Figure 55

Regional Outcome of Requests for Kidney Donation 1989 - 2005

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ **
Total Donors	**678**	**1060**	**82**	**754**	**54**	**432**	**35**	**284**	**3379**	**492**
Requested	676	1049	82	743	53	424	34	282	**3343**	**488**
Consented	676	1046	82	742	53	424	34	282	**3339**	**488**
Retrieved	1315	2012	159	1439	106	810	68	546	**6455**	**941**
Transplanted *	1275	1951	153	1371	97	770	64	522	**6203**	**893**
	(11) (2x)	(8) (1x)	(2)	(7) (1x)	(2)	(5) (8x)	(1x)	(5) (3x)	**(40) (16x)**	**(3) (5x)**

*** Recipients ( ) En bloc (x) Double Adult**
****New Zealand 1993 - 2005**

KIDNEY PERFUSION METHODS

Where kidneys were perfused with only one solution, Ross (47%), HTK (45%) and University of Wisconsin (UW) (8%) were the solutions used in Australia 2005.

In New Zealand UW (92%) and Ross (7%) were the solutions used (fig 56).

UW was used as the second perfusion solution in 99% and Ross in 1% of cases in Australia (fig 57).

Figure 56

Kidney Perfusion with Only One Solution 2001 - 2005

	Australia					New Zealand				
	2001	**2002**	**2003**	**2004**	**2005**	**2001**	**2002**	**2003**	**2004**	**2005**
Ross	26	14	12	6	24	4	2	0	2	4
UW	4	4	10	2	4	64	66	72	61	49
Collins	2	0	0	0	0	0	0	0	0	0
HTK	0	0	8	14	23	0	0	0	0	0
Hartman's	0	0	0	2	0	0	0	0	0	0
Total	**32**	**18**	**30**	**24**	**51**	**68**	**68**	**72**	**63**	**53**

Figure 57

Second Perfusion Solution - Kidneys 2001 - 2005

	Australia					New Zealand				
	2001	**2002**	**2003**	**2004**	**2005**	**2001**	**2002**	**2003**	**2004**	**2005**
Ross	52	54	37	42	0	0	0	0	0	0
UW	256	296	267	344	338	0	2	1	2	2
Collins	4	8	6	0	0	0	0	0	0	0
HTK	0	4	0	0	2	0	0	0	0	0
Hartman's	0	0	0	2	0	0	0	0	0	0
Total	**312**	**362**	**310**	**388**	**340**	**0**	**2**	**1**	**2**	**2**

Reasons Kidneys were Unusable

Kidney Biopsy at Retrieval

There were 18 donors (9%) who had a biopsy of the kidneys taken at retrieval in 2005 in Australia and ten donors (36%) in New Zealand.

Since 2000, there have been 13% (144) biopsies from 1132 kidney donors in Australia and 31% (64) from 209 kidney donors in New Zealand.

The reasons for kidneys that were unusable and the donor age are shown in Figures 58 and 59.

Figure 58

Reasons Kidneys were Unusable 2001 - 2005

		2001	2002	2003	2004	2005
Australia	Renal disease in donor	8	2	5	2	5
	Cancer in donor	0	0	2	2	1
	Anatomical	1	0	10	0	1
	Surgical	3	1	1	1	0
	Trauma	0	0	2	0	2
	Courier failure	1	0	0	0	0
	Hepatitis B Core Antibody	0	0	0	0	2
	Surgeons not available	0	0	0	1	0
	Total	**13**	**3**	**10**	**6**	**11**
New Zealand	Renal disease in donor	1	1	3	3	3
	Cancer in donor	0	0	2	0	0
	Surgical	0	0	1	0	0
	Recipient unsuitable	0	0	0	0	1
	Total	**1**	**1**	**6**	**3**	**4**

Figure 59

Donor Age of Unusable Kidneys 2001 - 2005

	Year	Age Groups									Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
Australia	2001	0	0	1	0	1	2	5	1	0	**10**
	2002	0	0	0	0	1	0	0	2	0	**3**
	2003	0	0	3	0	0	2	1	4	0	**10**
	2004	0	1	0	0	0	2	1	0	2	**6**
	2005	0	0	0	2	2	3	2	2	0	**11**
New Zealand	2001	0	0	0	0	0	0	0	1	0	**1**
	2002	0	0	0	0	0	0	1	0	0	**1**
	2003	0	1	2	0	0	0	1	2	0	**6**
	2004	0	0	0	1	0	0	2	0	0	**3**
	2005	0	0	0	0	0	1	3	0	0	**4**

Donor Kidney Function

Terminal Levels of Serum Creatinine and Urea

Australia

In 2005, 12% of Australian donors had a terminal serum creatinine concentration of ≥ 125 µmol/L and 10% had a terminal serum urea concentration of ≥ 9 mmol/L (figs 60 and 61).

Since 1989, 15% of all Australian donors had a terminal serum creatinine concentration of ≥ 125 µmol/L and 11% had a terminal serum urea concentration of ≥ 9 mmol/L.

New Zealand

There were 18% of donors in New Zealand with a terminal serum creatinine concentration of ≥ 125 µmol/L and 23% with terminal serum urea concentration of ≥ 9 mmol/L in 2005 (figs 60 and 61).

Since 1993, 9% of all New Zealand donors had a terminal serum creatinine concentration of ≥ 125 µmol/L and 9% had a terminal serum urea concentration of ≥ 9 mmol/L.

Figure 60

Terminal Serum Creatinine Levels 2001 - 2005

Creatinine (µmol/L)	Australia					New Zealand				
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
00-99	74%	76%	75%	72%	75%	78%	80%	82%	75%	59%
100-124	17%	12%	12%	14%	13%	16%	7%	9%	19%	23%
125-149	1%	4%	3%	5%	5%	3%	13%	3%	0%	9%
150-174	2%	3%	4%	1.5%	2%	0%	0%	6%	3%	9%
175-199	2%	1%	1%	1.5%	1%	0%	0%	0%	0%	0%
200-224	1%	2%	1%	1%	2%	0%	0%	0%	3%	0%
225-249	<1%	<1%	1%	2%	0%	0%	0%	0%	0%	0%
>250	2%	<1%	3%	3%	2%	0%	0%	0%	0%	0%

Figure 61

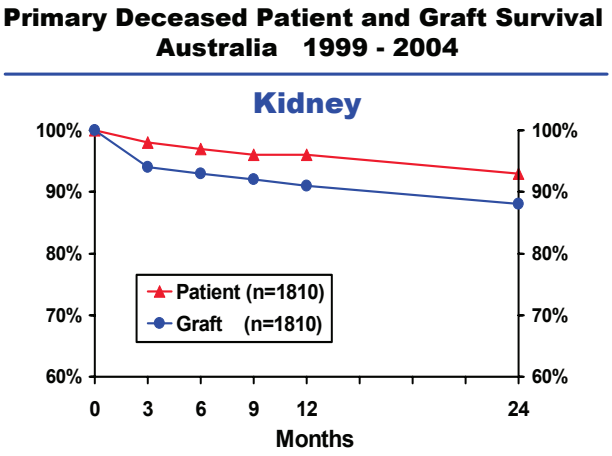
Terminal Serum Urea Levels 2001 - 2005

Urea (mmol/l)	Australia					New Zealand				
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
00-04	51%	57%	49%	52%	59%	59%	50%	52%	38%	45%
05-08	38%	33%	37%	35%	31%	38%	43%	34%	56%	32%
09-12	9%	5%	5%	8%	6%	3%	7%	3%	6%	14%
13-16	9%	2%	2%	3%	1%	0%	0%	3%	0%	9%
>16	<1%	<1%	2%	2%	3%	0%	0%	3%	0%	0%

KIDNEY TRANSPLANT OUTCOME

Figure 62 shows the patient and graft outcome for kidney transplants performed over the preceding five years in Australia and New Zealand.

Figure 62



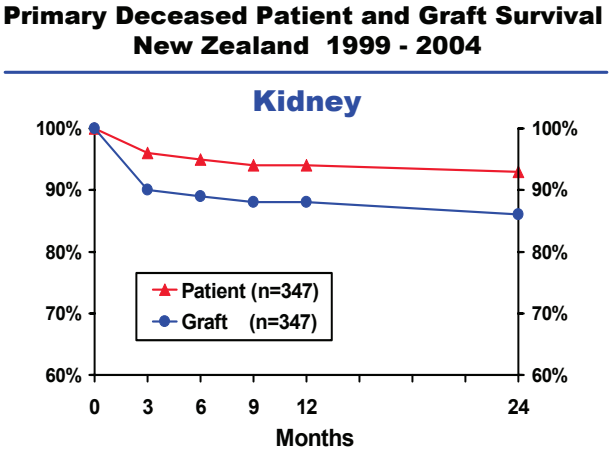
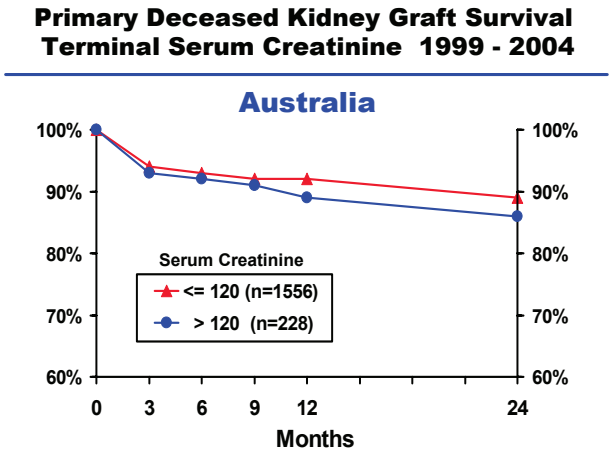


Figure 63



This data has been provided by the ANZDATA (Australia and New Zealand Dialysis and Transplant) Registry and further information on kidney transplant outcome is available from their website - www.anzdata.org.au

Special Section

Living Kidney Donor Transplantation – our increasing dependence should be matched by increased efforts to demonstrate long-term safety for donors

A/Prof Steve Chadban, PhD, FRACP
Manager, ANZDATA Transplant Section

Transplantation is the optimal form of renal replacement therapy for the majority of patients suffering end-stage kidney disease. As compared to dialysis, transplantation provides a better quality of life and improved life expectancy. Beyond the first year, transplantation also provides significant cost savings to the community. Due to the scarcity of kidneys available for transplantation in Australia and New Zealand, only a small minority of patients who may benefit receive a transplant in any one year (Figure A).

Living donor (LD) kidney transplantation is one means, increasingly utilized in ANZ (see Figure B), of increasing the availability of transplantation to patients with end-stage kidney disease. LD transplantation is performed across all states of Australia and New Zealand and across all recipient age groups (Figure C). The source of live donor kidney has evolved with an increase in the proportion of tissue-unrelated donors (spouses, friends) (Figure B).

Outcomes following LD transplantation are on average superior to those seen following deceased donor kidney transplantation (Figure D). Thorough assessment of live donors prior to donation is possible, thereby enabling selection of optimal kidneys for transplantation. The cold-ischaemia time between kidney harvest and implantation is significantly less than for deceased donor kidneys and consequently immediate graft function is the rule. As an elective procedure, the condition of the recipient may be maximized prior to transplantation leading to a greater chance of successful surgery and recovery.

In the ideal setting, the transplant may be performed pre-emptively (prior to the initiation of dialysis), thereby preventing the risk of co-morbidity that is associated with dialysis.

Figure A

Proportion of patients on dialysis who received a kidney transplant in 2004

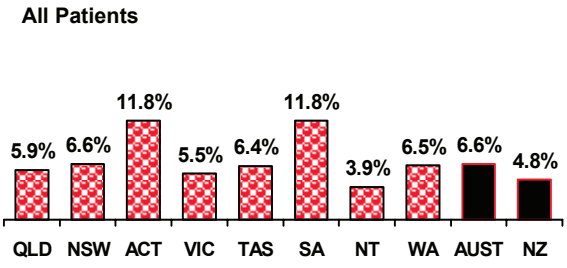


Figure B

Source of kidneys transplanted in Australia and New Zealand 1990 - 2004

An increasing proportion of living donor kidneys, and in particular living unrelated donor kidneys, is evident and has been responsible for the increase in the annual number of transplant procedures performed.

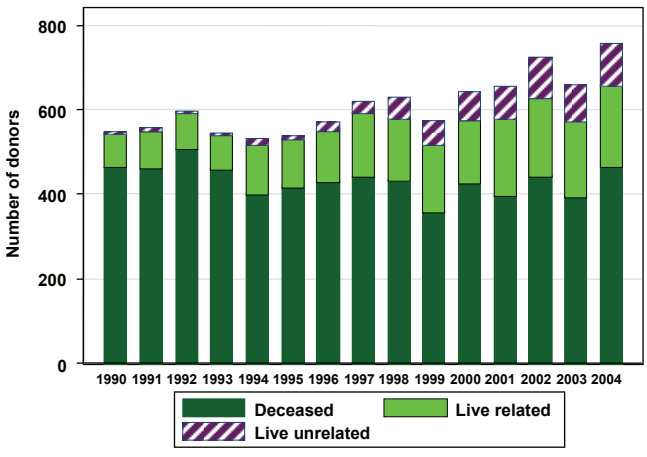
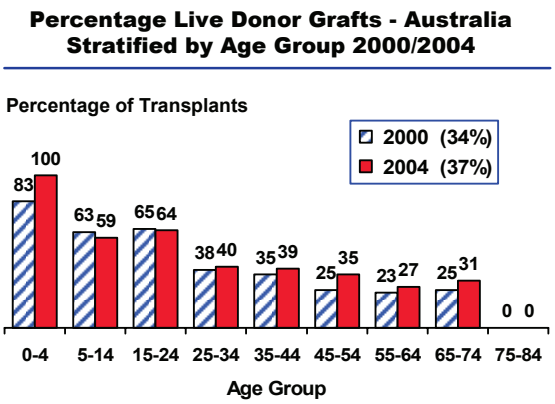


Figure C



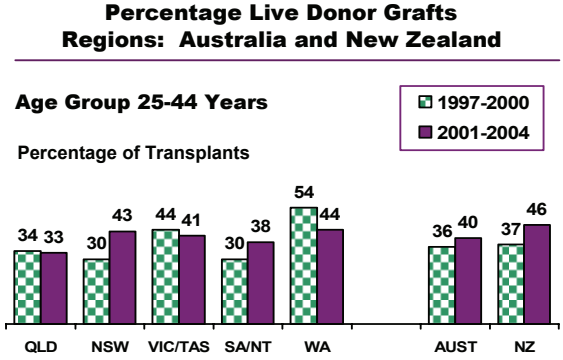
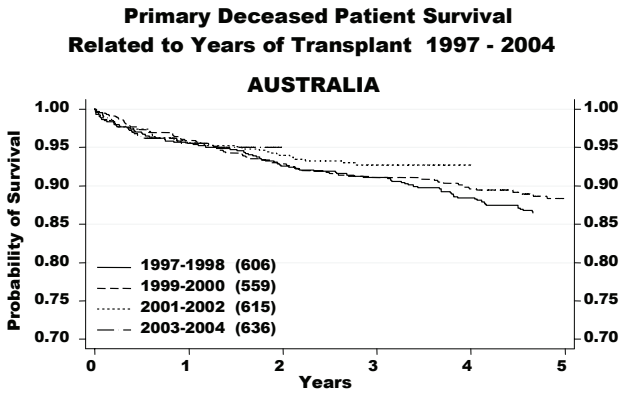
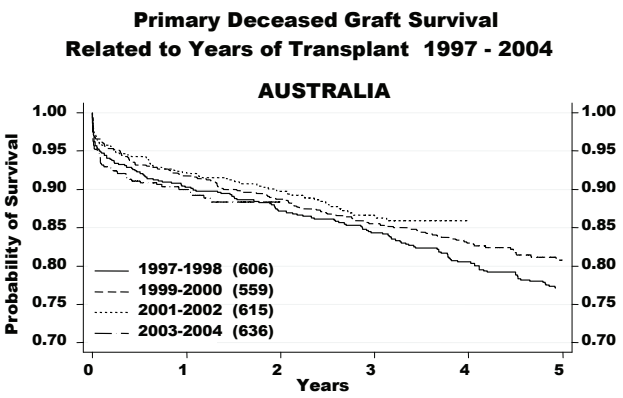
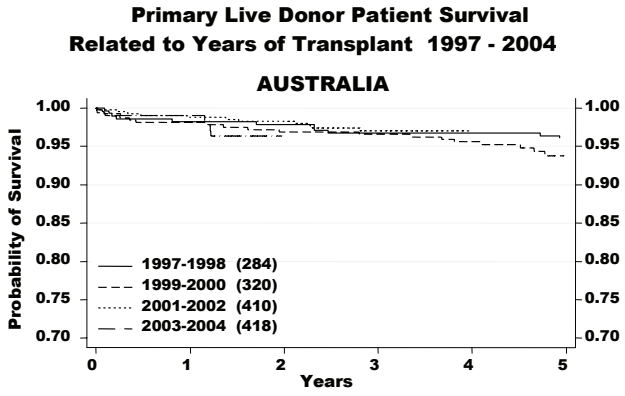
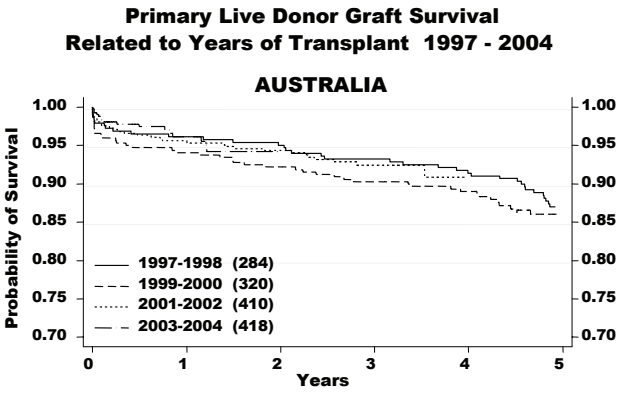


Figure D









The Use of LD Kidneys Does Come at a Price

At a community level, the direct health costs involved in living donor nephrectomy, and laparoscopic donor nephrectomy in particular, are likely to exceed those of deceased donor retrieval. However, any increase in cost here is likely to be outweighed by the reduction in costs associated with transplantation as compared to dialysis.

At an individual level, the risks associated with donor nephrectomy are borne largely by the donor. These include the risks of complications arising from invasive investigations (particularly angiography), the risks of surgical complications including death, and the long-term impact on risk of end-stage kidney disease and death.

Our current practice is underpinned by numerous, single centre cohort studies which in general have demonstrated superior rates of survival among kidney donors as compared to age and gender matched members of their general population. (eg. Transplantation 2001;72:444-9). This outcome would be expected, given that donors have traditionally been generally fit and healthy individuals, deemed suitable for major surgery. However, recent concerns regarding the peri-operative risks of live kidney donation (eg. Peri-operative death, psychological disturbance) and potential to increase long term risks of ESKD or cardiovascular death have been raised.

Peri-operative donor death has not been reported in Australia or New Zealand. The incidence has been reported for the United States by Dr C. Davis (American Transplantation Society, 2005). Twenty one deaths were reported to the UNOS Registry following 30,716 donation procedures. A search of national death registries identified a further 34 kidney donors who had died within twelve months following kidney donation, giving an incidence of 0.18%. Twenty two percent of deaths occurred within one month of the procedure and 36% within six months. The cause of death was unknown for the majority of cases, however suicide and violent deaths appeared to be more common than for the general community.

Whilst the majority of donors report psychological benefit from donation, it is clear from Australian data that a significant minority develop psychological illness within the first year after transplantation (Smith et al, Transplantation 2004;78:1384-9).

The long-term risk of ESKD appears increased among kidney donors as compared to the general population, at least in the USA. Data from 2002 reported 56 kidney donors as being listed for transplantation, from a pool of over 50,000 donors (Ellison MD et al, Transplantation 2002;74:1349-54). Data presented by Davis at the AST 2005 suggests the risk may be higher than this: 0.1% for white donors under 50 years of age and 0.52% for black donors, representing an approximate 10-fold increase in risk over the general population. Diabetes and focal and segmental glomerulosclerosis were the key conditions leading to ESKD among donors. Australian data is not available.

Among the general population, GFR<60ml/min is associated with an increased risk of cardiovascular disease and cardiovascular death. Whether the reduction in GFR caused by nephrectomy carries similar risk is unknown.

The Need to Demonstrate Long-term Safety of Kidney Donation

Given the increasing dependence of our transplant programs and ESKD patients on living donors, coupled with the known and potential risks incurred by living kidney donors in the USA, it should be a priority to determine the long-term safety of this practice in ANZ. ANZDATA launched a Living Kidney Donor Registry in 2004 to address exactly this issue. The registry received widespread support from clinicians at the 2003 Dialysis Nephrology and Transplantation workshop, but was launched as a voluntary registry given the burden of information gathering that would be required of individual clinicians and units, coupled with the variable patterns of donor follow-up that are employed.

In 2004, baseline data was received for the vast majority of the 291 living donors operated upon during that year, however 12 month follow-up data has been received for only 17 (5.8%) subjects to date! The registry is currently considering means by which this follow-up rate may be enhanced.

Conclusion

LD kidney transplantation enables an increasing number of ESKD patients in ANZ to receive the optimal form of renal replacement therapy and in doing so maximizes their quality and duration of life. This comes at a cost to the donor, a cost which is acceptable to clinicians, society and the vast majority of donors. This cost is, however, poorly defined. Given our reliance upon this procedure, greater efforts are required to document the true risks to donors in ANZ to enable us to provide accurate information to potential donors and to maximize their safety. The ANZDATA Living Kidney Donor Registry may be one means of achieving this end, however much work is required to improve the collection and provision of follow-up data.

Liver Donation

There were 187 liver transplants performed in 2005, 163 in Australia and 24 in New Zealand.

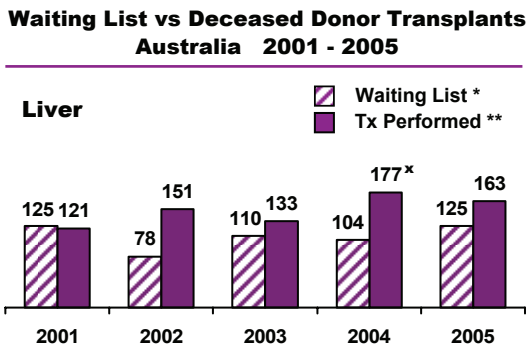
Six livers were donated from Australia and transplanted into New Zealand recipients and five livers donated from New Zealand were transplanted into Australian recipients.

There were 153 Australian donors, who provided 164 recipients with transplanted livers and 21 New Zealand donors provided livers for 23 recipients.

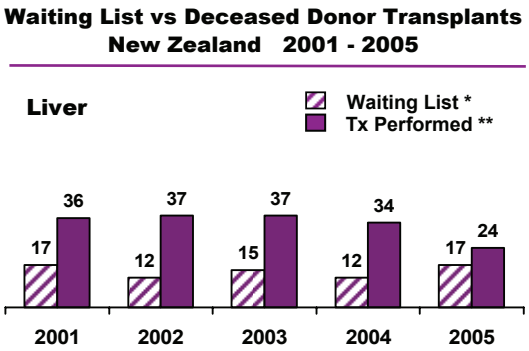
Twenty six transplants were performed using the "split" liver technique [transplanting one liver into two recipients]

* 8 Royal Prince Alfred Hospital, NSW
* 8 The Children's Westmead, NSW
* 4 Princess Alexandra Hospital, Qld
* 1 Royal Children's, Victoria
* 1 Royal Children's, Queensland
* 1 Sir Charles Gairdner, Western Australia
* 3 Auckland Hospital, New Zealand

Figure 64

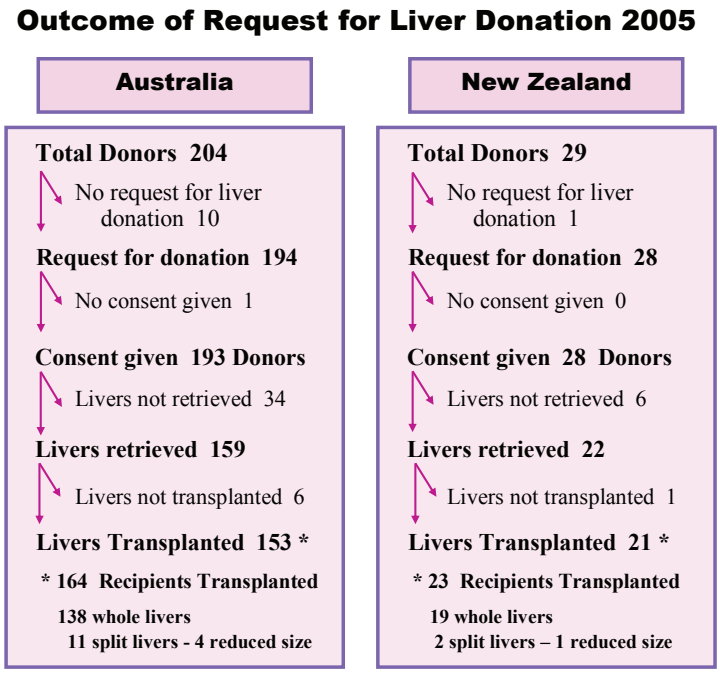


* Individual Transplant Units and NOMS (National Organ Matching Service)



* Source of Waiting List - NZ Donor Coordinators

Figure 65



* Includes split livers and number of recipients

Recipients transplanted, refers to outcome of livers donated in Australia or New Zealand

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

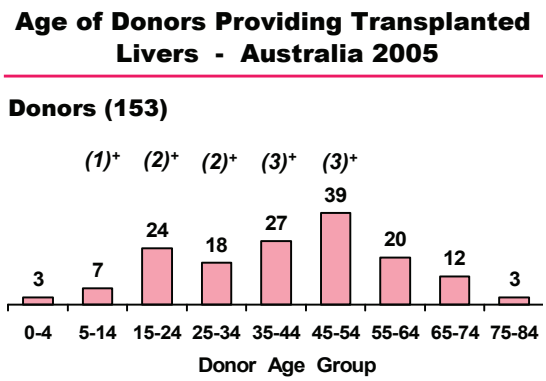
Figure 66

Age of Donors Providing Transplanted Livers 2001 - 2005

	Year	Age Groups									Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
Australia	2001	0	14 (1*)	29 (1*)	18 (1*)	14 (2*)	28 (1+)	15	8	1	**127**
	2002	5	11 (1+)(1*)	39 (4+)	14 (1+)	28	27 (3+)(1*)	17	6	1	**148**
	2003	2	8	30 (3+)	9 (1+)	20 (1+)	32 (2+)	16 (1+)	6	5 (1*)	**128**
	2004	1	4 (1+)(1#)	37 (1+)(2*)	29 (3+)	20 (3+)	31 (5+)	30	10	2	**164**
	2005	3	7 (1+)	24 (2+)(2*)	18 (2+)	27 (3+)	39 (3+)(2*)	20	12	3	**153**
New Zealand	2001	0	0	7	2	6	8	5	1	0	**29**
	2002	0	3 (1*)	5 (1+)(1*)	2	9	7	3	1	0	**30**
	2003	0	1	11 (1+)	4 (1+)(1*)	8 (1+)	1	5	0	1	**31**
	2004	1	0	9	4	3 (1+)(1*)	5	11	1	1	**35**
	2005	0	0	3 (1+)	3	5 (1*)	6 (1+)	4	0	0	**21**

\+ One liver transplanted into two recipients * One liver split and used for one patient only # Hepatocytes transplanted

Figure 67



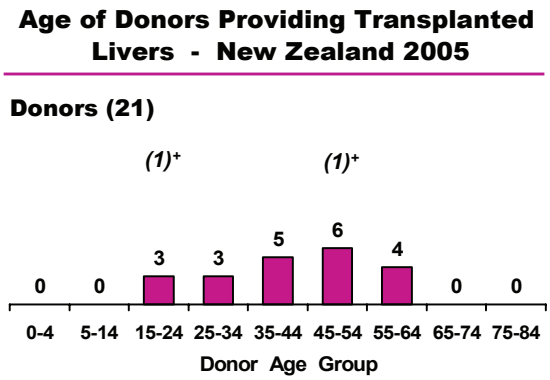
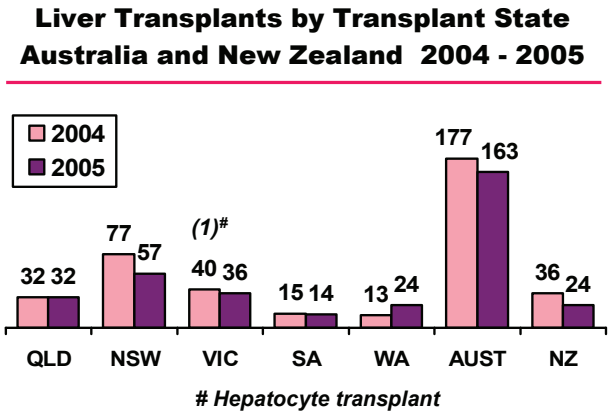


Figure 68



Perfusion of Livers

Australia

University of Wisconsin (UW) solution was used as the final perfusion for 94% of all livers. The initial flush solution was either Ross, Hartmann's, Saline or HTK solution. There were three livers only perfused with UW.

New Zealand

University of Wisconsin solution only was used for all of the livers retrieved.

Figure 69

Regional Outcome of Requests for Liver Donation 1989 - 2005

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ **
Total Donors	**678**	**1060**	**82**	**754**	**54**	**432**	**35**	**284**	**3379**	**492**
Requested	668	963	79	680	47	380	30	250	**3097**	**433**
Consented	658	942	74	658	44	370	30	241	**3017**	**430**
Retrieved	504	655	57	465	37	272	20	177	**2187**	**356**
Transplanted	526	665	62	419	35	262	19	172	**2160**	**347**

* Refers to number of recipients - use of split liver and hepatocytes
** New Zealand 1993 - 2005

Reasons Livers were Unusable After Retrieval

The liver is only retrieved when a compatible recipient has been identified. Figure 70 shows reasons the liver was not able to be transplanted into the identified recipient.

The use of the liver (and other organs) for research purposes requires specific permission from the most senior available next of kin.

Figure 70

Reasons Livers were Unusable 2001 - 2005

		2001	2002	2003	2004	2005
Australia	Biopsy - Fatty	3	3	3	2	2
	Disease	1	1	1	1	3
	Anatomical	1	1	1	0	0
	Research	1	2	2	0	0
	Cancer in Donor	0	0	0	1	0
	Recipient Issue	1	1	1	3	1
	Total	**6**	**8**	**7**	**7**	**6**
New Zealand	Biopsy - Fatty	1	0	2	0	0
	Cancer in Donor	0	0	1	0	0
	Disease	0	0	0	0	1
	Recipient Issue	0	1	0	0	0
	Total	**1**	**1**	**3**	**0**	**1**

Figure 71

Donor Age of Unusable Livers 2001 - 2005

	Year	Age Groups									Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
Australia	2001	0	1	1	0	1	2	1	0	0	**6**
	2002	0	0	1	0	1	3	3	0	0	**8**
	2003	0	0	0	1	2	0	1	3	0	**7**
	2004	0	0	0	0	0	2	3	1	1	**7**
	2005	0	0	0	0	0	2	3	1	0	**6**
New Zealand	2001	0	0	0	0	0	0	1	0	0	**1**
	2002	0	0	0	0	1	0	0	0	0	**1**
	2003	0	0	0	0	0	2	0	1	0	**3**
	2004	0	0	0	0	0	0	0	0	0	**0**
	2005	0	0	0	0	0	0	1	0	0	**1**

Donor Liver Function

The results of the serum tests for liver function for 159 Australian and 22 New Zealand donors in 2005, who had livers retrieved, is shown below.

There were 72% (114 donors) in Australia and 36% (eight donors) in New Zealand who had all five tests performed.

Figure 72 shows the number of donors whose liver function was above the normal range.

Figure 72

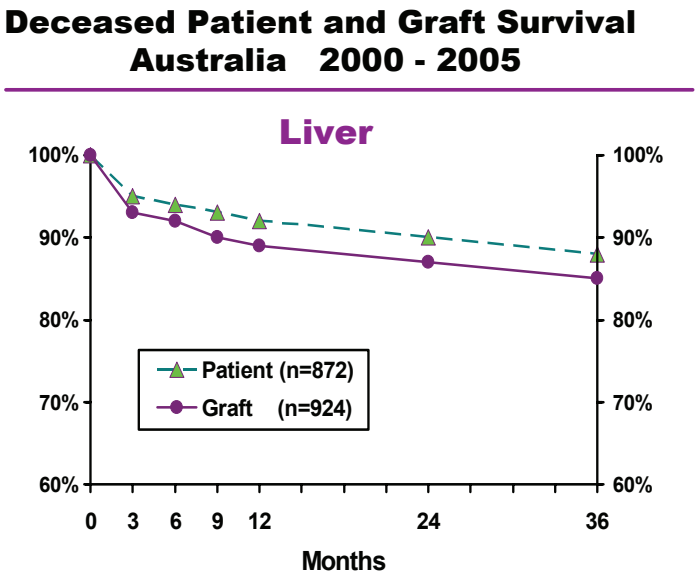
Number of Donors with Liver Function Tests above Normal Range 2005

Liver Function Tests	Australia			New Zealand		
	Donors with value recorded *	Above Normal	Maximum recorded 1989-2005	Donors with value recorded *	Above Normal	Maximum recorded 1993-2005
Alanine Transaminase ALT > 40 u/L	159	54 (34%)	1240 (705) x	17	4 (24%)	393 (295) x
Aspartate Transaminase AST > 40 u/L	125	57 (46%)	1480 (558)	15	7 (47%)	461 (100)
Gamma Glutamol Transferase GGT > 60 u/L	157	37 (24%)	750 (632)	12	3 (25%)	226 (153)
Alkaline Phosphatase > 116 u/L	150	19 (13%)	317 (278)	20	1 (5%)	264 (186)
Total Bilirubin > 20 umol/L	155	14 (9%)	114 (90)	22	2 (9%)	57 (31)

* Not all donors have all tests
x (2005) Maximum

Liver Transplant Outcome

Figure 73



Source: Australia and New Zealand Liver Transplant Registry

Cardio-Thoracic Organ Donation

Australia

In 2005 Australia performed 72 heart transplants, six heart/lung, 71 double and 10 single lung transplants.

The first perfusion fluid of choice for heart retrieval was crystalloid cardioplegia. The first perfusion fluid for lung retrieval was pneumoplegia (56%) and perfadex (30%). Cardioplegia followed by pneumoplegia was used in 13% of lung retrievals.

ECG and Echocardiogram

Seventy four percent (64 heart donors) had a normal ECG. Sixty four percent (56 heart donors) had an echocardiogram.

New Zealand

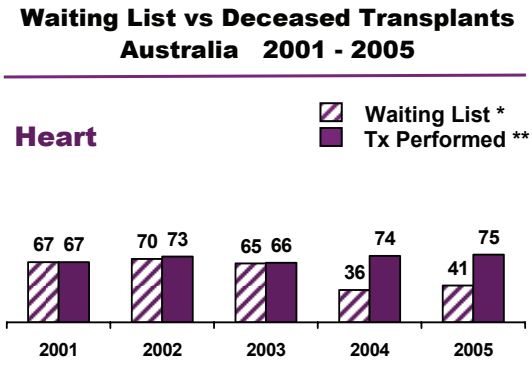
New Zealand performed sixteen heart and eight double lung transplants in 2005. Three hearts, two double lungs and one single lung were sent for transplantation in Australia.

The first perfusion fluid for heart retrieval was crystalloid cardioplegia and blood based pneumoplegia for the lungs.

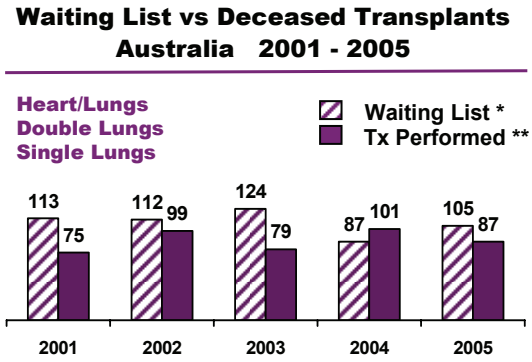
ECG and Echocardiogram

All sixteen heart donors had a normal ECG and all had an echocardiogram.

Figure 74



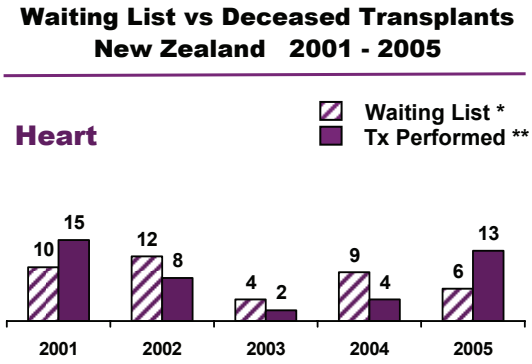
** Includes hearts sent from New Zealand



** Includes lungs sent from New Zealand

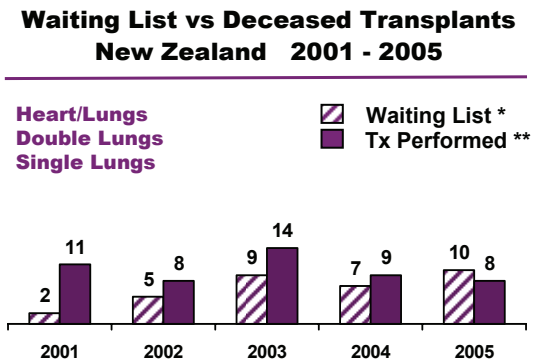
* Individual Transplant Units and the Cardiothoracic Registry

Figure 75



* Source of waiting list - NZ Donor Coordinators

** Not included hearts sent to Australia
2002 (2), 2003 (3), 2004 (2), 2005 (3)



* Source of waiting list - NZ Donor Coordinators

** Not included number of lungs sent to Australia
2001 (2), 2002 (4), 2003 (9), 2004 (3), 2005 (3)

Figure 76

Outcome of Request for Heart Donation 2005

Australia	New Zealand
Total Donors 204	**Total Donors 29**
No request for heart donation 34	No request for heart donation 5
Request for donation 170	**Request for donation 24**
No consent given 6	No consent given 0
Consent given 164 Donors	**Consent given 24 Donors**
Hearts not retrieved 77	Hearts not retrieved 8
Hearts retrieved 87	**Hearts retrieved 16**
Hearts not transplanted 9	Hearts not transplanted 0
Hearts Transplanted 78	**Hearts Transplanted 16**
Heart only - 72	Heart only - 16
Heart/Lungs - 6	Heart/Lungs - 0

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

Figure 77

Age of Donors Providing Transplanted Hearts 2001 - 2005

	Year	Age Groups								Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	
Australia	2001	0	5	22	10	12	18	2	0	**69**
	2002	1	8	29	10	15	14	3	0	**80**
	2003	0	3	21	8	17	17	2	0	**68**
	2004	0	1	28	16	11	17	5	0	**78**
	2005	0	3	21	12	17	20	5	0	**78**
New Zealand	2001	0	0	5	2	3	3	2	0	**15**
	2002	0	1	1	0	4	2	1	0	**9**
	2003	0	2	8	3	6	3	3	0	**25**
	2004	0	0	3	1	1	0	1	0	**6**
	2005	0	0	2	2	2	6	4	0	**16**

Figure 78

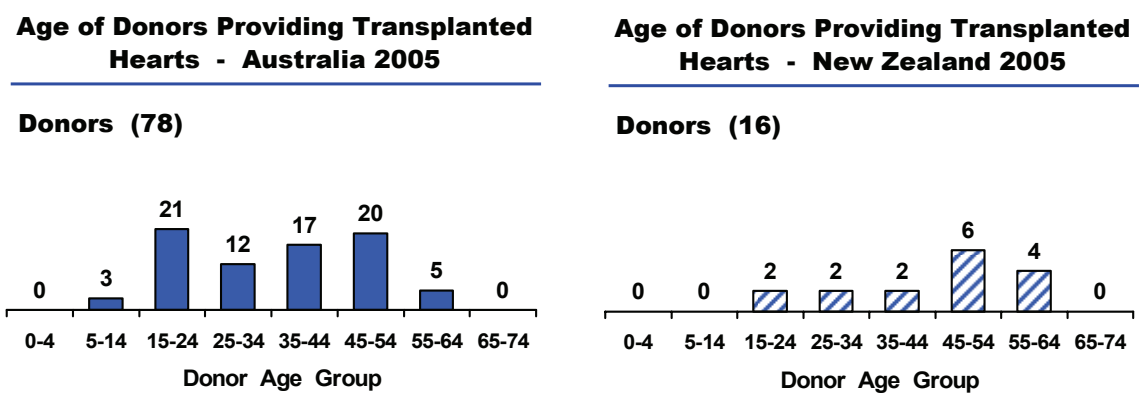


Figure 79

Heart Transplants by Transplant State
Australia and New Zealand 2004 - 2005

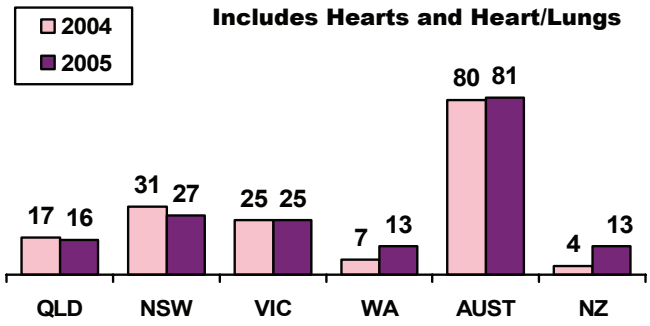


Figure 80

Heart and Lung Transplant Recipients
By Transplant Country 2000 - 2005

	Heart/Lung	2000	2001	2002	2003	2004	2005
Australia	Heart	57	67	73	66	74	75
	Heart/lung	2	2	8	5	6	6
	Double Lung	65	47	66	58	82	71
	Single left lung	12	10	12	9	7	5
	Single right lung	13	16	13	7	6	5
	Total	**149**	**142**	**172**	**145**	**175**	**162**
New Zealand	Heart	13	15	8	22	4	13
	Heart/lung	0	0	0	0	0	0
	Double lung	10	9	5	10	9	8
	Single left lung	0	1	1	2	0	0
	Single right lung	2	1	2	2	0	0
	Total	**25**	**26**	**16**	**36**	**13**	**21**

Figure 81

Regional Outcome of Requests for Heart Donation 1989 - 2005

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ *
Total Donors	**678**	**1060**	**82**	**754**	**54**	**432**	**35**	**284**	**3379**	**492**
Requested	642	882	73	649	48	327	29	222	2872	397
Consented	611	829	67	613	46	316	28	203	2713	388
Retrieved	339	476	47	361	32	176	12	117	1560	169
Transplanted	337	468	46	335	31	170	12	113	1512	168

* New Zealand 1993 - 2005
Includes Hearts only, Heart/Lungs and Heart / (L) Lung

Heart Valve Donation

The aortic and pulmonary heart valves can often be viable for transplantation when the whole heart is not suitable. Heart valves can be stored for up to five years.
This data relates only to heart valves retrieved from organ donors.

Figure 82

Outcome of Request for Heart Valve Donation 2005

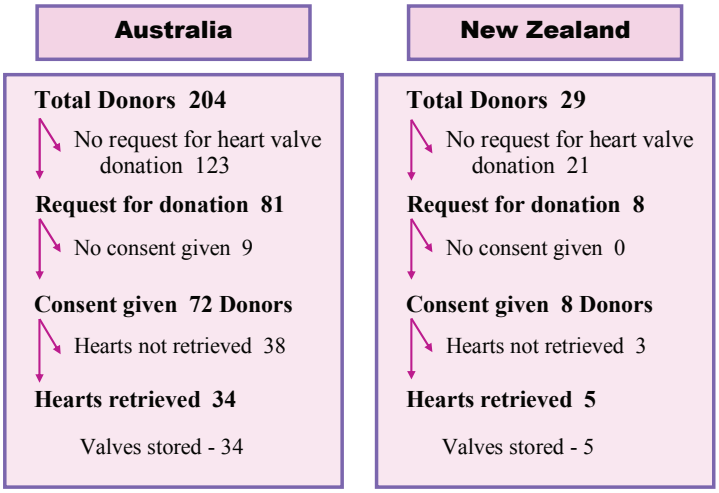


Figure 83

Age of Heart Valve Donors 2001 - 2005

	Year	Age Groups									Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
Australia	2001	0	7	3	8	2	13	7	0	0	**40**
	2002	2	4	8	4	11	15	10	0	0	**54**
	2003	1	2	7	4	4	11	8	0	1	**38**
	2004	0	3	3	6	4	13	7	0	0	**36**
	2005	4	3	1	2	4	17	3	0	0	**34**
New Zealand	2001	0	0	2	1	3	4	3	0	0	**13**
	2002	0	2	1	2	6	7	2	0	0	**20**
	2003	0	0	4	1	4	0	0	0	0	**9**
	2004	0	0	4	3	3	3	8	0	0	**21**
	2005	0	0	1	1	2	1	0	0	0	**5**

Figure 84

Regional Outcome of Requests for Heart Valve Donation 1989 - 2005

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ *
Total Donors	**678**	**1060**	**82**	**754**	**54**	**432**	**35**	**284**	**3379**	**492**
Requested	237	241	16	147	7	78	5	65	796	216
Consented	227	237	15	138	7	77	5	61	767	213
Retrieved	185	184	14	92	6	58	3	52	594	196
Transplanted or Stored	183	174	14	91	6	56	3	51	578	195

* New Zealand 1993 - 2005

Figure 85

Outcome of Request for Lung Donation 2005

Australia	New Zealand
Total Donors 204	**Total Donors 29**
No request for lung donation 36	No request for lung donation 5
Request for donation 168	**Request for donation 24**
No consent given 5	No consent given 0
Consent given 163 Donors	**Consent given 24 Donors**
Lungs not retrieved 165	Lungs not retrieved 26
Lungs retrieved 161	**Lungs retrieved 22**
Lungs not transplanted 2	Lungs not transplanted 1
Lungs Transplanted 159	**Lungs Transplanted 21**
(Double lung - 69 recipients)	(Double lung - 10 recipients)
(Heart/double lung - 6 recipients)	(Heart/double lung - 0 recipients)
(Single lung - 9 recipients)	(Single lung - 1 recipient)

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

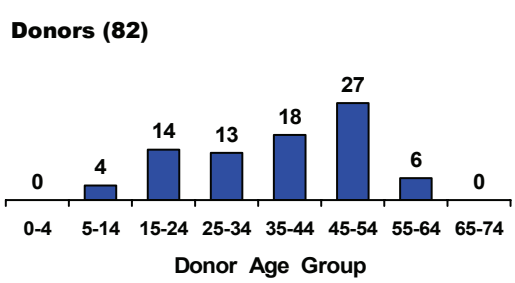
Figure 86

Age of Donors Providing Transplanted Lungs 2001 - 2005

	Year	Age Groups									Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
Australia	2001	0	6	16	11	9	22	1	0	0	**65**
	2002	0	6	27	7	19	17	9	0	0	**85**
	2003	0	2	20	7	12	15	10	0	1	**67**
	2004	0	4	24	23	16	17	11	0	0	**95**
	2005	0	4	14	13	18	27	6	0	0	**82**
New Zealand	2001	0	0	3	0	2	4	3	0	0	**12**
	2002	0	0	0	0	8	2	2	0	0	**12**
	2003	0	1	5	3	8	0	2	0	0	**19**
	2004	0	0	3	1	1	0	6	0	0	**11**
	2005	0	0	2	0	2	5	2	0	0	**11**

Figure 87

Age of Donors Providing Transplanted Lungs - Australia 2005



Age of Donors Providing Transplanted Lungs - New Zealand 2005

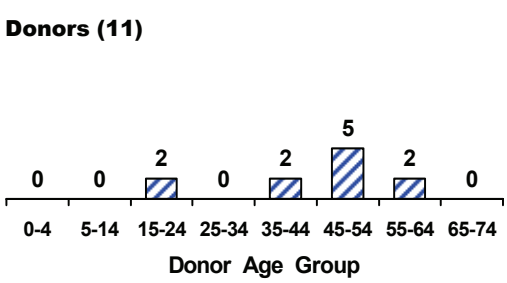


Figure 88

Lung Transplant Recipients 2004 - 2005 by Transplant State - Australia and NZ

Bilateral Sequential (Double) and Single Lung Transplants by State 2004 - 2005

Figure 89

Regional Outcome of Requests for Lung Donation 1989 - 2005

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ **
Total Donors	**678**	**1060**	**82**	**754**	**54**	**432**	**35**	**284**	**3379**	**492**
Requested	610	846	73	595	44	284	28	194	2674	329
Consented	572	795	66	565	42	272	27	180	2519	324
Retrieved x	387	661	67	477	46	256	26	158	2078	245
Transplanted x	360	638	65	439	46	244	25	153	1970	228

X Number of Lungs (Includes Heart/Double Lungs and Heart/Single (L) Lung)
** New Zealand 1993 - 2005

Donor Lung Function

Australia

There were 48 Australian lung donors (59%) who had a bronchoscopy in 2005. Seven donors had chest trauma; these included pneumothorax (3), chest drain (3) and contusion (1).

The arterial blood gases were taken on 100% FiO_2 and PEEP of 5 cm. Thirteen donors had a PEEP >5 cm. The results from 69 lung donors in 2005 show 14% (10) to be acidotic (pH < 7.35) and 16% (11) to be alkalotic (pH > 7.45).

Oxygenation measured as PaO_2 ranged from 236-625 mmHg with a median of 458 mmHg.

$PaCO_2$ ranged from 28.0-53.2 mmHg with a median of 31.3 mmHg.

New Zealand

There were seven (66%) New Zealand lung donors who had a bronchoscopy in 2005. One donor had a pneumothorax.

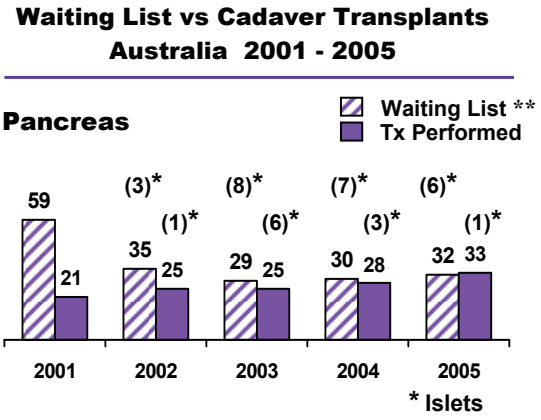
The arterial blood gas results from 11 lung donors in 2005 shows 18% (2) to be acidotic (pH < 7.35) and 27% (3) to be alkalotic (pH > 7.45).

Oxygenation measured as PaO_2 ranged from 289-679 mmHg with a median of 398 mmHg.

$PaCO_2$ ranged from 30.0-60.8 mmHg with a median of 40.0 mmHg.

Pancreas Donation

Figure 90



**National Pancreas Registry
Dr Kannellis (Pancreas-Victoria)

There were 30 combined kidney/pancreas transplants performed in 2005: twenty one at Westmead Hospital, NSW, eight at Monash Medical Centre, Victoria and one combined kidney/liver/pancreas at Royal Prince Alfred Hospital in NSW.

Three pancreas only and one islets transplant were performed at Westmead in 2005.

In New Zealand there were two combined kidney/pancreas transplants performed in Auckland in 2005.

Figure 91

Waiting List

	AUST	NZ **
Number of Patients with Diabetes Type 1 on dialysis (December 2004) *	**209**	**51**
Patients < 45 years of age	96	29
Patients < 55 years of age	164	44
Number of patients on the Kidney Transplant Waiting List	1407	339
Number of patients on the Kidney Pancreas Transplant Waiting List	31	7
Number of patients on the Pancreas only Waiting List	1	-
Number of patients on the Islet Transplant Waiting List	6	-

Reference: * ANZDATA Registry
National Pancreas Registry and Dr Kanellis (Pancreas-Victoria)
**NZ Donor Coordinators and Dr Pilmore

Figure 92

Outcome of Request for Pancreas Donation 2005

Australia	New Zealand
Total Donors 204	**Total Donors 29**
No request for pancreas donation 46	No request for pancreas donation 9
Request for donation 158	**Request for donation 20**
No consent given 6	No consent given 0
Consent given 152 Donors	**Consent given 20 Donors**
Pancreas not retrieved 85	Pancreas not retrieved 18
Pancreas retrieved 67	**Pancreas retrieved 2**
Pancreas not transplanted 33	Pancreas not transplanted 0
Pancreas Transplanted 33	**Pancreas Transplanted 2**
Islets Transplanted 1	**Islets Transplanted 0**
(Kidney/Pancreas - 30)	(Kidney/Pancreas - 2)
(Pancreas only - 3)	(Pancreas only - 0)

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

Figure 93

Age of Donors Providing Transplanted Pancreas 2001 - 2005

	Year	Age Groups							Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	
Australia	2001	0	0	9	9	6	2	0	**26**
	2002	0	1	14	6	2	2	0	**25**
	2003	0	0	14	4	7	0	0	**25**
	2004	0	1	11	6	9	1	0	**28**
	2005	0	2	11	8	8	4	0	**33**
New Zealand	2001	0	0	1	0	2	0	0	**3**
	2002	0	0	1	0	0	1	0	**2**
	2003	0	0	3	2	1	0	0	**6**
	2004	0	0	1	0	1	0	0	**2**
	2005	0	0	0	1	1	0	0	**2**

Figure 94

Age of Donors Providing Transplanted Islets 2002 - 2005

	Year	Age Groups							Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	
Australia	2002	0	0	0	1	0	0	0	**1**
	2003	0	0	1	0	3	0	2	**6**
	2004	0	0	2	0	1	0	0	**3**
	2005	0	0	0	0	1	0	0	**1**

Figure 95

Age of Donors Providing Transplanted Pancreas and Islets - Australia 2005

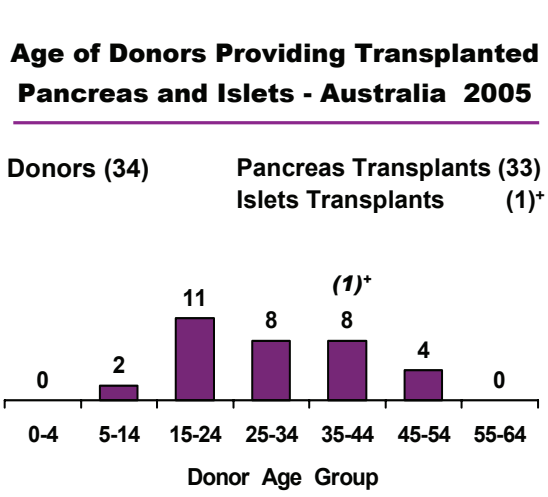


Figure 96

Regional Outcome of Requests for Pancreas 1989 - 2005

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ **
Total Donors	**678**	**1060**	**82**	**754**	**54**	**432**	**35**	**284**	**3379**	**492**
Requested	567	818	73	433	24	140	10	100	2165	220
Consented	503	775	67	403	21	120	10	78	1977	213
Retrieved	27	226	22	170	10	30	0	56	541	30
Transplanted	20	150	14	77	9	22	0	2	294	21
Pancreas Islets	0	7	1	2	0	1	0	0	11	0

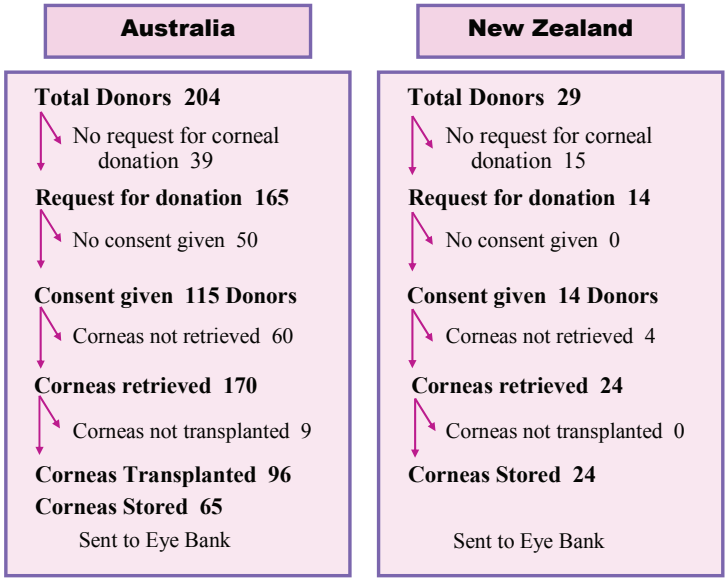
** New Zealand 1993 - 2005

CORNEAL DONATION

This section refers only to corneas donated from solid organ donors. It does not include any cases of cornea only donation.

Full data is available from The Australian Corneal Graft Registry (Editors K.A. Williams, S.M. Muehlberg, C. Bartlett and D.J. Coster), Flinders Medical Centre, Bedford Park 5042, South Australia.

Figure 97 **Outcome of Request for Corneal Donation 2005**



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

Figure 98

Age of Corneal Donors 2001 - 2005

	Year	Age Groups										Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85-94	
Australia	2001	0	5	11	8	9	29	15	6	2	0	**85**
	2002	1	4	18	5	16	23	25	6	2	0	**100**
	2003	0	2	13	4	6	25	12	16	2	1	**71**
	2004	0	4	13	10	11	31	20	10	1	0	**100**
	2005	0	4	8	9	12	18	21	8	1	0	**81**
New Zealand	2001	0	0	3	1	1	3	4	1	0	0	**13**
	2002	0	0	0	1	6	5	3	0	0	0	**15**
	2003	0	0	7	1	7	1	3	0	0	0	**19**
	2004	0	0	5	2	2	2	4	2	0	0	**17**
	2005	0	0	0	1	1	6	4	0	0	0	**12**

Figure 99

Regional Outcome of Requests for Corneal Donation 1989 - 2005

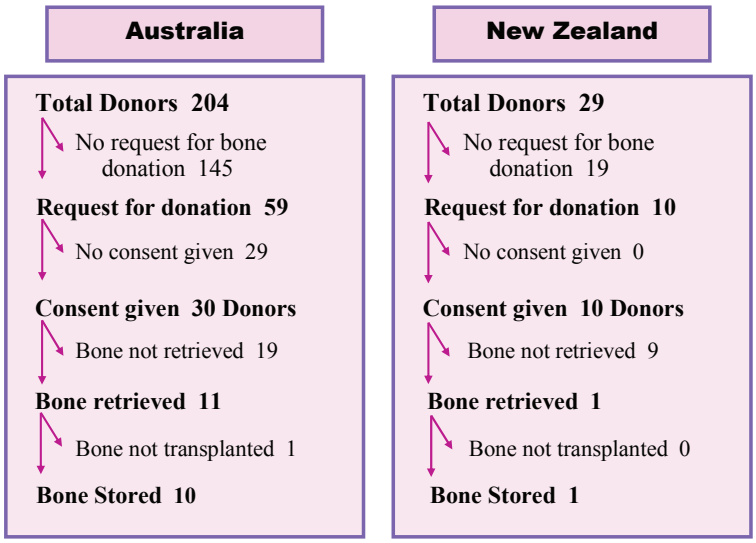
	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ **
Total Donors	**678**	**1060**	**82**	**754**	**54**	**432**	**35**	**284**	**3379**	**492**
Requested	626	933	73	673	38	301	9	208	**2861**	**271**
Consented	435	684	41	525	28	187	6	132	**2038**	**215**
Retrieved x	623	1278	71	1009	49	325	2	240	**3597**	**362**
Gone to Eye Bank xx	611	1009	56	985	46	313	2	228	**3250**	**358**

X Number of Corneas xx Gone to Eye Bank - Transplanted later
** New Zealand 1993 - 2005

Bone Donation

Figure 100

Outcome of Request for Bone Donation 2005



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

Figure 101

Age of Bone Donors 2001 - 2005

	Year	Age Groups									Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
Australia	2001	0	0	0	2	1	7	4	1	0	**15**
	2002	0	0	2	1	3	1	0	0	0	**7**
	2003	0	0	4	4	1	3	1	0	0	**13**
	2004	0	0	6	1	1	6	2	0	0	**16**
	2005	0	0	1	0	1	6	2	0	0	**10**
New Zealand	2001	0	0	0	0	0	0	0	0	0	**0**
	2002	0	2	0	0	2	0	0	0	0	**2**
	2003	0	0	1	0	1	0	0	0	0	**2**
	2004	0	0	0	0	0	0	0	0	0	**0**
	2005	0	0	1	0	0	0	0	0	0	**1**

Figure 102

Regional Outcome of Bone Donation 1989 - 2005

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ **
Total Donors	**678**	**1060**	**82**	**754**	**54**	**432**	**35**	**284**	**3379**	**492**
Requested	535	76	4	79	4	158	3	128	**987**	**170**
Consented	366	56	4	50	2	63	3	74	**618**	**133**
Retrieved	145	8	0	15	2	42	0	44	**256**	**37**
Transplanted/Stored	141	8	0	9	2	42	0	43	**245**	**37**

** New Zealand 1993 - 2005

Terminal Management

Time from Admission to Brain Death

Australia

In 2005, 30% of Australian donors were declared brain dead within 23 hours of hospital admission.

The median time from admission to brain death was 36.7 hours.

Nearly 13% of donors were in hospital for more than five days.

New Zealand

In 2005, 38% of New Zealand donors were declared brain dead within 23 hours of hospital admission.

Time of admission to hospital was unknown in 17% of donors. The median time from admission to brain death was 31.2 hours.

Almost 11% of donors were in hospital for more than five days.

Figure 103

Time from Admission to Brain Death 2001 - 2005

	Year	Hours								Not Known	Median (hours)	No. of Donors
		0-23	24-47	48-71	72-95	96-119	120-143	144-167	>=168			
Australia	2001	36%	34%	9%	6%	2%	4%	2%	7%	0%	30.8	**185**
	2002	39%	28%	16%	4%	4%	2%	1%	6%	0%	30.3	**206**
	2003	37%	32%	10%	7%	3%	2%	1%	8%	0%	28.6	**179**
	2004	36%	30%	11%	8%	5%	3%	1%	6%	0%	33.3	**218**
	2005	30%	32%	16%	3.5%	5%	1.5%	1%	10%	1%	36.7	**204**
New Zealand	2001	59%	27%	5%	3%	3%	0%	0%	3%	0%	21.0	**37**
	2002	44%	33%	3%	6%	3%	0%	3%	8%	6%	25.6	**38**
	2003	35%	20%	5%	5%	8%	0%	0%	0%	27%	24.0	**40**
	2004	33%	25%	10%	0%	2%	2%	2%	8%	18%	26.3	**40**
	2005	38%	14%	10%	7%	3.5%	0%	0%	10.5%	17%	31.2	**29**

Figure 104

Australian States Time from Admission to Brain Death 2005

States	Hours								Not Known	Median (hours)	No. of Donors
	0-23	24-47	48-71	72-95	96-119	120-143	144-167	>=168			
Queensland	37%	23%	17%	3%	6%	0%	3%	8%	3%	37.3	35
New South Wales	26%	43%	11%	2%	7%	4%	0%	7%	0%	36.7	54
ACT	44%	22%	11%	11%	0%	0%	0%	11%	0%	24.3	9
Victoria	28%	32%	22%	6%	6%	0%	0%	6%	0%	37.5	50
Tasmania	0%	0%	50%	0%	0%	0%	0%	50%	0%	165.3	2
South Australia	40%	25%	10%	0%	0%	0%	0%	25%	0%	28.6	20
Northern Territory	50%	25%	0%	25%	0%	0%	0%	0%	0%	30.2	4
Western Australia	20%	37%	17%	0%	3%	3%	3%	13%	3%	39.2	30

Figure 105

Time from Ventilation to Brain Death 2001 - 2005

	Year	Hours								Not Known	Median (hours)	No. of Donors
		0-23	24-47	48-71	72-95	96-119	120-143	144-167	>=168			
Australia	2001	40%	32%	10%	7%	2%	3%	2%	4%	0%	28.5	**185**
	2002	38%	31%	16%	4%	3%	1%	1%	5%	<1%	29.3	**206**
	2003	39%	35%	7%	6%	4%	2%	<1%	12%	0%	27.0	**179**
	2004	39%	33%	12%	7%	4%	1%	1%	3%	0%	29.7	**218**
	2005	32%	37%	16%	4%	2%	1%	0%	7%	<1%	31.4	**204**
New Zealand	2001	65%	24%	3%	3%	3%	0%	0%	2%	0%	17.4	**37**
	2002	42%	32%	5%	5%	2.5%	2.5%	0%	0%	11%	24.8	**38**
	2003	43%	18%	2%	5%	5%	2%	0%	0%	25%	21.1	**40**
	2004	40%	22.5%	7.5%	2.5%	5%	0%	2.5%	5%	15%	25.3	**40**
	2005	34.5%	17%	14%	0%	0%	0%	0%	10.5%	24%	27.7	**29**

Time From Brain Death to Aortic Cross Clamp

Australia

Thirty five percent of donors had undergone aortic cross clamp within twelve hours of the certification of brain death in 2005.

The median time was 14.5 hours.

New Zealand

In 2005, 83% of donors had undergone aortic cross clamp within twelve hours of certification of brain death.

The median time was 10.3 hours

Figure 106

Time from Brain Death to Aortic Cross Clamp 2001 - 2005

Hours	Australia					New Zealand				
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
<=6	6%	4%	3%	5%	5%	19%	18%	12.5%	12.5%	3%
7 - 12	53%	48%	42%	40%	30%	65%	61%	67.5%	70%	80%
13 - 18	32%	39%	41%	44%	48%	14%	13%	17.5%	17.5%	17%
19 - 24	4%	6%	7%	6%	13%	2%	3%	0%	0%	0%
> 24	5%	3%	7%	5%	4%	0%	5%	2.5%	0%	0%
Median Hours	**12.1**	**12.8**	**13.4**	**13.5**	**14.5**	**9.5**	**9.5**	**9.9**	**9.6**	**10.3**
Number of Donors	183	204	178	215	195	37	38	40	40	29
Donation after Cardiac Death	2	2	1	3	9	0	0	0	0	0

Figure 107

Australian States Time from Brain Death to Aortic Cross Clamp 2005

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA
<= 6 hours	11%	2%	0%	2%	0%	16%	0%	3%
7 - 12 hours	40%	44%	22%	18%	0%	31%	0%	23%
13 - 18 hours	37%	50%	67%	60%	0%	53%	25%	37%
19 - 24 hours	3%	2%	0%	20%	100%	0%	50%	30%
> 24 hours	9%	2%	11%	0%	0%	0%	25%	7%
Median Hours	**12.4**	**13.6**	**15.6**	**15.7**	**20.1**	**13.1**	**21.0**	**17.2**
Number of Donors	35	46	9	50	2	19	4	30
Donation after Cardiac Death	0	8	0	0	0	1	0	0

Donor Maintenance

Drugs for Maintenance of the Donor (given in the Intensive Care/Critical Care Unit)

Australia

There were 6% (12) of donors who did not require inotropic support in 2005.

Antidiuretic agents (desmopressin/vasopressin) were prescribed to 62% (127) of all donors.

MAP <50 mm Hg

Mean arterial blood pressure (MAP) <50 mm Hg was recorded in 4% (9) of donors in Australia in 2005. One donor had a duration of less than one hour, four one hour and four greater than one hour.

Range was thirty minutes to four hours.

New Zealand

In 2005 all donors required inotropic support.

Antidiuretic agents (desmopressin/vasopressin) were prescribed to 69% (20) of all donors.

MAP <50 mm Hg

Two donors were reported with a mean arterial blood pressure (MAP) <50 mm Hg with a duration of one hour.

Figure 108

Donor Maintenance 2001 - 2005

Drugs	Australia					New Zealand				
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
Number of Donors	**(185)**	**(206)**	**(179)**	**(218)**	**(204)**	**(37)**	**(38)**	**(40)**	**(40)**	**(29)**
Dopamine	30	18	12	22	15	12	10	9	6	1
Adrenaline	42	42	34	28	26	4	2	0	4	0
Noradrenaline	121	151	138	174	165	26	31	28	44	26
Aramine	7	7	12	4	4	4	0	2	0	0
Dobutamine	3	5	3	3	8	0	0	0	0	1
Desmopressin/DDAVP	123	134	122	133	127	20	14	20	16	20

NB: Donors may be given more than one drug

Figure 109

Australian States Donor Maintenance 2005 (2004)

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA
Number of Donors	**35 (39)**	**54 (63)**	**9 (6)**	**50 (42)**	**2 (2)**	**20 (39)**	**4 (1)**	**30 (23)**
Dopamine	9 (14)	2 (1)	1 (0)	1 (4)	1 (1)	0 (1)	0 (0)	1 (1)
Adrenaline	1 (5)	7 (5)	0 (0)	9 (4)	1 (0)	5 (12)	0 (0)	3 (2)
Noradrenaline	23 (21)	41 (58)	9 (60	43 (41)	1 (2)	18 (26)	4 (1)	26 (20)
Aramine	0 (0)	1 (0)	0 (3)	2 (0)	0 (0)	1 (0)	0 (0)	0 (0)
Dobutamine	2 (1)	2 (0)	1 (1)	2 (0)	0 (0)	0 (0)	0 (0)	1 (1)
Desmopressin/DDAVP	27 (24)	34 (45)	9 (6)	50 (18)	2 (1)	20 (20)	4 (1)	30 (18)

NB: Donors may be given more than one drug

Terminal Treatment

Terminal Treatment (provided in the operating theatres)

Australia

Eleven donors did not receive any heparin as part of their terminal treatment in 2005. Four of these were donation after cardiac death donors.

Seven donors did not receive any terminal treatment at all. Three of those were beating heart donors.

New Zealand

Two donors did not receive heparin as part of their terminal treatment. These two donors did not receive any terminal treatment at all.

All were beating heart donors in 2005.

Figure 110

Terminal Treatment 2001 - 2005

Drugs	Australia					New Zealand				
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
Number of Donors	**(185)**	**(206)**	**(179)**	**(218)**	**(204)**	**(37)**	**(38)**	**(40)**	**(40)**	**(29)**
Heparin	177	203	177	211	193	36	37	40	37	27
Methyl Prednisolone	166	186	157	182	145	0	2	4	5	2
Chlorpromazine	34	49	37	35	30	0	2	0	1	0
Mannitol	16	8	12	4	6	0	0	0	0	0
Prostacyclin	69	89	76	93	59	12	12	21	11	10

NB: Donors may be given more than one drug

Figure 111

Australian States Terminal Treatment 2005 (2004)

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA
Number of Donors	**35 (39)**	**54 (63)**	**9 (6)**	**50 (45)**	**2 (2)**	**20 (39)**	**4 (1)**	**30 (23)**
Heparin	33 (39)	48 (60)	9 (6)	50 (45)	2 (2)	19 (37)	4 (1)	28 (21)
Methyl Prednisolone	13 (30)	48 (59)	9 (6)	38 (42)	2 (2)	18 (38)	4 (1)	13 (4)
Chlorpromazine	22 (28)	0 (0)	0 (1)	6 (5)	0 (0)	0 (1)	2 (0)	0 (0)
Mannitol	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (3)	0 (0)	5 (0)
Prostacyclin	35 (20)	54 (31)	9 (5)	50 (14)	2 (2)	20 (12)	4 (0)	30 (9)

NB: Donors may be given more than one drug