149)	58.2%	41.9%	30.3%	22.8%	14.6%	77.0%	57.4%	44.4%	34.2%	25.1%
1975-1979 (n=1463)	51.7%	36.0%	25.6%	17.7%	12.6%	81.0%	63.6%	49.4%	35.5%	26.2%
1980-1984 (n=1595)	63.3%	45.4%	32.1%	23.0%	16.2%	91.4%	75.1%	59.4%	45.9%	34.7%
1985-1989 (n=1916)	80.8%	65.8%	47.2%	32.9%	21.4%	92.1%	80.3%	64.5%	51.2%	39.6%
1990-1994 (n=1906)	85.0%	70.9%	50.7%	34.7%	24.1%	93.4%	83.9%	67.7%	53.2%	41.1%
1995-1999 (n=1779)	88.6%	76.2%	58.6%	41.3%	-	94.7%	86.1%	72.4%	57.1%	-
2000-2004 (n=1850)	91.6%	80.9%	64.3%	-	-	96.0%	89.1%	76.9%	-	-
2005-2009 (n=1911)	92.3%	81.0%	-	-	-	96.7%	89.6%	-	-	-
2010-2014 (n=1092)	94.8%	-	-	-	-	97.4%	-	-	-	-

Figure 8.44



SHORT TERM SURVIVAL - SECOND AND SUBSEQUENT DECEASED DONOR GRAFTS

AUSTRALIA AND NEW ZEALAND

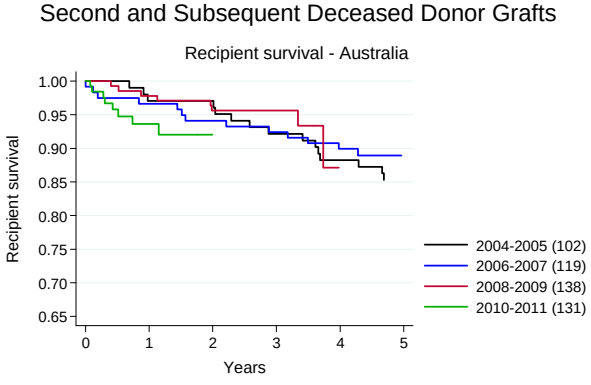
Patient and graft survival for second or subsequent deceased donor grafts in Australia, calculated by the Kaplan-Meier method, is shown in Figures 8.45 and 8.46.

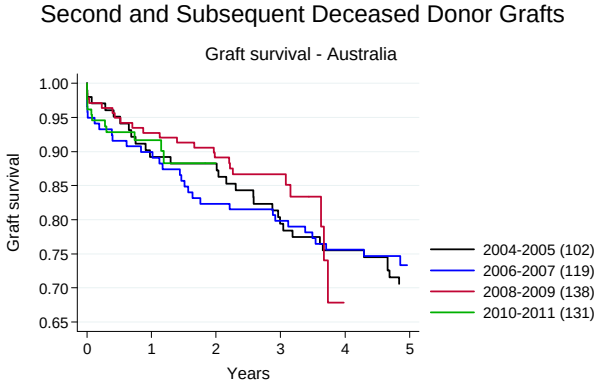
Figure 8.45

Second and Subsequent Deceased Donor - Australia
Recipient and Graft Survival 1992 - 2011
% [95% Confidence Interval]

Year of Transplant	Survival			
	1 month	6 months	1 year	5 years
Recipient Survival				
1992-1993 (n=135)	99 (95, 100)	96 (91, 98)	95 (89, 97)	84 (76, 89)
1994-1995 (n=109)	98 (93, 100)	97 (92, 99)	95 (89, 98)	87 (79, 92)
1996-1997 (n=94)	100	98 (92, 99)	98 (92, 99)	86 (77, 92)
1998-1999 (n=102)	100	97 (91, 99)	94 (87, 97)	84 (76, 90)
2000-2001 (n=78)	97 (90, 99)	95 (87, 98)	95 (87, 98)	90 (81, 95)
2002-2003 (n=99)	99 (93, 100)	95 (88, 98)	90 (82, 94)	85 (76, 91)
2004-2005 (n=102)	100	100	97 (91, 99)	85 (77, 91)
2006-2007 (n=119)	99 (94, 100)	97 (92, 99)	97 (91, 99)	89 (82, 93)
2008-2009 (n=138)	100	99 (95, 100)	98 (93, 99)	-
2010-2011 (n=131)	99 (95, 100)	96 (90, 98)	94 (87, 97)	-
Graft Survival				
1992-1993 (n=135)	83 (75, 88)	79 (71, 85)	78 (70, 84)	65 (57, 73)
1994-1995 (n=109)	86 (78, 91)	83 (74, 89)	81 (72, 87)	67 (57, 75)
1996-1997 (n=94)	90 (82, 95)	87 (79, 93)	86 (77, 92)	69 (59, 77)
1998-1999 (n=102)	93 (86, 97)	88 (80, 93)	83 (75, 89)	69 (59, 77)
2000-2001 (n=78)	90 (81, 95)	83 (73, 90)	82 (72, 89)	67 (55, 76)
2002-2003 (n=99)	93 (86, 97)	90 (82, 94)	85 (76, 91)	71 (61, 79)
2004-2005 (n=102)	97 (91, 99)	95 (89, 98)	89 (81, 94)	71 (61, 78)
2006-2007 (n=119)	95 (89, 98)	92 (85, 95)	90 (83, 94)	73 (64, 80)
2008-2009 (n=138)	97 (92, 99)	95 (90, 98)	93 (87, 96)	-
2010-2011 (n=131)	95 (89, 97)	93 (87, 96)	92 (85, 95)	-

Figure 8.46





LONG TERM SURVIVAL - SECOND AND SUBSEQUENT DECEASED DONOR GRAFTS

AUSTRALIA AND NEW ZEALAND

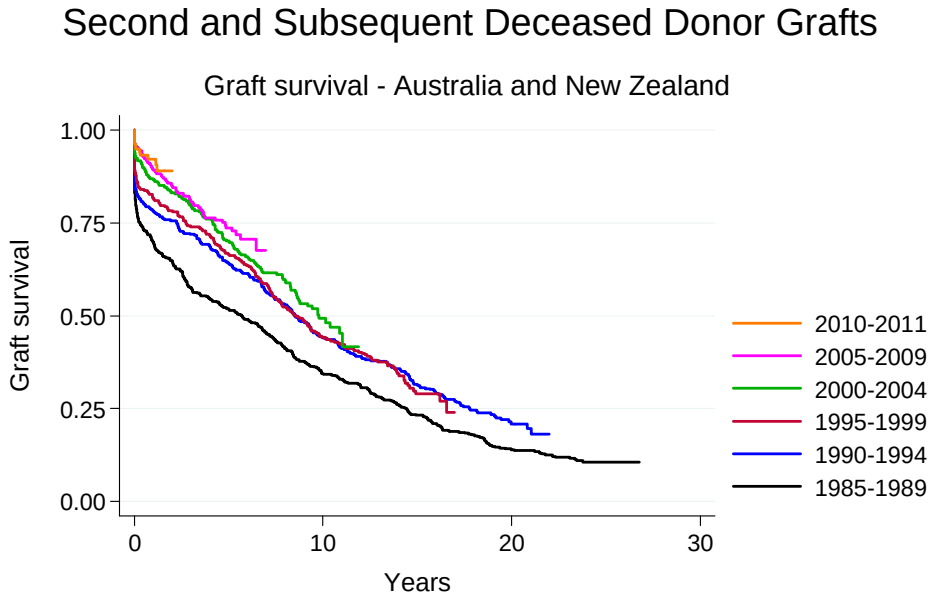
The long-term graft and patient survival of second and subsequent grafts is shown in Figures 8.47 and 8.48. There has been a steady improvement in both graft and patient survival, such that survival of subsequent grafts is now similar to primary grafts (Figures 8.43 and 8.44).

Figure 8.47

Graft and Patient Survival of Second and Subsequent Grafts
Deceased Donors
Australia and New Zealand

	Graft Survival					Patient Survival				
Time Period	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**
1970-1974 (n=158)	58.9%	37.3%	27.2%	21.5%	14.6%	79.1%	55.7%	42.4%	33.5%	26.6%
1975-1979 (n=284)	44.0%	28.2%	20.4%	15.0%	8.1%	78.2%	57.4%	44.7%	31.3%	20.0%
1980-1984 (n=417)	48.9%	36.0%	25.6%	20.3%	14.2%	90.6%	74.8%	59.0%	46.8%	37.1%
1985-1989 (n=458)	70.1%	51.7%	34.4%	23.2%	13.9%	93.7%	79.2%	62.8%	47.3%	35.1%
1990-1994 (n=374)	78.3%	64.2%	44.1%	31.2%	20.8%	93.0%	82.6%	67.9%	54.0%	40.2%
1995-1999 (n=296)	81.8%	66.6%	44.3%	29.0%	-	95.9%	86.1%	73.3%	59.1%	-
2000-2004 (n=268)	86.6%	70.1%	49.3%	-	-	93.7%	86.2%	74.8%	-	-
2005-2009 (n=343)	89.5%	73.7%	-	-	-	96.2%	88.7%	-	-	-
2010-2011 (n=139)	92.2%	-	-	-	-	94.0%	-	-	-	-

Figure 8.48



SHORT TERM SURVIVAL - PRIMARY LIVING DONOR GRAFTS

AUSTRALIA AND NEW ZEALAND

For primary living donor graft recipients, excellent patient and graft survival rates have been maintained despite the increased rates of living donor transplantation and corresponding increase in performing less ideal living donor transplants, particularly from older donors and unrelated donor transplants.

Current patient and graft survival for primary living donor recipients in Australia and New Zealand are similar.

Figure 8.49 Australia

Primary Living Donor Grafts 1992 - 2011
Recipient and Graft Survival
% [95% Confidence Interval]

Year of Transplant	1 month	6 months	1 year	5 years
Recipient Survival				
1992-1993 (n=124)	100	99 (94, 100)	98 (94, 100)	92 (85, 96)
1994-1995 (n=179)	100	98 (94, 99)	97 (93, 98)	94 (89, 97)
1996-1997 (n=239)	100	99 (97, 100)	99 (96, 100)	96 (92, 98)
1998-1999 (n=305)	100	99 (97, 100)	99 (97, 100)	96 (93, 97)
2000-2001 (n=364)	99 (98, 100)	99 (97, 99)	99 (97, 99)	95 (92, 97)
2002-2003 (n=409)	100 (98, 100)	99 (97, 99)	98 (96, 99)	93 (90, 95)
2004-2005 (n=441)	100 (98, 100)	100 (98, 100)	99 (98, 100)	97 (94, 98)
2006-2007 (n=483)	100 (99, 100)	99 (98, 100)	99 (97, 99)	95 (92, 96)
2008-2009 (n=615)	100 (98, 100)	99 (97, 99)	98 (97, 99)	-
2010-2011 (n=499)	100	100 (98, 100)	99 (97, 100)	-
Graft Survival				
1992-1993 (n=124)	97 (92, 99)	96 (91, 98)	94 (88, 97)	83 (75, 88)
1994-1995 (n=179)	94 (90, 97)	92 (86, 95)	90 (85, 94)	83 (76, 87)
1996-1997 (n=239)	96 (92, 98)	95 (91, 97)	94 (90, 96)	86 (81, 90)
1998-1999 (n=305)	98 (96, 99)	97 (94, 98)	96 (94, 98)	87 (82, 90)
2000-2001 (n=364)	98 (95, 99)	96 (93, 97)	95 (93, 97)	88 (84, 91)
2002-2003 (n=409)	98 (96, 99)	96 (94, 98)	95 (93, 97)	88 (84, 91)
2004-2005 (n=441)	100 (98, 100)	98 (96, 99)	98 (96, 99)	89 (86, 92)
2006-2007 (n=483)	99 (97, 99)	98 (96, 99)	97 (95, 98)	89 (86, 92)
2008-2009 (n=615)	98 (96, 99)	96 (95, 98)	96 (94, 97)	-
2010-2011 (n=499)	99 (98, 100)	99 (98, 100)	98 (96, 99)	-

Figure 8.50 New Zealand

Primary Living Donor Grafts 1992 - 2011
Recipient and Graft Survival
% [95% Confidence Interval]

Year of Transplant	1 month	6 months	1 year	5 years
Recipient Survival				
1992-1993 (n=31)	100	97 (79, 100)	97 (79, 100)	94 (77, 98)
1994-1995 (n=40)	100	100	98 (84, 100)	92 (78, 97)
1996-1997 (n=54)	100	100	100	87 (75, 94)
1998-1999 (n=66)	100	100	100	92 (83, 97)
2000-2001 (n=67)	100	100	100	95 (87, 99)
2002-2003 (n=84)	100	99 (92, 100)	99 (92, 100)	95 (88, 98)
2004-2005 (n=93)	99 (93, 100)	98 (92, 99)	96 (89, 98)	89 (81, 94)
2006-2007 (n=97)	100	99 (93, 100)	99 (93, 100)	96 (89, 99)
2008-2009 (n=125)	99 (94, 100)	98 (94, 100)	97 (92, 99)	-
2010-2011 (n=111)	100	99 (93, 100)	99 (93, 100)	-
Graft Survival				
1992-1993 (n=31)	100	97 (79, 100)	97 (79, 100)	84 (66, 93)
1994-1995 (n=40)	93 (79, 98)	90 (76, 96)	90 (76, 96)	75 (58, 86)
1996-1997 (n=54)	96 (86, 99)	96 (86, 99)	96 (86, 99)	74 (60, 84)
1998-1999 (n=66)	97 (88, 99)	95 (87, 99)	94 (85, 98)	74 (62, 83)
2000-2001 (n=67)	97 (89, 99)	97 (89, 99)	97 (89, 99)	83 (72, 90)
2002-2003 (n=84)	100	99 (92, 100)	99 (92, 100)	90 (82, 95)
2004-2005 (n=93)	96 (89, 98)	94 (86, 97)	92 (85, 96)	86 (77, 92)
2006-2007 (n=97)	100	98 (92, 99)	98 (92, 99)	93 (85, 97)
2008-2009 (n=125)	98 (94, 100)	98 (93, 99)	96 (91, 98)	-
2010-2011 (n=111)	97 (92, 99)	96 (91, 99)	96 (91, 99)	-

Figure 8.51

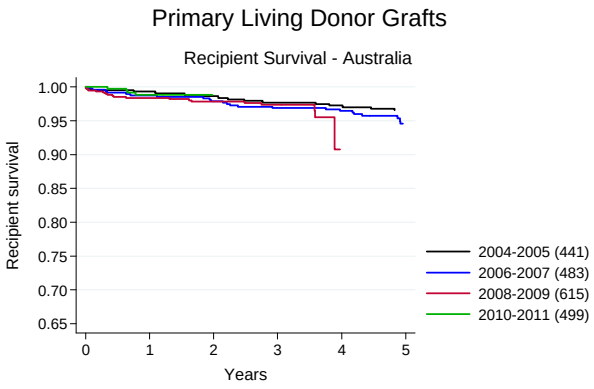


Figure 8.52

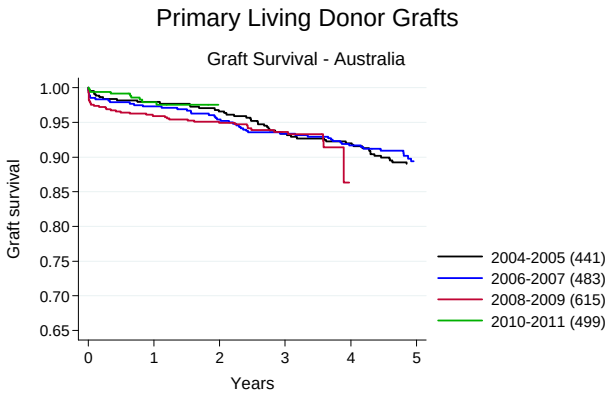


Figure 8.53

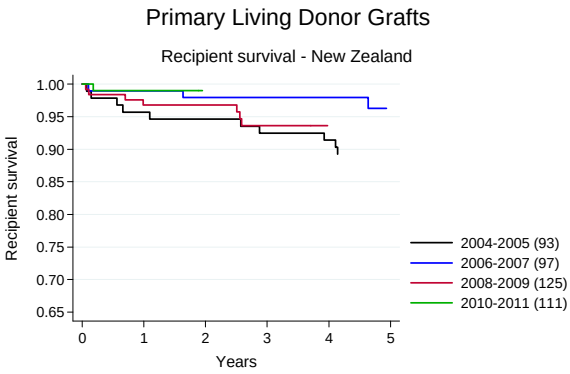
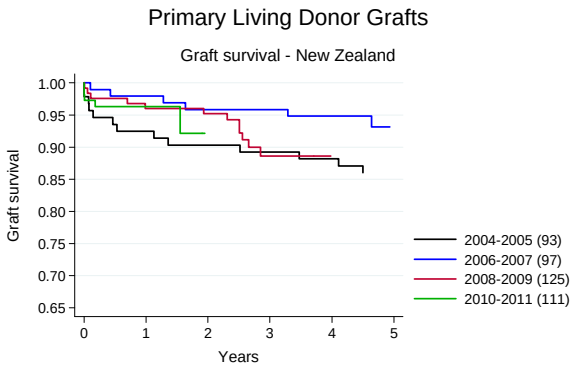


Figure 8.54



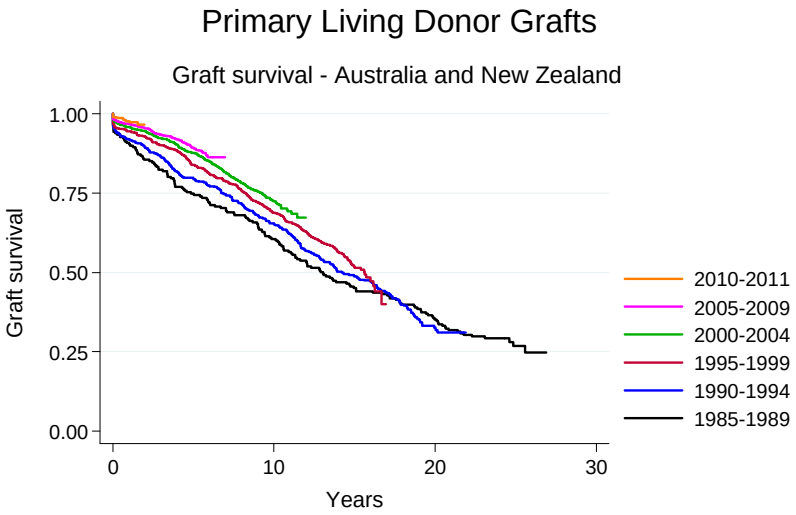
LONG TERM SURVIVAL - PRIMARY LIVING DONOR GRAFTS
AUSTRALIA AND NEW ZEALAND

Figure 8.55

Graft and Patient Survival of Primary Grafts
Living Donors - Australia and New Zealand

	Graft Survival					Patient Survival				
Time Period	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**
1970-1974 (n=21)	85.7%	76.2%	61.5%	46.2%	20.5%	90.5%	81.0%	61.9%	52.4%	42.9%
1975-1979 (n=107)	81.2%	63.3%	49.9%	41.2%	31.1%	90.7%	78.5%	71.0%	61.7%	52.2%
1980-1984 (n=241)	82.8%	71.2%	59.3%	46.5%	35.9%	96.3%	85.4%	74.9%	64.8%	55.4%
1985-1989 (n=230)	90.8%	74.8%	60.5%	45.1%	35.1%	95.2%	87.8%	79.9%	71.1%	62.9%
1990-1994 (n=431)	91.8%	79.6%	65.3%	48.8%	32.6%	97.2%	89.2%	84.0%	74.5%	69.0%
1995-1999 (n=766)	94.5%	84.0%	68.8%	51.9%	-	98.6%	94.7%	86.6%	76.4%	-
2000-2004 (n=1193)	95.9%	87.7%	72.4%	-	-	98.5%	94.3%	87.2%	-	-
2005-2009 (n=1585)	96.7%	89.4%	-	-	-	98.5%	95.1%	-	-	-
2010-2011 (n=610)	97.6%	-	-	-	-	98.9%	-	-	-	-

Figure 8.56



LONG TERM SURVIVAL - SECOND AND SUBSEQUENT LIVING DONOR GRAFTS

AUSTRALIA AND NEW ZEALAND

Figure 8.57

Graft and Patient Survival of Second and Subsequent Grafts
Living Donors - Australia and New Zealand

	Graft Survival					Patient Survival				
Time Period	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**
1970-1974 (n=1)	100.0%	100.0%	-	-	-	100.0%	100.0%	-	-	-
1975-1979 (n=11)	72.7%	45.5%	36.4%	36.4%	27.3%	100.0%	100.0%	81.8%	72.7%	63.6%
1980-1984 (n=42)	78.6%	64.3%	59.5%	50.0%	40.5%	97.6%	81.0%	78.6%	71.4%	51.9%
1985-1989 (n=31)	87.1%	74.2%	58.1%	45.2%	29.0%	96.8%	83.9%	71.0%	64.5%	47.5%
1990-1994 (n=38)	100.0%	86.8%	41.2%	35.7%	23.5%	100.0%	94.7%	73.3%	67.9%	50.2%
1995-1999 (n=74)	93.2%	82.4%	68.9%	58.9%	-	98.6%	98.6%	89.2%	81.0%	-
2000-2004 (n=107)	93.5%	86.0%	65.3%	-	-	98.1%	95.3%	85.1%	-	-
2005-2009 (n=175)	95.4%	80.4%	-	-	-	98.3%	92.0%	-	-	-
2010-2011 (n=58)	92.6%	-	-	-	-	97.8%	-	-	-	-

Figure 8.58