

# Australia and New Zealand Organ Donation Registry

**1997 Report**

Volume 1



# Australia and New Zealand Organ Donation Registry

(ANZOD Registry)

**1997 Report**

Volume 1

[Data collected to 31<sup>st</sup> December 1996]

Edited by Ms. Karen Herbertt and Dr Graeme Russ

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## Statistical Methods

Actuarial and Kaplan-Meier survivals  
have been produced using the procedure  
contained in

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## Introduction

We are pleased to present the Sixth Report of the Australia and New Zealand Organ Donation Registry (ANZOD Registry). ANZOD Registry is a joint project of the Australasian Transplant Coordinators Association (ATCA Inc.) and the ANZDATA Registry.

This Report contains information on eight years of Australian solid organ donors (1,641) and four years of New Zealand donors (140). The format has been changed from previous reports with more emphasis on individual Australian State statistics.

Data presented in this report, has been collected by Donor Transplant Coordinators in each Australian State and in New Zealand. As with most data collection, it can be a rather tedious exercise and we would like to thank all of the Transplant Coordinators for their contribution to this report.

We would like to acknowledge the ongoing financial support from the Australian Health Ministers' Advisory Council, the Australian Kidney Foundation and the New Zealand Ministry of Health.

The ANZOD Registry is well supported by the staff of the ANZDATA Registry. Mrs Lee Excell continues to do a brilliant job in the area of computer programming, data management and graphic displays. Mrs Lis Steinmetz is to be congratulated for her work on the layout and typing of this report and Mr Brian Livingston to be thanked for his computing and statistical programming contribution.

This report is circulated to Donor Hospitals, Departments' of Health, Transplant Units and Transplant Coordinators. The report can also be accessed via our Internet Web site. <http://www.anzdata.org.au>

Requests for further information or addition to the mailing list should be directed to the Editor of the ANZOD Registry.

## Summary – Australia

1. There were 1641 organ donors (average 11.8 donors per million of population) in Australia for the reporting period 1.1.89 – 31.12.96. The number of organ transplants from these donors were: 3057 kidneys, 857 livers, 847 hearts, 413 lungs and 85 pancreas.

In 1996, there were 194 donors (11 donors per million) with 361 kidneys, 119 livers, 87 hearts, 7 heart-lung, 116 lungs and 12 pancreas transplanted.

2. In 1996 the highest donor rate was in South Australia and Northern Territory (17 per million) and the lowest was in Western Australia (7 per million).
3. The median age of donors increased slightly in 1996 to 38.5 years (from 38.1 years in 1995) with an age range of 1.45 years to 74.2 years.
4. In 1996, 47% of donors with a known occupation (89% of total) were classified as student, blue collar workers and home duties (48%, 1995). The majority of donors were Caucasian and their religion stated as Christian.
5. The major cause of death in 43% of donors was cerebrovascular accidents (CVA), road trauma caused 27% of all deaths in 1996.
6. In 1996, consent for organ donation was sought in 63% of cases by the Intensive Care Unit Clinician, volunteered by the family in 26% of cases and sought by the Transplant Coordinator in 9% of cases. Coronial enquiries were required in 57% of all donors in 1996.
7. Consent was given for more than one organ in 96% of donors in 1996. In 1996 the consent rates for specific organs were: kidneys 100%, liver 96%, heart 93%, lungs 96%, pancreas 93%, corneas 59% and bone 63%.
8. In 1996, from donors where organs had been retrieved, 94% of kidneys, 104% of livers (split liver technique), 100% of hearts, 91% of lungs and 48% of pancreas were actually transplanted.
9. Donor factors having a significant effect on primary renal graft survival were delayed graft function >7 days, total ischaemia >18 hours, female gender, death from trauma and donor age.

## Summary – New Zealand

1. There were 140 organ donors (average 10 donors per million of population) in New Zealand for the reporting period 1.1.93 – 31.12.96. The number of organ transplants were: 272 kidneys, 44 hearts, 25 lungs and 81 livers.

In 1996, there were 36 donors (10 donors per million), which resulted in 71 kidneys, 14 hearts, 18 lungs and 23 livers being transplanted.

2. The median age of donors has decreased from 44.4 years in 1993 to 35.2 years in 1996, with an age range of 9.6 – 72.5 years.
3. The major cause of death in 1996 was cerebrovascular accidents 58% and road trauma 31%.
4. Over the four year period, 24% of donors with a known occupation were classified as blue collar workers, student and white collar workers. The majority of donors were Caucasian and their religion was stated as Christian.
5. Consent for organ donation was sought in 58% of cases in 1996 by the Intensive Care Unit Clinician. Consent was volunteered by the family in 22% of cases. Coronial inquiries were required in 47% of all donors.
6. The donation of more than one organ occurred in 83% of donors in 1996.
7. In 1996, from donors where consent had been obtained, 99% kidneys, 92% of livers, 100% of hearts and 90% of lungs were transplanted.
8. New Zealand has provided 5 kidneys, 81 livers, 6 hearts and 11 lungs to the Australian Transplant Programs in the four year reporting period 1993-96.

### Organ Donors in Australia and New Zealand

The Australian and New Zealand organ donation rate over the last three years has remained relatively unchanged at 10-11 donors per million of population (dpmp). There are state variations to be seen in Table 1.

Table 1

Australia and New Zealand

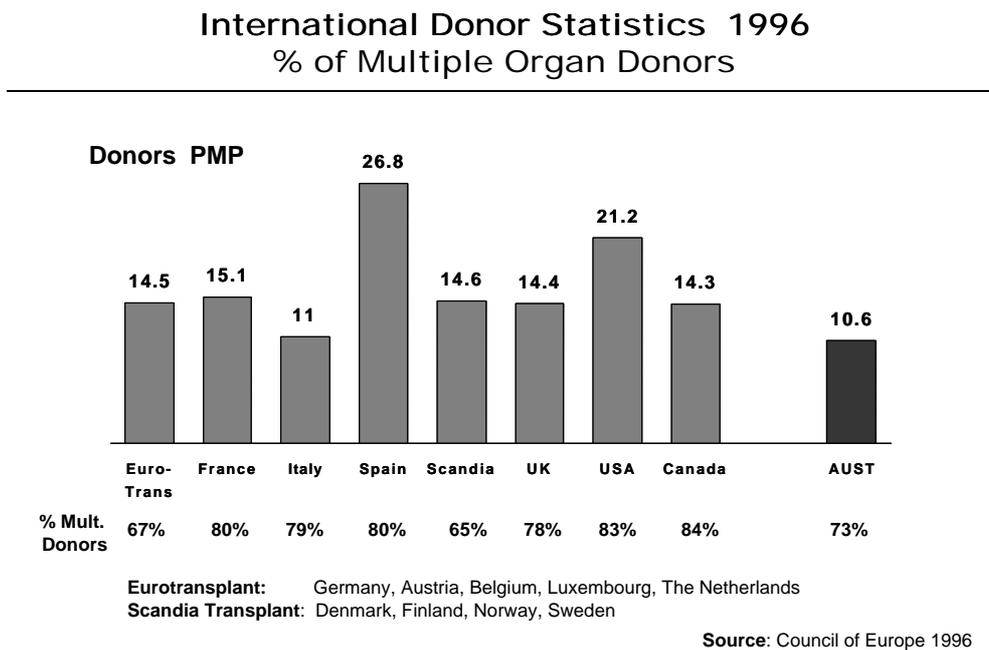
		Number of Donors 1993 - 1996							
		1993		1994		1995		1996	
Queensland		44	(14)	38	(12)	34	(10)	35	(10)
New South Wales/ACT		74	(12)	73	(11)	67	(10)	69	(11)
Victoria		52	(12)	26	(6)	38	(8)	49	(11)
Tasmania		6	(13)	6	(13)	4	(8)	1	(2)
South Australia		23	(16)	23	(16)	23	(16)	25	(17)
Northern Territory		3	(18)	1	(6)	1	(6)	3	(17)
Western Australia		19	(11)	16	(9)	17	(10)	12	(7)
<b>Australia</b>		<b>221</b>	<b>(13)</b>	<b>183</b>	<b>(10)</b>	<b>184</b>	<b>(10)</b>	<b>194</b>	<b>(11)</b>
<b>New Zealand</b>		<b>34</b>	<b>(10)</b>	<b>35</b>	<b>(10)</b>	<b>35</b>	<b>(10)</b>	<b>36</b>	<b>(10)</b>

( ) Per Million

Refer to Appendix for the number of donors by state and hospital.

For completeness of the report the international donor per million statistics are included. Spain had the highest rate of donation (26.8 donors per million population). The percentage of donors who donate more than one organ range between 84% Canada to 65% Scandia – Transplant.

Figure 1



Previously the comparison between states and countries has been based upon donors per million of population. However, the number of deaths that occur and therefore the ability to be donors may be a more valuable way of comparing donation rates. Donors per thousand deaths is presented for the first time in this report. Australian data on deaths for 1996 is not available until August of 1997. New Zealand data is from 1993.

Table 2

## Australia and New Zealand

## Donors per Thousand Deaths 1989 - 1996

Year	Australia	New Zealand
1989	1.84	-
1990	1.71	-
1991	1.76	-
1992	1.76	-
1993	1.83	1.25
1994	1.44	1.29
1995	1.54	1.29
1996	n/a	1.27

Table 3

## Australian States

## Donors per Thousand Deaths 1989 - 1995

Year	QLD	NSW/ACT	Vic.	Tas.	SA	NT	WA
1989	1.8	1.9	2.0	0.54	1.66	0.54	1.76
1990	1.97	1.79	1.47	0.54	2.49	0.27	1.17
1991	2.4	1.74	1.45	0.55	1.35	0.55	2.47
1992	3.23	1.55	1.32	1.07	1.78	-	1.4
1993	2.19	1.7	1.67	1.65	1.98	0.83	1.85
1994	1.75	1.58	0.8	1.54	2.11	0.26	1.56
1995	1.75	1.53	1.23	1.12	2.11	0.28	1.71

Table 4

## Australian States

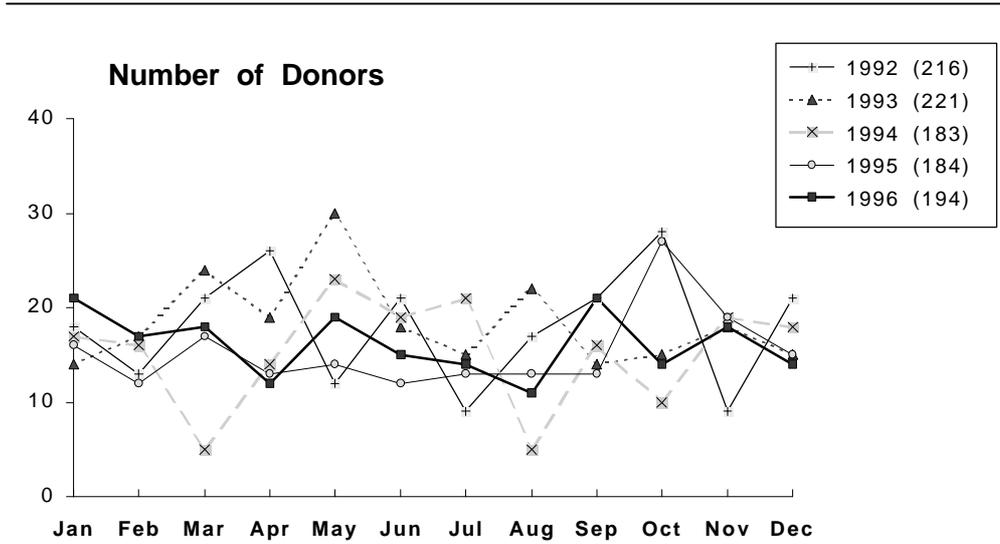
State Comparison Between Donors Per Million  
Population and Donors per Thousand Deaths ( ) 1990 - 1995

Year	QLD		NSW/ACT		Vic.		Tas.		SA		NT		WA	
1990	13	(2.0)	13	(1.8)	10	(1.5)	4	(0.5)	19	(2.5)	6	(0.3)	7	(1.2)
1991	15	(2.4)	12	(1.7)	10	(1.5)	4	(0.6)	10	(1.4)	13	(0.6)	14	(2.5)
1992	22	(3.2)	11	(1.6)	9	(1.3)	8	(1.1)	14	(1.8)	-	-	8	(1.4)
1993	14	(2.2)	12	(1.7)	12	(1.7)	13	(1.7)	16	(2.0)	18	(0.8)	11	(1.9)
1994	12	(1.8)	11	(1.6)	6	(0.8)	13	(1.5)	16	(2.1)	6	(0.3)	9	(1.6)
1995	10	(1.8)	10	(1.5)	8	(1.2)	8	(1.1)	16	(2.1)	6	(0.3)	10	(1.7)

Figure 2 shows the unpredictable nature of organ donation. There is no consistency in donor numbers by month over the years.

Figure 2

Donors Per Month in Australia  
1992 - 1996



## Donor Profile

### Age and Gender Distribution

The mean age for organ donors in Australia has increased over the last three years from 36.4 to 38.3 years. This same increase has also been reflected in the median age. In 1996 there were nine donors (4.6%) over the age of 65 years. The oldest donor in 1996 was 74.2 years.

New Zealand in 1996 had a mean age of 36.6 years and median of 35.2 years. This reflects a decrease in age when compared to previous years (mean age: 1993 – 40.1 years, 1994 – 40.6 years). In 1996 there was one donor over the age of 60 years. Refer to Table 5.

The gender distribution for Australia (by state) and New Zealand is presented in Table 6.

Refer to Figures 3-8 for age and gender of donors for Australia and New Zealand, 1994-96.

Table 5

### Australia and New Zealand

#### Age of Male and Female Donors 1993 – 1996

	Mean (years)			Median (years)			Range
	All	Female	Male	All	Female	Male	Years
<b>Australia</b>							
1993	37.2	37.2	37.2	36.6	39.0	35.9	1.5 – 72.4
1994	36.4	38.9	34.0	36.8	41.8	31.7	1.3 – 76.3
1995	37.7	40.0	36.4	38.1	41.7	35.2	3.0 – 72.1
1996	38.3	40.3	36.9	38.5	46.1	36.2	1.45 – 74.2
<b>New Zealand</b>							
1993	40.1	40.4	39.7	44.4	42.1	45.2	4.7 – 67.1
1994	40.6	44.9	38.3	40.6	47.3	37.3	2.5 – 70.1
1995	34.2	34.0	34.4	34.8	35.3	28.6	6.8 – 70.7
1996	36.6	37.9	35.1	35.2	42.7	29.9	9.6 – 72.5

Table 6

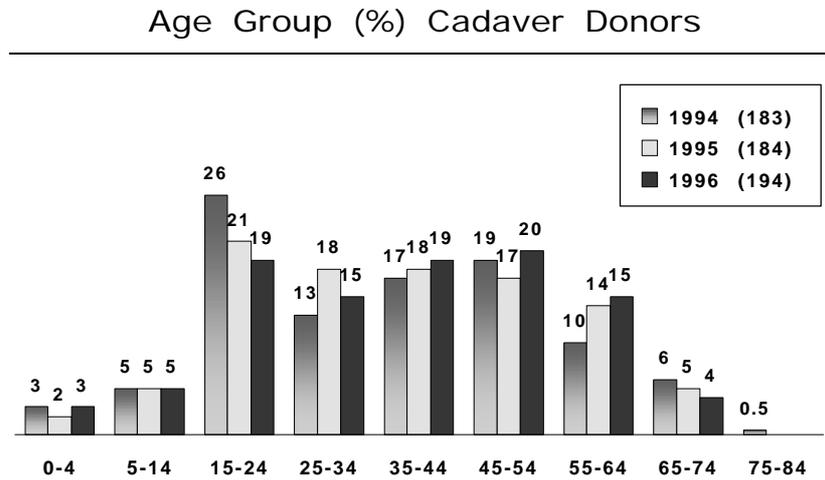
### Australia and New Zealand

#### Gender of Donors 1993 – 1996

	Female		Male		Total	
	Count	%	Count	%	Count	%
<b>Australia</b>	648	39%	993	61%	<b>1641</b>	<b>100%</b>
Queensland	112	33%	226	67%	<b>338</b>	<b>100%</b>
New South Wales/ACT	246	41%	351	59%	<b>597</b>	<b>100%</b>
Victoria	155	43%	207	57%	<b>362</b>	<b>100%</b>
Tasmania	9	33%	18	66%	<b>27</b>	<b>100%</b>
South Australia	69	39%	106	61%	<b>175</b>	<b>100%</b>
Northern Territory	1	8%	12	92%	<b>13</b>	<b>100%</b>
Western Australia	56	43%	73	57%	<b>129</b>	<b>100%</b>
<b>New Zealand</b>	61	44%	79	56%	<b>140</b>	<b>100%</b>

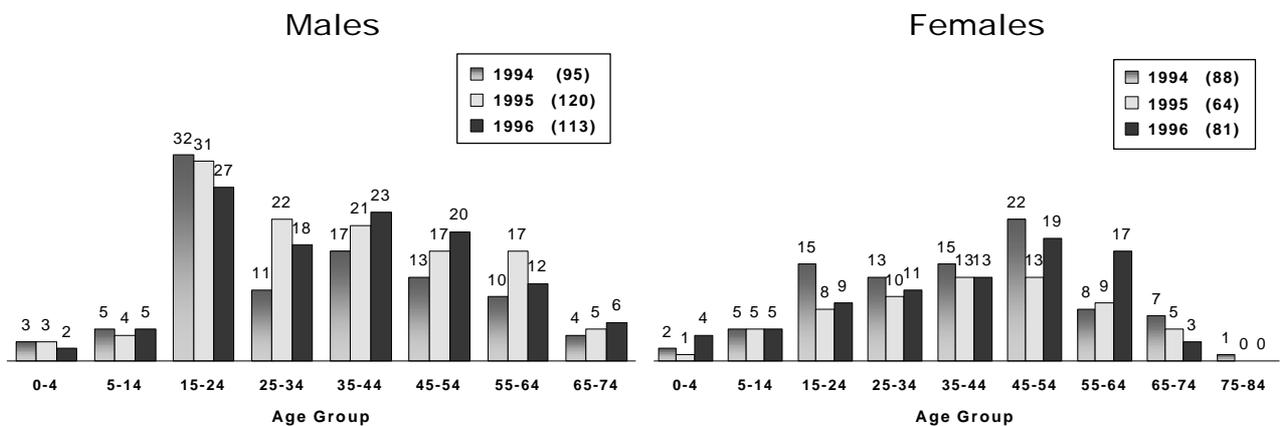
## Australia 1994 - 1996

Figure 3



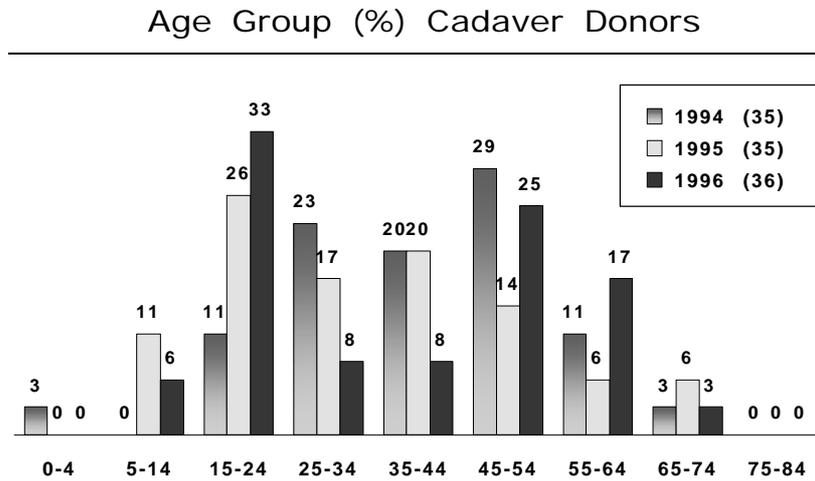
Figures 4 and 5

### Age and Gender Distribution of Donors



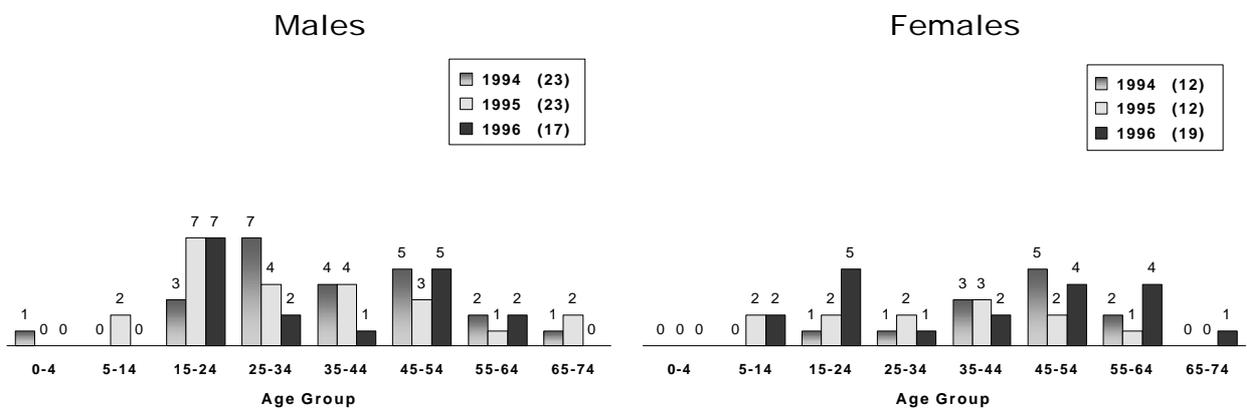
## New Zealand 1994 - 1996

Figure 6



Figures 7 and 8

### Age and Gender Distribution of Donors



Cause of Death – All Donors

Figures 9 and 10 show the cause of death for all organ donors in Australia since 1989 and for New Zealand since 1993. The primary cause of death being cerebrovascular accidents (CVA) (45% of all Australian donors and 55% of all New Zealand donors).

Table 7 shows a detailed cause of death for organ donors in 1996 and a breakdown of gender. Table 8 shows a breakdown by Australian state with the major causes of death for the last eight years. Table 9 shows CVA are responsible for 68% of all deaths in donors 55 years and older, whereas in the 15-34 year group, trauma accounted for 71% of all deaths.

Figures 9 and 10

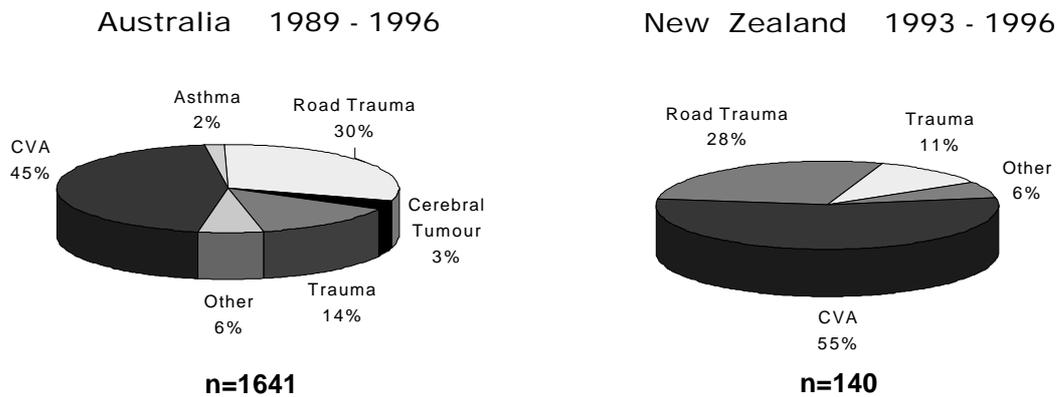


Table 7

Australia and New Zealand

Cause of Donor Death 1996

	Australia			New Zealand		
	Male	Female	Total	Male	Female	Total
<b>Cerebrovascular Accidents (CVA)</b>						
Intracranial haemorrhage	31	47	78	9	12	21
Infarct	4	1	5	-	-	-
<b>Road trauma</b>						
Motor vehicle accident	17	10	27	5	3	8
Motor bike accident	6	-	6	-	1	1
Cyclist	8	-	8	1	-	1
Pedestrian	7	1	8	-	1	1
Other road accident	1	3	4	-	-	-
<b>Trauma</b>						
Drowning	3	1	4	-	-	-
Fall	19	5	24	1	1	2
Hanging	-	1	1	-	-	-
Gunshot	4	-	4	-	-	-
Assault	1	-	1	-	-	-
Other accident	1	1	2	-	-	-
<b>Cerebral tumour</b>	3	6	9	-	-	-
<b>Asthma</b>	-	2	2	-	-	-
<b>Other</b>						
Hypoxia (cardiac arrest)	5	1	6	1	-	1
Smoke inhalation	1	-	1	-	-	-
Meningitis - pneumococcal	-	1	1	-	-	-
- meningococcus	-	1	1	-	-	-
Overdose	2	-	2	-	1	1
<b>Total</b>	<b>113</b>	<b>81</b>	<b>194</b>	<b>17</b>	<b>19</b>	<b>36</b>

Table 8

## Australia and New Zealand

## Cause of Death 1.1.89 – 31.12.96

	QLD	NSW/ACT	Vic.	Tas.	SA	NT	WA	N.Z. *
CVA	36%	50%	46%	37%	42%	15%	49%	55%
Road Trauma	33%	26%	30%	30%	28%	46%	37%	28%
Trauma (non road)	22%	14%	10%	26%	16%	23%	8%	11%
Other	9%	10%	14%	7%	14%	15%	6%	6%

\*\* New Zealand 1993 - 1996

Table 9

## Australia

## Cause of Death Related to Age Group 1996

	0-14	15-34	35-54	55 on	Total
CVA	-	13	44	26	83
Road Trauma	8	33	11	2	54
Trauma (non road)	5	13	10	7	35
Other	3	6	10	3	22
<b>Total</b>	<b>16</b>	<b>65</b>	<b>75</b>	<b>38</b>	<b>194</b>

Table 10

## New Zealand

## Cause of Death Related to Age Group 1996

	0-14	15-34	35-54	55 on	Total
CVA	-	4	11	6	21
Road Trauma	2	8	-	1	11
Trauma (non road)	-	1	1	-	2
Other	-	2	-	-	2
<b>Total</b>	<b>2</b>	<b>15</b>	<b>12</b>	<b>7</b>	<b>36</b>

Table 11

## Australia and New Zealand

## Occupation of Donors 1993 – 1996

	Australia					New Zealand				
	1993	1994	1995	1996	Total	1993	1994	1995	1996	Total
Home duties	29	29	19	22	99	6	1	1	4	12
Student	36	24	23	24	107	-	2	8	8	18
Pre-school	5	7	4	6	22	1	1	-	-	2
Blue collar	41	22	31	35	129	6	8	7	3	24
White collar	15	22	10	18	65	5	2	2	4	13
Professional	18	11	12	20	61	2	4	2	2	10
Management	1	2	1	-	4	3	2	2	2	9
Primary industry	5	3	1	4	13	3	1	-	-	4
Tradesperson	9	6	12	9	36	1	4	2	5	12
Small business owner	5	3	9	5	22	-	-	-	-	-
Retired	10	11	14	13	48	1	4	2	3	10
Invalid pensioner	2	6	6	8	22	-	1	-	-	1
Unemployed	6	5	6	8	25	1	1	3	1	6
Other	-	-	1	-	1	-	-	-	-	-
Unknown	39	32	35	22	128	5	4	6	4	19
<b>Total</b>	<b>221</b>	<b>183</b>	<b>184</b>	<b>194</b>	<b>782</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>36</b>	<b>140</b>

Table 12

## Australia and New Zealand

## Ethnic Origin of Donors 1993 - 1996

	Australia					New Zealand				
	1993	1994	1995	1996	Total	1993	1994	1995	1996	Total
Caucasoid	216	171	180	184	<b>751</b>	34	35	33	35	<b>137</b>
Greek	(1)	(3)	(1)	(2)	<b>(7)</b>	-	-	-	-	-
Italian	(4)	-	(4)	(3)	<b>(11)</b>	-	-	-	-	-
Aboriginal	-	2	1	2	<b>5</b>	-	-	-	-	-
Arab	1	-	-	-	<b>1</b>	-	-	-	-	-
Chilean	1	-	-	-	<b>1</b>	-	-	-	-	-
Pacific Islander	-	2	-	1	<b>3</b>	-	-	-	1	<b>1</b>
Maori	-	-	1	-	<b>1</b>	-	-	2	-	<b>2</b>
Vietnamese	-	1	-	3	<b>4</b>	-	-	-	-	-
Filipino	-	1	1	1	<b>3</b>	-	-	-	-	-
Chinese	1	-	-	2	<b>3</b>	-	-	-	-	-
Japanese	1	-	-	-	<b>1</b>	-	-	-	-	-
Indian	1	3	-	-	<b>4</b>	-	-	-	-	-
Malay	-	1	-	-	<b>1</b>	-	-	-	-	-
Iranian	-	1	-	-	<b>1</b>	-	-	-	-	-
Turk	-	1	-	-	<b>1</b>	-	-	-	-	-
Pakistani	-	-	1	-	<b>1</b>	-	-	-	-	-
Sri Lankan	-	-	-	1	<b>1</b>	-	-	-	-	-
<b>Total</b>	<b>221</b>	<b>183</b>	<b>184</b>	<b>194</b>	<b>782</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>36</b>	<b>140</b>

Table 13

## Australia and New Zealand

## Religious Denomination of Donors 1993 - 1996

	Australia					New Zealand				
	1993	1994	1995	1996	Total	1993	1994	1995	1996	Total
Christian	123	117	103	108	<b>451</b>	17	24	11	11	<b>63</b>
Jewish	-	1	-	2	<b>3</b>	-	-	-	-	-
Buddhist	-	1	-	2	<b>3</b>	-	-	-	-	-
Muslim	-	3	1	-	<b>4</b>	-	-	-	-	-
No religion	15	15	22	19	<b>71</b>	5	2	4	5	<b>16</b>
Unknown	83	46	58	63	<b>250</b>	12	9	20	20	<b>61</b>
<b>Total</b>	<b>221</b>	<b>183</b>	<b>184</b>	<b>194</b>	<b>782</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>36</b>	<b>140</b>

## Heart Beating Donors

In 1996 there were two non-heart beating donors in Australia and one in New Zealand.

Table 14

Australia and New Zealand

		Australia					New Zealand				
		1993	1994	1995	1996	Total	1993	1994	1995	1996	Total
Yes		221	182	180	192	775	34	34	35	35	138
No		-	1	4	2	7	-	1	-	1	2
<b>Total</b>		<b>221</b>	<b>183</b>	<b>184</b>	<b>194</b>	<b>782</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>36</b>	<b>140</b>

Table 15

Australia and New Zealand

		Australia				New Zealand			
		1993	1994	1995	1996	1993	1994	1995	1996
Yes		54	41	31	40	3	5	7	4
No		160	137	149	152	28	28	27	30
Unknown		7	5	4	2	3	2	1	2
<b>Total</b>		<b>221</b>	<b>183</b>	<b>184</b>	<b>194</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>36</b>

## Hepatitis B and Hepatitis C Status of Donors

In 1994, 1995, and 1996, all donors for Australia and New Zealand were Hepatitis B surface antigen and C antibody negative.

## Cytomegalovirus (CMV) Status of Donors

Table 16

Australia and New Zealand

		Australia					New Zealand				
		1993	1994	1995	1996	Total	1993	1994	1995	1996	Total
Positive		153	117	122	139	531	16	18	25	19	78
Negative		65	63	61	55	244	18	17	10	16	61
Not done		3	3	1	-	7	-	-	-	1	1
<b>Total</b>		<b>221</b>	<b>183</b>	<b>184</b>	<b>194</b>	<b>782</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>36</b>	<b>140</b>

Blood Group of Donors

The distribution of blood groups in the general population is 'O': 49%, 'A': 38%, 'B': 10%, 'AB': 3% (data from Australian Red Cross Blood Bank).

Figures 11 and 12

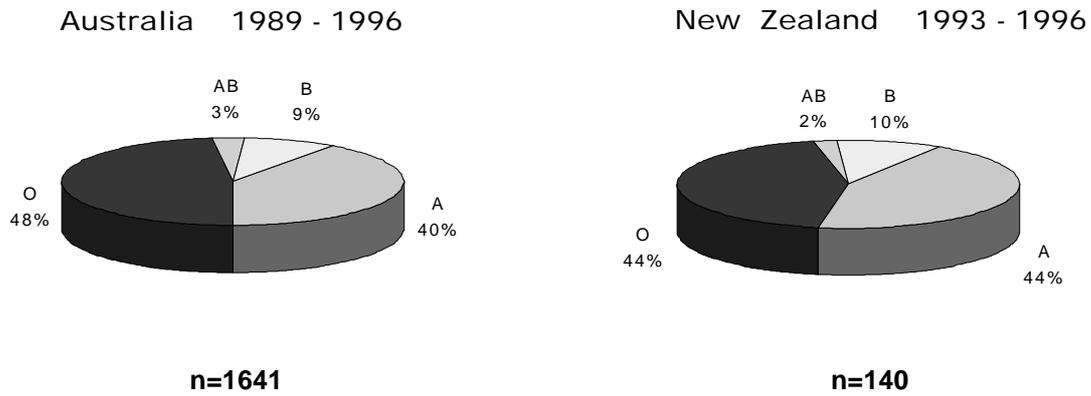


Table 17

Australia and New Zealand

		Blood Group of Donors 1993 - 1996							
		1993		1994		1995		1996	
<b>Australia</b>									
O		97	44%	83	45%	92	50%	92	47%
A		95	43%	71	39%	68	37%	86	44%
B		23	10%	20	11%	17	9%	13	7%
AB		6	3%	9	5%	7	4%	3	2%
<b>Total</b>		<b>221</b>	<b>100%</b>	<b>183</b>	<b>100%</b>	<b>184</b>	<b>100%</b>	<b>194</b>	<b>100%</b>
<b>New Zealand</b>									
O		16	47%	19	54%	13	37%	14	39%
A		14	41%	14	40%	17	49%	16	44%
B		3	9%	2	6%	4	11%	5	14%
AB		1	3%	-	-	1	3%	1	3%
<b>Total</b>		<b>34</b>	<b>100%</b>	<b>35</b>	<b>100%</b>	<b>35</b>	<b>100%</b>	<b>36</b>	<b>100%</b>

## Medical Conditions of Donor

The following information relating to diabetes, hypertension, smoking and alcohol intake was added to the data collection in 1993.

### Diabetes

There were two Type 2 diabetics (non insulin dependent) accepted as donors in Australia in 1996. New Zealand had none.

### Hypertension

In 1996, 11% of Australian donors had a past history of chronic hypertension, 43% of this group had hypertension recorded between 5-10 years.

New Zealand recorded two donors (6%) with a past history of chronic hypertension.

### Smoking

In 1996, 35% of Australian organ donors were recorded as being current smokers, and 2% were recorded as being former smokers.

In New Zealand, 31% were reported as current smokers.

### Alcohol

In Australia (1996), 35% of donors were recorded as having an alcohol intake of >40 grams per day. However, for the same year in New Zealand it was 11%.

### Donor weight

The allocation of heart, lungs and livers are based on the matching of recipient and donor weight. This information has been included for the first time in the report.

Table 18

Australia and New Zealand

Years	Kilograms									Total
	0-19	20-29	30-30	40-49	50-59	60-69	70-79	80-89	90 +	
<b>Australia</b>										
1989	5	6	7	8	28	47	45	23	6	175
1990	7	5	6	3	14	48	50	37	13	183
1991	4	6	3	6	19	50	57	43	18	206
1992	7	6	2	4	17	46	57	48	23	210
1993	6	4	6	6	16	53	55	49	19	214
1994	4	8	-	2	13	48	50	34	20	179
1995	1	5	3	2	19	29	54	44	25	182
1996	5	2	2	6	18	42	47	47	22	191
<b>Total</b>	<b>39</b>	<b>42</b>	<b>29</b>	<b>37</b>	<b>144</b>	<b>363</b>	<b>415</b>	<b>325</b>	<b>146</b>	<b>1540</b>
<b>New Zealand</b>										
1993	-	1	-	-	2	8	12	9	-	32
1994	1	-	-	-	2	8	8	11	5	35
1995	-	1	1	-	2	7	10	12	1	34
1996	-	-	1	2	6	7	12	8	-	36
<b>Total</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>12</b>	<b>30</b>	<b>42</b>	<b>40</b>	<b>6</b>	<b>137</b>

## Donor Intention

Tables 19 to 21 show whether the donor had recorded an intention to be a donor through a signed driver's licence or a donor card.

In 1996, 20% of Australian and 17% of New Zealand organ donors had a signed driver's licence. There was a large variation between the Australian States, with the highest recording in Queensland of 43% and the lowest in Victoria, Tasmania and Northern Territory of 0%. There are a large number of donors in the "unknown" category.

In 1996, only 6% of Australian and no New Zealand donors had a signed donor card. Victoria had the highest recording with 14% having a donor card and Queensland, Tasmania, Northern Territory and Western Australia having no recordings of donor cards. Once again there was a large number of donors in the "unknown" category.

Table 19

## Australia and New Zealand

Driver's Licence Status 1993 - 1996										
	Australia					New Zealand				
	1993	1994	1995	1996	Total	1993	1994	1995	1996	Total
Yes	52	49	48	39	188	5	12	6	6	29
No	75	51	54	67	247	1	5	1	6	13
Student	31	22	16	22	91	1	1	6	1	9
Unknown	63	61	66	66	256	27	17	22	23	89
<b>Total</b>	<b>221</b>	<b>183</b>	<b>184</b>	<b>194</b>	<b>782</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>36</b>	<b>140</b>

Table 20

## Australian States

Driver's Licence Status 1996 (1995)																
	QLD		NSW/ACT		Vic.		Tas.		SA		NT		WA		Total	
	Yes	15	(16)	15	(21)	-	-	-	(1)	5	(6)	-	-	4	(4)	39
No	3	(4)	9	(8)	33	(16)	1	-	13	(14)	1	(1)	7	(11)	67	(54)
Student	10	(5)	4	(5)	4	(3)	-	-	3	(1)	-	-	1	(2)	22	(16)
Unknown	7	(9)	41	(33)	12	(19)	-	(3)	4	(2)	2	-	-	-	66	(66)
<b>Total</b>	<b>35</b>	<b>(34)</b>	<b>69</b>	<b>(67)</b>	<b>49</b>	<b>(38)</b>	<b>1</b>	<b>(4)</b>	<b>25</b>	<b>(23)</b>	<b>3</b>	<b>(1)</b>	<b>12</b>	<b>(17)</b>	<b>194</b>	<b>(184)</b>

Table 21

## Australia and New Zealand

Donor Card Status 1993 - 1996										
	Australia					New Zealand				
	1993	1994	1995	1996	Total	1993	1994	1995	1996	Total
Yes	7	16	12	11	46	-	1	-	-	1
No	100	74	75	79	328	30	32	28	31	101
Student	31	21	15	22	89	1	1	6	5	13
Unknown	83	72	82	82	319	3	1	1	-	5
<b>Total</b>	<b>221</b>	<b>183</b>	<b>184</b>	<b>194</b>	<b>782</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>36</b>	<b>140</b>

Table 22

## Australian States

	Donor Card Status 1996 (1995)															
	QLD		NSW/ACT		Vic.		Tas.		SA		NT		WA		Total	
Yes	-	(1)	3	(8)	7	(1)	-	-	1	(2)	-	-	-	-	<b>11</b>	<b>(12)</b>
No	11	(14)	14	(14)	25	(17)	1	(1)	18	(19)	2	(1)	8	(9)	<b>79</b>	<b>(75)</b>
Student	10	(5)	4	(5)	4	(3)	-	-	3	-	-	-	1	(2)	<b>22</b>	<b>(15)</b>
Unknown	14	(14)	48	(40)	13	(17)	-	(3)	3	(2)	1	-	3	(6)	<b>82</b>	<b>(82)</b>
<b>Total</b>	<b>35</b>	<b>(34)</b>	<b>69</b>	<b>(67)</b>	<b>49</b>	<b>(38)</b>	<b>1</b>	<b>(4)</b>	<b>25</b>	<b>(23)</b>	<b>3</b>	<b>(1)</b>	<b>12</b>	<b>(17)</b>	<b>194</b>	<b>(184)</b>

## Consent for Organ Donation

Table 23 shows that Intensive Care Clinicians and Registrars play the predominant role in the requesting of consent for organ donation in both Australia (63%) and New Zealand (58%).

There is a large difference between the Australian States in the role of the Transplant Coordinator in seeking consent. In 1996, consent was sought by the Transplant Coordinator in South Australia in 40% of donors. In the other states: Queensland 11%, Western Australia 8%, New South Wales 3% and Victoria 2%. Northern Territory and Tasmania do not have any resident Transplant Coordinators. See Table 24.

Twenty six per cent of families volunteered consent for organ donation in Australia and 22% in New Zealand. Western Australia had the highest number of donor families who volunteered consents 58% in 1996, followed by Queensland 34%, Northern Territory 33%, New South Wales 29%, South Australia 16%, Victoria 14% and Tasmania 0%.

Table 23

## Australia and New Zealand

	Australia					New Zealand				
	1993	1994	1995	1996	Total	1993	1994	1995	1996	Total
ICU Clinician/Registrar	138	95	105	123	<b>461</b>	20	19	18	21	<b>78</b>
Renal Physician/Registrar	3	3	3	-	<b>9</b>	3	3	1	4	<b>11</b>
Other Doctor	-	1	-	-	<b>1</b>	2	1	1	-	<b>4</b>
Transplant Coordinator	21	14	18	18	<b>71</b>	-	-	-	-	<b>-</b>
Volunteered	59	68	56	51	<b>234</b>	9	12	14	8	<b>43</b>
Nursing Staff	-	1	1	-	<b>2</b>	-	-	1	-	<b>1</b>
Social Worker	-	-	1	2	<b>3</b>	-	-	-	-	<b>-</b>
Others	-	1	-	-	<b>1</b>	-	-	-	3	<b>3</b>
<b>Total</b>	<b>221</b>	<b>183</b>	<b>184</b>	<b>194</b>	<b>782</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>36</b>	<b>140</b>

Table 24

## Australian States

	Consent 1996 (1995)															
	QLD		NSW/ACT		Vic.		Tas.		SA		NT		WA		Total	
ICU Staff	18	(16)	46	(40)	41	(27)	1	(3)	11	(10)	2	(1)	4	(8)	<b>123</b>	<b>(105)</b>
Renal Staff	-	-	-	(3)	-	-	-	-	-	-	-	-	-	-	<b>-</b>	<b>(3)</b>
Tx.Coord.	4	(5)	2	(2)	1	-	-	-	10	(7)	-	-	1	(4)	<b>18</b>	<b>(18)</b>
Volunteered	12	(12)	20	(22)	7	(11)	-	(1)	4	(5)	1	-	7	(5)	<b>51</b>	<b>(56)</b>
Other	1	(1)	1	-	-	-	-	-	-	(1)	-	-	-	-	<b>2</b>	<b>(2)</b>
<b>Total</b>	<b>35</b>	<b>(34)</b>	<b>69</b>	<b>(67)</b>	<b>49</b>	<b>(38)</b>	<b>1</b>	<b>(4)</b>	<b>25</b>	<b>(23)</b>	<b>3</b>	<b>(1)</b>	<b>12</b>	<b>(17)</b>	<b>194</b>	<b>(184)</b>

## Director Contact with Transplant Coordinator

Table 25 shows the direct contact that Transplant Coordinators have with donor families at the time of organ donation at the hospital. In Australia, there has been an increase in contact in 1996 (71%) [1995 -58%]. In New Zealand it has been consistent at 14% for the last two years.

There are differences between the States, with Western Australia and South Australia having the highest contact in 1996 (92%), followed by Victoria 81%, Queensland 74%, New South Wales/ACT 55% and Northern Territory and Tasmania 0%. The geography of each State being a contributing factor.

Table 25

Australia and New Zealand

### Direct Contact with Transplant Coordinator 1996 (1995)

	QLD	NSW/ACT	Vic.	Tas.	SA	NT	WA	Aust.	N.Z.
Yes	26 (19)	38 (24)	40 (25)	- (1)	23 (22)	- (-)	11 (15)	138 (107)	5 (5)
No	9 (15)	31 (43)	9 (13)	1 (3)	2 (1)	3 (-)	1 (2)	56 (77)	31 (30)
<b>Total</b>	<b>35 (34)</b>	<b>69 (67)</b>	<b>49 (38)</b>	<b>1 (4)</b>	<b>25 (23)</b>	<b>3 (1)</b>	<b>12 (17)</b>	<b>194 (184)</b>	<b>36 (35)</b>

## Coroner's Cases

Fifty seven per cent of all Australian donors were subject to Coronial enquiry. This is a slight increase over previous years. In New Zealand it was 47% for 1996.

Table 26

Australia and New Zealand

### Coroner's Cases 1993 - 1996

	Australia					New Zealand				
	1993	1994	1995	1996	Total	1993	1994	1995	1996	Total
Yes	117	93	96	110	<b>416</b>	17	14	24	17	<b>72</b>
No	104	90	88	84	<b>366</b>	17	21	11	19	<b>68</b>
<b>Total</b>	<b>221</b>	<b>183</b>	<b>184</b>	<b>194</b>	<b>782</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>36</b>	<b>140</b>

Table 27

Australian States

### Coroner's Cases 1996 (1995)

	QLD	NSW/ACT	Vic.	Tas.	SA	NT	WA	Total
Yes	22 (21)	43 (38)	20 (16)	1 (2)	15 (9)	3 (1)	6 (9)	<b>110 (96)</b>
No	13 (13)	26 (29)	29 (22)	- (2)	10 (14)	- (-)	6 (8)	<b>84 (88)</b>
<b>Total</b>	<b>35 (34)</b>	<b>69 (67)</b>	<b>49 (38)</b>	<b>1 (4)</b>	<b>25 (23)</b>	<b>3 (1)</b>	<b>12 (17)</b>	<b>194 (184)</b>

## Summary – Organs Requested, Consent Given, Retrieved and Transplanted

The information relating to the request for organ donation refers only to those patients who become organ donors. If consent was sought and refused, the Registry has no record of these potential donors.

The difference between a request and a consent is a family refusal for the specific organ. Reasons for not requesting organs, not retrieving and not transplanting are documented for all of the specific organs.

Table 28 shows the outcome of organs requested in 1996 and 1995.

Table 28

Australia and New Zealand

### Outcome Following Request for Organ Donation 1996 (1995)

	Kidneys	Liver	Heart	Lungs	Pancreas	Bone
<b>Australia</b>						
Requested	388 (368)	177 (168)	169 (163)	320 (308)	104 (107)	49 (53)
Consent Given	388 (368)	170 (168)	157 (156)	296 (296)	94 (99)	31 (32)
Retrieved	385 (361)	114 (129)	94 (111)	127 (136)	25 (14)	15 (8)
Transplanted	361 (346)	*119 (124)	94 (108)	116 (128)	12 (13)	St. St.
<b>New Zealand</b>						
Requested	72 (70)	29 (24)	31 (26)	46 (28)	8 (4)	10 (8)
Consent Given	72 (70)	29 (24)	31 (26)	46 (28)	8 (4)	10 (8)
Retrieved	72 (70)	25 (22)	14 (12)	20 (16)	2 (4)	6 (7)
Transplanted	71 (70)	23 (21)	14 (12)	18 (5)	- -	St. St.

\* Split Liver

St. = Stored

Kidneys and Lungs are counted as separate organs

## Organs Requested

From the 194 Australian organ donors in 1996, specific organs requested were: kidneys in all donors 100%, liver 91%, heart 87%, lungs 82%, pancreas 54%, bone 25%.

From the 36 New Zealand donors in 1996 specific organs requested were: kidneys in all donors 100%, liver 81%, heart 86%, lungs 64%, pancreas 22%, bone 28%.

## Organs Consented

Overall consent to retrieve more than one organ or tissue was given in 96% of Australian donors in 1996. This is the same as in the previous year. For New Zealand 97% of 1996 donors consented to more than one organ. This is an increase when compared to previous years.

The specific organs consented in Australia in 1996 were: kidneys 100%, liver 96%, heart 93%, lungs 93%, pancreas 90% and bone 63%. In New Zealand all specific organs requested were successfully consented (100%).

## Organs Retrieved

For those Australian organs in which consent had been given, the specific organ retrieval rates in 1996 were: kidneys 99%, livers 67%, hearts 60%, lungs 43%, pancreas 27% and bone 48%. For New Zealand in 1996 there were: kidneys 100%, liver 86%, heart 45%, lungs 43%, pancreas 25% and bone 60%.

Table 29

Australia and New Zealand

### Trend to Multiple Organ Retrieval 1993 - 1996

No. of Organs	Australia				New Zealand			
	1993	1994	1995	1996	1993	1994	1995	1996
Single	30%	21%	18%	27%	41%	31%	29%	17%
Two	25%	27%	20%	24%	38%	43%	31%	44%
Three	24%	20%	33%	25%	21%	17%	20%	25%
Four	19%	26%	26%	18%	-	9%	20%	14%
Five	2%	6%	3%	6%	-	-	-	-

Table 30 shows the state by state comparison of organ retrieval in 1996.

Table 30

Australia

### State by State Comparison of Multiple Organ Retrieval 1996

No. of Organs	QLD	NSW/ACT	Vic./Tas.	SA/NT	WA	Aust.
1	14%	29%	44%	18%	8%	27%
2	32%	13%	26%	32%	42%	24%
3	43%	28%	14%	18%	17%	25%
4	11%	17%	14%	32%	25%	18%
5	-	13%	2%	-	8%	6%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

NB 2 kidneys = 1 organ 2 lungs = 1 organ

## Organs Transplanted

The rate of transplantation from Australian organs that were retrieved in 1996 is the following: kidneys 94%, liver 104% (including recipients of "split" livers), heart 100%, lungs 91%, pancreas 48%; bones were stored for later use.

In 1996 for New Zealand, the transplantation rate was kidneys 99%, livers 92%, hearts 100%, lungs 90%, pancreas 0%; bones were stored for later use.

Queensland had the highest number of organs transplanted, 3.69 per donor.

Table 31

Australia and New Zealand

### Organs Transplanted per Donor

	QLD	NSW/ACT	Vic./Tas.	SA/NT	WA	Aust.	N.Z.
No. Organs Transplanted	129	239	147	102	44	661	119
No. of Donors	35	69	50	28	12	194	36
Average per Donor	3.69	3.46	2.94	3.64	3.66	3.40	3.30

## Exchange of Organs

Table 32 shows the number of organs that were sent and received from within Australia and New Zealand. A balance is maintained between Australian states with the allocation of kidneys. This is achieved by the Interstate Kidney Exchange protocols in which all Australian states participate.

There is no monitoring of allocation for the other organs.

Table 32

## Australia and New Zealand

Exchange of Organs Between States and New Zealand 1996

	Kidneys	Liver	Heart	Lungs *	Total
<b>Queensland</b>					
Sent	10	4	1	10	25
Received	8	17	6	-	31
<b>New South Wales/ACT</b>					
Sent	27	11	5	8	51
Received	33	20	7	29	89
<b>Victoria</b>					
Sent	23	9	1	-	33
Received	25	15	13	31	84
<b>Tasmania</b>					
Sent	2	1	1	2	6
<b>South Australia</b>					
Sent	16	9	15	24	64
Received	14	3	-	-	17
<b>Northern Territory</b>					
Sent	6	2	1	-	9
<b>Western Australia</b>					
Sent	10	1	3	12	26
Received	15	5	2	-	22
<b>New Zealand</b>					
Sent	1	23	1	4	29
Received	-	-	-	-	-

\* Total number of lungs (not recipients)

Table 33

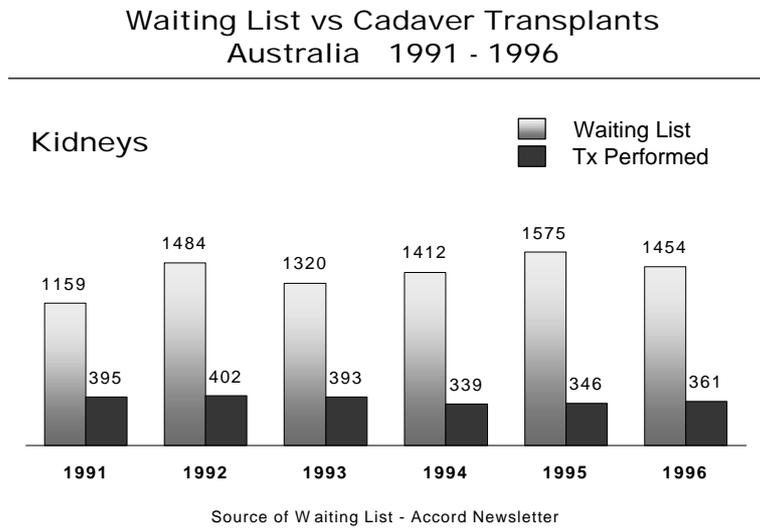
Summary of Organs from New Zealand Donors  
Transplanted in Australia 1989 - 1996

	Liver	Heart	Lungs	Kidneys	Total
1989	1	-	-	-	1
1990	7	-	-	-	7
1991	13	-	-	-	13
1992	24	-	-	2	26
1993	16	-	-	-	16
1994	21	-	2	4	27
1995	21	5	5	-	31
1996	23	1	4	1	29
<b>Total</b>	<b>126</b>	<b>6</b>	<b>11</b>	<b>7</b>	<b>150</b>

## Kidneys

Figure 13 shows the number of Australian patients waiting for a kidney transplant and the number of cadaveric transplants performed for each year from 1991 – 1996.

Figure 13



As at February 13, 1997, the National Kidney Waiting List was 1,467. The breakdown of blood group is: “O”: 807, “A”: 489, “B”: 149 and “AB”: 22. (Data supplied by NSW Blood Transfusion Service).

Figure 14 shows the number of New Zealand patients waiting for a kidney transplant and the number of cadaveric transplants performed for each year from 1993 – 1996.

Figure 14

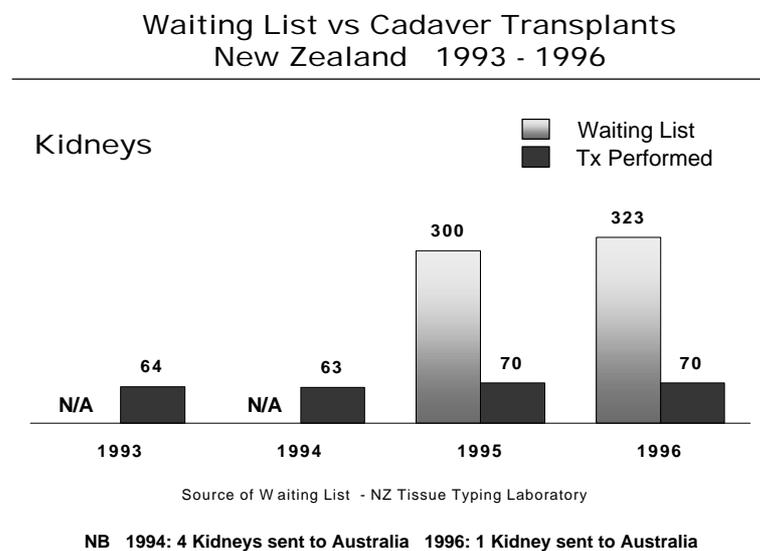


Table 34

Australia and New Zealand

Age of Kidney Donors 1993 – 1996

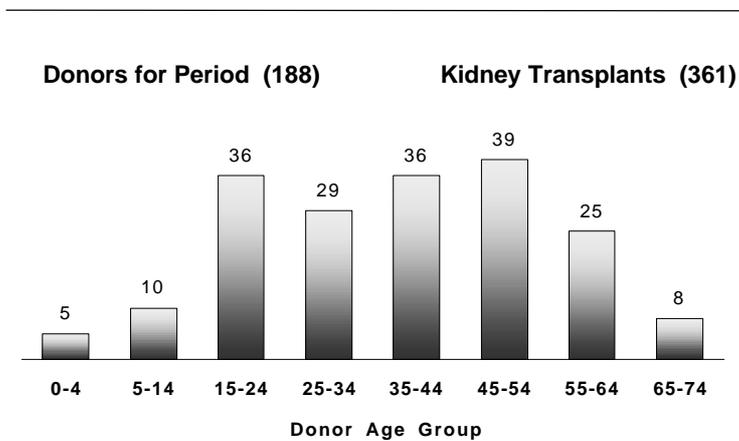
Year	00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	Total
<b>Australia</b>										
1993	3 (1)	17	46	34	33	39	26	7	-	<b>205</b>
1994	5 (3)	10	46	23	27	32	17	10	1	<b>171</b>
1995	4 (2)	9	39	31	33	29	23(1)*	10	-	<b>178</b>
1996	5 (3)	10	36	29	36	39	25	8	-	<b>188</b>
<b>Total</b>	<b>17 (9)</b>	<b>46</b>	<b>167</b>	<b>117</b>	<b>129</b>	<b>139</b>	<b>91 (1)</b>	<b>35</b>	<b>1</b>	<b>742</b>
<b>New Zealand</b>										
1993	1	-	6	3	6	14	2	1	-	<b>33</b>
1994	1 (1)	-	4	8	7	10	4	1	-	<b>35</b>
1995	-	4	9	6	7	5	2	2	-	<b>35</b>
1996	-	2	12	3	3	9	6	1	-	<b>36</b>
<b>Total</b>	<b>2 (1)</b>	<b>6</b>	<b>31</b>	<b>20</b>	<b>23</b>	<b>38</b>	<b>14</b>	<b>5</b>	<b>-</b>	<b>139</b>

( ) "En-Bloc" Kidneys  
 \* Horseshoe Kidney (Adult)

Figures 15 and 16

Age of Kidney Donors

Australia 1996



New Zealand 1996

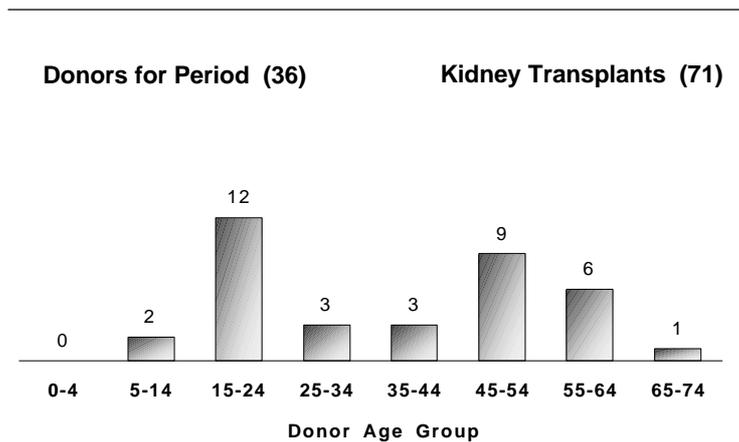


Table 35

Australia

## Reasons Kidneys were Unusable 1993 - 1996

	1993	1994	1995	1996	Total
Renal disease in donor	17	2	5	9	33
Infection in donor	2	2	-	3	7
Cancer in donor	-	2	2	-	4
Anatomical	1	-	-	6	7
Surgical	2	2	5	1	10
Trauma	2	-	-	-	2
No suitable recipient	1	-	-	1	2
Unknown	5	-	-	1	6
<b>Total</b>	<b>30</b>	<b>8</b>	<b>12</b>	<b>21</b>	<b>71</b>

Table 36

Australia and New Zealand

## Donor Age for Unusable Kidneys 1993 - 1996

Year	00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	Total
<b>Australia</b>									
1993	-	1	2	-	1	7	10	9	30
1994	1	-	-	2	-	-	3	2	8
1995	-	-	-	-	4	-	8	-	12
1996	3	-	-	-	1	-	11	6	21
<b>Total</b>	<b>4</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>6</b>	<b>7</b>	<b>32</b>	<b>17</b>	<b>71</b>
<b>New Zealand</b>									
1993	-	-	1	2	1	-	-	-	4
1994	-	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-	-
1996	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>4</b>

## Outcome of Requests for Kidney Donation 1996

Figure 17

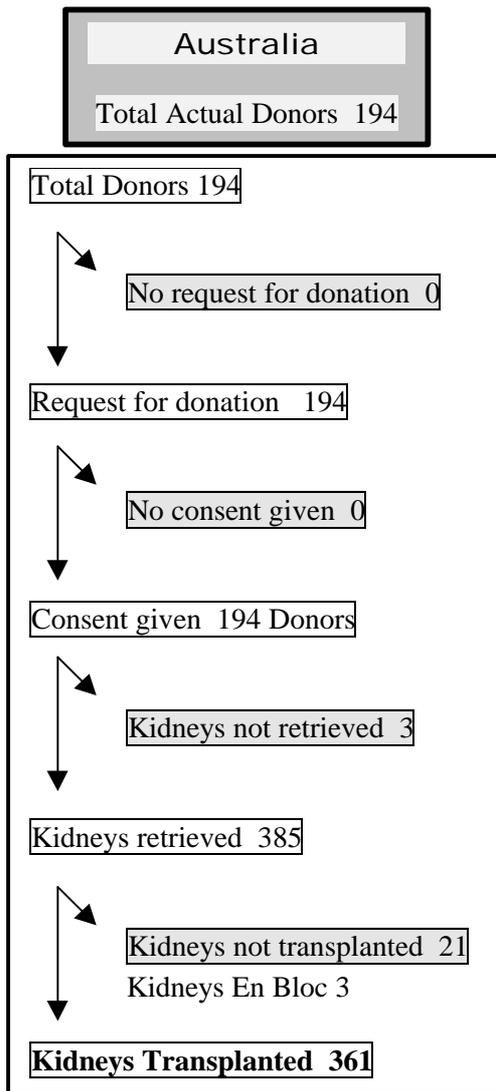
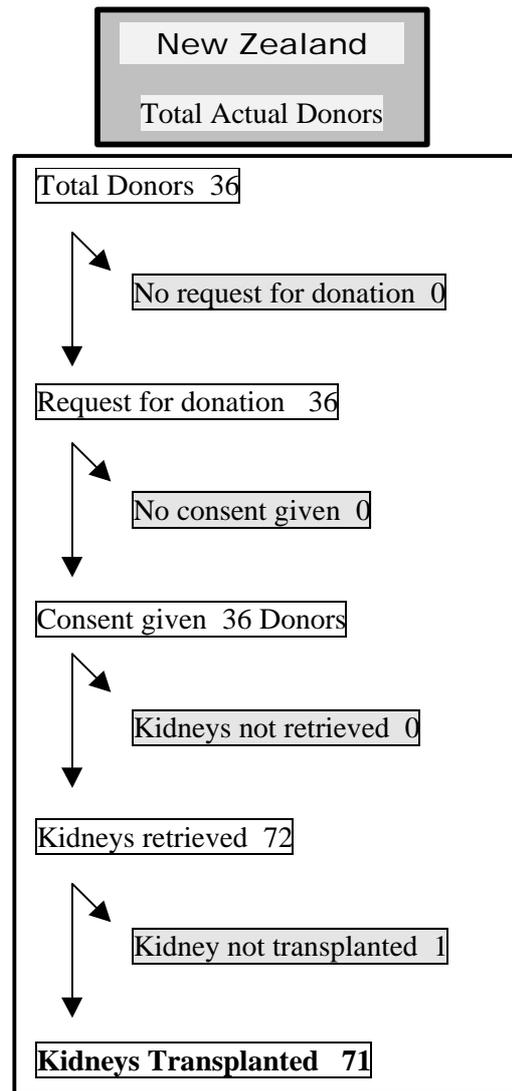


Figure 18



Refer to Appendices for reasons kidneys were not requested, not retrieved and not transplanted.

## Kidney Perfusion Methods

### Australia

In 1996, Ross solution was used predominantly (77%) as the single perfusion solution.

However, University of Wisconsin (UW) was used as the final perfusion solution in 57% of cases when more than one solution was used.

### New Zealand

Collins and Ross solution was predominantly used as the single perfusion solution.

University of Wisconsin (UW) was the final perfusion solution in 72% of kidneys.

Table 37

Australia and New Zealand

#### Kidney Perfusion with Only One Solution 1993 – 1995

	Australia				New Zealand			
	1993	1994	1995	1996	1993	1994	1995	1996
Ross	181	97	84	114	12	6	-	8
U.W.	104	103	22	22	40	24	12	2
Collins	26	16	6	10	-	4	16	8
Hartman	-	-	-	2	-	-	-	-
<b>Total</b>	<b>311</b>	<b>216</b>	<b>112</b>	<b>148</b>	<b>52</b>	<b>34</b>	<b>28</b>	<b>18</b>

Table 38

Australia and New Zealand

#### Final Perfusion Solution - Kidneys 1989 – 1995

	Australia				New Zealand			
	1993	1994	1995	1996	1993	1994	1995	1996
Ross	223	125	130	130	14	10	2	12
U.W.	154	165	203	219	54	52	52	52
Collins	45	54	26	34	-	6	16	8
Hartman	-	-	-	2	-	-	-	-
<b>Total</b>	<b>422</b>	<b>344</b>	<b>359</b>	<b>385</b>	<b>68</b>	<b>68</b>	<b>70</b>	<b>72</b>

## Donor Kidney Function

**Terminal Levels of Serum Creatinine and Urea**

In 1996 in Australia, 85% of donors had a serum creatinine of <125 µmol/L and 86% had a serum urea of <9 mmol/L.

New Zealand had 94% of donors with a serum creatinine of <125 µmol/L and 94% with serum urea of <9 mmol/L.

Table 39

## Australia and New Zealand

## Terminal Serum Creatinine Levels 1993 – 1996

Creatinine Level	Australia				New Zealand			
	1993	1994	1995	1996	1993	1994	1995	1996
00-99	61%	72%	56%	63%	76%	78%	56%	85%
100-124	21%	17%	26%	22%	6%	11%	35%	9%
125-149	9%	4%	12%	7%	15%	4.5%	9%	3%
150-174	4%	3%	5%	5%	3%	2%	-	-
175-199	3%	2%	-	1%	-	-	-	3%
200-224	-	1%	1%	1%	-	-	-	-
225-249	<1%	1%	-	<1%	-	4.5%	-	-
> 250	1%	-	<1%	-	-	-	-	-
<b>Total</b>	<b>100%</b>							

TABLE 40

## Australia and New Zealand

## Terminal Serum Urea Levels 1993 – 1996

Urea Level	Australia				New Zealand			
	1993	1994	1995	1996	1993	1994	1995	1996
00-04	45%	50%	35%	48%	35%	43%	46%	47%
05-08	42%	40%	55%	38%	50%	48%	44%	47%
09-12	11%	10%	9%	10%	7.5%	3%	5%	3%
13-16	1%	<1%	-	2%	7.5%	6%	5%	3%
> 16	1%	-	1%	2%	-	-	-	-
<b>Total</b>	<b>100%</b>							

### Effect of Creatinine Level on Kidney Graft Survival

The kidney graft survival over five years was not significantly different ( $p=0.7354$ ) when donors with a terminal serum creatinine of  $<120 \mu\text{mol/L}$  were compared to those with higher levels. This does not mean creatinine is not important, rather it suggests the choice of donors with an abnormal creatinine has been appropriate (e.g. raised creatinine as a result of dehydration).

Table 41

Australia

Creatinine Levels in Kidney Donors  
Primary Cadaver Graft Survival 1989 - 1996

Creatinine	1 Year	2 Years	3 Years	4 Years	5 Years
Less than $120 \mu\text{mol/L}$ (n=1922)	$86 \pm 1$	$82 \pm 1$	$79 \pm 1$	$76 \pm 1$	$73 \pm 1$
Greater than or equal to $120 \mu\text{mol/L}$ (n=569)	$85 \pm 2$	$83 \pm 2$	$80 \pm 2$	$77 \pm 2$	$73 \pm 2$

% survival  $\pm$  S.E.

### Effect of Oliguria on Kidney Graft Survival

There was a minor reduction in the graft survival at one year following terminal donor oliguria (84% oliguric donors, 86% donors without oliguria) (Log rank  $p=0.0838$ ). In the terminal twelve hours oliguria was defined as urine output  $<20 \text{ ml/hr}$ .

Table 42

Australia

Oliguria in Kidney Donors  
Primary Cadaver Graft Survival 1989 - 1996

	1 Year	2 Years	3 Years	4 Years	5 Years
No oliguria (n=2309)	$86 \pm 1$	$83 \pm 1$	$79 \pm 1$	$76 \pm 1$	$74 \pm 1$
Oliguria (n=276)	$84 \pm 2$	$80 \pm 3$	$74 \pm 3$	$70 \pm 3$	$64 \pm 4$

% survival  $\pm$  S.E.

## Effect of Hypotension on Kidney Graft Survival

There was no significant difference (Log rank  $p=0.7837$ ) in kidney graft survival over five years between those donors with or without hypotension (defined as systolic blood pressure  $<70$  mmHg).

Table 43

Australia

### Hypotension in Kidney Donors Primary Cadaver Graft Survival 1989 – 1996

	1 Year	2 Years	3 Years	4 Years	5 Years
No Hypotension (n=1860)	86 ± 1	82 ± 1	79 ± 1	76 ± 1	72 ± 1
Hypotension (n= 729)	85 ± 1	82 ± 2	79 ± 2	76 ± 2	73 ± 2

% survival ± S.E.

## Combined Effect of Hypotension and Oliguria on Kidney Graft Survival

In donors without hypotension the presence of oliguria was associated with a statistically significant difference in graft survival (Log rank  $p=0.0159$ ). Five year graft survival was 55% with oliguria and 74% without oliguria. In the presence of hypotension there was no significant difference (Log rank  $p=0.9728$ ) in the presence or absence of oliguria.

Table 44

Australia

### Hypotension and Oliguria in Kidney Donors Primary Cadaver Graft Survival 1989 – 1996

	1 Year	2 Years	3 Years	4 Years	5 Years
<b>No Hypotension</b> (Wilcoxon $p=0.0995$ ) (Log rank 0.0159)					
Oliguria present (n=132)	86 ± 3	81 ± 4	69 ± 5	64 ± 5	55 ± 6
Oliguria absent (n=1725)	86 ± 1	83 ± 1	79 ± 1	76 ± 1	74 ± 1
<b>Hypotension Present</b> (Wilcoxon $p=0.5223$ ) (Log rank 0.9728)					
Oliguria present (n=144)	82 ± 3	79 ± 4	77 ± 4	74 ± 4	71 ± 4
Oliguria absent (n= 582)	86 ± 2	83 ± 2	79 ± 2	76 ± 2	74 ± 2

% survival ± S.E.

## Liver

There were 142 liver transplants performed in 1996 from 135 donors. Eight transplants were performed using the “split” liver techniques (seven split livers at the Princess Alexandra Hospital, Brisbane, and one at the National Liver Transplant Unit, Sydney). This includes 23 livers sent to Australia from New Zealand.

Figure 19

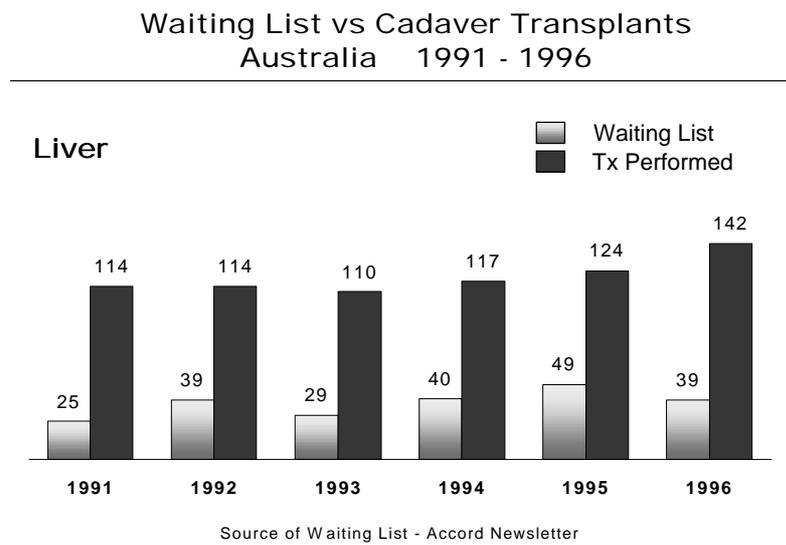


Table 45

### Australia and New Zealand

**Regional Outcome of Requests for Liver Donation 1989 - 1996**

Potential Donors	QLD	NSW/ACT	Vic/Tas.	SA/NT	WA	Aust.	N.Z.**
<b>Total</b>	<b>338</b>	<b>596</b>	<b>389</b>	<b>188</b>	<b>129</b>	<b>1641</b>	<b>140</b>
Requested	331	520	338	153	99	1441	101
Consented	324	502	319	144	92	1381	100
Retrieved	233	316	200	89	55	893	81
Transplanted	* 236	309	175	83	51	929	81

\* Refers to number of recipients – use of split livers

\*\* New Zealand 1993 – 1996

Table 46

Australia and New Zealand

Age of Liver Donors 1993 – 1996

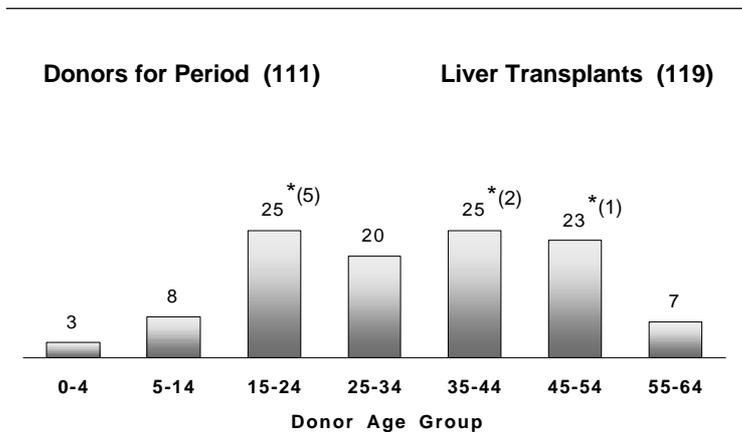
Year	00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	Total
<b>Australia</b>									
1993	5	12	29	19	16	18	11	-	<b>110</b>
1994	3	9	40++	17	20	18	8	-	<b>115</b>
1995	4	8	32++	21+	22+	21	11	1	<b>120</b>
1996	3	8	25	20	25	23	7	-	<b>111</b>
<b>Total</b>	<b>15</b>	<b>37</b>	<b>126</b>	<b>77</b>	<b>83</b>	<b>80</b>	<b>37</b>	<b>1</b>	<b>456</b>
<b>New Zealand</b>									
1993	1	-	3	2	2	8	-	-	<b>16</b>
1994	1	-	4	5	6	5	-	-	<b>21</b>
1995	-	2	7	2	5	4	1	-	<b>21</b>
1996	-	1	10	1	1	6	4	-	<b>23</b>
<b>Total</b>	<b>2</b>	<b>3</b>	<b>24</b>	<b>10</b>	<b>14</b>	<b>23</b>	<b>5</b>	<b>-</b>	<b>81</b>

+ One liver transplanted into two recipients

Figures 20 and 21

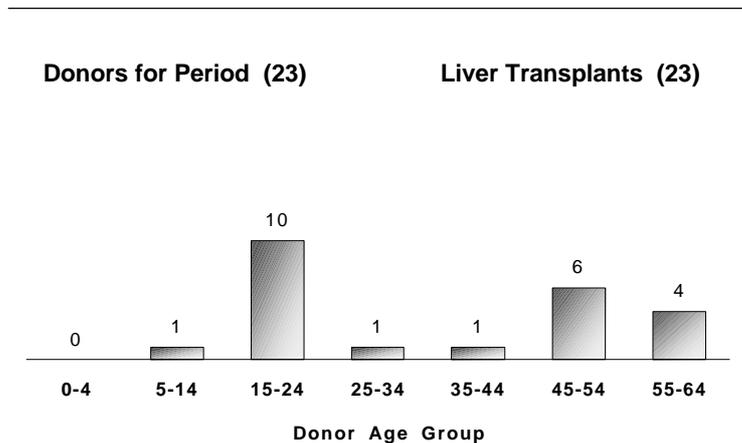
Age of Liver Donors

Australia 1996



\* Number of livers transplanted into two recipients

New Zealand 1996



## Outcome of Request for Liver Donation 1996

Figure 22

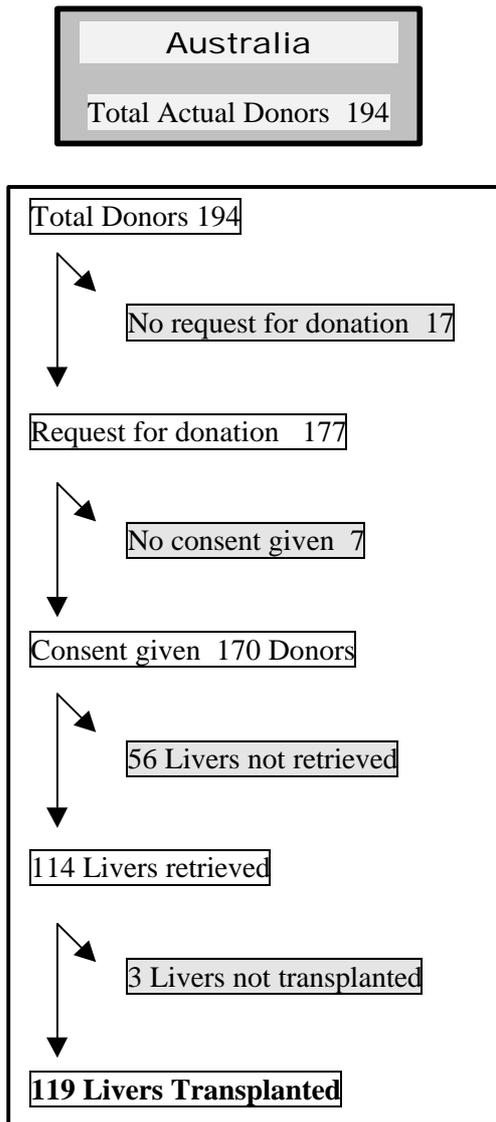
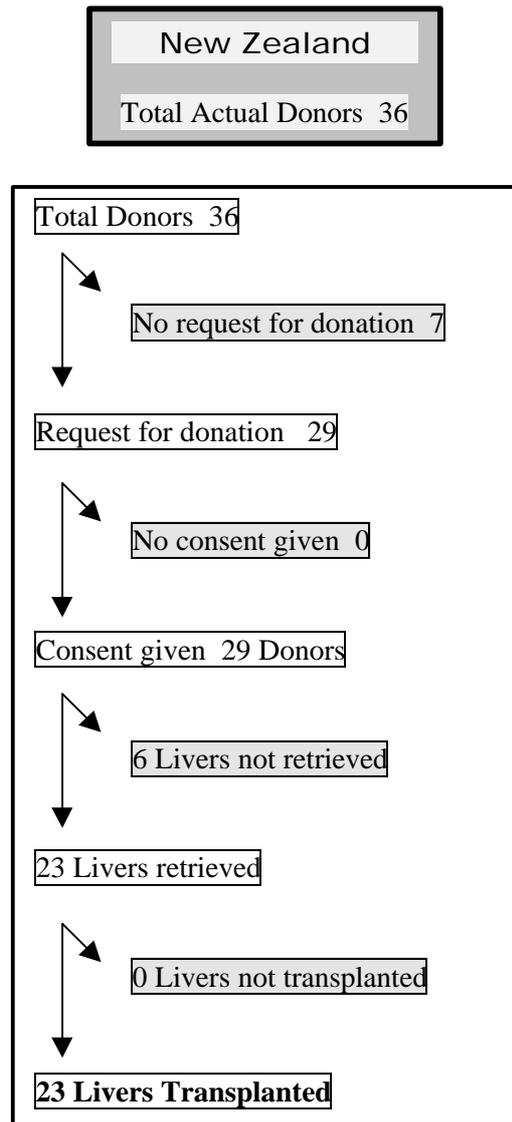


Figure 23



Refer to Appendices for reasons  
livers were not requested, not  
retrieved and not transplanted.

## Perfusion of Livers

### Australia

All livers retrieved in 1996 had a final perfusion with University of Wisconsin solution (UW).

Ross (50%) and Hartmans (32%) were used as an initial preservation solution, followed by UW.

### New Zealand

Of the 23 livers retrieved in 1996, 22 had final perfusion with UW and one with Ross solution.

## Donor Liver Function

The results of the serum tests for liver function for 113 Australian and 23 New Zealand donors in 1996 is shown below. Sixty per cent of Australian and 17% of New Zealand donors had all five tests performed. Table 47 shows the number of donors whose liver function was above the normal range.

Table 47

Australia and New Zealand

### Number of Donors with Liver Function Tests above Normal Range

	Australia	New Zealand
Alkaline Transaminase ALT >45 $\mu$ /L	22 (max. recorded 390)	7 (max. recorded 208)
Gamma Glutamyl Transferase GGT >60 $\mu$ /L	16 (max. recorded 677)	-
Total Bilirubin >20 $\mu$ mol/L	23 (max. recorded 70)	2 (max. recorded 29)
Alkaline Phosphatase >120 $\mu$ /L	7 (max. recorded 192)	-
Aspartate Transaminase AST >45 $\mu$ /L	30 (max. recorded 276)	5 (max. recorded 897)

# Heart

There were 87 hearts, seven heart/lung bloc, 37 double lung and 28 single lung transplants performed in Australia in 1996. In New Zealand there were 13 heart, seven double and four single lung transplants performed in 1996. One heart, one double and two single lungs were transplanted in Australia.

Figures 24, 25, 26 and 27

## Waiting List vs Cadaver Transplants Related to Country of Donation

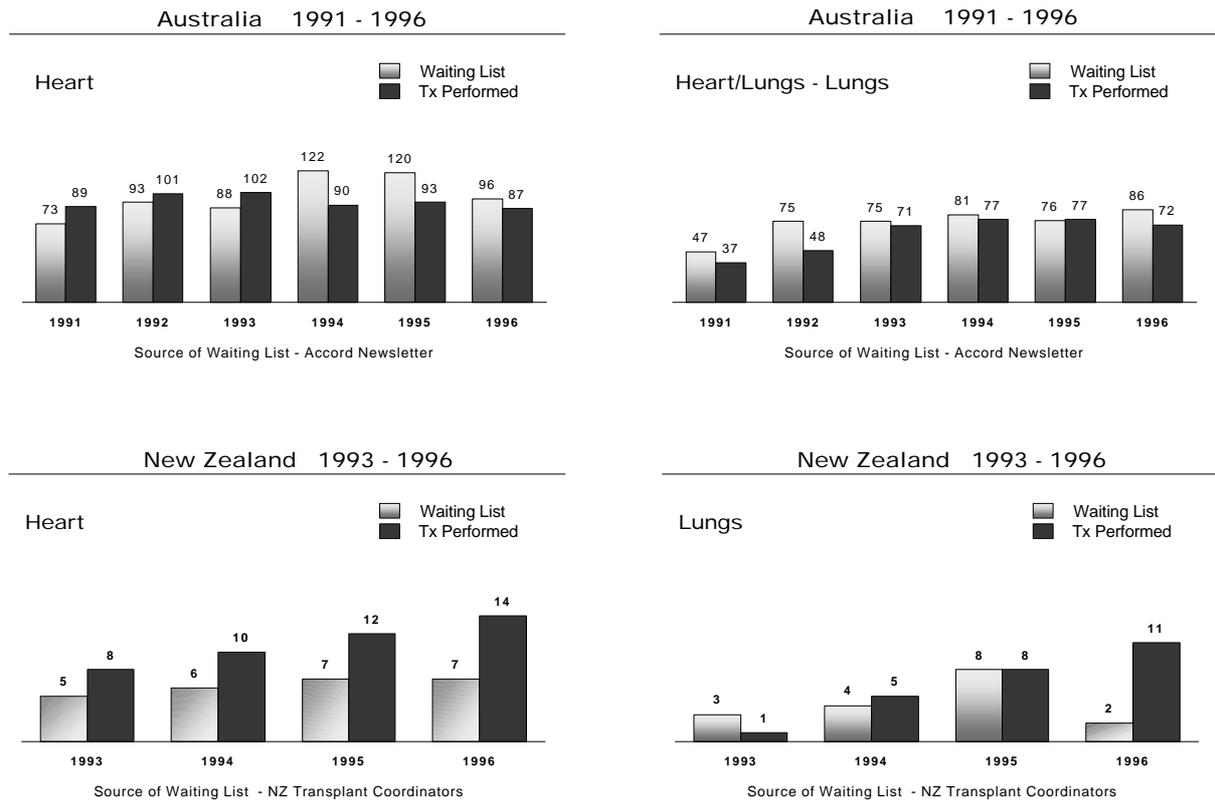


Table 48

## Australia and New Zealand

### Heart and Lung Transplants 1993 - 1996 Related to Number of Recipients

	1993	1994	1995	1996	Total
<b>Australia</b>					
Heart	102	90	93	87	<b>372</b>
Heart/lung	13	13	15	7	<b>48</b>
Double lung	34	43	36	37	<b>150</b>
Single left lung	13	11	12	12	<b>48</b>
Single right lung	11	10	14	16	<b>51</b>
<b>Total</b>	<b>173</b>	<b>167</b>	<b>170</b>	<b>159</b>	<b>669</b>
<b>New Zealand</b>					
Heart	8	10	12	14	<b>44</b>
Double lung	-	1	6	7	<b>14</b>
Single lung	1	4	2	4	<b>11</b>
<b>Total</b>	<b>9</b>	<b>15</b>	<b>20</b>	<b>25</b>	<b>69</b>

Table 49

Australia and New Zealand

Age of Heart Donors 1993 - 1996

Year	00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	Total
<b>Australia</b>									
1993	-	7	33	25	21	20	9	-	115
1994	1	4	37	14	16	22	8	1	103
1995	2	7	29	20	22	20	8	-	108
1996	1	3	22	21	22	24	1	-	94
<b>Total</b>	<b>4</b>	<b>21</b>	<b>121</b>	<b>80</b>	<b>81</b>	<b>86</b>	<b>26</b>	<b>1</b>	<b>420</b>
<b>New Zealand</b>									
1993	-	-	2	1	2	3	-	-	8
1994	-	-	1	5	2	2	-	-	10
1995	-	1	4	1	6	-	-	-	12
1996	-	-	6	1	2	5	-	-	14
<b>Total</b>	<b>-</b>	<b>1</b>	<b>13</b>	<b>8</b>	<b>12</b>	<b>10</b>	<b>-</b>	<b>-</b>	<b>44</b>

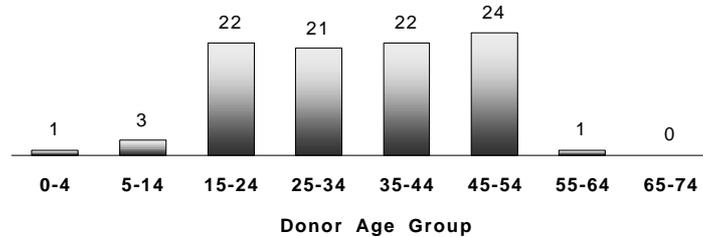
Figures 28 and 29

Age of Heart Donors

Australia 1996

Donors for Period (94)

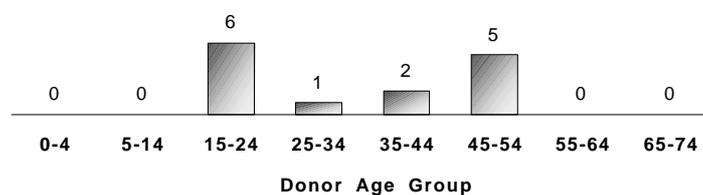
Heart Transplants (94)



New Zealand 1996

Donors for Period (14)

Heart Transplants (14)



## Outcome of Request for Heart Donation 1996

Figure 30

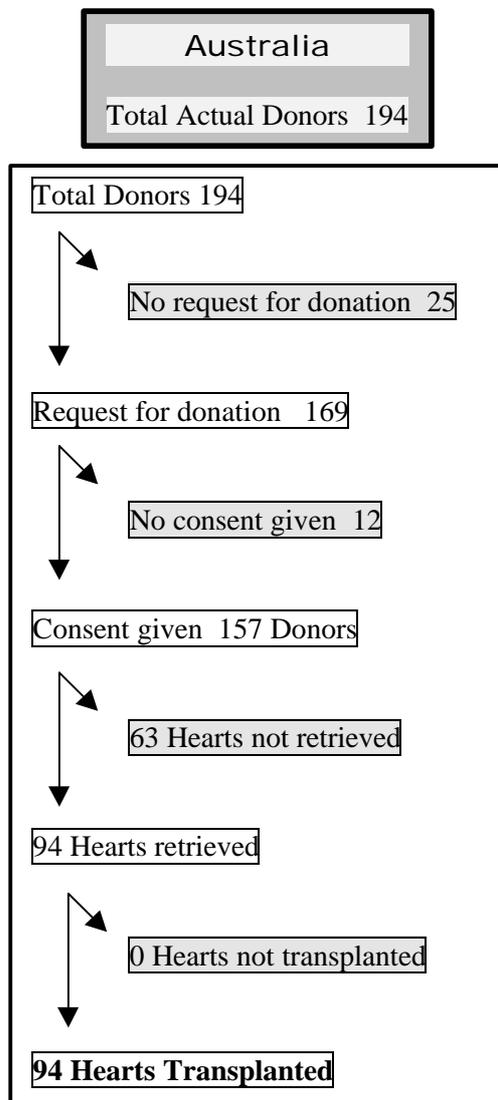
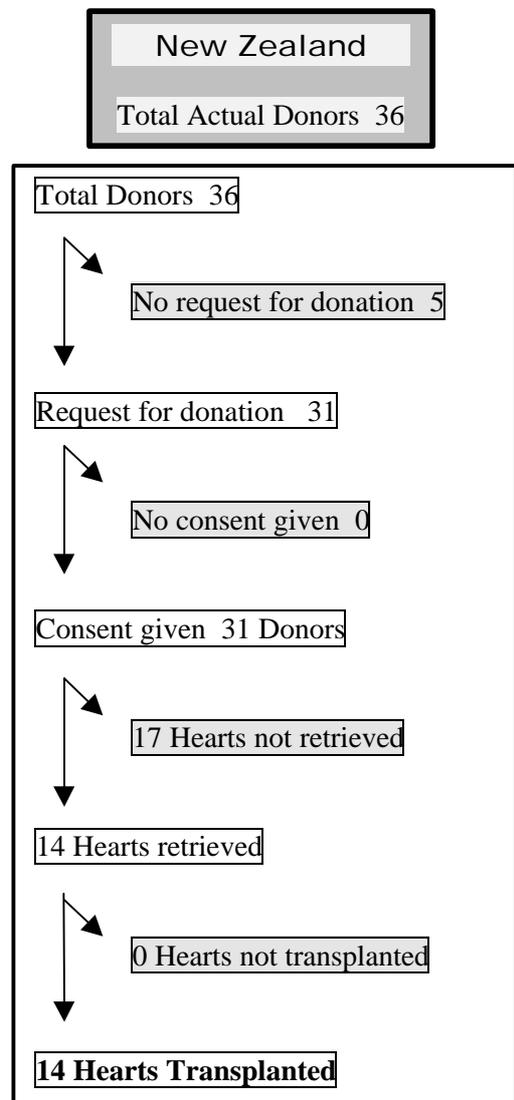


Figure 31



Refer to Appendices for reasons hearts were not requested, not retrieved and not transplanted.

Table 50

Australia and New Zealand

### Regional Outcome of Requests for Heart Donation 1989 - 1996

Potential donors	QLD	NSW/ACT	Vic./Tas.	SA/NT	WA	Aust.	N.Z. *
<b>Total</b>	<b>338</b>	<b>597</b>	<b>389</b>	<b>188</b>	<b>129</b>	<b>1641</b>	<b>140</b>
Requested	323	505	336	149	89	1402	109
Consented	304	475	310	144	76	1309	104
Retrieved	186	330	207	92	38	853	44
Transplanted	185	329	204	91	38	843	44

\* New Zealand 1993 - 1996

# Lungs

Table 51

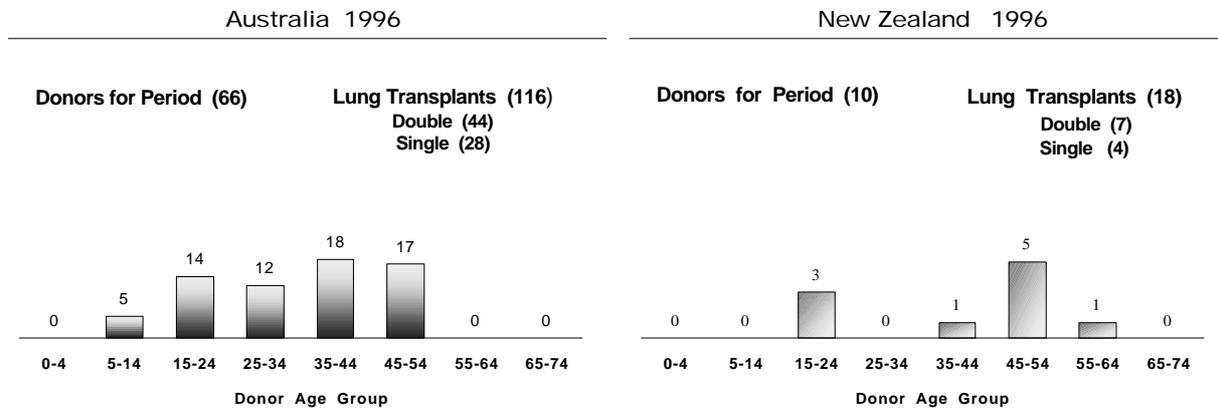
Australia and New Zealand

Age of Lung Donors 1993 – 1996

Year	00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	Total
<b>Australia</b>									
1993	-	3	24	14	11	8	3	-	63
1994	-	2	23	12	17	12	3	-	69
1995	-	3	16	20	13	11	4	-	67
1996	-	5	14	12	18	17	-	-	66
<b>Total</b>	-	<b>13</b>	<b>77</b>	<b>58</b>	<b>59</b>	<b>48</b>	<b>10</b>	-	<b>265</b>
<b>New Zealand</b>									
1993	-	-	-	-	-	1	-	-	1
1994	-	-	1	2	1	-	-	-	4
1995	-	-	4	-	3	1	-	-	8
1996	-	-	3	-	1	5	1	-	10
<b>Total</b>	-	-	<b>8</b>	<b>2</b>	<b>5</b>	<b>7</b>	<b>1</b>	-	<b>23</b>

Figures 32 and 33

## Age of Lung Donors



## Donor Lung Function

The arterial blood gas results from 67 Australian lung donors in 1996 shows 30% (20) to be acidotic (pH<7.36) and 31% (21) to be alkalotic (pH>7.44).

Oxygenation measured as PaO<sub>2</sub> ranged from 290-649 mmHg, medial 448 mmHg. Presumably FiO<sub>2</sub> was 100% and PEEP was 5 cm.

PaCO<sub>2</sub> ranged from 23.9 – 57.6 mmHg, median 37.1 mmHg. Plasma bicarbonate range was 18.6 – 40.3 mmol/L, median 23.0 mmol/L.

## Outcome of Request for Lung Donation 1996

Figure 34

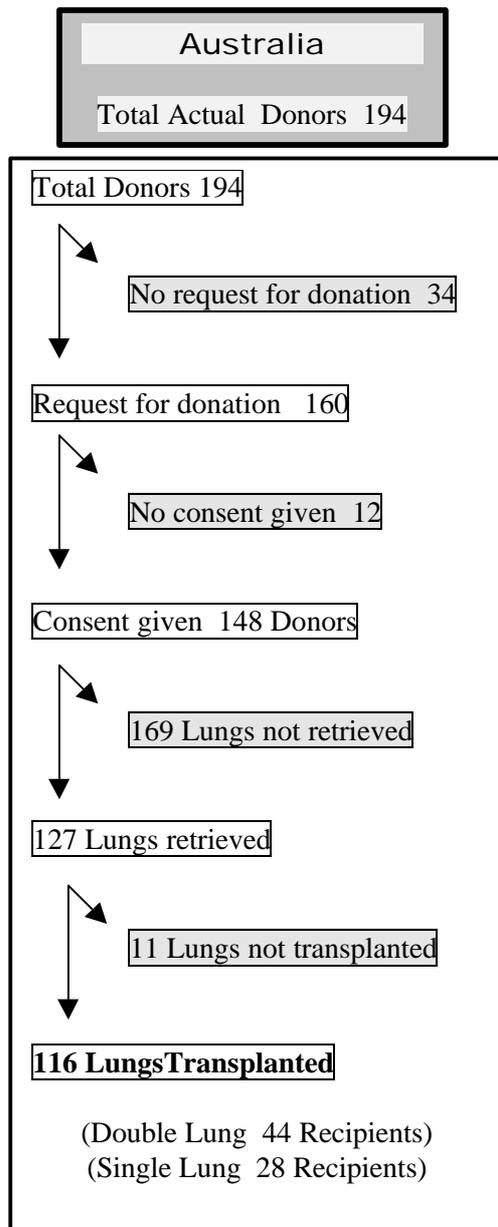
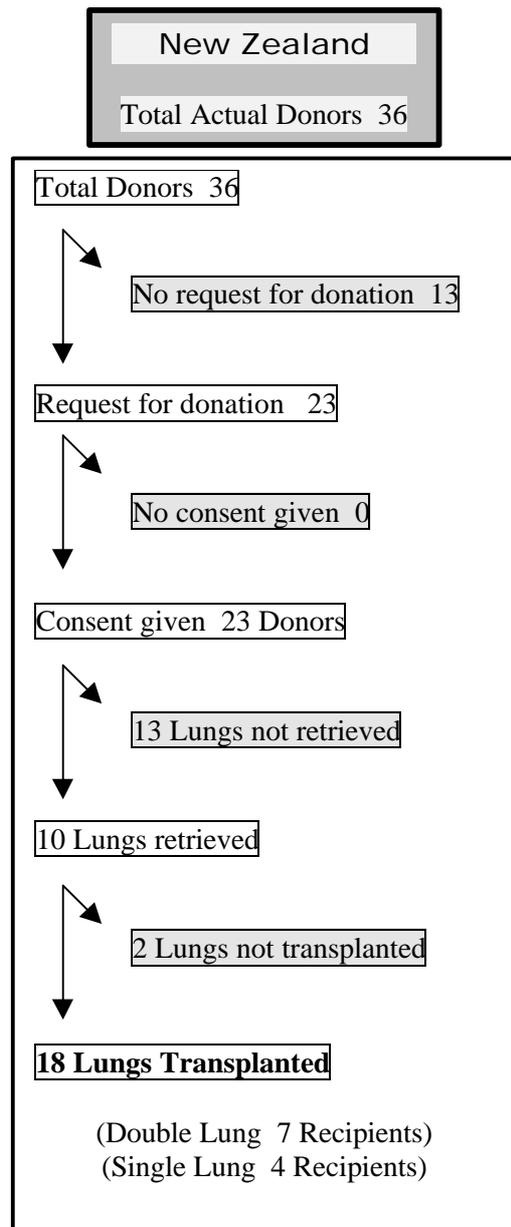


Figure 35



Refer to Appendices for reasons lungs were not requested, not retrieved and not transplanted.

Table 52

Australia and New Zealand  
Regional Outcome of Requests for Lung Donation 1989 - 1996

Potential Donors	QLD	NSW/ACT	Vic./Tas.	SA/NT	WA	Aust.	N.Z. **
<b>Total</b>	<b>338</b>	<b>597</b>	<b>389</b>	<b>188</b>	<b>129</b>	<b>1641</b>	<b>140</b>
Requested	294	469	281	115	64	1223	61
Consented	267	433	256	108	57	1121	58
Retrieved	58	156	89	50	24	377	25
Transplanted *	68	174	92	55	24	413	25

\* Relates to the number of recipients (not the number of organs)  
 \*\* New Zealand 1993 - 1996

# Pancreas

There were 11 combined kidney/pancreas transplants performed at Westmead Hospital (NSW) and one at Monash Medical Centre, Victoria.

There is no pancreas transplant program in New Zealand.

Figure 36

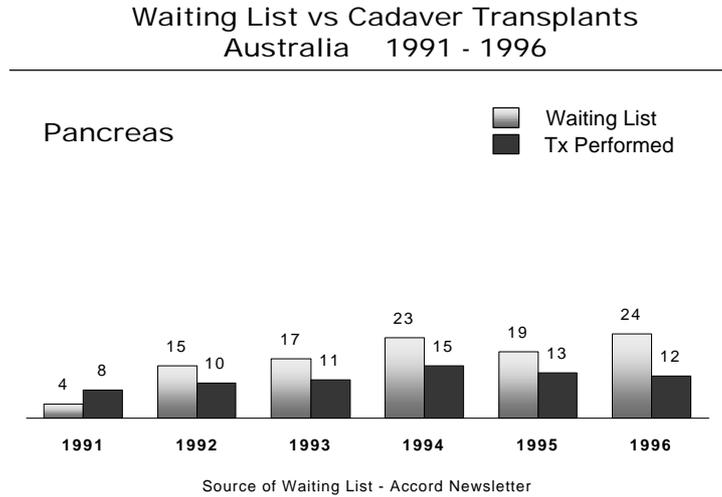


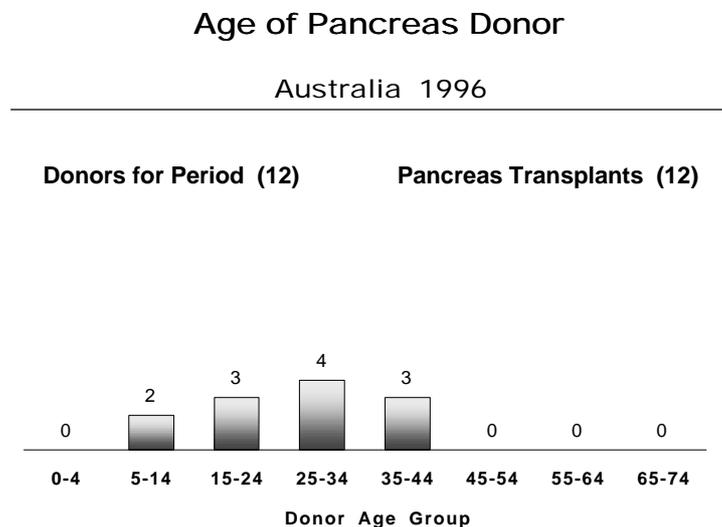
Table 53

Australia

**Donor Age for Transplanted Pancreas 1993 - 1996**

Year	00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	Total
1993	-	1	5	3	2	-	-	-	11
1994	-	1	8	2	1	3	-	-	15
1995	-	1	9	3	-	-	-	-	13
1996	-	2	3	4	3	-	-	-	12
<b>TOTAL</b>	-	<b>5</b>	<b>25</b>	<b>12</b>	<b>6</b>	<b>3</b>	-	-	<b>51</b>

Figure 37



## Outcome of Request for Pancreas Donation 1996

Figure 38

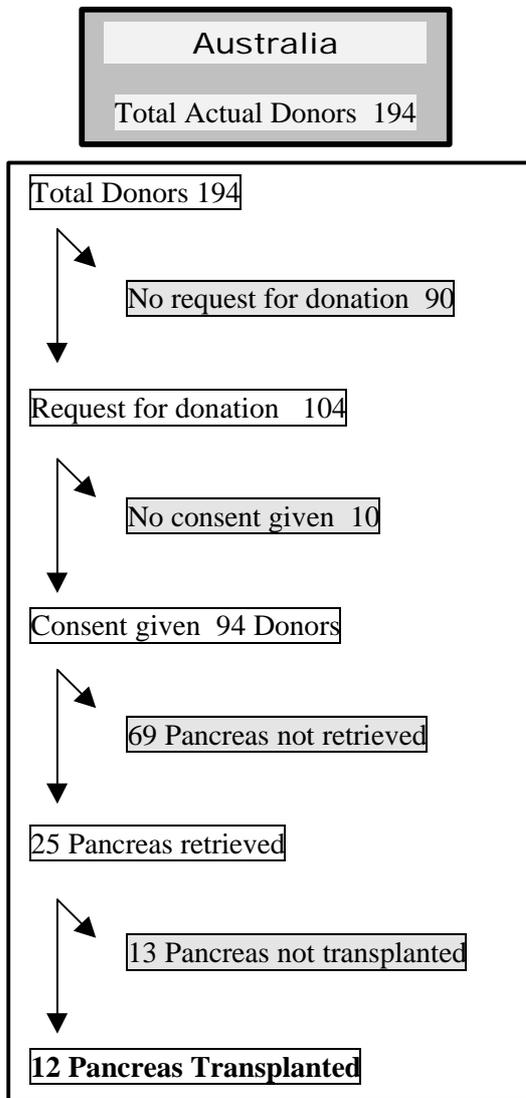
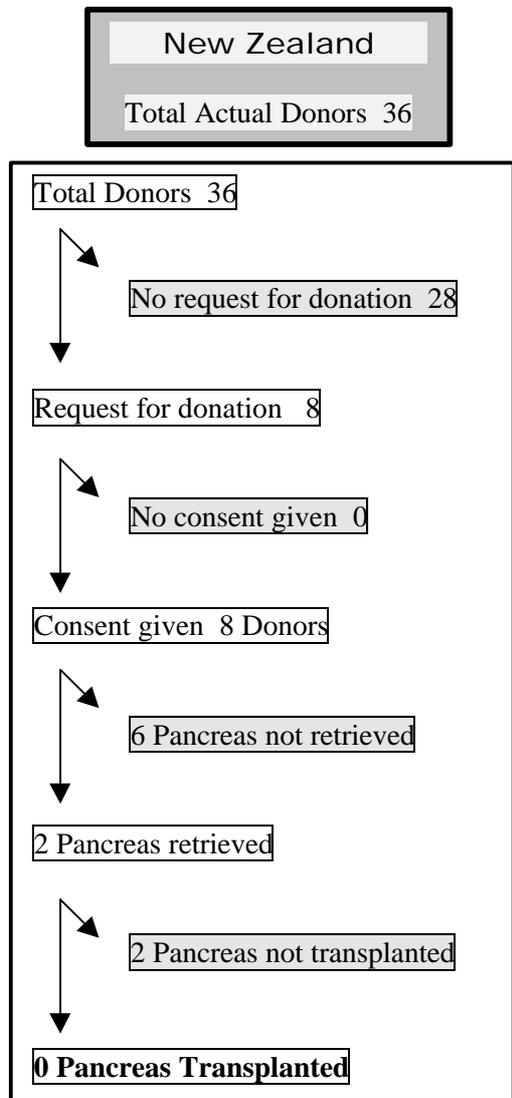


Figure 39



Refer to Appendices for reasons pancreas were not requested, not retrieved and not transplanted.

## Corneas

This section refers only to corneas donated from solid organ donors. It does not include any cases of corneal only donation. Full data is available from The Australian Corneal Graft Registry (Editors K.A. Williams, S.M. Muehlberg, R.F. Lewis and D.J. Coster. Flinders Medical Centre, Bedford Park 5042, South Australia.

### Outcome of Request for Cornea Donation 1996

Figure 40

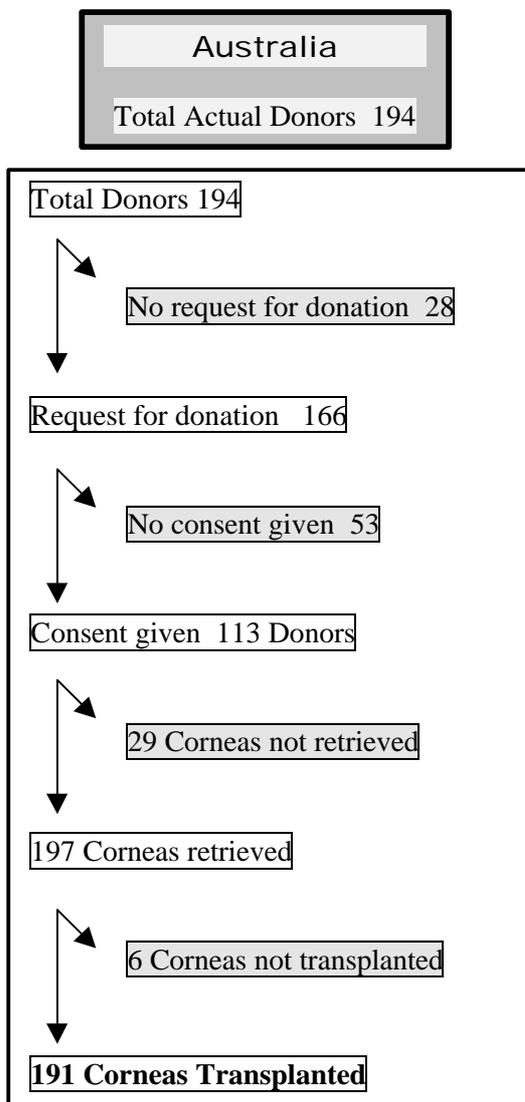
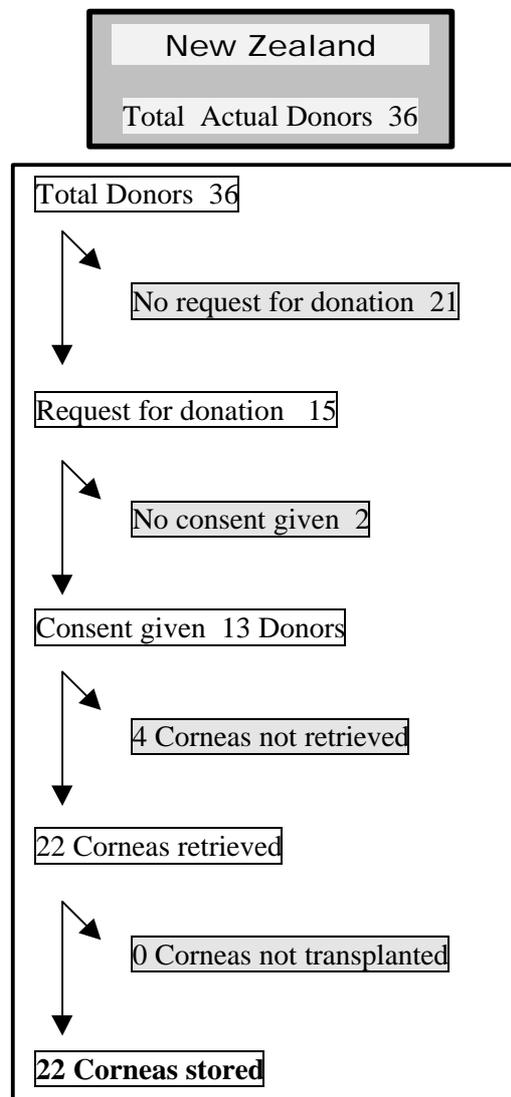


Figure 41



Refer to Appendices for reasons corneas were not requested, not retrieved and not transplanted.

## Bone

There were 15 bone donations from the solid organs in Australia and six from New Zealand in 1996.

### Outcome of Request for Bone Donation 1996

Figure 42

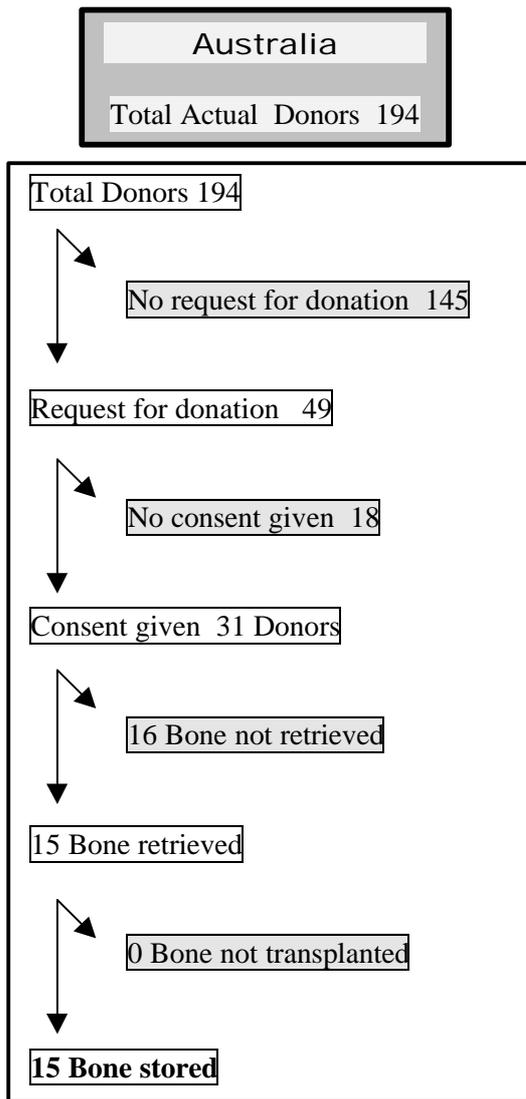
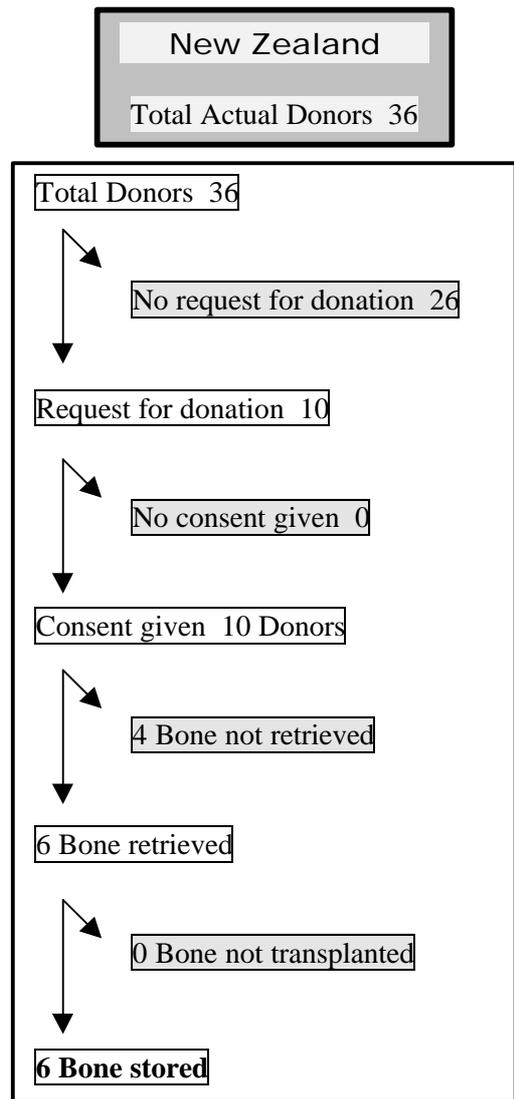


Figure 43



Refer to Appendices for reasons bones were not requested, not retrieved and not transplanted.

## Terminal Management

### Time from Admission to Brain Death

#### Australia

There has consistently been (in the last three years) between 37-38% of all donors certified brain dead within 24 hours of admission. Ten per cent of donors were in hospital for more than five days.

#### New Zealand

Similarly, 38% of donors were certified brain dead within 24 hours of admission. This is an increase over previous years. Twelve per cent were in hospital for more than five days.

Table 54

Australia and New Zealand

### Time from Admission to Brain Death

	Hours								Unknown	Median (hours)	No. of Donors
	0-23	24-47	48-71	72-95	96-119	120-143	144-167	>168			
<b>Australia</b>											
1990	33%	22%	8%	5%	2%	2%	2%	6%	20%	29	203
1991	36%	24%	11%	7%	3%	1%	2%	3%	13%	31	209
1992	37%	23%	10%	4%	2%	-	1%	6%	17%	26	216
1993	32%	23%	8%	10%	2%	3%	<1%	3%	19%	28	221
1994	37%	24%	11%	7%	3%	4%	4%	7%	3%	33	183
1995	37%	27%	12%	3%	5%	3%	2%	7%	4%	30	184
1996	38%	30%	8%	8%	4%	-	3%	7%	2%	32	194
<b>New Zealand</b>											
1993	32%	29%	12%	6%	-	3%	3%	6%	9%	30	34
1994	17%	31%	6%	6%	-	3%	-	9%	28%	35	35
1995	31%	14%	11%	9%	6%	6%	-	11%	12%	46	35
1996	38%	14%	8%	11%	6%	8%	3%	9%	3%	37	36

Table 55

Australia and New Zealand

### Time from Ventilation to Brain Death

	Hours								Unknown	No. of Donors
	0-23	24-47	48-71	72-95	96-119	120-143	144-167			
<b>Australia</b>										
1993	35%	22%	8%	7%	2%	2%	2%	23%	221	
1994	35%	27%	12%	8%	2%	3%	7%	6%	183	
1995	39%	27%	13%	3%	4%	3%	8%	3%	184	
1996	41%	28%	10%	7%	3%	<1%	8%	2%	194	
<b>New Zealand</b>										
1993	35%	29%	9%	6%	-	6%	3%	12%	34	
1994	34%	34%	6%	6%	-	3%	9%	8%	35	
1995	36%	6%	17%	9%	3%	6%	9%	14%	35	
1996	50%	17%	8%	6%	3%	11%	3%	3%	36	

The majority of donors had been ventilated for less than 48 hours.

## Time from Brain Death to Aortic Cross Clamp

### Australia

Seventy three per cent of donors had organs retrieved within 12 hours of the certification of brain death. This is consistent with previous years.

### New Zealand

Eighty per cent of donor organs were retrieved within 12 hours. The median 8.6 hours is less than the previous two years of 9.6 and 9.1 years.

Table 56

Australia

Time from Brain Death to Aortic Cross Clamp 1996

Hours	QLD		NSW/ACT		Vic.		Tas.		SA		NT		WA	
< = 6	4	12%	6	9%	13	27%	-	-	5	20%	-	-	-	-
7-12	24	70%	45	66%	19	39%	-	-	15	60%	2	67%	6	50%
13-18	5	15%	15	22%	15	30%	1	100%	5	20%	1	33%	5	42%
19-24	-	-	2	3%	-	-	-	-	-	-	-	-	1	8%
> 24	1	3%	-	-	2	4%	-	-	-	-	-	-	-	-
Median hours	10		11		10		14		9		12		12	
<b>No. Donors</b>	<b>34</b>	<b>100%</b>	<b>68</b>	<b>100%</b>	<b>49</b>	<b>100%</b>	<b>1</b>	<b>100%</b>	<b>25</b>	<b>100%</b>	<b>3</b>	<b>100%</b>	<b>12</b>	<b>100%</b>

Table 57

Australia and New Zealand

Time from Brain Death to Aortic Cross Clamp 1993 - 1996

Hours	Australia				New Zealand			
	1993	1994	1995	1996	1993	1994	1995	1996
< = 6	18%	11%	10%	15%	38%	31%	31%	20%
7-12	60%	61%	61%	58%	56%	51%	51%	60%
13-18	16%	26%	23%	25%	6%	17%	6%	17%
19-24	3%	1%	4%	1%	-	-	6%	-
> 24	3%	1%	-	1%	-	-	-	3%
Unknown	-	-	2% *	-	-	-	-	-
Median Hours	10.4	11	10.5	10.8	7.9	9.6	9.1	8.6
<b>No. of Donors</b>	<b>221</b>	<b>183</b>	<b>184</b>	<b>192</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>35</b>

\* Non heart beating donors

## Drugs for Maintenance of the Donor

### Australia

In 1996 there were 29 (15%) donors who did not require inotropic support.

There has been a decrease in the use of Dopamine, and an increase in the use of Adrenaline and Noradrenalin compared to 1994 and 1995.

Antidiuretic agents (Desmopressin/Vasopressin) were prescribed to 117 (64%) of all donors.

### New Zealand

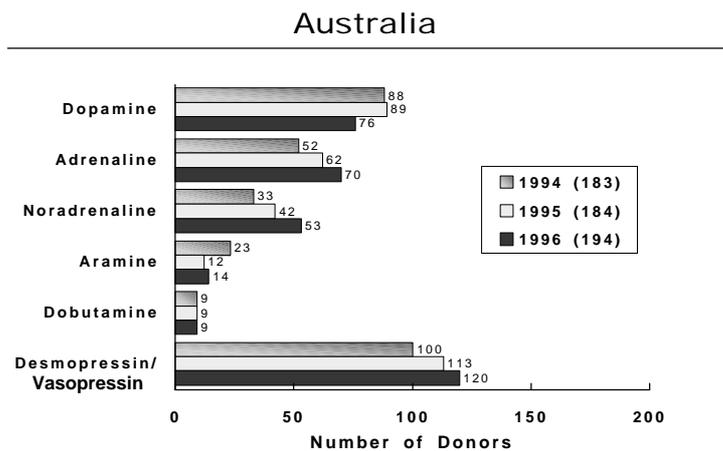
There were four (11%) donors who did not require inotropic support.

There has been an increase in the use of Noradrenaline and decrease in use of Adrenaline and Dopamine compared to 1995.

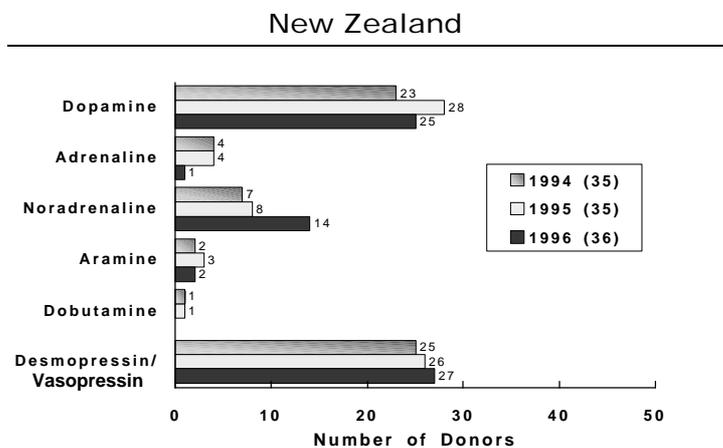
There were nine (25%) donors who received antidiuretic agents (Desmopressin/Vasopressin).

Figures 44 and 45

Donor Maintenance 1994 - 1996



NB: Donors may be given more than one drug



NB: Donors may be given more than one drug

# Terminal Treatment

## Australia

There were eight donors who received no Heparin. There has been an increase in the use of Heparin and Methyl Prednisolone and a decrease in use of Chlorpromazine when compared to 1994/95.

## New Zealand

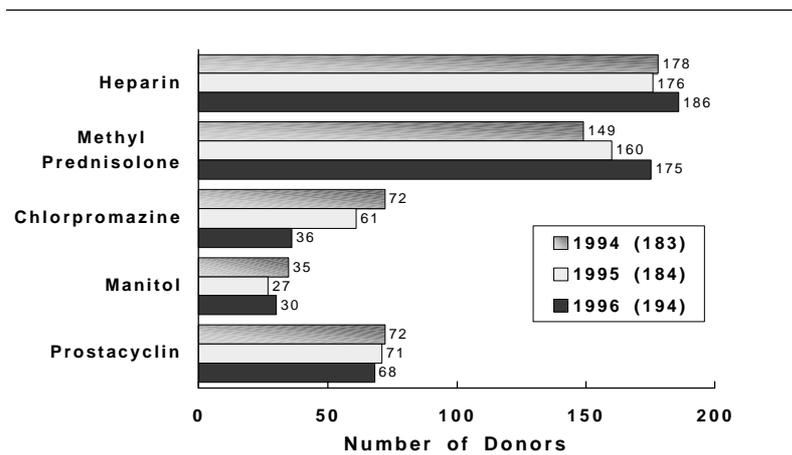
There were two donors who received no form of terminal treatment.

There has been an increase in the use of Heparin and Methyl Prednisolone when compared to 1994 and 1995.

Figures 46 and 47

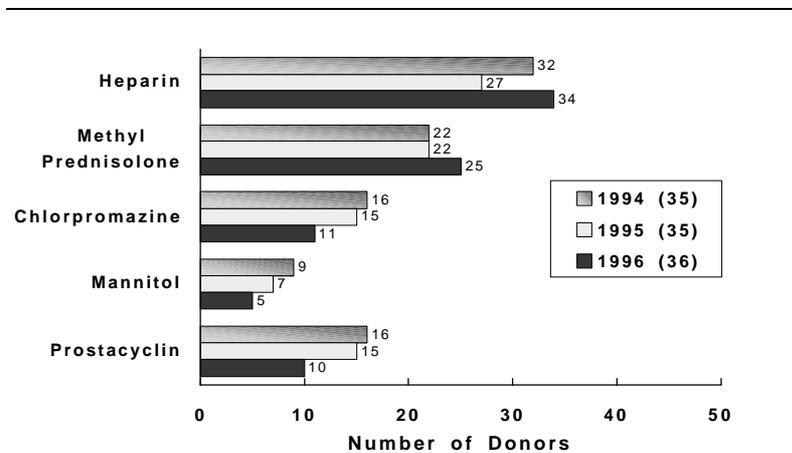
### Terminal Treatment 1994 - 1996

#### Australia



NB: Donors may be given more than one drug

#### New Zealand



NB: Donors may be given more than one drug

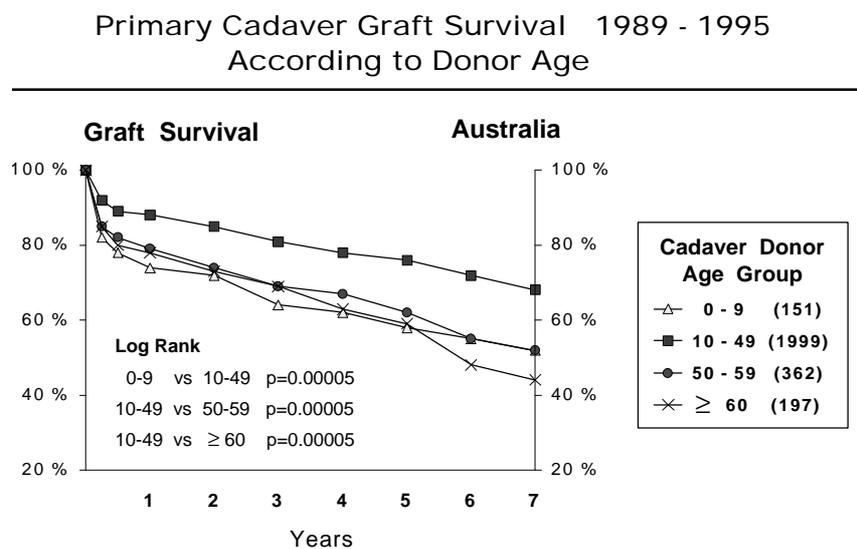
## Special Section

### Donor Factors Affecting Primary Cadaveric Renal Graft Survival 1989 - 1995 (Data derived from ANZDATA Registry)

#### Primary Cadaveric Renal Allograft Survival According to Donor Age

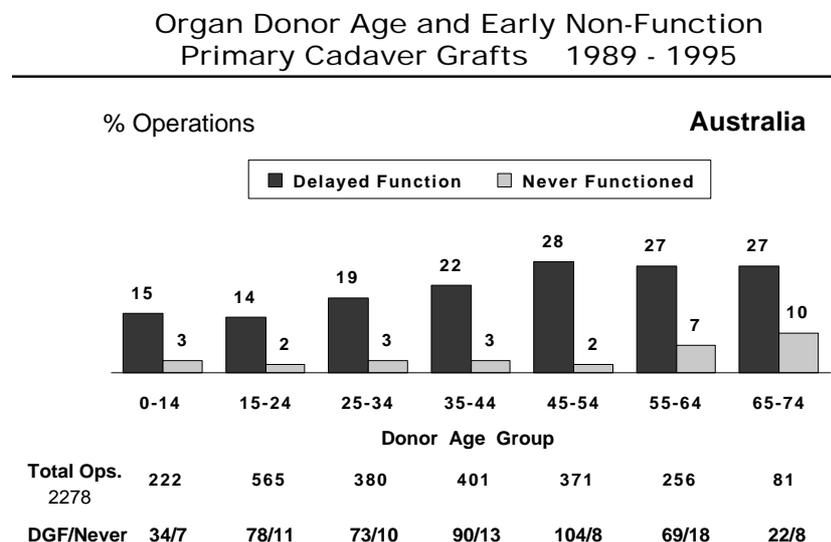
Kidneys from donors aged between 10 and 49 years of age had a significantly better graft survival after transplantation compared to kidneys from donors in all other age groups. This difference was seen as early as three months post transplant and differences increased with increasing time post transplant. After five years post transplant, donors over the age of 60 years had the worst graft survival.

Figure 48



The incidence of grafts never functioning increases with donor age beyond the age of 55 years. However, the incidence of delayed function also increases with age and is more common in recipients of donors greater than 45 years old.

Figure 49

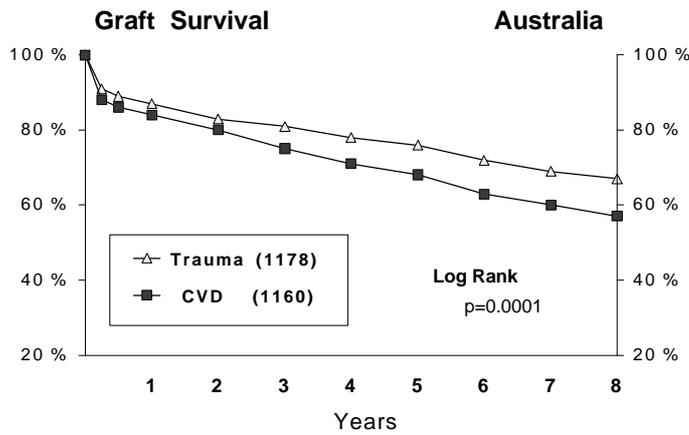


### Primary Renal Allograft Survival According to Cause of Donor Death

Kidneys from donors who died from cerebrovascular disease had a significantly inferior graft survival compared to kidneys from donors dying from trauma. Again differences were seen within the first twelve months but these increased with time post transplant such that there was a 10% higher graft survival in the trauma group at eight years.

Figure 50

Primary Cadaver Graft Survival 1989 - 1995  
According to Cause of Donor Death

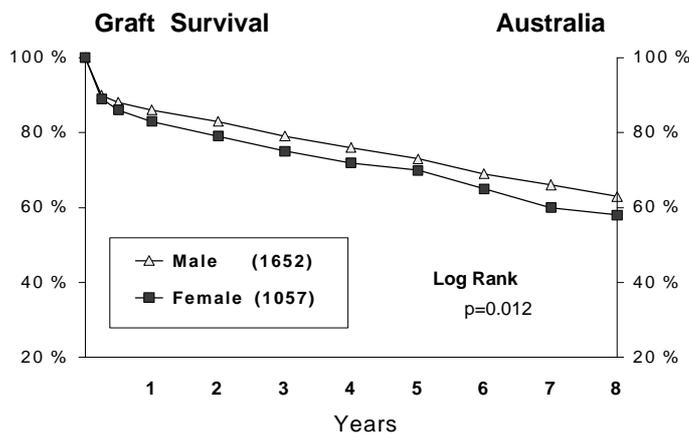


### Primary Renal Allograft Survival According to Donor Gender

Graft survival is slightly better for kidneys from male donors.

Figure 51

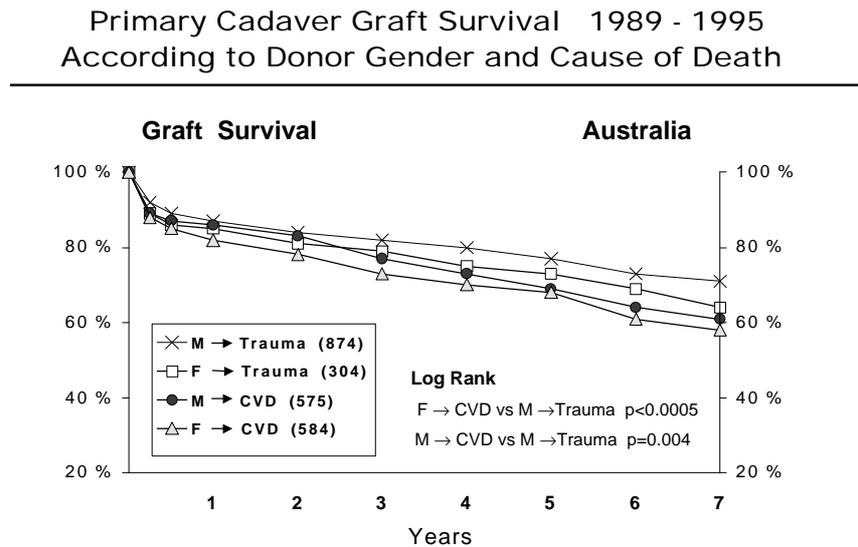
Primary Cadaver Graft Survival 1989 - 1995  
According to Donor Gender



### Primary Cadaveric Renal Graft Survival Related to Donor Death and Gender

Figure 52 examines the eight year post transplant graft survival for males and female donors related to the cause of death. Kidneys from male donors whose cause of death is trauma have the best long term survival. The worst survival is for kidneys from female donors whose cause of death is cerebrovascular disease.

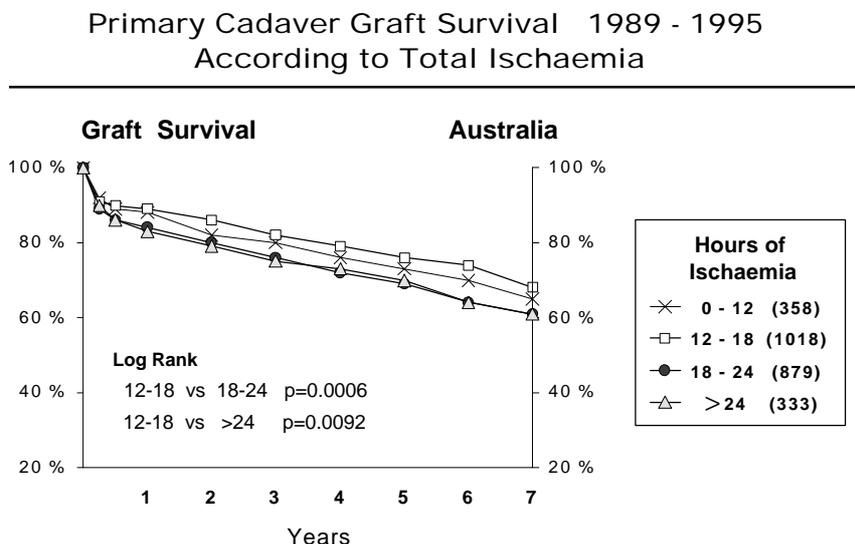
Figure 52



### Primary Cadaveric Renal Graft Survival Related to Hours of Ischaemia

Prolonged total ischaemia beyond 18 hours is associated with statistically inferior graft survival in the long term. The best graft survival occurred for kidneys with a total ischaemia between 12 and 18 hours.

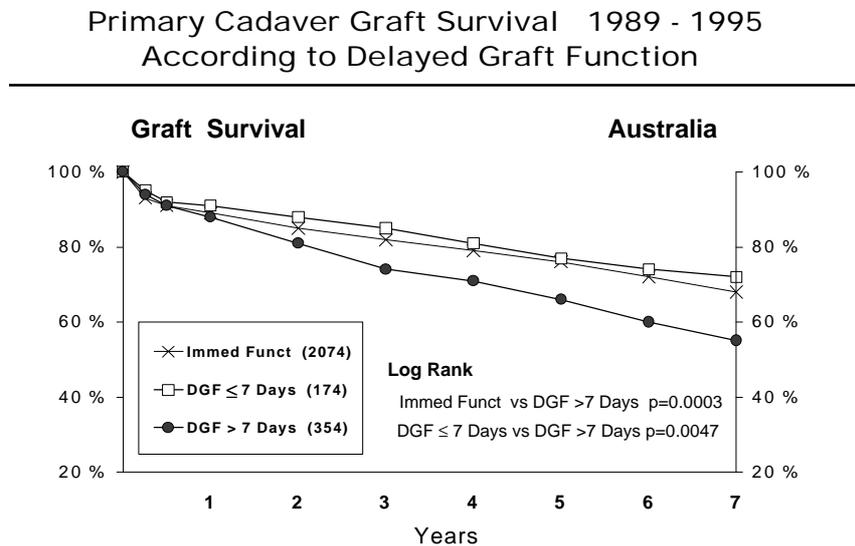
Figure 53



### Primary Cadaveric Renal Graft Survival Related to the Presence of Delayed Graft Function

Delayed graft function is not detrimental to long term allograft survival as long as it is less than seven days duration. In this case the function in the long term is the same as if immediate graft function occurs. However, delayed graft function of greater than seven days duration is associated with a significantly worse graft survival. This difference becomes obvious at two years and increases with increasing time.

Figure 54



For further analysis of donor factors effecting primary cadaveric renal graft survival refer to Pages 28 and 29.