

## **CHAPTER 8**

# **TRANSPLANTATION**

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## TRANSPLANTS PERFORMED IN 2005

**Figure 8.1**

Number of Renal Transplant Operations (Live Donors)											
Year	Australia						New Zealand				
	1st	2nd	3rd	4th	5th	Total	1st	2nd	3rd	4th	Total
1963	5	1	0	0	0	6 (1)	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 (14)	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)	69	13	2	0	84 (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	444	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 (169)	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	582	53	11	3	0	649 (243)	98	7	0	0	105 (48)
2005	539	67	15	2	0	623 (246)	87	5	0	1	93 (46)

### AUSTRALIA

The 623 transplant operations performed in 2005 represents a decrease of 4% compared to 2004 (649 operations) (Figure 8.1). However, this number was the second highest ever recorded. This was a transplant rate of 31 per million population per year compared to 32 per million per year in 2004. The decrease was due to less deceased donors (down 7% from 2004) but live donors increased slightly (Figure 8.2).

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

Live donor transplants accounted for 39% (246 grafts) in 2005, compared to 37% (243 grafts) in 2004. While these figures are similar, this proportion continues to increase over time.

Primary recipients (those receiving a first transplant) received 87% of all kidneys transplanted in 2005, compared to 90% in 2004.

### NEW ZEALAND

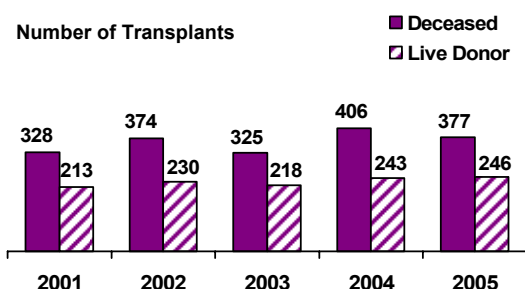
The number of transplant operations (93) performed in 2005 represents a transplant rate of 23 per million population per year (a decrease of 11% from 2004) and the lowest number since 1994 (Figure 8.1).

The percentage of live donors increased from 46% to 49% of all operations in 2005 (Figure 8.3).

Of the grafts performed in 2005, 94% were to primary recipients, (93% in 2004).

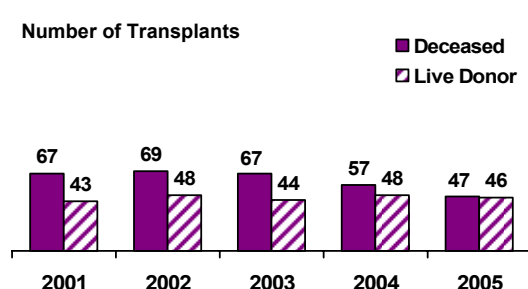
**Figure 8.2**

**Deceased and Live Donor Transplants  
Australia 2001 - 2005**



**Figure 8.3**

**Deceased and Live Donor Transplants  
New Zealand 2001 - 2005**



## TRANSPLANT RATE OF PATIENTS DIALYSED

In Australia the proportion of patients receiving dialysis in 2005, who were transplanted that year was 6.0%, a decrease from 6.6% in 2004 and similar to 2003. A further 84 patients with ESKD received pre-emptive transplantation (transplantation as the first RRT modality); thus transplantation was the mode of RRT for 623 of 10,362 (6.0%) of patients who would have otherwise been managed with dialysis in 2005.

Of all patients in the 15-59 year age group who received dialysis treatment during 2005, 10.9% were transplanted in 2005, compared to 11.9% in 2004.

In New Zealand, 4.1% of all dialysed patients were transplanted in 2005, compared to 4.8% in 2004. A further 13 patients with ESKD received pre-emptive transplantation, thus transplantation was the mode of RRT for 93 of 2,247 (4.1%) of patients. In the 15-59 year age group 6.2% of those on dialysis were transplanted in 2005 (Figures 8.4 and 8.5).

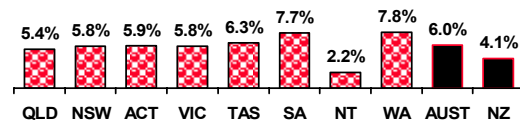
The rate of transplantation in Australia was the highest in the age group 5-14 years (58.6%) and 0-4 years of age (40%) and continued to decline with increasing age (Figure 8.6).

As in Australia, the rate of transplantation for New Zealand patients was highest among those less than 14 years old and declined with age (Figure 8.7).

**Figure 8.4**

**Ratio of Transplantation 2005 Related to Patients Dialysed\***

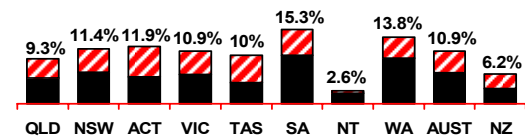
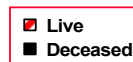
All Patients



**Figure 8.5**

**Ratio of Transplantation 2005 Related to Patients Dialysed\***

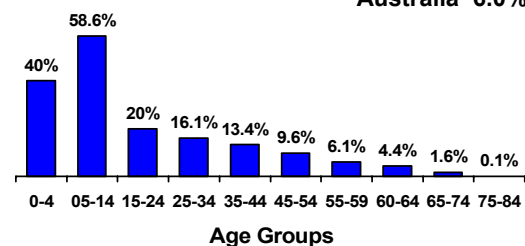
Patients - Age Group 15-59 Years



**Figure 8.6**

**Ratio of Transplantation 2005 Related to Patients Dialysed\***

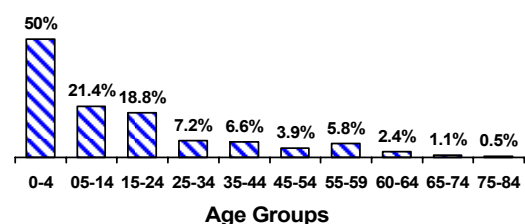
Australia 6.0%



**Figure 8.7**

**Ratio of Transplantation 2005 Related to Patients Dialysed\***

New Zealand 4.1%



\* Preemptive transplant patients included



## AGE OF RECIPIENTS TRANSPLANTED IN 2005

**Figure 8.8**

### Graft Number and Age of Patients Transplanted 2005

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	
<b>Australia</b>											
Deceased	1	2	12	7	32	63	96	74	33	0	<b>319</b>
	2	0	1	2	13	11	9	6	2	0	<b>44</b>
	3	0	0	2	2	6	2	0	0	0	<b>12</b>
	4	0	0	0	0	1	1	0	0	0	<b>2</b>
Live Donor	1	2	14	25	41	48	49	33	6	2	<b>220</b>
	2	0	0	1	2	9	6	3	2	0	<b>23</b>
	3	0	0	0	1	2	0	0	0	0	<b>3</b>
<b>Total</b>		<b>4</b>	<b>27</b>	<b>37</b>	<b>91</b>	<b>140</b>	<b>163</b>	<b>116</b>	<b>43</b>	<b>2</b>	<b>623</b>
<b>New Zealand</b>											
Deceased	1	0	0	5	5	8	8	10	5	1	<b>42</b>
	2	0	0	0	0	2	1	1	0	0	<b>4</b>
	4	0	0	0	0	1	0	0	0	0	<b>1</b>
Live Donor	1	1	3	8	5	5	8	14	1	0	<b>45</b>
	2	0	0	0	0	1	0	0	0	0	<b>1</b>
<b>Total</b>		<b>1</b>	<b>3</b>	<b>13</b>	<b>10</b>	<b>17</b>	<b>17</b>	<b>25</b>	<b>6</b>	<b>1</b>	<b>93</b>

### AUSTRALIA

The median age of transplant recipients in 2005 was 46.1 years, compared to 47.6 years in 2004. The age range was 2.6 to 76.4 years (Figures 8.8 and 8.9).

Forty nine percent of recipients were in the 35-54 year age group. Twenty six percent of recipients in 2005 were over 54 years of age, similar to 2004.

The transplantation rate per million for each age group and as a percentage of dialysed patients for each age group is shown in Figures 8.6 and 8.9.

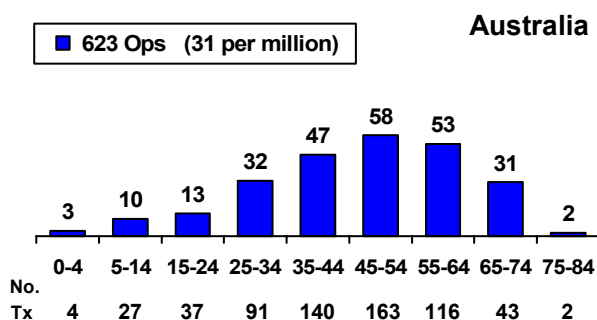
### NEW ZEALAND

The median age of transplant recipients in 2005 was 48.7 years compared to 46.6 years in 2004. The age range was 1.3 to 75.8 years (Figures 8.8 and 8.10).

Recipients aged between 35 and 54 years comprised 37% of the total. Thirty four percent of recipients were over 54 years of age in 2005.

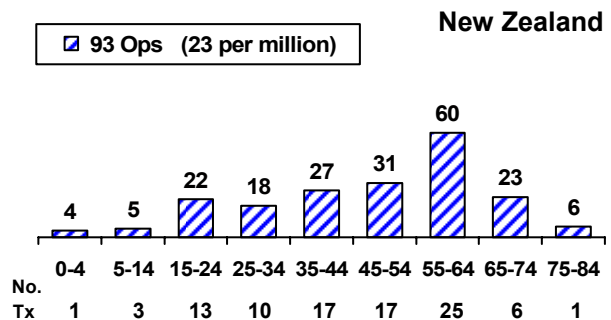
**Figure 8.9**

### Transplant Operations (Per Million) 2005



**Figure 8.10**

### Transplant Operations (Per Million) 2005



## ETHNICITY OF TRANSPLANT RECIPIENTS

### AUSTRALIA

Figures 8.11 and 8.13.

For the 15-59 year age group in 2005, 13.2% of dialysed Caucasoid patients were transplanted and 12.3% of Asians.

For Australian Aboriginals and Torres Strait Islanders (ATSI), the transplant rate was 2.4% compared to 3.4% in 2004. The number of ATSI patients dialysed continues to increase each year.

<b>Figure 8.11</b>									
<b>Australia</b>									
<b>Transplantation Rate - Age Group 15-59 years</b>									
<b>1995 - 2005</b>									
Year	Caucasoid			Aboriginal and Torres St. Islanders			All Patients		
	Dialysed	Tx	Rate	Dialysed	Tx	Rate	Dialysed	Tx	Rate
1995	2320	316	13.6%	345	13	3.7%	2995	366	12.2%
1996	2449	358	14.6%	388	8	2.0%	3187	402	12.6%
1997	2528	359	14.2%	440	20	4.5%	3363	429	12.7%
1998	2656	358	13.4%	479	25	5.2%	3555	436	12.2%
1999	2747	323	11.7%	514	19	3.7%	3699	386	10.4%
2000	2868	388	13.5%	541	17	3.1%	3885	441	11.3%
2001	2947	391	13.3%	599	20	3.3%	4052	457	11.3%
2002	2976	443	14.9%	635	16	2.5%	4151	511	12.3%
2003	3015	363	12.0%	679	13	1.9%	4271	422	9.9%
2004	3093	442	14.3%	738	25	3.4%	4444	528	11.9%
2005	3165	417	13.2%	787	19	2.4%	4574	499	10.9%

### NEW ZEALAND

Figures 8.12 and 8.13.

Amongst the 15-59 year age group, the proportion of Maori and Pacific People who received a renal transplant in 2005 was 0.7% and 1.3% respectively, compared with 14.3% for Caucasoid dialysis patients.

<b>Figure 8.12</b>												
<b>New Zealand</b>												
<b>Transplantation Rate - Age Group 15-59 years</b>												
<b>1995 - 2005</b>												
Year	Caucasoid			Maori			Pacific People			All Patients		
	Dialysed	Tx	Rate	Dialysed	Tx	Rate	Dialysed	Tx	Rate	Dialysed	Tx	Rate
1995	332	54	16.2%	240	11	4.5%	113	6	5.3%	725	78	10.7%
1996	348	58	16.6%	262	7	2.6%	128	7	5.4%	784	79	10.0%
1997	372	73	19.6%	279	9	3.2%	134	3	2.2%	829	91	10.9%
1998	372	60	16.1%	321	14	4.3%	151	7	4.6%	897	85	9.5%
1999	389	67	17.2%	318	16	5.0%	159	8	5.0%	928	98	10.5%
2000	401	68	17.0%	330	10	3.0%	184	4	2.1%	976	86	8.8%
2001	414	64	15.4%	360	13	3.6%	213	5	2.3%	1054	92	8.7%
2002	434	60	13.9%	383	11	2.8%	225	14	6.2%	1109	89	8.0%
2003	433	57	13.2%	406	15	3.7%	227	12	5.3%	1140	92	8.1%
2004	441	57	12.9%	421	9	2.1%	228	11	4.8%	1171	86	7.3%
2005	453	65	14.3%	418	3	0.7%	240	3	1.3%	1182	74	6.2%

### Figure 8.13

#### New Transplanted Patients 2001 - 2005 Related to Ethnicity

Race	2001	2002	2003	2004	2005
<b>Australia</b>	(541)	(604)	(543)	(649)	(623)
Caucasoid	469 (87%)	529 (88%)	472 (87%)	550 (85%)	527 (85%)
Aboriginal/Torres St. Isl.	21 (4%)	17 (3%)	14 (3%)	26 (4%)	22 (4%)
Asian	33 (6%)	45 (7%)	42 (7%)	57 (9%)	58 (9%)
Other	18 (3%)	13 (2%)	15 (3%)	16 (2%)	16 (2%)
<b>New Zealand</b>	(110)	(117)	(111)	(105)	(93)
Caucasoid	79 (72%)	83 (71%)	72 (65%)	72 (69%)	83 (89%)
Maori	15 (14%)	13 (11%)	16 (14%)	12 (11%)	3 (3%)
Pacific People	6 (5%)	15 (13%)	14 (13%)	12 (11%)	4 (4%)
Asian	10 (9%)	5 (4%)	9 (8%)	6 (6%)	3 (4%)
Other	-	1 (1%)	-	3 (3%)	-



## AUSTRALIAN REGIONAL TRANSPLANTATION ACTIVITY 2005

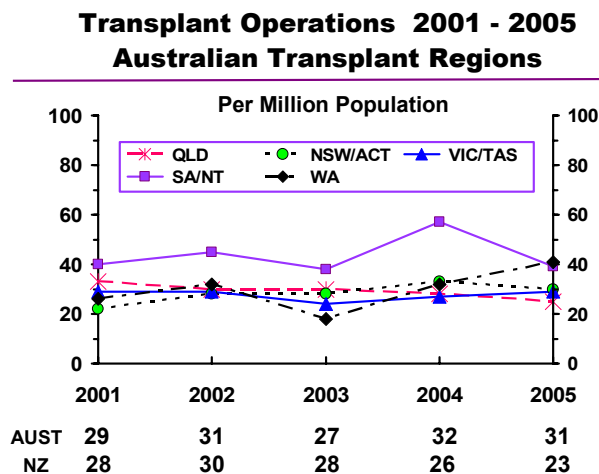
**Figure 8.14**

**Transplants in each Region 2001 - 2005**  
**Number of Operations**  
**(per Million Population per year)**

State	2001	2002	2003	2004	2005
Queensland	121 (33)	111 (30)	114 (30)	108 (28)	99 (25)
New South Wales/ACT *	146 (22)	198 (28)	198 (28)	230 (33)	212 (30)
Victoria/Tasmania *	155 (29)	157 (29)	129 (24)	150 (27)	162 (29)
South Australia/NT *	69 (40)	77 (45)	66 (38)	98 (57)	68 (39)
Western Australia	50 (26)	61 (32)	36 (18)	63 (32)	82 (41)
<b>Australia</b>	<b>541 (28)</b>	<b>604 (31)</b>	<b>543 (27)</b>	<b>649 (32)</b>	<b>623 (31)</b>

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

Figure 8.15

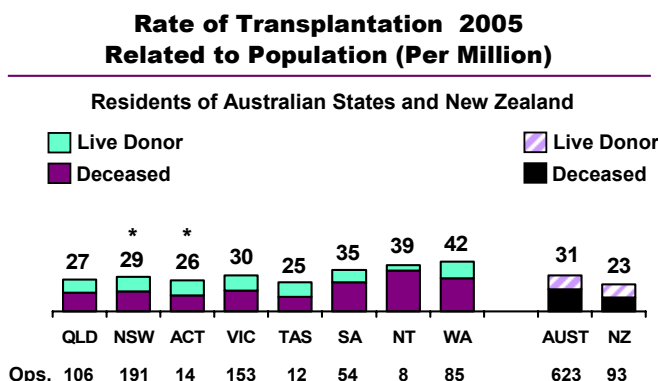


The rate of transplantation for each transplant region is shown in Figures 8.14 and 8.15.

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

Western Australia had the highest transplant rate (41 per million), closely followed by the South Australia/Northern Territory region (39 per million) in 2005.

Figure 8.16



The transplant rates for residents of each State and the Northern Territory is shown in Figure 8.16. The highest rate occurred in Western Australia (42 per million), followed by the Northern Territory (39 per million) and South Australia (35 per million). The lowest rate (25 per million) was in Tasmania.

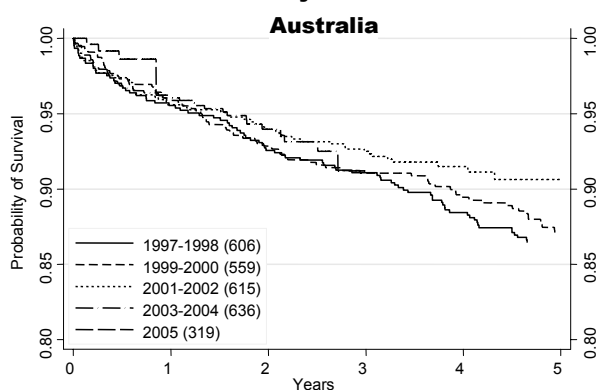
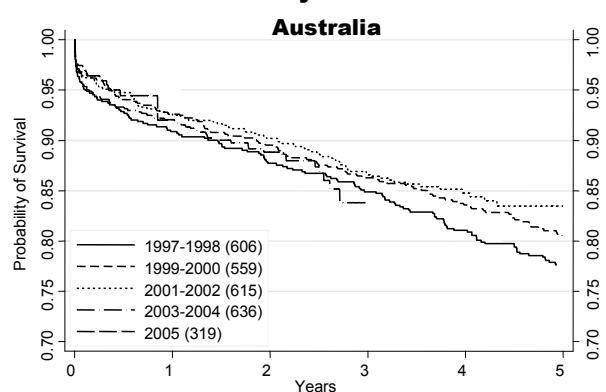
\* NSW population excludes residents of the Southern Area Health Service  
 \* ACT population includes residents of the Southern Area Health Service Medical services in the ACT service the Southern Area Region

## TRANSPLANT SURVIVAL - PRIMARY DECEASED DONOR GRAFTS

### AUSTRALIA

Graft and patient survival for primary deceased donor grafts performed in Australia is shown in Figure 8.17. Both have shown gradual improvement over the past decade, and one year graft survival for this group is now consistently over 90%. Survival rates are now calculated by the Kaplan-Meier method rather than the life-table method in the 2005 Report. Kaplan-Meier graphs illustrating this are shown in Figure 8.18.

<b>Figure 8.17</b>					
<b>Primary Deceased Donor Recipient and Graft Survival 1991 - 2005</b>					
<b>% [95% Confidence Interval]</b>					
Year of Transplant	No. of Patients	Survival			
		1 month	6 months	1 year	5 years
<b>Recipient Survival</b>					
1991-1992	655	99 [98, 99]	95 [93, 96]	93 [91, 95]	84 [81, 87]
1993-1994	609	99 [97, 99]	96 [94, 97]	95 [93, 97]	85 [82, 88]
1995-1996	601	99 [98, 100]	96 [94, 97]	95 [93, 97]	88 [85, 90]
1997-1998	606	99 [97, 99]	97 [95, 98]	96 [94, 97]	86 [83, 89]
1999-2000	559	99 [98, 100]	97 [96, 98]	96 [94, 97]	87 [84, 90]
2001-2002	615	99 [98, 100]	97 [96, 98]	96 [94, 97]	-
2003-2004	636	99 [98, 100]	97 [95, 98]	96 [94, 97]	-
2005	319	100 [-, -]	99 [96, 100]	-	-
<b>Graft Survival</b>					
1991-1992	655	93 [91, 95]	89 [86, 91]	86 [84, 89]	73 [70, 77]
1993-1994	609	95 [93, 96]	91 [88, 93]	89 [87, 92]	74 [70, 77]
1995-1996	601	96 [94, 97]	92 [89, 94]	91 [88, 93]	79 [76, 82]
1997-1998	606	96 [94, 97]	93 [90, 95]	91 [88, 93]	78 [74, 81]
1999-2000	559	97 [96, 98]	94 [92, 96]	93 [90, 95]	80 [77, 84]
2001-2002	615	96 [95, 98]	95 [93, 96]	93 [90, 94]	-
2003-2004	636	95 [94, 97]	93 [91, 95]	92 [90, 94]	-
2005	319	97 [94, 98]	94 [91, 97]	-	-

**Figure 8.18**
**Patient Survival - Primary Deceased Donor Grafts**

**Graft Survival - Primary Deceased Donor Grafts**


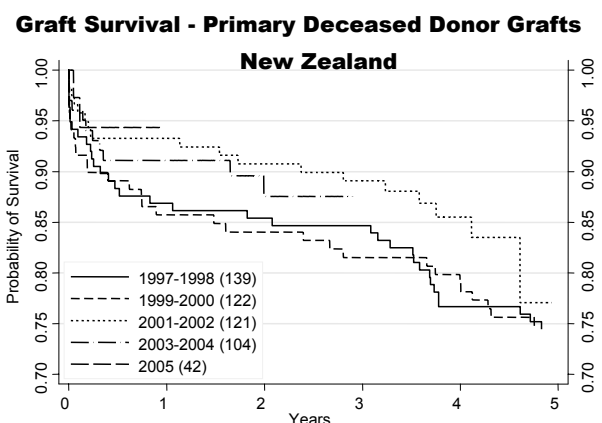
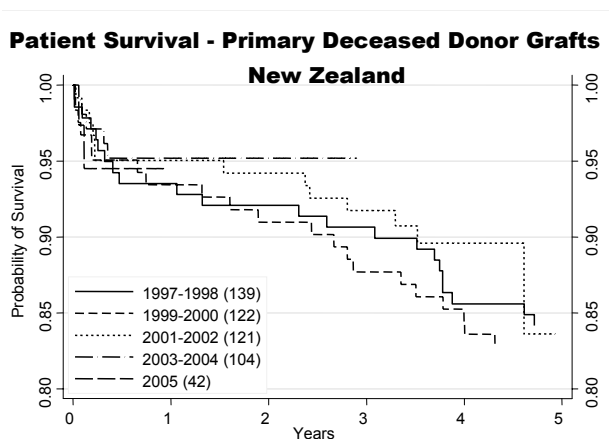


## TRANSPLANT SURVIVAL - PRIMARY DECEASED DONOR GRAFTS NEW ZEALAND

Graft and patient survival for primary deceased donor grafts performed in New Zealand is shown in Figure 8.19. Like Australia, there has been a progressive improvement over the past decade. Survival rates are now calculated by the Kaplan-Meier method rather than the life-table method in the 2005 Report. Tables illustrating this are shown in Figure 8.19. Figure 8.20 presents these as Kaplan-Meier curves.

<b>Figure 8.19</b>					
<b>Primary Deceased Donor Recipient and Graft Survival 1991 - 2005</b>					
<b>% [95% Confidence Interval]</b>					
Year of Transplant	No. of Patients	Survival			
		1 month	6 months	1 year	5 years
<b>Recipient Survival</b>					
1991-1992	140	99 [95, 100]	96 [91, 98]	94 [88, 97]	81 [74, 87]
1993-1994	104	98 [92, 100]	90 [82, 95]	87 [79, 92]	79 [70, 86]
1995-1996	126	98 [94, 100]	94 [89, 97]	93 [87, 96]	86 [78, 91]
1997-1998	139	99 [94, 100]	94 [88, 97]	94 [88, 97]	84 [77, 89]
1999-2000	122	97 [92, 99]	95 [89, 98]	93 [87, 97]	83 [75, 88]
2001-2002	121	99 [94, 100]	95 [89, 98]	95 [89, 98]	-
2003-2004	104	99 [93, 100]	95 [89, 98]	95 [89, 98]	-
2005	42	97 [83, 100]	95 [78, 99]	-	-
<b>Graft Survival</b>					
1991-1992	140	91 [85, 95]	84 [77, 89]	82 [74, 87]	70 [62, 77]
1993-1994	103	86 [77, 91]	81 [72, 87]	77 [67, 84]	62 [51, 70]
1995-1996	126	92 [86, 96]	89 [82, 93]	85 [77, 90]	73 [64, 80]
1997-1998	139	94 [89, 97]	88 [82, 93]	87 [80, 92]	74 [66, 81]
1999-2000	122	92 [82, 95]	89 [82, 94]	86 [78, 91]	75 [66, 82]
2001-2002	121	97 [91, 99]	93 [87, 97]	93 [87, 97]	-
2003-2004	104	96 [90, 98]	91 [84, 95]	91 [84, 95]	-
2005	42	97 [82, 100]	94 [79, 99]	-	-

**Figure 8.20**



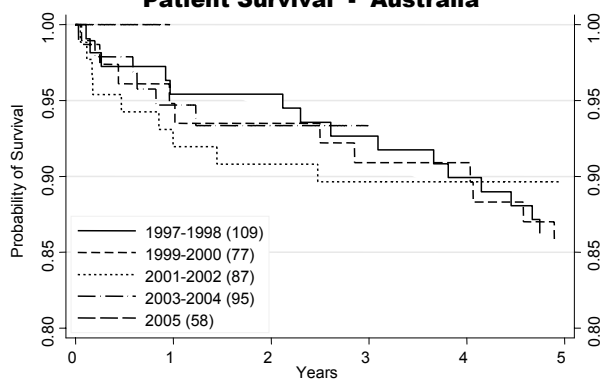
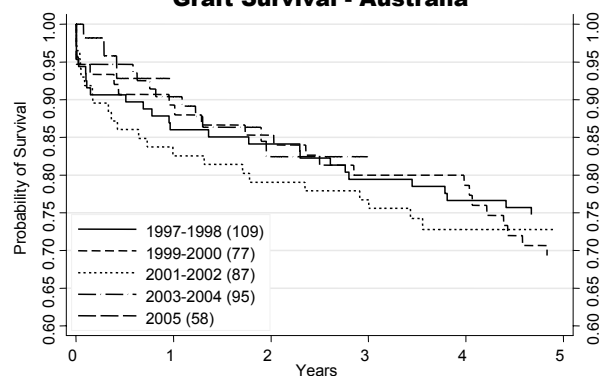


## TRANSPLANT SURVIVAL - AUSTRALIA

### SECOND AND SUBSEQUENT DECEASED DONOR GRAFTS

Patient and graft survivals for second or subsequent deceased donor grafts in Australia are shown in (Figure 8.21). As expected, graft survival is slightly worse than for primary grafts. Kaplan-Meier graphs are shown in Figure 8.22.

<b>Figure 8.21</b>					
<b>Second and Subsequent Deceased Donor Recipient and Graft Survival 1991 - 2005</b>					
% [95% Confidence Interval]					
Year of Transplant	No. of Patients	Survival			
		1 month	6 months	1 year	5 years
<b>Recipient Survival</b>					
1991-1992	144	100 [ -, - ]	97 [92, 99]	95 [90, 98]	85 [78, 90]
1993-1994	121	98 [94, 100]	98 [93, 99]	94 [88, 97]	86 [78, 91]
1995-1996	107	99 [94, 100]	97 [92, 99]	97 [92, 99]	86 [78, 91]
1997-1998	109	100 [ -, - ]	97 [92, 99]	95 [89, 98]	86 [78, 91]
1999-2000	77	99 [91, 100]	96 [88, 99]	95 [87, 98]	86 [76, 92]
2001-2002	87	99 [92, 100]	94 [87, 98]	92 [84, 96]	-
2003-2004	95	99 [93, 100]	98 [92, 99]	95 [88, 98]	-
2005	58	100 [ -, - ]	100 [ -, - ]	-	-
<b>Graft Survival</b>					
1991-1992	144	90 [83, 94]	84 [77, 90]	83 [76, 88]	67 [59, 75]
1993-1994	121	91 [84, 95]	89 [81, 93]	87 [80, 92]	73 [64, 80]
1995-1996	107	90 [82, 94]	84 [75, 90]	83 [74, 89]	66 [55, 74]
1997-1998	109	94 [88, 97]	91 [83, 95]	86 [78, 91]	75 [65, 82]
1999-2000	77	95 [86, 98]	91 [81, 95]	89 [80, 95]	69 [58, 78]
2001-2002	87	93 [85, 97]	86 [77, 92]	83 [73, 89]	-
2003-2004	95	95 [88, 98]	95 [88, 98]	90 [82, 95]	-
2005	58	98 [88, 100]	93 [79, 98]	-	-

**Figure 8.22**
**Second and Subsequent Deceased Donor Grafts**  
**Patient Survival - Australia**

**Second and Subsequent Deceased Donor Grafts**  
**Graft Survival - Australia**




## LIVE DONOR TRANSPLANTS

**Figure 8.23**

Live Donor Operations as a Proportion (%) of Annual Transplantation 2001 - 2005					
Recipient Age Groups	Year of Transplantation				
	2001	2002	2003	2004	2005
00-04 years	86%	80%	78%	100%	50%
05-14 years	75%	50%	50%	59%	52%
15-24 years	68%	54%	62%	64%	70%
25-34 years	37%	56%	44%	40%	48%
35-44 years	37%	31%	38%	39%	42%
45-54 years	40%	30%	34%	35%	34%
55-64 years	27%	33%	33%	27%	31%
65-74 years	33%	30%	37%	31%	19%
75-84 years	0%	0%	100%	0%	100%
<b>All Recipients</b>	<b>39%</b>	<b>38%</b>	<b>40%</b>	<b>37%</b>	<b>39%</b>

### AUSTRALIA

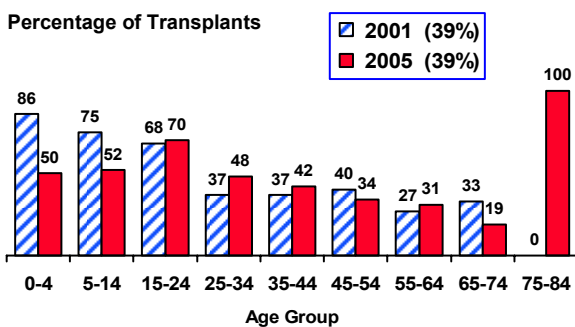
Two hundred and forty six live donor (LD) kidney transplants were performed in 2005 in Australia, representing 39% of all transplant operations. This proportion has remained steady for the past five years (Figures 8.2 and 8.23).

The overall number of live donor transplants increased by only 1%, however, this was the highest number ever done.

Figure 8.24 shows the age-related proportion of live donor transplants for the years 2001 and 2005. The overall proportion of live donors continued to increase in the 15-24 year, 25-34 year and 35-44 year groups, decreasing in the 45-54 year and remaining steady in the 55-64 year groups. There were eight recipients (19%) of live donors in the 65-74 year group and two recipients (100%) in the 75-84 year group in 2005.

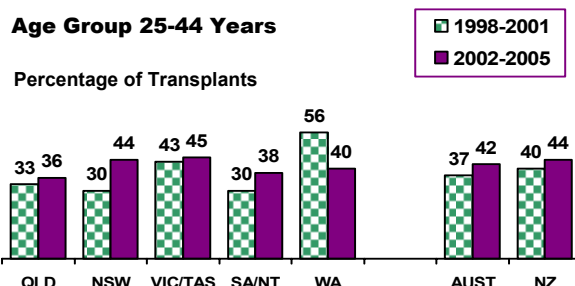
**Figure 8.24**

**Percentage Live Donor Grafts - Australia Stratified by Age Group 2001/2005**



**Figure 8.25**

**Percentage Live Donor Grafts Regions: Australia and New Zealand**



The proportion of live donor transplants for each State and New Zealand for recipients aged 25-44 years is shown in Figure 8.26 for the years 1998-2001 and 2002-2005. There has been an increase in both countries in this age group for the years 2002-2005.

The proportion of genetically unrelated donors was 41% in 2005 compared to 32% in 2004. This was an increase of 30% (23 donors) from last year. Sixty one percent of live unrelated donors were spouses. The number of related donors decreased 12% (146 donors) from 166 donors in 2004 (Figure 8.27 and 8.29).

### NEW ZEALAND

The rate of live donor transplantation remains similar in New Zealand, as has the proportion of living unrelated donor transplants (Figures 8.28 and 8.29).

Forty four percent of grafts were from a live donor (46% in 2004 and 40% in 2003). There were 14 live unrelated donors (30% of live donors). Friends accounted for 50% of all unrelated live donors in 2005 (Figure 8.29).

## TIMING OF LIVE DONOR TRANSPLANTS

The timing of live donor transplants is shown in Figure 8.26.

The proportion of all live donor transplants performed “pre-emptively” in Australia was 34%, compared to 23% in 2004. Thirty eight percent had received dialysis treatment for twelve months or longer prior to a first live donor graft.

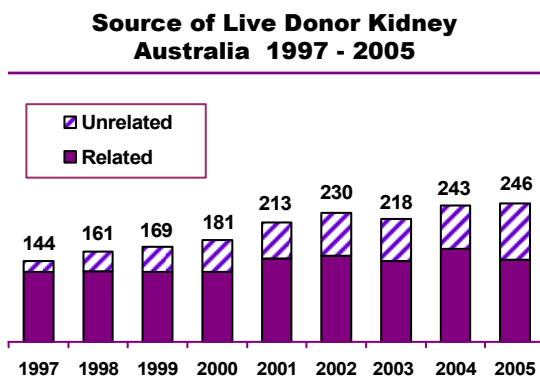
The proportion of pre-emptive live donor transplants in New Zealand was 22% in 2005, similar to the previous two years. Forty seven percent were waiting for twelve months or longer post dialysis.

**Figure 8.26**

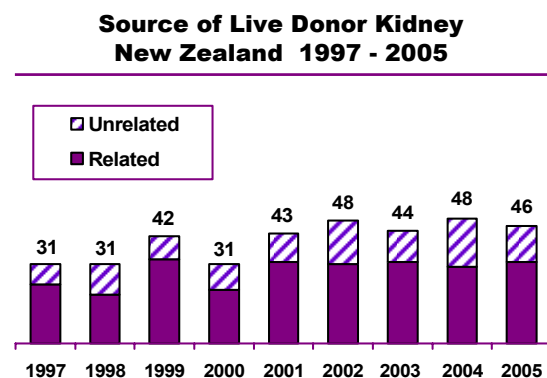
**Timing of Live Donor Transplantation  
for Primary Grafts in Relation to  
Date of Dialysis Start by Year of Transplant  
2001 - 2005**

		2001	2002	2003	2004	2005
<b>Aust</b>	Pre-dialysis	43 (22%)	55 (26%)	50 (25%)	51 (23%)	74 (34%)
	<1 month post dialysis	7 (4%)	5 (2%)	5 (2%)	8 (4%)	5 (2%)
	1-11.9 months post dialysis	69 (35%)	68 (32%)	59 (30%)	62 (28%)	57 (26%)
	>=12 months post dialysis	80 (40%)	83 (39%)	84 (42%)	99 (45%)	84 (38%)
<b>NZ</b>	Pre-dialysis	10 (26%)	12 (27%)	9 (22%)	10 (21%)	10 (22%)
	<1 month post dialysis	1 (3%)	-	-	2 (4%)	1 (2%)
	1-11.9 months post dialysis	17 (43%)	12 (27%)	15 (38%)	12 (25%)	13 (29%)
	>=12 months post dialysis	11 (28%)	20 (46%)	16 (40%)	24 (50%)	21 (47%)

**Figure 8.27**



**Figure 8.28**





**Figure 8.29**

**Source of Live Donor Kidneys 2001 - 2005**  
(x = identical twin) (+ = non identical twin)

Source	Australia					New Zealand				
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
<b>Total Live Donors</b>	<b>213</b>	<b>230</b>	<b>218</b>	<b>243</b>	<b>246</b>	<b>43</b>	<b>48</b>	<b>44</b>	<b>48</b>	<b>46</b>
<b>Related</b>	<b>(149)</b>	<b>(153)</b>	<b>(144)</b>	<b>(166)</b>	<b>(146)</b>	<b>(32)</b>	<b>(31)</b>	<b>(32)</b>	<b>(30)</b>	<b>(32)</b>
Mother	34	47	40	44	39	9	7	13	4	7
Father	39	19	30	24	30	7	6	4	5	3
Brother	32 (1x)	33	23 (1x)	39	31	4	5	3	6	7
Sister	25 (1x)	37 (1X)	30 (1X)	32 (1+)	26 (1+)	8	7	7	9	9 (1X)
Offspring	9	5	10	14	8	4	3	4	3	4
Grandfather	2	-	1	4	1	-	-	-	-	-
Grandmother	1	3	-	-	1	-	-	-	-	-
Cousin	5	4	4	4	5	-	1	-	1	1
Nephew	-	1	2	1	1	-	-	1	-	-
Niece	-	-	2	-	2	-	1	-	-	-
Uncle	-	1	1	3	1	-	-	-	1	-
Aunt	2	3	1	1	1	-	1	-	1	1
<b>Unrelated</b>	<b>(64)</b>	<b>(77)</b>	<b>(74)</b>	<b>(77)</b>	<b>(100)</b>	<b>(11)</b>	<b>(17)</b>	<b>(12)</b>	<b>(18)</b>	<b>(14)</b>
Wife	21	31	25	27	37	5	6	2	6	-
Husband	23	18	19	12	24	1	3	6	3	1
Mother-in-Law	-	2	-	-	1	-	-	-	-	-
Father-in-Law	-	-	1	-	3	-	-	-	-	-
Adoptive Mother	-	-	-	-	-	-	1	-	-	-
Adoptive Father	1	-	-	-	-	-	-	-	-	-
Adoptive Son	-	-	-	-	1	-	-	-	-	-
Son-in-Law	-	-	-	1	1	-	-	-	-	-
Stepfather	2	2	1	1	2	-	-	-	-	-
Stepmother	-	-	1	-	-	-	-	-	-	-
Sister-in-Law	1	-	2	4	3	-	-	-	-	-
Brother-in-Law	1	1	1	1	-	-	-	-	-	1
Partner	4	4	2	3	7	-	-	-	-	1
Fiance / Fiancee	-	-	1	1	-	-	-	-	1	-
Friend	9	11	18	19	14	4	6	4	5	7
Aunt	-	1	-	-	-	-	-	-	-	-
Adopted Sister	-	1	-	-	-	-	-	-	-	-
Stepsister	-	1	-	-	-	-	-	-	-	-
Stepson	-	1	1	-	-	-	-	-	-	-
Niece	-	-	-	-	-	1	-	-	-	1
Altruistic	-	-	-	2	2	-	1	-	3	3
Non Directed	-	-	-	-	1	-	-	-	-	-
Pathological	2	4	2	6	4	-	-	-	-	-

## TRANSPLANT SURVIVAL - PRIMARY LIVE DONOR 1991-2005

For primary live donor graft recipients, excellent early survival rates have been evident since 1991 (Figure 8.30).

Parallel improvement in graft survival is also evident. This is reassuring given the increased rates of live donor transplantation and corresponding increase in performing less ideal live donor transplants (particularly from older donors and unrelated donor transplants) (Figures 8.8 and 8.23).

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

<b>Figure 8.30</b>		<b>Australia</b>			
<b>Year of Transplant</b>	<b>No. of Patients</b>	<b>% [95% Confidence Interval]</b>			
		<b>Survival</b>			
		<b>1 month</b>	<b>6 months</b>	<b>1 year</b>	<b>5 years</b>
<b>Recipient Survival</b>					
1991-1992	135	100 [-, -]	99 [95, 100]	99 [95, 100]	86 [79, 91]
1993-1994	160	100 [-, -]	99 [95, 100]	98 [94, 99]	94 [89, 97]
1995-1996	186	100 [-, -]	98 [95, 99]	97 [94, 99]	94 [90, 97]
1997-1998	284	100 [-, -]	99 [96, 99]	98 [96, 99]	96 [93, 98]
1999-2000	320	99 [97, 100]	98 [96, 99]	98 [96, 99]	94 [91, 96]
2001-2002	410	100 [98, 100]	99 [97, 100]	99 [97, 99]	-
2003-2004	418	100 [98, 100]	99 [97, 100]	99 [97, 100]	-
2005	220	100 [-, -]	100 [-, -]	-	-
<b>Graft Survival</b>					
1991-1992	135	96 [91, 98]	94 [88, 97]	92 [86, 96]	77 [69, 83]
1993-1994	160	97 [93, 99]	96 [92, 98]	96 [91, 98]	85 [79, 90]
1995-1996	186	94 [89, 96]	91 [86, 95]	90 [85, 94]	85 [79, 90]
1997-1998	284	99 [97, 100]	97 [95, 99]	97 [94, 99]	88 [84, 91]
1999-2000	320	97 [94, 98]	95 [92, 97]	94 [91, 96]	86 [82, 90]
2001-2002	410	99 [97, 99]	97 [95, 98]	96 [94, 98]	-
2003-2004	418	99 [97, 100]	98 [96, 99]	97 [95, 98]	-
2005	220	-	99 [95, 100]	-	-

<b>Figure 8.31</b>		<b>New Zealand</b>			
<b>Year of Transplant</b>	<b>No. of Patients</b>	<b>% [95% Confidence Interval]</b>			
		<b>Survival</b>			
		<b>1 month</b>	<b>6 months</b>	<b>1 year</b>	<b>5 years</b>
<b>Recipient Survival</b>					
1991-1992	27	100 [-, -]	96 [76, 99]	96 [76, 99]	96 [76, 99]
1993-1994	35	100 [-, -]	100 [-, -]	97 [81, 100]	88 [72, 95]
1995-1996	46	100 [-, -]	100 [-, -]	100 [-, -]	91 [78, 97]
1997-1998	57	100 [-, -]	100 [-, -]	100 [-, -]	89 [78, 95]
1999-2000	66	100 [-, -]	100 [-, -]	100 [-, -]	95 [86, 98]
2001-2002	83	100 [-, -]	99 [92, 100]	99 [92, 100]	-
2003-2004	88	99 [92, 100]	99 [92, 100]	98 [91, 99]	-
2005	45	100 [-, -]	97 [82, 100]	-	-
<b>Graft Survival</b>					
1991-1992	27	96 [76, 99]	93 [74, 98]	93 [74, 98]	81 [61, 92]
1993-1994	35	91 [76, 97]	89 [72, 96]	89 [72, 96]	74 [56, 86]
1995-1996	46	98 [86, 100]	98 [86, 100]	98 [86, 100]	76 [61, 86]
1997-1998	57	100 [-, -]	100 [-, -]	98 [88, 100]	76 [61, 84]
1999-2000	66	98 [89, 100]	97 [88, 99]	97 [88, 99]	84 [73, 91]
2001-2002	83	100 [-, -]	99 [92, 100]	99 [92, 100]	-
2003-2004	88	97 [90, 99]	95 [88, 98]	95 [88, 98]	-
2005	45	100 [-, -]	97 [82, 100]	-	-



Figure 8.32

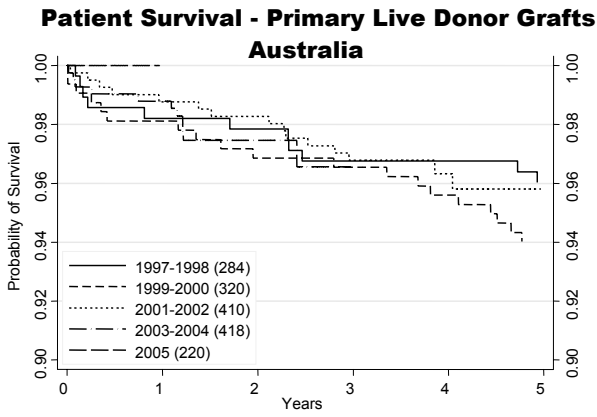


Figure 8.33

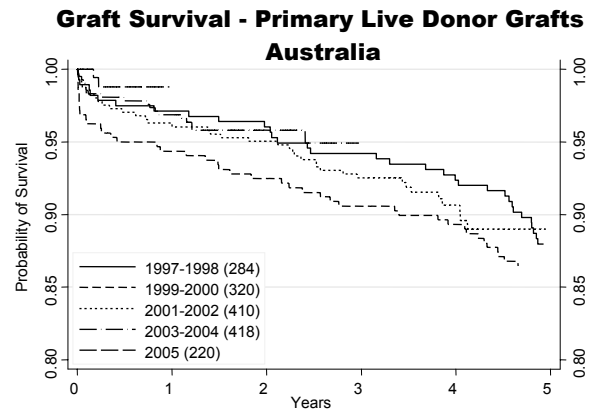


Figure 8.34

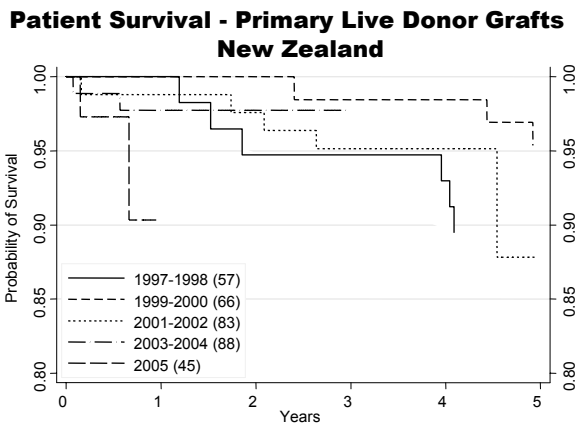
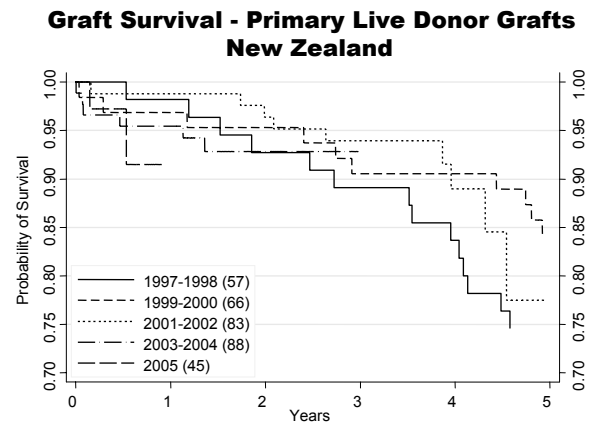


Figure 8.35



## FUNCTIONING TRANSPLANTS AT 31<sup>ST</sup> DECEMBER 2005 TRANSPLANT OPERATIONS 1963 - 2005

### AUSTRALIA

There have been 15,345 transplant operations performed on 13,154 patients since 1963. Of these, 6,539 grafts were functioning at 31<sup>st</sup> December 2005 (322 per million population). Fifteen percent of operations and 12% of functioning grafts were regrafts. Live donor transplants accounted for 19% of operations and 32% of functioning grafts (Figure 8.36). The number of operations performed by each hospital during this period is shown in Appendix I at the end of this Report.

The number of functioning grafts at the end of 2005 is a 5% increase over the previous year. The annual rate of increase has remained steady (Figure 8.38 and 8.39). Eighty eight percent of the functioning grafts were primary, and 67% were from deceased donors. The number of functioning grafts from live donors increased by 9% from 2004 to 2005, similar to the 10% increase in both 2003 and 2004.

The prevalence of functioning grafts in each State is shown in Figures 8.38 and 8.39. South Australia/Northern Territory has the highest prevalence of functioning renal transplants (466 per million). The lowest prevalence was in Western Australia (303 per million) an increase from (280 per million) in 2004. Patients with functioning grafts numbered in excess of those dependent on dialysis in South Australia only (Appendix I).

The age relationship of functioning transplants as a proportion of patients on renal replacement therapy is shown in Figure 8.44. The proportion depending on live donor grafts is greater in the younger age groups (Figures 8.41 and 8.42).

The modal age group for transplant dependent patients was 45-54 years and the mean and median ages were 49.5 and 50.7 years respectively (Figures 8.43 and 8.44). The modal age group for live donor recipients was 45-54 years and 53% of recipients dependent on live donor grafts were less than 45 years of age.

The majority of recipients with functioning grafts were male (60%). The ethnic origin of recipients was Caucasoid 89%, Asian 7%, Aboriginal and Torres Strait Islanders 2% and Others 2% (Figure 8.46).

The 6,539 grafts functioning at the end of 2005 represent 43% of all kidneys transplanted since 1963. Thirty three percent of grafts were functioning ten or more years and 8% for 20 or more years. There are 83 recipients with grafts functioning 30 years or longer. The longest graft had functioned for 38 years at 31<sup>st</sup> December, 2005.

**Figure 8.36**

<b>Summary of Renal Transplantation Australia 1963 - 2005</b>			
		Performed	Functioning*
<b>Deceased Donor</b>	First	10,504	3,895
	Second	1,623	496
	Third	253	72
	Fourth	37	14
	Fifth	2	1
	<b>Total</b>	<b>12,419</b>	<b>4,478</b>
<b>Live Donor</b>	First	2,650	1,878
	Second	235	155
	Third	34	23
	Fourth	6	5
	Fifth	1	-
	<b>Total</b>	<b>2,926</b>	<b>2,061</b>
<b>Total</b>	<b>15,345</b>	<b>6,539</b>	

\* Lost to follow up not included

### NEW ZEALAND

There have been 3,059 operations performed on 2,555 patients since 1965 with 1,239 grafts (302 per million) still functioning at 31<sup>st</sup> December 2005 (Figure 8.37). This represents a 2% increase. Sixteen percent of operations and 11% of functioning grafts were regrafts. Kidneys from live donors accounted for 22% of operations and 34% 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 8.43. The majority were male (58%) and the racial distribution was Caucasoid 79%, Maori 9%, Pacific People 6% and Asian 6% (Figure 8.43).

The majority (70%) of functioning grafts were in the 35-64 year age group and the mean and median ages were 48.5 and 49.7 years respectively. The modal age group for live donors was 35-44 years (Figure 8.43).

The 1,239 grafts functioning at the end of 2005 represent 41% of all kidneys transplanted since 1965. The longest surviving graft has reached 36 years and 1 month as at 31<sup>st</sup> December 2005. Eighty nine grafts have been functioning for 20 or more years and twelve for 30 or more years (Figure 8.48).

**Figure 8.37**

<b>Summary of Renal Transplantation New Zealand 1965 - 2005</b>			
		Performed	Functioning*
<b>Deceased Donor</b>	First	1,939	713
	Second	370	88
	Third	71	16
	Fourth	7	-
	<b>Total</b>	<b>2,387</b>	<b>817</b>
<b>Live Donor</b>	First	616	393
	Second	52	27
	Third	4	2
<b>Total</b>	<b>672</b>	<b>422</b>	
<b>Total</b>	<b>3,059</b>	<b>1,239</b>	

\* Lost to follow up not included



**Figure 8.38**

**Functioning Transplants  
Transplanting Region, Australia and New Zealand  
1994 - 2005  
(Number Per Million Population)**

Year	QLD	NSW/ACT *	VIC/TAS *	SA/NT *	WA	AUST	NZ
1994	786 (247)	1417 (223)	1055 (213)	459 (280)	342 (201)	<b>4059 (227)</b>	<b>731 (202)</b>
1995	813 (249)	1481 (230)	1098 (220)	478 (290)	358 (206)	<b>4228 (234)</b>	<b>783 (213)</b>
1996	848 (254)	1550 (234)	1161 (231)	515 (311)	363 (206)	<b>4437 (242)</b>	<b>824 (221)</b>
1997	901 (265)	1638 (249)	1226 (241)	540 (324)	377 (210)	<b>4682 (253)</b>	<b>882 (233)</b>
1998	943 (274)	1683 (253)	1294 (253)	583 (347)	396 (217)	<b>4889 (261)</b>	<b>936 (245)</b>
1999	957 (273)	1719 (256)	1336 (259)	622 (368)	432 (234)	<b>5066 (268)</b>	<b>984 (257)</b>
2000	1004 (282)	1766 (260)	1385 (266)	642 (378)	468 (250)	<b>5265 (275)</b>	<b>1023 (265)</b>
2001	1062 (293)	1796 (260)	1451 (275)	668 (391)	494 (260)	<b>5471 (282)</b>	<b>1062 (274)</b>
2002	1107 (298)	1877 (270)	1533 (288)	701 (408)	525 (273)	<b>5743 (292)</b>	<b>1115 (283)</b>
2003	1148 (302)	1978 (282)	1573 (292)	735 (426)	526 (269)	<b>5960 (300)</b>	<b>1167 (291)</b>
2004	1183 (305)	2081 (295)	1645 (302)	789 (455)	556 (280)	<b>6254 (311)</b>	<b>1219 (300)</b>
2005	1222 (308)	2166 (305)	1729 (314)	813 (466)	609 (303)	<b>6539 (322)</b>	<b>1239 (302)</b>

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

Figure 8.39

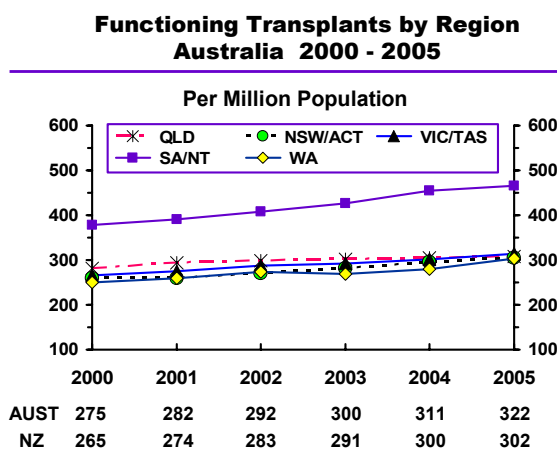


Figure 8.40

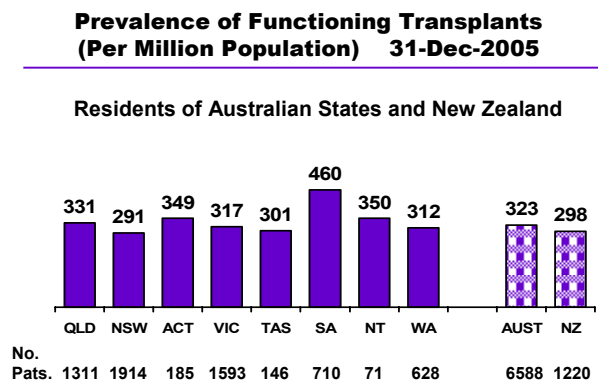


Figure 8.41

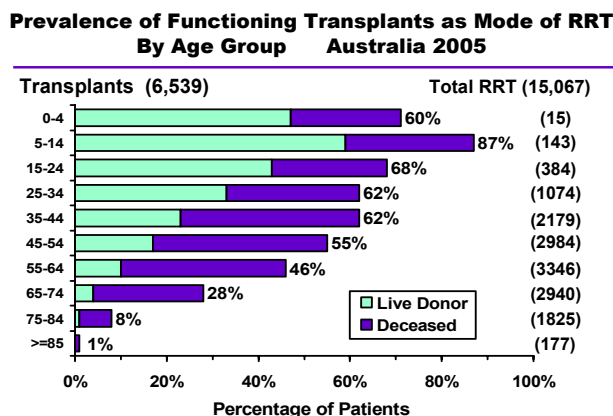
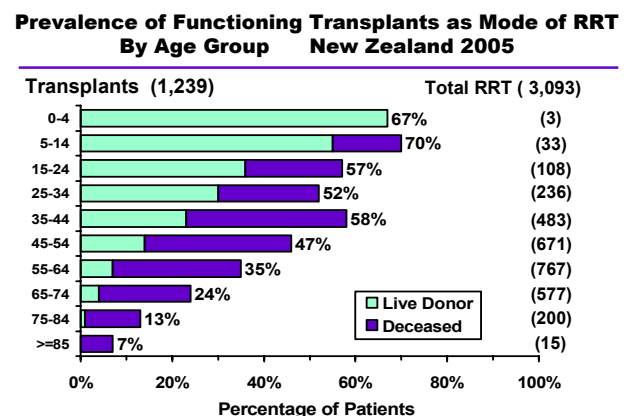


Figure 8.42



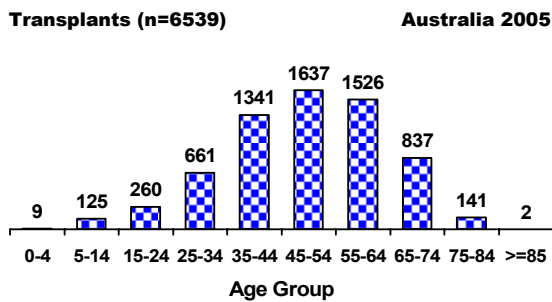


**Figure 8.43**

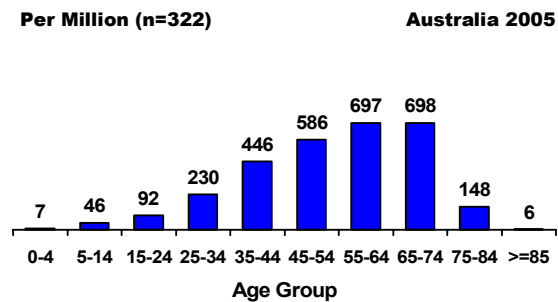
<b>Age of All Functioning Transplant Patients Resident Country at Transplant 31-Dec-2005</b>												
Donor Source	Graft No.	Age Groups										Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85-94	
<b>Australia</b>		<b>9</b>	<b>125</b>	<b>260</b>	<b>661</b>	<b>1341</b>	<b>1637</b>	<b>1526</b>	<b>837</b>	<b>141</b>	<b>2</b>	<b>6539</b>
Deceased Donor	1	2	35	84	254	706	976	1062	657	117	2	<b>3895</b>
	2	-	4	8	46	121	135	125	47	10	-	<b>496</b>
	3	-	1	3	11	22	18	13	4	-	-	<b>72</b>
	4	-	-	-	1	4	7	1	1	-	-	<b>14</b>
	5	-	-	-	-	-	1	-	-	-	-	<b>1</b>
	<b>Total</b>	<b>2</b>	<b>40</b>	<b>95</b>	<b>312</b>	<b>853</b>	<b>1137</b>	<b>1201</b>	<b>709</b>	<b>127</b>	<b>2</b>	<b>4478</b>
Live Donor	1	7	84	156	320	428	444	304	123	12	-	<b>1878</b>
	2	-	1	8	27	51	45	16	5	2	-	<b>155</b>
	3	-	-	1	1	7	9	5	-	-	-	<b>23</b>
	4	-	-	-	1	2	2	-	-	-	-	<b>5</b>
		<b>Total</b>	<b>7</b>	<b>85</b>	<b>165</b>	<b>349</b>	<b>488</b>	<b>500</b>	<b>325</b>	<b>128</b>	<b>14</b>	<b>-</b>
<b>New Zealand</b>		<b>2</b>	<b>23</b>	<b>62</b>	<b>122</b>	<b>279</b>	<b>313</b>	<b>271</b>	<b>140</b>	<b>26</b>	<b>1</b>	<b>1239</b>
Deceased Donor	1	-	5	20	41	136	181	193	112	24	1	<b>713</b>
	2	-	-	3	10	28	27	16	3	1	-	<b>88</b>
	3	-	-	-	1	4	8	3	-	-	-	<b>16</b>
		<b>Total</b>	<b>-</b>	<b>5</b>	<b>23</b>	<b>52</b>	<b>168</b>	<b>216</b>	<b>212</b>	<b>115</b>	<b>25</b>	<b>1</b>
Live Donor	1	2	18	39	65	100	85	58	25	1	-	<b>393</b>
	2	-	-	-	5	10	11	1	-	-	-	<b>27</b>
	3	-	-	-	-	1	1	-	-	-	-	<b>2</b>
		<b>Total</b>	<b>2</b>	<b>18</b>	<b>39</b>	<b>70</b>	<b>111</b>	<b>97</b>	<b>59</b>	<b>25</b>	<b>1</b>	<b>-</b>

**Figure 8.44**

**Age Distribution of Functioning Transplants Resident Country at Transplant**

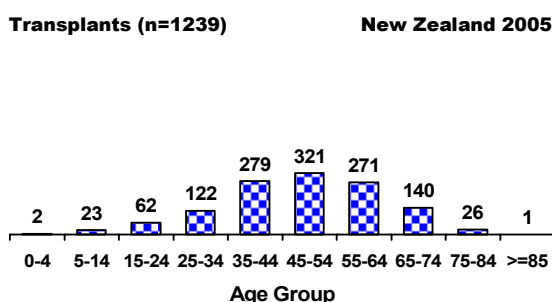


**Age Distribution of Functioning Transplants Resident Country at Transplant**

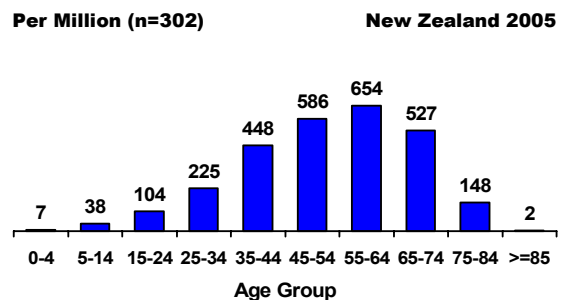


**Figure 8.45**

**Age Distribution of Functioning Transplants Resident Country at Transplant**



**Age Distribution of Functioning Transplants Resident Country at Transplant**



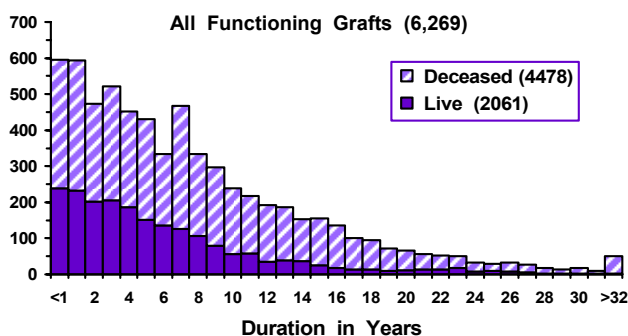


**Figure 8.46**

<b>Functioning Transplant Patients - Resident Country at Transplant Related to Ethnicity and Age Group 31-Dec-2005</b>												
Sex	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	
<b>Australia</b>		<b>9</b>	<b>125</b>	<b>260</b>	<b>661</b>	<b>1341</b>	<b>1637</b>	<b>1526</b>	<b>837</b>	<b>141</b>	<b>2</b>	<b>6539</b>
<b>Female</b>	Caucasoid	-	38	87	236	455	566	500	367	75	-	<b>2324</b>
	Aboriginal/TSI	-	2	4	4	16	16	8	-	-	-	<b>50</b>
	Asian	1	4	6	20	40	72	43	16	2	-	<b>204</b>
	Other	-	3	4	6	15	13	9	9	-	-	<b>59</b>
	<b>Total</b>	<b>1</b>	<b>47</b>	<b>101</b>	<b>266</b>	<b>526</b>	<b>667</b>	<b>560</b>	<b>392</b>	<b>77</b>	<b>-</b>	<b>2637</b>
<b>Male</b>	Caucasoid	7	70	144	348	748	846	870	411	62	2	<b>3508</b>
	Aboriginal/TSI	-	2	1	5	15	29	23	8	-	-	<b>83</b>
	Asian	1	6	10	31	42	81	53	21	2	-	<b>247</b>
	Other	-	-	4	11	10	14	20	5	-	-	<b>64</b>
	<b>Total</b>	<b>8</b>	<b>78</b>	<b>159</b>	<b>395</b>	<b>815</b>	<b>970</b>	<b>966</b>	<b>445</b>	<b>64</b>	<b>2</b>	<b>3902</b>
<b>New Zealand</b>		<b>2</b>	<b>23</b>	<b>62</b>	<b>122</b>	<b>279</b>	<b>313</b>	<b>271</b>	<b>140</b>	<b>26</b>	<b>1</b>	<b>1239</b>
<b>Female</b>	Caucasoid	-	12	23	37	87	102	89	50	14	1	<b>415</b>
	Maori	-	-	4	7	9	10	7	7	1	-	<b>45</b>
	Pacific People	-	-	5	7	10	8	2	2	-	-	<b>34</b>
	Asian	-	1	-	2	11	11	5	2	-	-	<b>32</b>
	<b>Total</b>	<b>-</b>	<b>13</b>	<b>32</b>	<b>53</b>	<b>117</b>	<b>131</b>	<b>103</b>	<b>61</b>	<b>15</b>	<b>1</b>	<b>526</b>
<b>Male</b>	Caucasoid	2	8	24	54	137	136	129	59	10	-	<b>559</b>
	Maori	-	1	1	4	10	19	19	10	1	-	<b>65</b>
	Pacific People	-	1	-	8	6	10	8	5	-	-	<b>38</b>
	Asian	-	-	5	3	6	16	10	5	-	-	<b>45</b>
	Other	-	-	-	-	3	1	2	-	-	-	<b>6</b>
<b>Total</b>	<b>2</b>	<b>10</b>	<b>30</b>	<b>69</b>	<b>162</b>	<b>182</b>	<b>168</b>	<b>79</b>	<b>11</b>	<b>-</b>	<b>713</b>	

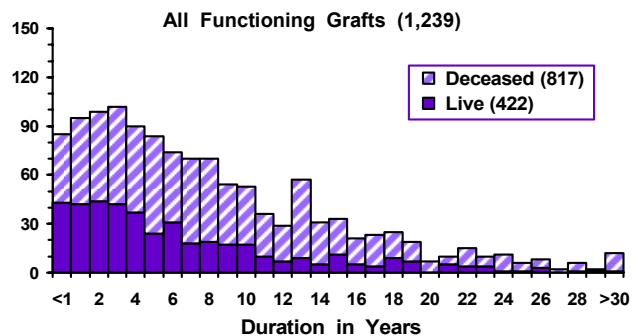
**Figure 8.47**

**Number and Duration of Functioning Grafts Australia 2005**



**Figure 8.48**

**Number and Duration of Functioning Grafts New Zealand 2005**



## RATES OF GRAFT LOSS

The rates of graft failure in 2005 decreased from the previous year in Australia from 3.1% to 2.6%, while death increased slightly from 2.0% to 2.1% of those at risk (Figure 8.49).

The rates of graft failure in New Zealand increased from 1.8% to 3.2% in 2005. Death has remained the same for the past three years at 2.2% (Figure 8.49).

The cause of graft failure from 1996 to 2005 is shown in Figure 8.50.

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

While the rate of death with function has been falling, rates of graft failure have remained steady in Australia (Figure 8.51).

The importance of chronic allograft nephropathy, recurrence of primary disease and death with function as causes of graft loss after one year is evident in Figure 8.51.

Among the causes of death with functioning graft, cancer was the most common cause. An in-depth analysis of rates of cancer post-transplant in Australia was recently published in JAMA (2006: 296: 2823-31).

**Figure 8.49**

Graft Loss Rate 2000 - 2005						
	2000	2001	2002	2003	2004	2005
<b>Australia</b>	(5597)	(5806)	(6075)	(6286)	(6609)	(6877)
Graft Failure	2.8%	2.7%	2.9%	2.6%	3.1%	2.6%
Death with Function	2.7%	2.6%	2.2%	2.2%	2.0%	2.1%
All Losses	5.6%	5.4%	5.1%	4.9%	5.1%	4.7%
<b>New Zealand</b>	(1090)	(1134)	(1179)	(1226)	(1272)	(1312)
Graft Failure	3.4%	3.7%	2.7%	2.5%	1.8%	3.2%
Death with Function	2.5%	2.2%	2.7%	2.2%	2.2%	2.2%
All Losses	6.0%	6.0%	5.4%	4.7%	4.0%	5.4%

**Figure 8.50**

Year of Graft Loss Due to Death or Failure 1996 - 2005												
Loss	Cause of Failure	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
<b>Australia</b>												
	Death with Function	113	109	123	117	167	153	137	141	134	145	<b>1339</b>
<b>Failed</b>	Rejection - Acute	19	8	11	7	9	7	8	3	5	3	<b>80</b>
	Rejection - Chronic Allograft Nephropathy	87	79	105	107	91	111	108	113	143	123	<b>1067</b>
	Rejection - Hyperacute	2	1	-	2	1	-	-	-	-	-	<b>6</b>
	Vascular	13	15	9	15	7	11	16	15	17	13	<b>131</b>
	Technical Problems	1	3	-	3	4	2	3	3	2	5	<b>26</b>
	Recurrence Primary Disease	7	19	10	10	16	8	15	12	13	15	<b>124</b>
	Non Compliance	4	7	6	5	7	7	11	10	8	6	<b>71</b>
	Other	15	13	15	15	17	16	16	13	20	16	<b>157</b>
<b>Total</b>		<b>261</b>	<b>254</b>	<b>279</b>	<b>281</b>	<b>319</b>	<b>315</b>	<b>314</b>	<b>310</b>	<b>342</b>	<b>326</b>	<b>3001</b>
<b>New Zealand</b>												
	Death with Function	26	27	25	23	28	25	32	27	28	29	<b>270</b>
<b>Failed</b>	Rejection - Acute	3	1	1	4	-	1	1	1	-	2	<b>14</b>
	Rejection - Chronic Allograft Nephropathy	12	15	19	24	20	31	22	16	15	22	<b>196</b>
	Rejection - Hyperacute	1	-	-	-	-	-	-	-	1	-	<b>2</b>
	Vascular	4	5	-	6	8	1	1	1	-	4	<b>30</b>
	Technical Problems	-	2	-	2	-	2	1	2	-	2	<b>11</b>
	Recurrence Primary Disease	2	-	3	4	3	2	1	4	2	3	<b>24</b>
	Non Compliance	1	-	3	-	5	2	3	3	1	1	<b>19</b>
	Other	6	2	3	1	2	4	3	4	4	8	<b>37</b>
<b>Total</b>		<b>55</b>	<b>52</b>	<b>54</b>	<b>64</b>	<b>66</b>	<b>68</b>	<b>64</b>	<b>58</b>	<b>51</b>	<b>71</b>	<b>603</b>



<b>Figure 8.51</b>						
<b>Graft Failures 2001 - 2005</b>						
<b>Cause of Failure</b>	<b>Australia</b>			<b>New Zealand</b>		
	<b>Graft Function</b>			<b>Graft Function</b>		
	<b>&lt;1 year</b>	<b>&gt;= 1 year</b>	<b>Anytime</b>	<b>&lt;1 year</b>	<b>&gt;= 1 year</b>	<b>Anytime</b>
<b>Death with functioning Graft</b>						
Cardiac	11 (18.6%)	197 (30.3%)	208 (29.3%)	1 (9.1%)	33 (25.4%)	34 (24.1%)
Vascular	4 (6.8%)	65 (10.0%)	69 (9.7%)	3 (27.3%)	17 (13.1%)	20 (14.2%)
Infection	32 (54.2%)	81 (12.4%)	113 (15.9%)	3 (27.3%)	17 (13.1%)	20 (14.2%)
Social	-	16 (2.4%)	16 (2.3%)	-	7 (5.4%)	7 (5.0%)
Malignancy	5 (8.5%)	213 (32.7%)	218 (30.7%)	1 (9.1%)	45 (34.6%)	46 (32.6%)
Miscellaneous	7 (11.9%)	79 (12.1%)	86 (12.1%)	3 (27.3%)	11 (8.5%)	14 (9.9%)
<b>Total</b>	<b>59 (100%)</b>	<b>651 (100%)</b>	<b>710 (100%)</b>	<b>11 (100%)</b>	<b>130 (100%)</b>	<b>141 (100%)</b>
<b>Graft Failure</b>						
Rejection - Acute	22 (15.4%)	4 (0.5%)	26 (2.9%)	4 (13.8%)	1 (0.7%)	5 (2.9%)
Rejection - Chronic Allograft	5 (3.5%)	593 (78.6%)	598 (66.7%)	-	106 (74.6%)	106 (62.0%)
Rejection - Hyperacute	-	-	-	1 (3.5%)	-	1 (0.6%)
Vascular Rejection	66 (46.2%)	6 (0.8%)	72 (8.0%)	6 (20.7%)	1 (0.7%)	7 (4.1%)
Technical Problems	12 (8.4%)	3 (0.4%)	15 (1.7%)	6 (20.7%)	1 (0.7%)	7 (4.1%)
Recurrence of Primary Disease	3 (2.1%)	60 (8.0%)	63 (7.0%)	-	12 (8.5%)	12 (7.0%)
Non Compliance	1 (0.7%)	41 (5.4%)	42 (4.7%)	-	10 (7.0%)	10 (5.8%)
Other	34 (23.8%)	47 (6.2%)	81 (9.0%)	12 (41.4%)	11 (7.7%)	23 (13.5%)
<b>Total</b>	<b>143 (100%)</b>	<b>754 (100%)</b>	<b>897 (100%)</b>	<b>29 (100%)</b>	<b>142 (100%)</b>	<b>171 (100%)</b>

## IMMUNOSUPPRESSION

### AUSTRALIA

Tacrolimus is now the more commonly used calcineurin inhibitor at initiation and 12 months with a substantial increase in use in 2005 compared to 2004 (Figure 8.52).

The use of Sirolimus at 12 months has been increasing, although still at a low level. For the periods covered in this table, Sirolimus was not reimbursed by the Australian Government under the PBS S100 regulations which apply to MMF, CyA, Tacrolimus and MPA.

<b>Figure 8.52</b>		<b>Australia</b>								
<b>Immunosuppressive Therapy - Primary Deceased Donor Graft 2000 - 2005</b>										
	<b>Year</b>	<b>Aza</b>	<b>CyA</b>	<b>Tacrol</b>	<b>MMF</b>	<b>Sirol</b>	<b>Everolimus</b>	<b>Pred</b>	<b>MPA</b>	<b>No. of Deceased Donor Grafts</b>
<b>Initial treatment</b>	2000	22 (7%)	208 (67%)	83 (27%)	282 (91%)	9 (3%)	0 (0%)	284 (91%)	0 (0%)	311
	2001	16 (6%)	215 (74%)	65 (22%)	221 (76%)	33 (11%)	1 (0%)	277 (96%)	0 (0%)	289
	2002	9 (3%)	239 (73%)	81 (25%)	272 (83%)	7 (2%)	22 (7%)	318 (98%)	15 (5%)	326
	2003	8 (3%)	187 (68%)	77 (28%)	190 (69%)	10 (4%)	0 (0%)	258 (94%)	52 (19%)	274
	2004	5 (1%)	213 (59%)	137 (38%)	309 (85%)	10 (3%)	0 (0%)	360 (99%)	24 (7%)	362
	2005	9 (3%)	131 (41%)	173 (54%)	299 (94%)	17 (5%)	0 (0%)	308 (97%)	4 (1%)	319
<b>Treatment at 12 months</b>	2000	41 (14%)	164 (56%)	118 (41%)	228 (78%)	10 (3%)	0 (0%)	248 (85%)	0 (0%)	291
	2001	23 (9%)	150 (57%)	102 (39%)	205 (78%)	26 (10%)	1 (0%)	225 (86%)	1 (0%)	262
	2002	24 (8%)	160 (52%)	124 (41%)	240 (79%)	14 (4%)	19 (6%)	278 (91%)	11 (4%)	305
	2003	22 (9%)	125 (50%)	103 (41%)	161 (64%)	15 (6%)	0 (0%)	221 (88%)	44 (18%)	250
	2004	23 (7%)	129 (40%)	156 (48%)	234 (72%)	31 (10%)	0 (0%)	303 (93%)	47 (14%)	326
<b>Treatment at 24 months</b>	2000	50 (18%)	151 (53%)	117 (41%)	212 (75%)	9 (3%)	0 (0%)	203 (72%)	0 (0%)	283
	2001	31 (12%)	143 (56%)	99 (39%)	190 (74%)	23 (9%)	1 (0%)	205 (80%)	1 (0%)	257
	2002	22 (7%)	151 (51%)	118 (40%)	230 (78%)	20 (7%)	19 (6%)	247 (84%)	14 (5%)	294
	2003	19 (8%)	105 (44%)	103 (43%)	160 (67%)	19 (8%)	0 (0%)	204 (85%)	40 (17%)	240

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



## IMMUNOSUPPRESSION

### NEW ZEALAND

Cyclosporin and Mycophenolate Mofetil are clearly the dominant calcineurin inhibitor and anti-metabolite respectively at initiation. Tacrolimus use is much lower than Australia. However this predominance is much less by 12 months.

By 24 months the predominant anti-metabolite is Azathioprine, while Cyclosporin and Tacrolimus have similar usage.

Figure 8.53		New Zealand								
Immunosuppressive Therapy - Primary Deceased Donor Graft 2000 - 2005										
	Year	Aza	CyA	Tacrol	MMF	Sirol	Everolimus	Pred	MPA	No. of Deceased Donor Grafts
Initial treatment	2000	0 (0%)	60 (95%)	3 (5%)	63 (100%)	0 (0%)	0 (0%)	63 (100%)	0 (0%)	63
	2001	0 (0%)	59 (95%)	3 (5%)	62 (100%)	0 (0%)	0 (0%)	62 (100%)	0 (0%)	62
	2002	0 (0%)	57 (97%)	2 (3%)	59 (100%)	0 (0%)	0 (0%)	59 (100%)	0 (0%)	59
	2003	0 (0%)	47 (87%)	7 (13%)	46 (85%)	0 (0%)	0 (0%)	52 (96%)	3 (6%)	54
	2004	0 (0%)	47 (94%)	3 (6%)	49 (98%)	0 (0%)	0 (0%)	50 (100%)	0 (0%)	50
	2005	0 (0%)	32 (76%)	8 (19%)	41 (98%)	0 (0%)	0 (0%)	41 (98%)	0 (0%)	42
Treatment at 12 months	2000	22 (39%)	41 (73%)	15 (27%)	34 (61%)	0 (0%)	0 (0%)	54 (96%)	0 (0%)	56
	2001	27 (47%)	45 (79%)	12 (21%)	27 (47%)	0 (0%)	0 (0%)	56 (98%)	0 (0%)	57
	2002	18 (33%)	41 (76%)	13 (24%)	31 (57%)	0 (0%)	0 (0%)	53 (98%)	0 (0%)	54
	2003	15 (33%)	24 (53%)	21 (47%)	22 (49%)	1 (2%)	0 (0%)	42 (93%)	3 (7%)	45
	2004	9 (19%)	30 (64%)	17 (36%)	37 (79%)	0 (0%)	0 (0%)	44 (94%)	0 (0%)	47
Treatment at 24 months	2000	50 (91%)	40 (73%)	15 (27%)	3 (5%)	0 (0%)	0 (0%)	48 (87%)	0 (0%)	55
	2001	48 (87%)	39 (71%)	16 (29%)	3 (5%)	0 (0%)	0 (0%)	53 (96%)	0 (0%)	55
	2002	49 (92%)	39 (74%)	14 (26%)	1 (2%)	0 (0%)	0 (0%)	48 (91%)	0 (0%)	53
	2003	34 (79%)	22 (51%)	21 (49%)	3 (7%)	1 (2%)	0 (0%)	40 (93%)	2 (5%)	43

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