The Twenty Third Report

AUSTRALIA AND NEW ZEALAND DIALYSIS AND TRANSPLANT REGISTRY

2000

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Statistical Methods

Actuarial and Kaplan-Meier survivals have been produced using the procedure contained in SPSS ® for Windows ™ Release 9.0.1 SPSS Inc.

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Publications based upon ANZDATA Registry information reported here or supplied upon request, must include the citation as noted above and the following notice:

> The data reported here have been supplied by the Australia and New Zealand Dialysis and Transplant Registry. The interpretation and reporting of these data are the responsibility of the Editors and in no way should be seen as an official policy or interpretation of the Australia and New Zealand Dialysis and Transplant Registry.

Participating Hospitals

Queensland
Allamanda Private Hospital
Bundaberg Base Hospital
Cairns Base Hospital
Goldcoast Hospital
Greenslopes Private Hospital
Hervey Bay Hospital
John Flynn Hospital
Mackay Base Hospital
Nambour Hospital
Princess Alexandra Hospital
Riverview Private Hospital
Rockhampton Base Hospital
Royal Brisbane Hospital
Toowoomba Hospital
Townsville General Hospital
Wesley Private Hospital

New South Wales / Australian Capital Territory (ACT)
Dubbo Base Hospital
Gosford Hospital
John Hunter Hospital
Lismore Hospital
Mater Misericordiae Hospital
New Children's Hospital
Prince of Wales Hospital
Royal North Shore Hospital
St. George Hospital
St. Vincent's Hospital
South West Sydney Renal Service
Bankstown Hospital
Liverpool Hospital
Statewide Renal Services
Concord Hospital
Royal Prince Alfred Hospital
Sydney Adventist Hospital
Sydney Children's Hospital (*Prince of Wales)*
Tamworth Hospital
The Canberra Hospital (ACT)
Westmead Hospital
Wollongong Hospital

Victoria
Alfred Hospital
Austin and Repatriation Medical Centre
Epworth Hospital
Geelong Hospital
Monash Medical Centre – Adult
Monash Medical Centre – Paediatric
Royal Children's Hospital
North West Health Care
Royal Melbourne Hospital
Western Hospital
St. Vincent's Hospital

Tasmania
Launceston General Hospital
Royal Hobart Hospital

South Australia
Flinders Medical Centre
The Queen Elizabeth Hospital
Royal Adelaide Hospital
Women's and Children's Hospital

Northern Territory
Royal Darwin Hospital
Alice Springs Hospital

Western Australia
Fremantle Hospital
Princess Margaret Hospital for Children
Royal Perth Hospital
Sir Charles Gairdner Hospital

New Zealand
Auckland Hospital
Starship Children's Hospital
Christchurch Hospital
Dunedin Hospital
Middlemore Hospital
Palmerston North Hospital
Waikato Hospital
Wellington Hospital
Whangarei Area Hospital

Satellite Dialysis Units

Queensland
Atherton Satellite - Cairns Base Hospital
Calvary Hospital - Cairns Base Hospital
Home Hill Satellite – Townsville General Hospital
Keperra – Royal Brisbane Hospital
Logan Satellite – Princess Alexandra Hospital
Mater Children's Hospital
Noosa Satellite - Nambour Hospital
Royal Children's Hospital
Sandgate Satellite – Royal Brisbane Hospital
Vincent Satellite – Townsville General Hospital

New South Wales (ACT)
Ballina Satellite – Lismore Hospital
Bankstown Hospital - S.W.Sydney Renal Service
Bathurst - St. Vincent's Hospital
Blacktown Satellite - Westmead Hospital
Brewarrina Hospital
Canberra Community Dialysis Centre (ACT)
Chatswood Satellite
Coffs Harbour Base Hospital
Coonamble Hospital
Dame Eadith Walker - Statewide Renal Services
Dubbo Base Hospital
Eora Cottage – Prince of Wales Hospital
Grafton Hospital - Lismore Hospital
Kempsey Hospital
Lanceley Cottage – Royal North Shore Hospital
Liverpool Community Hospital
– South West Sydney Renal Service
Maitland Hospital
Nita Reed House (Taree) - John Hunter Hospital
Norfolk Island Hospital
Orange Base Hospital – Westmead Hospital
Shellharbour – Wollongong Hospital
Shoalhaven Satellite (Nowra) - Wollongong Hosp.
Singleton Satellite – John Hunter Hospital
Sydney Adventist Hospital
Sydney Dialysis Centre
Wagga Wagga Base Hospital
Wansey Satellite – John Hunter Hospital
Westmead Hospital

Victoria
Angliss Hospital
Apollo Bay Hospital
Ararat Hospital
Austin Training Satellite - Austin & Repat.Hosp.
Bacchus Marsh Hospital
Bairnsdale Hospital
Ballarat Hospital
Bendigo Hospital
Berwick Hospital
Birchip Hospital
Broadmeadows Hospital
Brunswick Satellite
Casterton Hospital
Caulfield Satellite
Charlton Campus
Cohuna Hospital
Colac Hospital
Cranbourne Satellite
Daylesford Hospital
Diamond Valley Hospital
Echuca Hospital
Edenhope Hospital
Epworth Hospital
Frankston Satellite
Geelong Hospital
Goulburn Valley Hospital
Hamilton Hospital
Hastings Hospital
Heidelberg – Austin & Repatriation Hospital
Hepburn Health Satellite
Horsham Satellite
La Trobe Regional Satellite

Victoria cont...
Laverton Hospital
Lorne Hospital
Maryborough District Health Service
Mildura Hospital
Mitcham Hospital
Moorabbin Satellite
Myrtleford Hospital
Nauru (overseas) – Alfred Hospital
North East Kidney Service - Austin Hosp.
Orbost Hospital
Peter James Centre
Portland Hospital
Robinvale Hospital
St. Arnaud Hospital
Sale Hospital
Sandringham Satellite
Sealakes District Health Centre
Seymour Hospital
Sunshine Hospital
Swan Hill Hospital
Terang Satellite
Walwa Hospital
Wangaratta Hospital
Warrnambool Hospital
Werribee Mercy Hospital
Western Gippsland Hospital
Williamstown Satellite
Wodonga Hospital
Wonthaggi Hospital
Yarawonga District Hospital
Yarram Hospital

Tasmania
North West Renal Unit
- Burnie - Launceston Hosp.
Royal Hobart Hospital

South Australia
Berri Hospital
College Grove Private Hospital
Hartley Private Hospital
North Adelaide Satellite Centre
Port Augusta Hospital
Wayville Satellite Centre

Northern Territory
Bathurst Island Hospital - Royal Darwin
Community Health Centre
– Alice Springs Hospital
Jabiru Health Centre
Nightcliff Community Centre
– Royal Darwin Hospital

Western Australia
Armadale Satellite
Bunbury Satellite
Geraldton Hospital
Joondalup Satellite Unit
Kalgoorlie Hospital
Leonora Hospital
Melville Satellite
Peel Health Campus
Roebourne District Hospital
Royal Perth Rehabilitation Hospital
– Royal Perth Hospital

New Zealand
Greenlane Hospital
Hastings Hospital
Kaikohe Hospital
Kawakawa Hospital
Middlemore Hospital
Nelson Hospital
New Plymouth Hospital
Rotorua Hospital

Introduction

This is the 23rd Report from ANZDATA Registry and coincides with a significant change in its leadership.

Dr Alex Disney is passing the responsibility for running the Registry and producing the Annual Report to A/Prof. Graeme Russ. This 23rd Report is to be the last edited by Alex – all previous reports have been produced either solely by him or with him as Editor. This is not the place to pay full recognition to Alex's contribution. He has devoted most of his spare professional time to the Registry and its causes. He has represented the Registry in the International Forum and has been the main factor responsible for its current reputation and credibility. Happily, he is going to continue on the Registry Executive but in a less demanding way.

A/Prof. Graeme Russ is well known to all Australian and New Zealand Nephrologists through his recent Presidency of the Australia and New Zealand Society of Nephrology and through other contributions; he has for some years been responsible for the transplant section of the Report.

We are about to go to Tender for solutions to allow the ANZDATA Registry to migrate to an "interactive WEB enabled system". This will be piloted in four Australian hospitals during 2001 with a view to all hospitals wishing to avail themselves of this modality to do so in 2002. The funding to allow this system to be developed has come from a generous seeding grant (untied) from Novartis. Without that, funds would not have been available to proceed.

Apart from efficiencies gained in data recording, the main value will be our ability to do a more timely analysis.

A review of Australian Transplant Outcome Registries is currently in progress. It is not clear in which direction this review is going to go. Strong support has been forthcoming from nephrology circles for the retention of a separate dialysis and transplant registry focussing on renal matters. Funding is going to be the key issue and for us to retain independence it will be necessary to show cost efficiency and an ability to generate continuous funding. In this regard the solid support from the Australian Kidney Foundation which has funded ANZDATA from its inception, is pivotal. Support from commercial sources remains a possibility but carries with it the need for such support to be untied.

The ANZDATA Registry Executive is responsible to the ANZDATA Registry Advisory Committee, which is a Subcommittee of the Dialysis and Transplant Committee of the Australian and New Zealand Society of Nephrology and the Australian Kidney Foundation. This Committee meets annually and currently consists of

Dr. J. Collins (Advisor/CAPD)
Dr. A. Disney (Retiring Executive Officer)
Mrs. L. Excell (Project Manager)
Dr. M. Falk
Dr. A. Gillin
A/Prof. D. Harris
Ms. K. Herbertt (Advisor/Organ Procurement)
A/Prof. P. Kerr (Advisor/Haemodialysis)
Dr. J. Knight (AKF Representative)
Dr. K. Lynn (NZ Representative)
A/Prof. T. Mathew (Chairman)
Dr. L. McMahon
Dr. B. Murphy
Dr. D. Nicol
Dr. H. Rhodes
A/Prof. G. Russ (Executive Officer)
Prof. A. Sheil (Advisor/Cancer)
Dr. M. Suranyi
A/Prof. R. Walker (Advisor/Paediatrics)

The ANZDATA Registry Advisory Committee met in October 2000 and authorized substantial change to some of the questions for future surveys. A special meeting with all Australian and New Zealand Heads of Renal Units and Registry Executive is scheduled for early December 2000. This is to ensure that there is consensus for the path planned for WEB enabled data entry.

The Annual Report is again a comprehensive account of the delivery of dialysis and transplantation to Australian and New Zealand patients. Special sections this year have been written by, John Collins, Karen Herbertt, Peter Kerr, Graeme Russ and Rowan Walker.

The overworked staff at Registry Headquarters in Adelaide are unchanged. Lee Excell continues to have prime responsibility for maintaining the database and overview of analyses. She is assisted by, Brian Livingston computer programmer and analyst, and Lis Steinmetz who attends to administration and secretarial support.

This report is posted to a large mailing list in Australia, New Zealand and overseas. Should you know of anyone who would like to join the mailing list, please let us know.

Timothy H. Mathew
Chairman

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SUMMARY - AUSTRALIA

Patients Treated 31 December 1999: 11,005 patients (580 per million), a 6% increase: 5,042 (266 per million) functioning transplants, 5,963 (314 per million) were dialysis dependent.

New Patients 1999: 1,708 patients (90 per million) a 6% increase. State intake ranged from Tasmania (49 per million), New South Wales (82 per million), Queensland (87 per million), Victoria and South Australia (94 per million), Western Australia (106 per million) and the Northern Territory (259 per million).

Caucasoid 81%, Aboriginal 8%, and Asian 7%. 58% of patients were male; 36% Aboriginals were male.

Co-morbid Factors 1996-1999: coronary artery disease 39.4%, peripheral vascular disease 27.8%.

Age of New Patients: 42% were 65 years or older. Main feature was the 20% increase in the older age group 65-74 years. Age range 7 months to 94.1 years. Median age was 61.1 years and mean age 57.8 years.

Primary Renal Disease: glomerulonephritis 20% (414/518 were biopsy proven), diabetic nephropathy (74/420 biopsy proven) 25%, hypertension 11% and analgesic nephropathy 6%. Diabetic nephropathy was classified as Type I in 17% of cases (23% in 1998).

Awaiting Transplantation: of patients <65 years, 41% were on the waiting list, 14% awaiting assessment and 4% temporarily off the list. Range 72% patients (5-14 years) to 28% (55-64 years).

Only 13% in the Northern Territory were on the waiting list; (36%) were awaiting assessment and (6%) temporarily off the list.

For patients <55 years on the list, New South Wales/ACT 65%, Victoria 52%, South Australia 49%, Western Australia 42%, Queensland 41%, Tasmania 37% and Northern Territory 24%.

Death Rates (per 100 patient years): overall dialysis dependent patient death rate was 16.5 and for those with a functioning transplant was 2.2.

Cause of Death: 42.5% of 952 dialysis patient deaths were due to a cardiac cause (11% myocardial infarction), 13% due to infection and 21% withdrawal from treatment (74% were >65 years old).

5% of deaths were attributed to malignancy. Twenty four (48%) of these dialysis patients had malignancy at first dialysis and a further 16% within nine months.

Eight cases were myeloma.

32% of 111 functioning transplant patient deaths were due to cardiac cause, 25% due to malignancy and 13% to infection.

There were two melanoma, three Merkel Cell, five skin SCC and three lymphomas amongst the transplant malignancy deaths.

Dialysis Treatment 1999: There was a 7% increase overall in all States except Tasmania. South Australia increased by 13%, Victoria and Western Australia 10%, Queensland 8%, New South Wales/ ACT 5% and the Northern Territory 4%.

Hospital based haemodialysis patients increased by 7%, satellite based haemodialysis 14% and home haemodialysis 4%.

Peritoneal dialysis increased from 1,623 to1,664 patients. Continuous ambulatory peritoneal dialysis remained almost the same as in 1998 (1,407 and 1,403 patients respectively). CCPD increased from 20% to 22%. Overall PD 28%.

In relation to age; 76% of patients 15-54 years old and 70% of patients >55 years old used haemodialysis; 70% of patients <15 years old used peritoneal dialysis.

SUMMARY - AUSTRALIA

Transplantation 1999

Grafts Performed in 1999

There were 453 operations performed in 1999 which represents a transplant rate of 24 per million of population. This was a 14% decrease compared to 1998. The cadaver donor transplant number for 1999 was the lowest since 1976. The living donor transplant rate was 37% in 1999 which is the highest on record.

6.1% of dialysing patients and 10.5% of dialysing patients between 15 and 59 years of age were transplanted.

South Australia/ Northern Territory had the highest transplant rate of 42 per million with other states ranging between 18 (Queensland) and 27 (Western Australia) per million.

Outcome

For primary cadaver grafts performed in 1998 the 12 month patient and graft survival was 95% and 91% respectively. This represents a constant success rate of between 89 and 91% since 1994. The five year cadaver recipient patient and graft survival for operations performed in 1994 was 84% and 72% respectively.

For second and subsequent cadaver grafts, the one year patient and graft survival for recipients transplanted between 1997 and 1999 was 96% and 86% respectively. This represents a marked improvement in graft survival for regrafts performed in the 1994 to 1996 period.

The median age of transplanted recipients in 1999 was 43.8 years. The age range was 1.7 to 68.9 years.

Living donor Transplants: 37% of all transplant operations were from living donors, the largest proportion ever performed in Australia. The number of unrelated living donors increased from 35 in 1998 to 43 in 1999. 67% of living donors in 1999 were female. 19% of living donor operations were performed without the recipient receiving dialysis therapy.

Functioning Transplants at 31 December 1999: there were 5,042 functioning grafts giving an prevalence of 266 patients per million. This represents a 4% increase over 1998. Patients with functioning grafts were in excess of those dependent on dialysis only in South Australia and Tasmania.

The modal age of transplant dependent patients was 45-54 years with a mean of 47.8 and a median of 48.8 years.

27% of grafts had been functioning for more than 10 years and 5% more than 20 years.

There are now 20 recipients with grafts functioning 30 years or longer.

22% of functioning grafts were from living donors and the modal age group for living donor recipients was 25-34 years.

Factors Affecting Graft Outcome

Delayed Graft Function:

The incidence of delayed graft function for primary cadaver grafts has dropped to a nadir in 1994 but there has been an increase since that time. The rate of delayed graft function in 1999 for primary grafts was 24% and for regrafts 42%.

Queensland has a significantly lower incidence of delayed graft function in recipients of primary cadaveric grafts compared to the rest of the country. New Zealand has a significantly lower rate of delayed graft function than Australia.

Primary cadaver grafts with delayed function have a significantly inferior survival in the long term by approximately 10% at nine years. This worse outcome is seen predominantly in those whose delayed graft function lasted for more than seven days.

The mean serum creatinine is greater at 12 months in primary cadaver grafts if there was delayed graft function.

Delayed graft function is more common in

* recipients receiving haemodialysis compared to those on peritoneal dialysis
* with increasing ischaemia time particularly beyond eighteen hours
* in recipients who have a high panel reactive antibody
* with increasing age of donor

Outcome According to Transplant Function at Six and Twelve Months:

The mean serum creatinine of primary cadaver grafts performed between 1994 and 1998 at six months is 144 µmol/L and at twelve months 147 µmol/L. The calculated glomerular filtration rate at these two intervals is 52.6 and 52.3 mls/min.
There is a significantly worse long term outcome for grafts with worse renal function at both six and twelve months if the serum creatinine is >160 µmol/L.

Donor Organ Report: the number of cadaver donors decreased from 10 to 9 per million in 1999. The median age of donors in 1999 was 42.5 years (range 0.21 -77.1 years) and again there was a predominance of male donors. 54% of donors died from cerebrovascular disease and 23% from road trauma.

SUMMARY - NEW ZEALAND

Patients Treated 31 December 1999: 2,202 patients (578 per million). Functioning transplants 975 (256 per million) and dialysis dependent 1,227 (322 per million). The minority (44%) were transplant dependent.

New Patients 1999: 368 patients (97 per million), slightly less than last year, 370 patients (98 per million). 50% Caucasoid, 29% Maori, 15% Pacific Islander and 5% Asian. 60% of patients were male.

Co-morbid Factors 1996-1999: coronary artery disease 34.8%, peripheral vascular disease 28.1%.

Age of New Patients: 57% were 55 years or older. Median 57.2 years, mean 55.8 years, range 9 months to 89.1 years.

Primary Renal Disease: glomerulonephritis 21% and diabetic nephropathy 40% (88% of diabetic nephropathy were Type II non insulin and insulin requiring).

Awaiting Transplantation: 25% were on the waiting list, 19% awaiting assessment, 3% temporarily off the list. Patients <65 years, 33% on list, 21% awaiting assessment and 4% temporarily off the list.

Death Rates: overall dialysis dependent death rate was 16.3 deaths per 100 patient years and for those with a functioning transplant 2.4 deaths per 100 patient years.

Cause of Death: 50% of dialysis patient deaths were due to cardiac causes (11% myocardial infarction), 16% due to infection. 23 transplant dependent patients died: cardiac 7 and malignancy 8 cases.

Dialysis Dependent patients: 1,227 patients (322 per million), an increase of 9.2% from the previous year. 69% were having home dialysis (73% home CAPD). The decrease in CAPD continued 53% to 51%. Home haemodialysis decreased from 24% to 21%. Hospital haemodialysis increased from 22% to 24% of all dialysis patients.

Transplantation 1999: there were 112 transplant operations at a rate of 29 per million. This is an increase of 6% from 1998. The percentage of living donors was 38%.

87% were primary grafts.

The median age of recipients in 1999 was 42.7 years (43 years in 1998).

7.3% of all dialysed patients were transplanted in 1999.

Functioning Transplants: there were 975 grafts functioning (256 per million) at 31 December 1999, a 5% increase from 1998.

80% of functioning transplants were Caucasoids, 10% Maoris, 4% Pacific Islanders, 5% Asians and <1% other.

The longest surviving grafts had reached 32 years and 41 grafts had functioned for more than 20 years.

Survival Following Primary Cadaveric Graft

Transplantation 1998: patient survival was 91% and graft survival was 87% at 12 months.

Figure 1 — Australia

Stock of Patients (31 December) 1994 - 1999

	1994	1995	1996	1997	1998	1999
No. Functioning Transplants #	4045 (227)	4210 (233)	4413 (241)	4649 (251)	4865 (259)	5042 (266)
No. Dialysis Patients	4100 (230)	4529 (251)	4893 (268)	5197 (280)	5549 (296)	5964 (314)
Proportion Home	47%	46%	45%	43%	40%	38%
Proportion Satellite	23%	25%	27%	28%	31%	33%
Proportion CAPD	31%	32%	30%	28%	25%	24%

Patient Flow Summary

	1994	1995	1996	1997	1998	1999
No. New Patients	1314 (74)	1378 (76)	1428 (78)	1483 (80)	1610 (86)	1708 (90)
No. New Transplants	440 (25)	441 (24)	475 (26)	502 (27)	518 (28)	453 (24)
Living Donor Transplants	103	93	115	144	161	167
Non Primary Transplants	56	71	59	58	75	51
No. Deaths	708	769	847	910	1019	1063
Dialysis Patients	597	649	732	797	894	952
Transplant Patients	111	120	115	113	125	111

( ) Number of patients per million population

Patients lost to follow up are not included

Figure 2

National and State Stock and Flow 1-Jan-99 to 31-Dec-99

State	New Patients	Transplant Operations (Caring State)	Deaths		Dialysis Dependent	Functioning Transplants # +	Total
			Dialysis	Transplant			
Queensland	304 (296)	65 (98)	191 (163)	29 (26)	952 (884)	1009 (989)	**1961 (1873)**
NSW/ACT	551 (542)	138 (153)	341 (340)	50 (45)	2187 (2088)	1672 (1630)	**3859 (3718)**
Victoria	442 (429)	114 (118)	214 (218)	16 (22)	1600 (1449)	1197 (1163)	**2797 (2612)**
Tasmania	23 (30)	13 (14)	22 (27)	1 (1)	97 (101)	116 (109)	**213 (210)**
South Australia	140 (114)	54 (73)	55 (50)	8 (21)	369 (326)	546 (520)	**915 (846)**
Northern Territory	50 (48)	17 (11)	29 (25)	1 (1)	162 (156)	63 (54)	**225 (210)**
Western Australia	198 (151)	52 (50)	100 (71)	6 (9)	597 (545)	455 (416)	**1052 (961)**
Australia	**1708 (1610)**	**453 (517)**	**952 (894)**	**111 (125)**	**5964 (5549)**	**5058 (4881)**	**11022 (10430)**
New Zealand	**368 (370)**	**112 (107)**	**191 (178)**	**23 (25)**	**1227 (1123)**	**959 (913)**	**2186 (2036)**

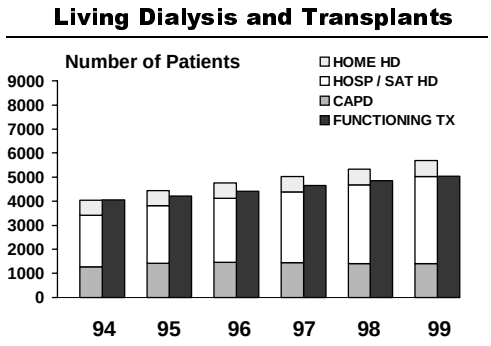
( ) 1998 December figures

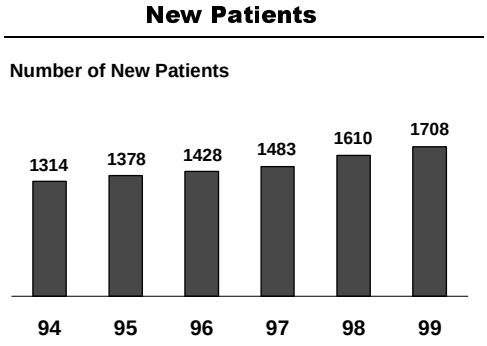
Patients lost to follow up are not included

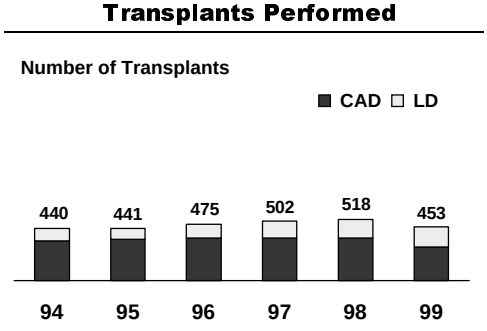
+ Functioning transplants by Caring State / Country

Figure 3

Stock and Flow Australia 1994 - 1999







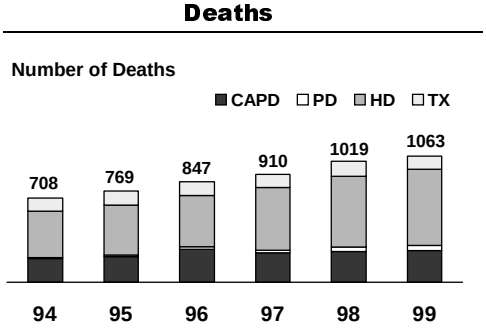


Figure 4 **New Zealand**

Stock of Patients (31 December) 1994 - 1999

	1994	1995	1996	1997	1998	1999
No. Functioning Transplants #	730 (203)	782 (214)	822 (221)	878 (233)	929 (245)	975 (256)
No. Dialysis Patients	786 (218)	851 (233)	937 (252)	1020 (271)	1123 (296)	1227 (322)
Proportion Home	84%	81%	80%	75%	73%	69%
Proportion Satellite	<1%	<1%	<1%	1%	4%	7%
Proportion CAPD	62%	59%	57%	54%	53%	51%

Patient Flow Summary

	1994	1995	1996	1997	1998	1999
No. New Patients	248 (69)	288 (79)	290 (78)	320 (85)	370 (98)	368 (97)
No. New Transplants	83 (23)	94 (26)	96 (26)	112 (30)	106 (28)	112 (29)
Living Donor Transplants	20	24	26	31	31	42
Non Primary Transplants	13	10	8	11	11	15
No. Deaths	157	168	161	184	203	214
Dialysis Patients	136	154	133	157	178	191
Transplant Patients	21	14	28	27	25	23

( ) Number of patients per million population

Patients lost to follow up are not included

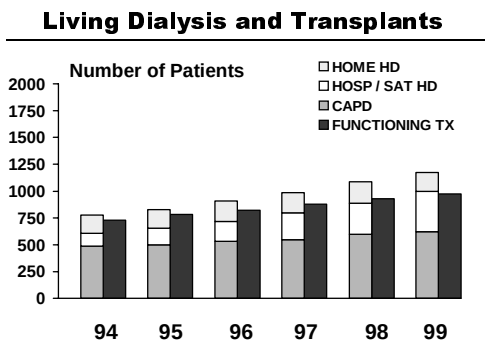
Figure 5 **New Zealand**

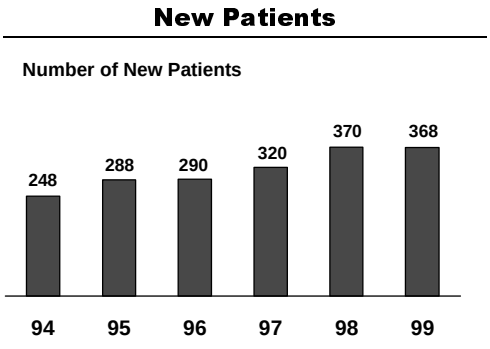
Stock and Flow 1987 - 1999

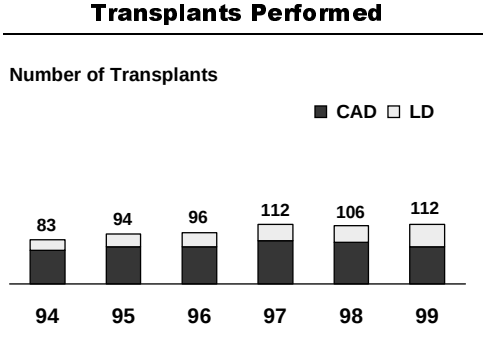
	New Patients	New Transplants		Deaths		Dialysis Dependent	Funct.Tx (Tx. in NZ)	Total
		Tx. Country	Caring Country	Dialysis	Transplant			
1987	151	79	79	66	23	438	452	**890**
1988	152	78	78	57	18	482	484	**966**
1989	174	83	83	68	13	528	531	**1059**
1990	179	102	101	83	21	557	579	**1136**
1991	215	77	77	88	20	632	607	**1239**
1992	245	115	115	122	13	676	676	**1352**
1993	232	84	85	138	17	722	705	**1427**
1994	248	83	84	136	21	786	730	**1516**
1995	288	94	94	154	14	851	782	**1633**
1996	290	96	96	133	28	937	822	**1759**
1997	320	112	112	157	27	1020	878	**1898**
1998	370	106	107	178	25	1123	929	**2052**
1999	368	112	112	191	23	1227	975	**2202**

Figure 6

Stock and Flow New Zealand 1994 - 1999







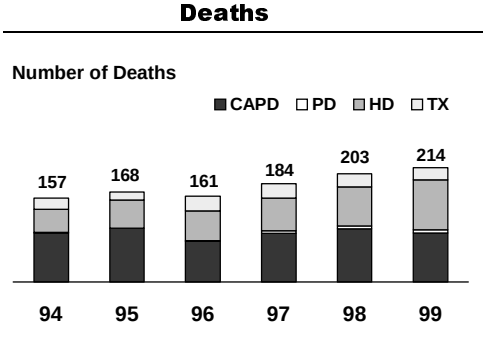


Figure 7

Patients Alive: Functioning Transplant or Dialysis 1989 - 1999

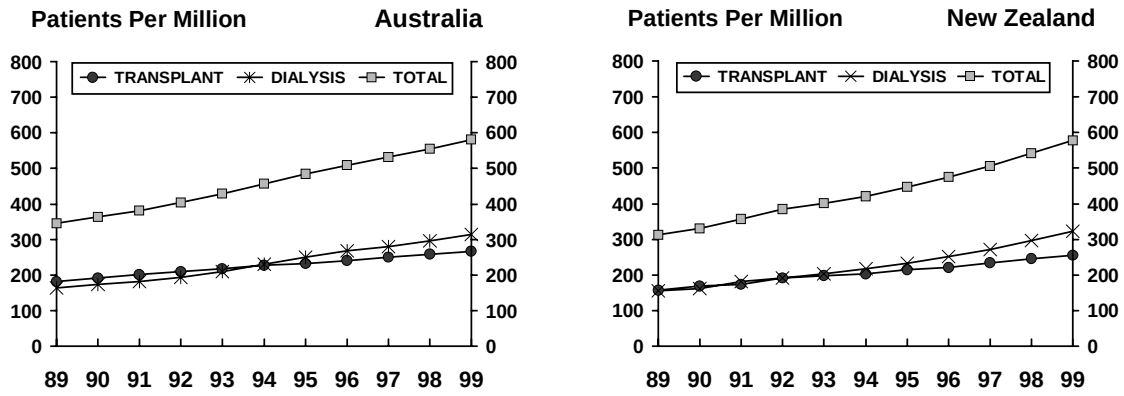


Figure 8

Transplant and Dialysis Patients 1989 - 1999

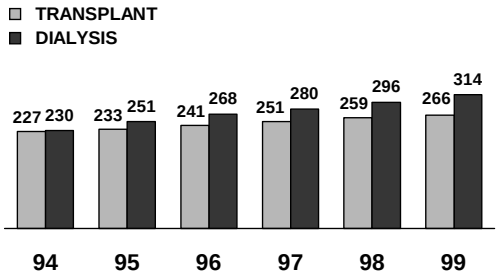
	Year	Transplant #	Per Million	Dialysis	Per Million	Total	Per Million
Australia	1989	3048	181	2752	164	5800	345
	1990	3259	191	2959	173	6218	364
	1991	3484	201	3139	181	6623	382
	1992	3687	210	3387	193	7074	404
	1993	3855	218	3705	210	7560	428
	1994	4045	227	4100	230	8145	456
	1995	4210	233	4529	251	8739	484
	1996	4413	241	4893	268	9306	509
	1997	4649	251	5197	280	9846	531
	1998	4866	260	5549	296	10415	555
	1999	5042	266	5964	314	11006	580
New Zealand	1989	531	158	528	156	1059	313
	1990	579	171	557	162	1136	331
	1991	607	175	632	182	1239	356
	1992	676	192	676	192	1352	384
	1993	705	198	722	203	1427	401
	1994	730	203	786	218	1516	421
	1995	782	214	851	233	1633	446
	1996	822	221	937	252	1759	473
	1997	878	233	1020	271	1898	504
	1998	929	245	1123	296	2052	541
	1999	975	256	1227	322	2202	578

Patients lost to follow up are not included

Comparison of Transplant and Dialysis Dependent Patients 1994 - 1999

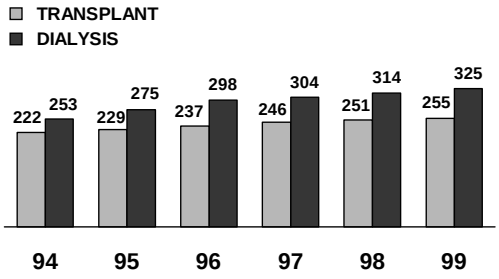
Australia

Patients Per Million



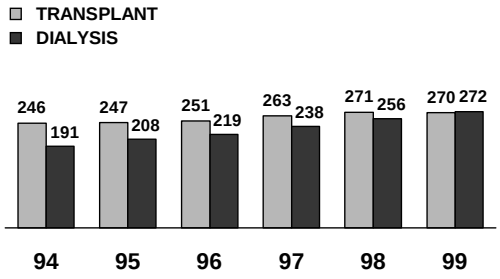
New South Wales

Patients Per Million



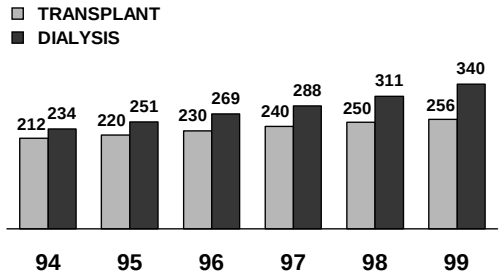
Queensland

Patients Per Million



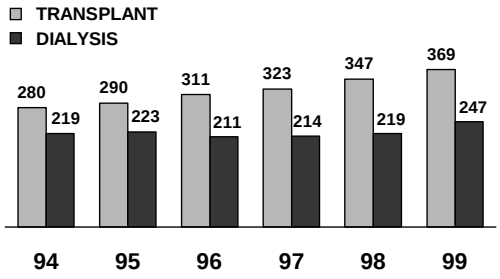
Victoria

Patients Per Million



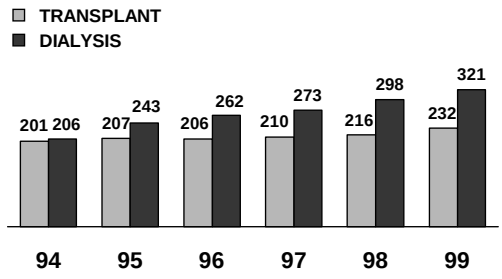
South Australia

Patients Per Million



Western Australia

Patients Per Million



Transplanted patients "Lost to follow up" have been excluded from the totals in each State.

Patients from Tasmania were transplanted in Victoria
and from the Northern Territory in South Australia.

For calculation of population related totals for functioning transplant patients
the populations of these States were amalgamated.

Figure 10

Treatment of Aboriginal Patients
Australia 1992 - 1999

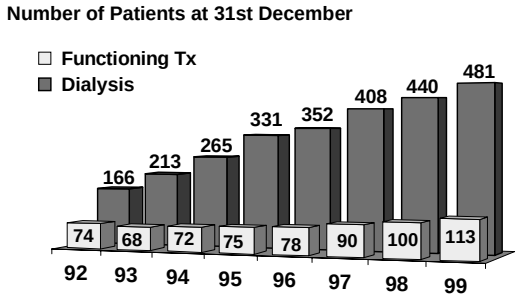


Figure 11

Treatment of Maori Patients
New Zealand 1992 - 1999

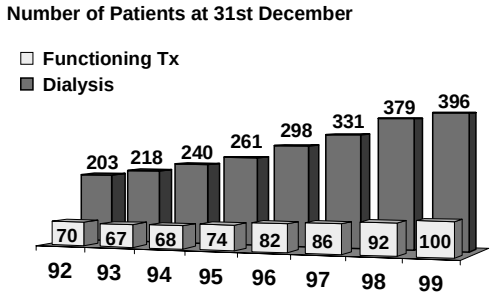


Figure 12

Treatment of Pacific Islander Patients
New Zealand 1992 - 1999

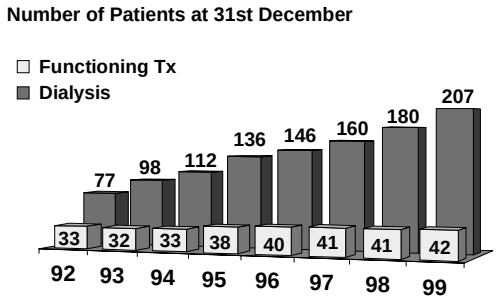


Figure 13

Prevalence and Incidence 1992 - 1999
Aboriginals - Australia

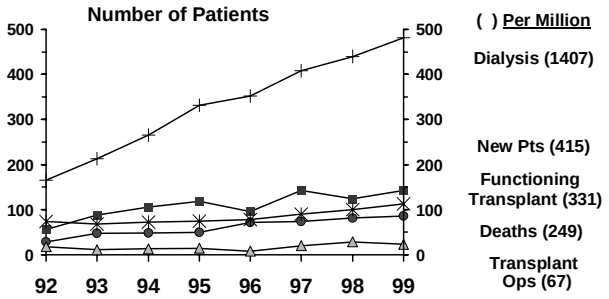


Figure 14

Prevalence and Incidence 1992 - 1999
Maoris - New Zealand

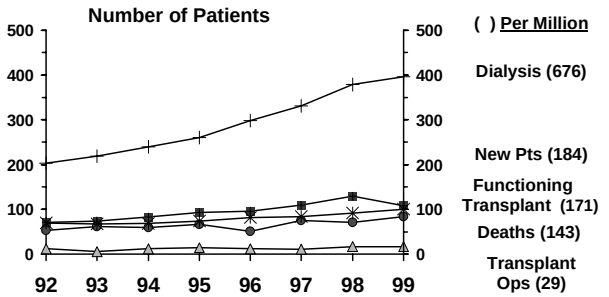
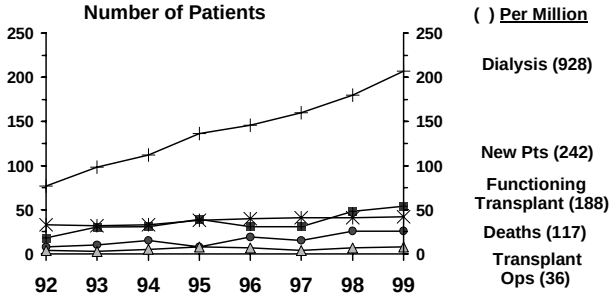


Figure 15

Prevalence and Incidence 1992 - 1999
Pacific Islanders - New Zealand



NEW PATIENTS
COMMENCING TREATMENT IN 1999

AUSTRALIA See Figures 17-19, 23-30.

The number of new patients commencing treatment in 1999 (1,708) had increased by 6% compared to the previous year; after some years of 3% annual increment it was 7% last year (1998). The increase was seen, in each major racial group, in each State, and particularly in the age group 65-74 years (a 20% rise following several years of no change in intake). Males comprised 58% of patients (59% in 1998).

In relation to population there were 90 patients per million which was 33% higher than 5 years earlier but still low compared to Western Europe and North America.

The median age of all patients rose to 61.1 years (61.2 years males, 60.8 years females). The modal age group was 65-74 (males and females). Mean age was 57.8 years (56.5 in 1998). Age range was from 7 months to 94.1 years.

The new patient age-group specific rates showed a marked rise (20%) in the 65-74 year group from 322 (1998) to 389 patients per million and in the 75-84 year group from 245 (1998) to 272 patients per million in 1999. Most patients (81%) were Caucasoid; 8.3% were Aboriginal, 7% Asian, 2% Pacific Islander and 2% Other.

AUSTRALIAN STATES

A marked increase in new patients occurred in Western Australia (31%) and South Australia (23%), a moderate increase in Victoria and a fall in Tasmania. The lowest rates were in Tasmania (49 per million) and New South Wales (82 per million). Excluding analgesic nephropathy the highest intakes were in Northern Territory (259 per million) and Western Australia (104 per million).

In the modal age group (65-74 years except Northern Territory 45-54 years) the lowest rate was in South Australia (318 per million) and the highest in Western Australia (448 per million) and Northern Territory (1,574 per million).

The median, mean ages and age range are shown in Figure 25. The median age increased in all States in 1999.

The highest in New South Wales, 62.6 years and the lowest, excluding the Northern Territory and Tasmania, was South Australia 58.7 years. The gender and age data for each State is shown in Figure 26. Females predominated in Northern Territory (70%) and were 10 years older than males.

The racial distribution in each State is shown in Figure 28: Aboriginals in the Northern Territory (86%), in Western Australia (16%), Queensland (12%); Asians in New South Wales/ACT (11%) and in Victoria (8%). Males predominated in all except Aboriginals. The number of Aboriginals increased only in Queensland and Northern Territory; it did not increase in Western Australia.

NEW ZEALAND See Figures 20-30.

The number of incident patients in 1999 (368) was similar to 1998 (370), and did not maintain the increase in the previous three years (1995-97). In the current year (1999) the population related figure (97 per million) was still higher than in Australia. In those 45-64 years the age group related incident rate decreased but there was an increase in the 45-54 years, and the 75-84 years age groups. Males comprised 60% of patients (60%, 1998).

The median age was 57.2 years (59.1 years for males and 54.7 years for females). The modal age group was 55-64 years for males and 45-54 years for females. Mean age had risen to 55.8 years, from 54.2 (1998). Age range was from 9 months to 89.1 years.

Most patients (50%) were Caucasoid; 29% were Maori, 15% Pacific Islander, 5% Asian and 1% Other. There were fewer Maoris (14%, 18 patients) and more Caucasoid patients.

Figure 16

Annual Intake of New Patients 1995 - 1999

	1995	1996	1997	1998	1999
Queensland	238 (73)	231 (69)	271 (80)	296 (86)	304 (87)
New South Wales/ACT	502 (78)	548 (84)	526 (80)	542 (82)	551 (82)
Victoria	324 (72)	342 (75)	361 (78)	429 (92)	442 (94)
Tasmania	41 (87)	30 (63)	30 (63)	30 (64)	23 (49)
South Australia	93 (63)	105 (71)	97 (66)	114 (77)	140 (94)
Northern Territory ★	39 [1] (224)	48 (270)	57 (305)	48 (253)	50 (259)
Western Australia	141 (81)	124 (70)	141 (78)	151 (82)	198 (106
Australia	**1378 (76)**	**1428 (78)**	**1483 (80)**	**1610 (86)**	**1708 (90)**
New Zealand	**288 (79)**	**290 (78)**	**320 (85)**	**370 (98)**	**368 (97)**

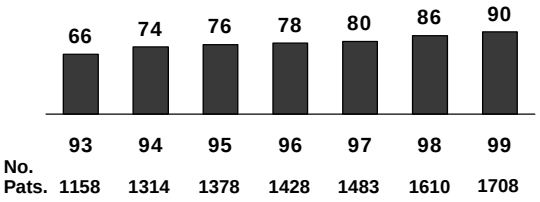
[★] Two Northern Territory resident received initial treatment in South Australia

( ) Per million population

New Patients - Australia

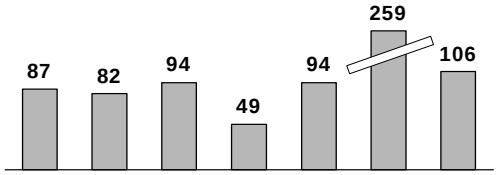
Figure 17

New Patients (Per Million)
Australia 1993 - 1999



	93	94	95	96	97	98	99
No. Pats.	1158	1314	1378	1428	1483	1610	1708

New Patients (Per Million)
Australian States 1999



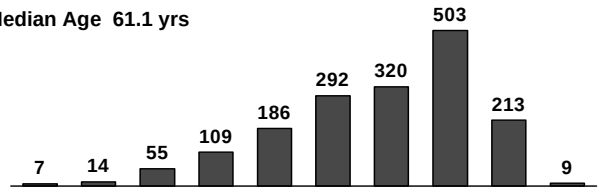
	QLD	NSW	VIC	TAS	SA	NT	WA
No. Pats.	304	551	442	23	140	50	198

Figure 18

Age of New Patients - Australia 1999

New Patients (1708)

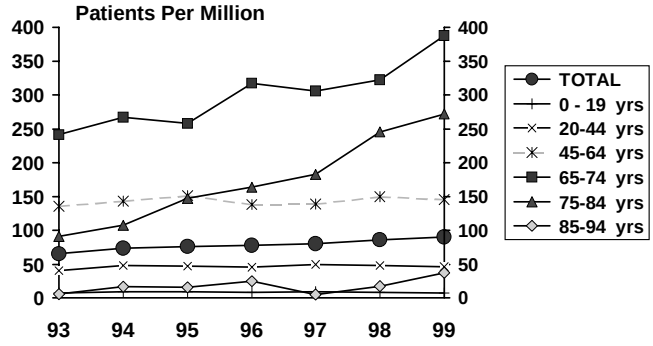
Median Age 61.1 yrs



	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85-94
Per Million Age Group	6	5	20	38	64	115	191	388	272	37
Diabetic %	0	0	0	16	25	31	30	27	16	0
Type 1	0	0	0	12	14	7	3	<1	0	0

Figure 19

Acceptance of New Patients 1993 - 1999
Age Specific Rates - Australia



New Patients - New Zealand

Figure 20

New Patients (Per Million)
New Zealand 1993 - 1999

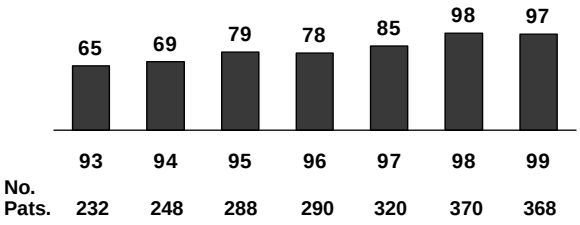
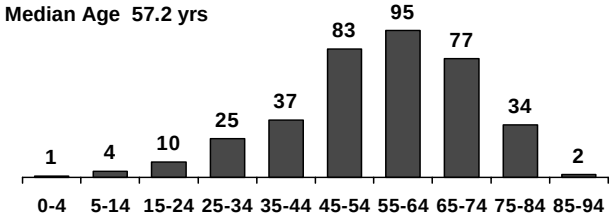


Figure 21

Age of New Patients - New Zealand 1999

New Patients (368)



	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85-94
Per Million Age Group	3	7	19	44	62	172	294	308	226	44
Diabetic %	0	0	10	12	32	58	51	39	15	0
Type 1	0	0	0	8	22	6	2	0	0	0

Figure 22

Acceptance of New Patients 1993 - 1999
Age Specific Rates - New Zealand

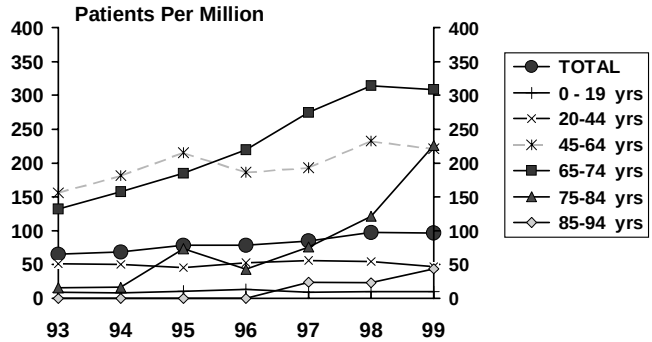


Figure 23

Acceptance of Elderly New Patients 1995 - 1999

	Age Groups	1995	1996	1997	1998	1999
Australia	60-64 years	178 (254)	164 (234)	176 (244)	177 (240)	165 (218)
	65-69 years	201 (290)	225 (325)	213 (310)	215 (315)	250 (369)
	70-74 years	130 (220)	186 (309)	183 (301)	203 (330)	253 (409)
	75-79 years	85 (209)	96 (225)	111 (249)	142 (303)	161 (325)
	80-84 years	15 (55)	20 (70)	23 (80)	44 (152)	52 (180)
	> 85 years	3 (16)	5 (25)	1 (5)	3 (13)	9 (37)
	Total	**612 (214)**	**696 (239)**	**707 (238)**	**785 (260)**	**890 (289)**
New Zealand	60-64 years	38 (273)	29 (211)	44 (318)	55 (391)	48 (333)
	65-69 years	31 (230)	36 (267)	36 (268)	46 (346)	47 (359)
	70-74 years	15 (131)	19 (164)	33 (283)	33 (279)	30 (253)
	75-79 years	9 (111)	6 (72)	6 (69)	17 (189)	28 (301)
	80-84 years	1 (18)	0 (0)	5 (87)	1 (17)	6 (104)
	85-89 years	0 (0)	0 (0)	1 (34)	1 (33)	2 (63)
	Total	**94 (167)**	**90 (159)**	**125 (217)**	**153 (262)**	**161 (273)**

( ) Per million population

Figure 24

Age Group Specific New Patient Intake 65-74 years old

State	1995	1996	1997	1998	1999
Queensland	232	307	367	341	370
New South Wales/ACT	290	376	312	315	369
Victoria	240	309	297	362	446
Tasmania	341	227	229	258	86
South Australia	210	194	203	170	318
Northern Territory	1023	720	1412	1151	1574
Western Australia	224	265	273	343	448
Australia	**258**	**318**	**306**	**322**	**388**
New Zealand	**185**	**220**	**275**	**315**	**308**

Figure 25

Median, Mean and Age Range of New Patients 1999

	Qld	NSW/ACT	Vic.	Tas.	SA	NT	WA	Aust.	N.Z.
Female	(n=148)	(n=225)	(n=166)	(n=10)	(n=52)	(n=35)	(n=86)	**(n=722)**	**(n=147)**
Median	62.9	62.3	60.4	55.6	58.2	52.6	59.9	**60.8**	**54.7**
Mean	59.1	59.0	56.4	55.1	55.0	53.9	56.9	**57.6**	**53.0**
Range	7.4-85.6	11.5-88.6	2.7-94.1	30.8-73.4	13.5-77.4	30.1-70.8	24.6-88.1	**2.7-94.1**	**13.8-80.7**
Male	(n=156)	(n=326)	(n=276)	(n=13)	(n=88)	(n=15)	(n=112)	**(n=986)**	**(n=221)**
Median	58.5	62.7	64.3	43.9	59.3	44.3	60.3	**61.2**	**59.1**
Mean	57.5	58.7	59.1	50.3	56.1	44.5	57.7	**57.9**	**57.6**
Range	17.2-84.3	1.6-84.4	0.6-86.2	24.8-77.3	5.2-86.6	19.9-74.2	0.8-86.2	**0.6-86.6**	**0.8-89.1**
All	(n=304)	(n=551)	(n=442)	(n=23)	(n=140)	(n=50)	(n=198)	**(n=1708)**	**(n=368)**
Median	61.2	62.7	62.5	53.2	58.7	52.0	60.1	**61.1**	**57.2**
Mean	58.3	58.8	58.1	52.4	55.7	51.1	57.3	**57.8**	**55.8**
Range	7.4-85.6	1.6-88.6	0.6-94.1	24.8-77.3	5.2-86.6	19.9-74.2	0.8-88.1	**0.6-94.1**	**0.8-89.1**

n = Number of Patients

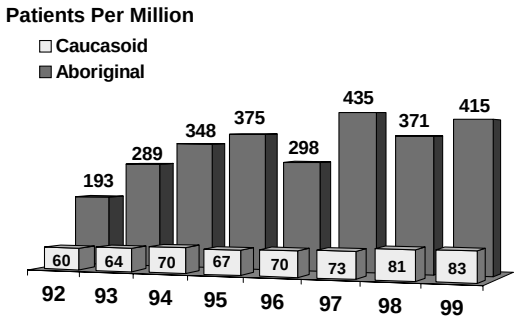
Figure 26

Age and Gender of New Patients 1-Jan-99 to 31-Dec-99

Age Groups	Qld (n=304)		NSW/ACT (n=551)		Vic. (n=442)		Tas. (n=23)		SA (n=140)		NT (n=50)		WA (n=198)		Aust. (n=1708)		N.Z. (n=368)	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
00-04 yrs	0	0	0	2	1	3	0	0	0	0	0	0	0	1	**1**	**6**	**0**	**1**
05-14 yrs	1	0	2	3	2	2	0	0	1	2	0	0	1	0	**6**	**8**	**3**	**1**
15-24 yrs	5	7	8	9	7	7	0	1	0	5	0	2	2	2	**22**	**33**	**5**	**5**
25-34 yrs	7	10	17	19	14	13	1	1	3	6	2	2	5	9	**49**	**60**	**12**	**13**
35-44 yrs	16	18	18	36	17	22	1	5	13	6	3	4	12	15	**80**	**106**	**19**	**18**
45-54 yrs	21	33	31	47	28	51	2	1	8	18	16	4	19	13	**125**	**167**	**37**	**46**
55-64 yrs	30	26	45	60	29	42	3	2	12	17	8	2	18	26	**145**	**175**	**34**	**61**
65-74 yrs	48	35	72	102	48	101	3	0	11	26	6	1	22	28	**210**	**293**	**30**	**47**
75-84 yrs	19	27	30	48	19	34	0	3	4	7	0	0	7	15	**79**	**134**	**7**	**27**
85-94 yrs	1	0	2	0	1	1	0	0	0	1	0	0	1	2	**5**	**4**	**0**	**2**
Total	**148**	**156**	**225**	**326**	**166**	**276**	**10**	**13**	**52**	**88**	**35**	**15**	**86**	**112**	**722**	**986**	**147**	**221**

Figure 27

New Acceptances by Race
Australia 1992 - 1999



New Acceptances by Race
New Zealand 1992 - 1999

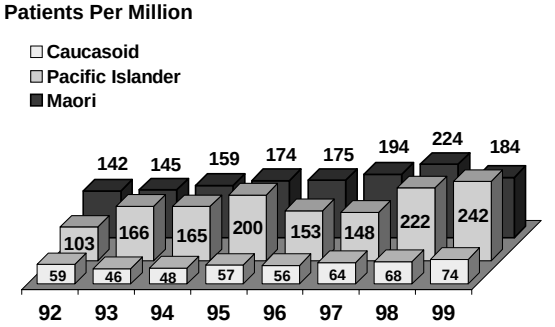


Figure 28

Number of New Patients by Race 1999

Gender	Race	Qld	NSW/ACT	Vic.	Tas.	SA	NT	WA	Aust.	N.Z.
Female	Aboriginal	23	8	4	0	5	31	20	**91**	**0**
	Caucasoid	108	191	132	10	43	2	57	**543**	**70**
	Asian	9	20	20	0	4	1	9	**63**	**13**
	Maori	1	2	0	0	0	0	0	**3**	**41**
	Pacific Islander	6	2	9	0	0	0	0	**17**	**23**
	Other	1	2	1	0	0	1	0	**5**	**0**
	Sub Total	**148**	**225**	**166**	**10**	**52**	**35**	**86**	**722**	**147**
Male	Aboriginal	13	9	1	0	5	12	11	**51**	**0**
	Caucasoid	135	261	251	13	82	3	96	**841**	**114**
	Asian	4	43	19	0	1	0	3	**70**	**8**
	Maori	0	1	1	0	0	0	0	**2**	**67**
	Pacific Islander	4	11	2	0	0	0	0	**17**	**31**
	Other	0	1	2	0	0	0	2	**5**	**1**
	Sub Total	**156**	**326**	**276**	**13**	**88**	**15**	**112**	**986**	**221**
Total		**304**	**551**	**442**	**23**	**140**	**50**	**198**	**1708**	**368**

Figure 29

Australia

Aboriginals as Proportion of Annual Intake of New Patients 1991 - 1999

State	1991	1992	1993	1994	1995	1996	1997	1998	1999
Queensland	10%	4%	12%	8%	11%	9%	9%	8%	12%
New South Wales/ACT	1%	3%	3%	2%	3%	2%	3%	4%	3%
Victoria	1%	<1%	1%	<1%	<1%	1%	1%	<1%	1%
Tasmania	0%	0%	0%	0%	0%	0%	0%	0%	0%
South Australia	5%	5%	4%	7%	9%	3%	6%	8%	7%
Northern Territory	82%	91%	83%	95%	95%	82%	81%	71%	86%
Western Australia	11%	12%	16%	22%	21%	15%	30%	23%	16%
Australia	**5%**	**5%**	**8%**	**8%**	**8%**	**7%**	**9%**	**8%**	**8%**

Figure 30

Co-Morbid Conditions at Entry to Program 1-Jan-96 to 31-Dec-99

		Coronary Artery Disease	Peripheral Vascular Disease	Cerebrovascular Disease	Chronic Lung Disease
Australia (6229)	Suspected	9.8% (612)	8.1% (506)	5.5% (345)	5.2% (326)
	Yes	29.6% (1844)	19.7% (1226)	10.3% (641)	11.5% (719)
	Total	**39.4% (2456)**	**27.8% (1732)**	**15.8% (986)**	**16.7% (1045)**
New Zealand (1348)	Suspected	13.9% (188)	8.2% (111)	3.8% (51)	5.0% (67)
	Yes	20.9% (282)	20.0% (269)	8.5% (114)	9.3% (126)
	Total	**34.8% (470)**	**28.1% (380)**	**12.2% (165)**	**14.3% (193)**

( ) = Number of Patients

Renal Function at Initiation of Treatment

Australia

During the two years to 31st March 2000, the serum creatinine level preceding the first dialysis or transplantation (without preceding dialysis) was recorded for 3,218 of the 3,239 new patients over 20 years old and for 3,045 patients dialysis dependent at 90 days. The creatinine clearance of 3,204 patients at entry and 3,015 patients at 90 days was estimated by the Cockroft-Gault formula standardised to body surface area 1.73m^2 from data listing height, weight, age and gender. The equations utilised were:

~{(140-age)*lean body wt}/{814*(creatinine/1000)} males: females multiply by 0.85

~lean body weight:{50+(0.9*[ht-152])} males :{45.5+(0.9*[ht-152])} females.

The 194 patients, those who died (83), who were transplanted (91) and those who recovered function or were lost to follow up (20), within 90 days of first treatment, were excluded from analysis regarding dialysis method: this allowed review of the peritoneal or haemodialysis groups once the preferred mode of dialysis had been chosen. The Australian experience shows many transfers, usually to peritoneal dialysis, after the first treatment.

The data from the past year shows a slight shift towards higher creatinine clearance values for the females, but there is still a marked difference in the proportion starting with calculated values less than 5 mls/min when compared with males. I assume that many decisions are based on serum creatinine rather than clearance calculations, which make adjustment for age, gender and lean body weight, thus providing low clearance values when creatinine values are still quite low.

A cumulative distribution curve of clearance values for the years 1998-1999, and 1999-2000, for age groups 55-64, 65-74 years, separately for females and males suggests that for the group 55-64 years there is a slight shift commencing at 12-13 mls/min for males and at 9-10 mls/min for females. The group 65-74 years shows a shift commencing at 17 mls/min for males but no suggestion of change for females.

A further year of follow-up should allow an analysis of the 12 month patient survival of this large two year cohort of nearly 2,700 patients.

Figure 31

New Patients Creatinine (µmol/L) at Entry
April 1998 - March 2000

	Australia	New Zealand
Age ≥ 20 years	(3218)	(706)
Median	773	750
25-75%	610 - 956	580 - 940
Mean ± SD	817 (319)	809 (350)

Figure 32

Median Creatinine Clearance mls/min
April 1998 - March 2000

Australia (at Entry)			
All	7	QLD	7
		NSW	7
Female	6	VIC	7
Male	8	TAS	8
Diabetic	8	SA	7
Non Diabetic	7	NT	7
		WA	7
Age 25-54	8		
55-64	7	Aboriginal	6
65-74	7	Caucasoid	7
75-84	6	Asian	6

Median Creatinine Clearance mls/min
April 1998 - March 2000

New Zealand (at Entry)			
All	8		
		Diabetic	7
Female	7	Non Diabetic	8
Male	9		
Age 25-54	8	Caucasoid	8
55-64	8	Maori	8
65-74	7	Pacific Islander	7
75-84	7	Asian	7

Figure 33

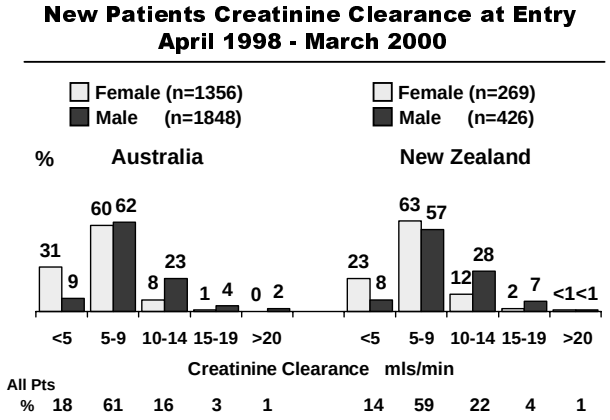


Figure 34

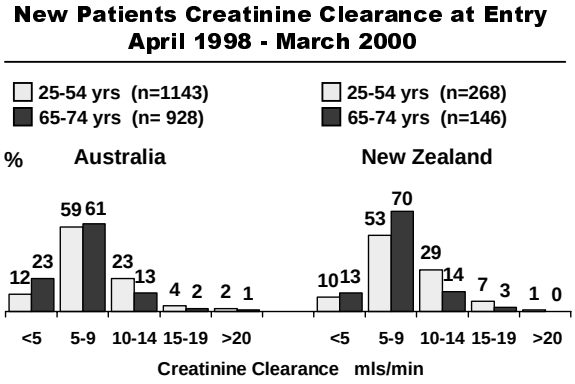


Figure 35

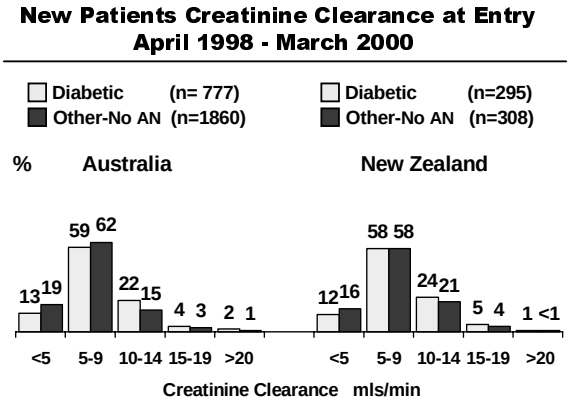


Figure 36

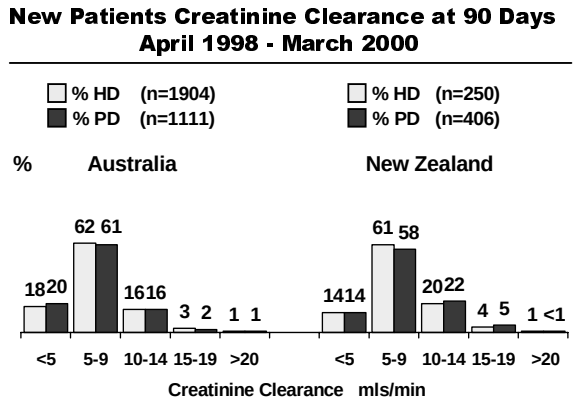


Figure 37

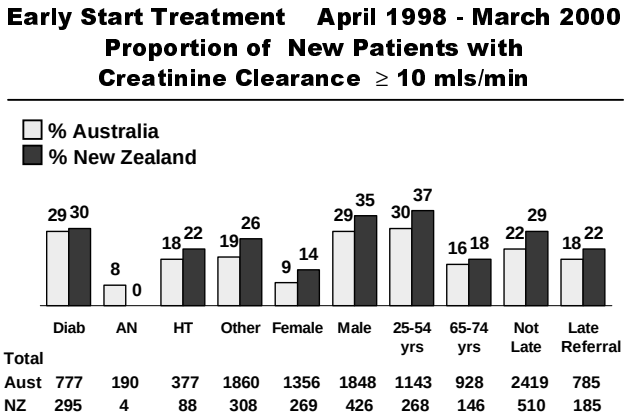


Figure 38 **Australia**

Creatinine Clearance at Entry to Program
New Patients 1-Apr-1998 to 31-Mar-2000

Category		No. of Pts.	Mls / Minute					
			0-4	5-9	10-14	15-20	20-24	> 25
All Patients		3204	18.2%	61.0%	16.5%	2.9%	0.8%	0.7%
Age	25-34 years	228	8.8%	49.6%	29.8%	7.5%	2.2%	2.2%
	35-44 years	362	10.5%	60.2%	21.0%	4.4%	1.9%	1.9%
	45-54 years	553	13.2%	60.9%	22.2%	2.5%	0.7%	0.4%
	55-64 years	655	17.9%	66.0%	12.7%	2.7%	0.5%	0.3%
	65-74 years	928	23.4%	60.8%	12.7%	2.2%	0.6%	0.3%
	>=75 years	413	26.4%	62.7%	9.4%	1.5%	0.0%	0.0%
Gender	Female	1356	31.0%	59.5%	7.9%	1.2%	0.1%	0.3%
	Male	1848	8.8%	62.1%	22.8%	4.1%	1.3%	0.9%
Race	Aboriginal	260	29.2%	58.5%	10.8%	1.2%	0.0%	0.4%
	Asian	179	28.5%	60.3%	10.1%	0.6%	0.6%	0.0%
	Caucasoid	2607	16.1%	61.6%	17.6%	3.2%	0.8%	0.7%
Diabetic		777	13.1%	57.8%	22.3%	4.5%	1.3%	1.0%
Non Diabetic	Analgesic Nephropathy	190	35.3%	56.3%	6.8%	1.1%	0.5%	0.0%
	Hypertension	377	17.5%	65.0%	14.9%	1.9%	0.5%	0.3%
	Other	1860	18.7%	62.0%	15.4%	2.6%	0.6%	0.6%
All Haemodialysis Patients at 90 days		1904	17.9%	62.0%	15.6%	3.2%	0.8%	0.6%
All Peritoneal Dialysis Patients at 90 days		1111	20.1%	60.6%	16.4%	1.8%	0.5%	0.6%
State	Queensland	587	23.2%	58.6%	14.0%	2.4%	1.4%	0.5%
	New South Wales/ACT	1050	17.4%	61.5%	17.0%	2.2%	1.0%	0.8%
	Victoria	821	15.3%	58.6%	20.1%	4.5%	0.6%	0.9%
	Tasmania	49	16.3%	55.1%	24.5%	2.0%	0.0%	2.0%
	South Australia	245	15.1%	66.5%	15.9%	2.0%	0.0%	0.4%
	Northern Territory	101	23.8%	59.4%	11.9%	4.0%	1.0%	0.0%
	Western Australia	351	19.7%	66.7%	11.1%	2.3%	0.0%	0.3%
Late Referral	No	2419	16.5%	61.9%	17.2%	3.0%	0.8%	0.6%
	Yes	785	23.4%	58.3%	14.1%	2.5%	0.8%	0.8%

Figure 39 **Australia**

Serum Creatinine and Creatinine Clearance at Entry to Program
New Patients 1-Apr-1998 to 31-Mar-2000

Category			No. of Pts.	Serum Creatinine				Creatinine Clearance			
				Mean		Std. Dev.	Median	Mean		Std.Dev.	Median
All Patients			3218	817	+	319	773	8.0	+	4.3	7.3
Age		25-54 years	1152	897	+	356	844	9.1	+	5.5	8.2
		55-64 years	657	812	+	269	786	7.6	+	3.2	7.1
		65-74 years	931	744	+	263	716	7.4	+	3.5	6.7
		>=75 years	413	727	+	272	687	6.7	+	2.6	6.1
Gender Patients at 90 days	HD	Female	747	763	+	293	729	6.6	+	3.5	5.9
		Male	1165	884	+	348	845	9.0	+	5.0	8.2
	PD	Female	534	760	+	285	716	6.4	+	2.7	5.8
		Male	579	819	+	281	795	9.0	+	4.0	8.3
All Haemodialysis Patients at 90 days			1912	837	+	333	792	8.0	+	4.6	7.3
All Peritoneal Dialysis Patients at 90 days			1113	791	+	285	750	7.7	+	3.7	7.0
Diabetic			779	743	+	280	710	8.8	+	4.3	7.9
Non Diabetic		Analgesic	190	724	+	230	706	6.3	+	2.7	5.8
		Hypertension	377	751	+	255	728	7.6	+	3.7	6.9
		Other	1872	871	+	343	820	7.9	+	4.5	7.3
Late Referral		No	2426	802	+	291	765	8.1	+	3.8	7.3
		Yes	792	863	+	389	800	7.9	+	5.6	6.9

Figure 40 **New Zealand**

Creatinine Clearance at Entry to Program
New Patients 1-Apr-1998 to 31-Mar-2000

Category		No. of Pts.	Mls / Minute				
			0-4	5-9	10-14	15-20	20-24
All Patients		695	13.7%	59.3%	21.9%	4.5%	0.6%
Age	25-34 years	48	4.2%	56.3%	29.2%	6.3%	4.2%
	35-44 years	73	9.6%	52.1%	26.0%	12.3%	0.0%
	45-54 years	147	12.9%	52.4%	30.6%	3.4%	0.7%
	55-64 years	211	16.1%	57.8%	20.9%	4.3%	0.5%
	65-74 years	146	12.3%	69.9%	14.4%	3.4%	0.0%
	>=75 years	57	24.6%	64.9%	10.5%	0.0%	0.0%
Gender	Female	269	22.7%	62.8%	12.3%	1.5%	0.7%
	Male	426	8.0%	57.0%	27.9%	6.3%	0.5%
Race	Asian	21	23.8%	71.4%	4.8%	0.0%	0.0%
	Caucasoid	334	12.0%	57.5%	23.4%	6.0%	1.2%
	Maori	226	12.4%	60.2%	23.0%	4.0%	0.0%
	Other	18	11.1%	61.1%	22.2%	5.6%	0.0%
	Pacific Islander	95	21.1%	60.0%	17.9%	1.1%	0.0%
Diabetic		295	12.5%	57.6%	23.7%	5.1%	0.7%
Non Diabetic	Analgesic Nephropathy	4	75.0%	25.0%	0.0%	0.0%	0.0%
	Hypertension	88	8.0%	70.5%	19.3%	2.3%	0.0%
	Other	308	15.6%	58.1%	21.1%	4.5%	0.6%
All Haemodialysis Patients at 90 days		250	13.6%	61.2%	19.6%	4.4%	1.2%
All Peritoneal Dialysis Patients at 90 days		406	14.3%	58.4%	22.2%	4.7%	0.2%
Late Referral	No	510	11.6%	59.6%	22.9%	5.1%	0.6%
	Yes	185	19.5%	58.4%	18.9%	2.7%	0.5%

Figure 41 **New Zealand**

Serum Creatinine and Creatinine Clearance at Entry to Program
New Patients 1-Apr-1998 to 31-Mar-2000

Category			No. of Pts.	Serum Creatinine				Creatinine Clearance			
				Mean	+	Std. Dev.	Median	Mean	+	Std.Dev.	Median
All Patients			706	809	+	350	750	8.4	+	3.5	7.6
Age		25-54 years	274	879	+	420	790	9.1	+	3.7	8.4
		55-64 years	212	781	+	291	750	8.4	+	3.8	7.5
		65-74 years	148	717	+	255	684	7.8	+	2.9	7.3
		>=75 years	59	781	+	333	691	6.8	+	2.6	6.8
Gender Patients at 90 days	HD	Female	78	758	+	283	715	7.0	+	3.2	6.5
		Male	175	942	+	446	840	8.8	+	3.7	8.1
	PD	Female	182	726	+	265	700	7.2	+	2.9	6.9
		Male	226	774	+	288	739	9.5	+	3.6	9.0
All Haemodialysis Patients at 90 days			253	885	+	278	800	8.3	+	3.7	7.3
All Peritoneal Dialysis Patients at 90 days			408	753	+	411	714	8.5	+	3.5	7.7
Diabetic			300	783	+	319	737	8.6	+	3.7	7.5
Non Diabetic		Analgesic	4	1043	+	157	1050	4.8	+	0.6	4.7
		Hypertension	90	724	+	263	684	8.3	+	2.7	7.9
		Other	312	855	+	392	781	8.3	+	3.6	7.6
Late Referral		No	515	777	+	289	740	8.6	+	3.6	7.9
		Yes	191	896	+	466	770	7.8	+	3.3	7.3

Figure 42

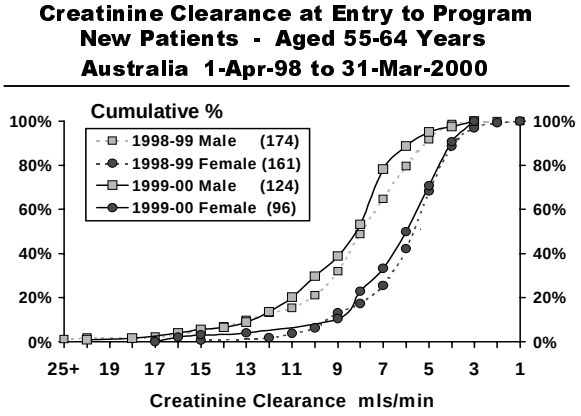


Figure 43

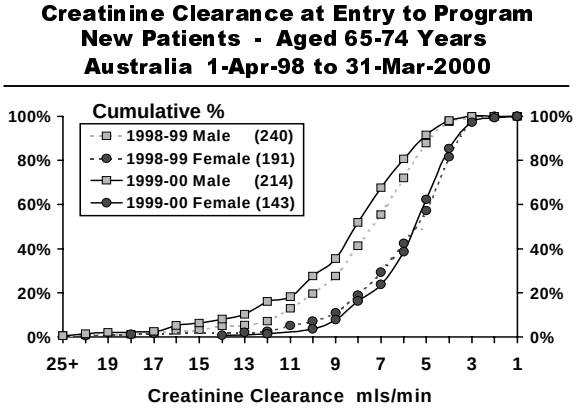


Figure 44

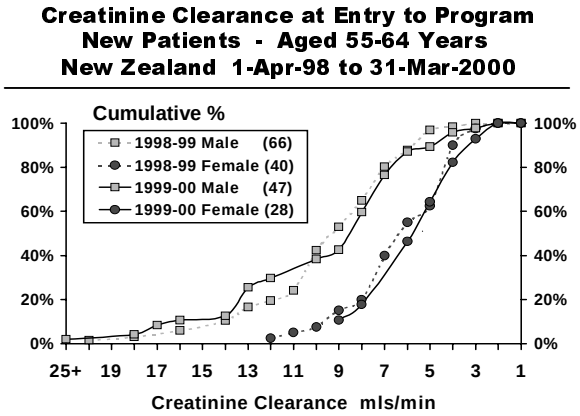
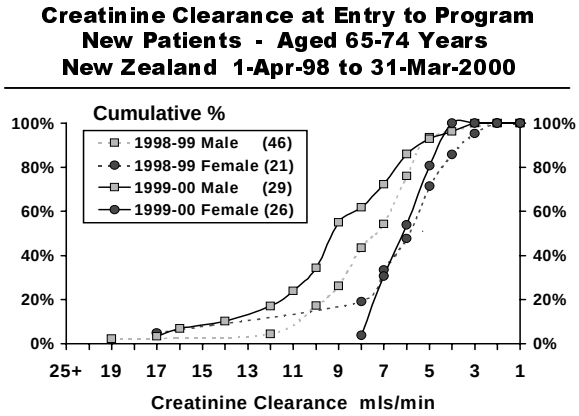


Figure 45



PRIMARY RENAL DISEASE

Australia

Glomerulonephritis (30%) remained the most common cause of renal failure (of these GN cases 20% were diagnosed without biopsy). **Diabetic nephropathy** (excludes diabetics with renal failure due to other causes) was the second most common condition (25%) followed by "hypertension" (11%) and polycystic kidney disease (7%), analgesic nephropathy (6%). See Figure 46.

The incidence of **analgesic nephropathy** was unchanged. The number of patients (96) and incidence rate (5.0 per million) were similar to the last six years. In Queensland, the incidence (8.2 per million) was the highest in the nation and the highest in the state since 1993; the incidence rose to 10% of new patients in 1999 due to a doubling of patients in the 65-74 age group with the condition. See Figures 56, 57.

IgA mesangial proliferative glomerulonephritis (26%) was the most common histologically proven form of glomerulonephritis (33% of biopsy proven glomerulonephritis), followed by **focal sclerosing glomerulonephritis** (15%) **and systemic disease** (12%). See Figure 47. The label "glomerulonephritis" has been recorded for many elderly patients, without biopsy confirmation. For detail of age and primary renal disease see Appendix I at the conclusion of this Report or Appendix II at Website (www.anzdata.org.au).

While **glomerulonephritis** is the most common condition in the **15-54 year** age group, it is now exceeded by **diabetic nephropathy** in the large **55-74 year** age group. There was a 20% increase in the total number of patients with diabetic nephropathy, a 26% increase in the 55-74 year age group. As a result the proportion overall with the label Type II rose from 77% to 83% (348 of 420 patients) with 148 of these 348 patients insulin requiring. **Hypertension** was the most common condition in the **75-84 year** age group.

Renal biopsy based diagnosis was reported in 36% of cases: glomerulonephritis 80%, hypertension 18%, diabetes (both I and II) 17%, reflux 15% and analgesic nephropathy 9%. The proportion of patients in each age group with biopsy based diagnosis is shown in Figure 51.

Amongst the **miscellaneous diseases,** interstitial nephritis, obstructive nephropathy, cyclosporin, amyloid, multiple myeloma, haemolytic uraemic syndrome and renal malignancy were prominent. See Figure 48.

There were four cases reported in the past year of **lithium toxicity** as the primary diagnosis, and a further three as a secondary diagnosis (renovascular disease, diabetic nephropathy and an uncertain primary diagnosis). **Cyclosporin toxicity** was reported in seven cases; four cases last year. The age and gender distribution of patients with lithium or cyclosporin toxicity is shown in Figures 48, 54, 55.

New Zealand

Diabetic nephropathy (40%) was again the most common cause of renal failure followed by **glomerulonephritis** (23%) and **hypertension** (11%). See Figure 46. **Diabetes Type II** (non-insulin and insulin requiring) represented 88% of diabetic nephropathy; as in Australia, this diagnosis was not based on biopsy in most cases. Biopsy proof was lacking for 24% of glomerulonephritis cases.

IgA mesangioproliferative (12%) and **focal sclerosing glomerulonephritis** (12%) represented 36% of biopsy proven glomerulonephritis. See Figure 47. Miscellaneous causes of primary renal disease are shown in Figure 48.

Figure 46

Primary Renal Disease 1997 - 1999

Primary Renal Disease	Australia			New Zealand		
	1997	1998	1999	1997	1998	1999
Glomerulonephritis	34% (503)	32% (514)	30% (519)	24% (78)	19% (71)	23% (84)
Analgesic Nephropathy	5% (78)	6% (99)	6% (96)	0% (0)	<1% (2)	<1% (2)
Polycystic Kidney Disease	6% (87)	7% (106)	7% (115)	5% (17)	6% (21)	7% (26)
Reflux Nephropathy	5% (81)	4% (76)	4% (75)	4% (15)	4% (13)	3% (12)
Hypertension	12% (175)	12% (190)	11% (182)	13% (40)	13% (49)	11% (40)
Diabetic Nephropathy	22% (321)	22% (356)	25% (420)	40% (127)	44% (164)	40% (147)
Miscellaneous	10% (145)	10% (164)	10% (174)	10% (31)	7% (26)	9% (33)
Uncertain Diagnosis	6% (93)	7% (105)	7% (128)	4% (12)	6% (24)	7% (24)
Total	**100% (1483)**	**100% (1610)**	**100% (1708)**	**100% (320)**	**100% (370)**	**100% (368)**

( ) Number of Patients

Figure 47

Types of Glomerulonephritis 1-Jan-99 to 31-Dec-99
(Australia 518 patients) (New Zealand 84 patients)

	Australia	New Zealand		Australia	New Zealand
No Biopsy	20% (102)	21% (18)	GN with Systemic Disease	<1% (1)	1% (1)
Focal Sclerosing	15% (76)	14% (12)	Goodpasture's Syndrome	1% (7)	1% (1)
MCGN - Type I	4% (23)	4% (3)	Anti GBM (no haemoptysis)	<1% (2)	1% (1)
MCGN - Type II	<1% (1)	0% (0)	Systemic Lupus	3% (15)	8% (7)
Membranous GN	7% (34)	6% (5)	Henoch-Schonlein Purpura	<1% (3)	1% (1)
Rapidly Progressive GN	2% (9)	10% (8)	Wegener's Granulomatosis	2% (12)	>2% (2)
Mesangioproliferative IgA +	26% (135)	14% (12)	Microscopic Polyarteritis	3% (15)	0% (0)
Mesangioproliferative IgA -	3% (14)	>2% (2)	Scleroderma	1% (6)	1% (1)
Mesangioproliferative No I.F.	1% (2)	0% (0)	GN Other	3% (13)	>2% (2)
Focal & Segmental Proliferative GN	2% (11)	6% (5)	Familial GN (including Alports)	3% (14)	>2% (2)
Advanced GN (end-stage type)	4% (23)	1% (1)			

Figure 48

Miscellaneous Causes of Primary Renal Disease
1-Jan-99 to 31-Dec-99
(Australia 174 patients) (New Zealand 33 patients)

	Aust.	N. Z.		Aust.	N. Z.
Interstitial Nephritis	15	5	Calculi	9	3
Cyclosporin Nephrotoxicity	7	0	Medullary Cystic Disease	7	1
Lithium Toxicity	4	1	Gout	0	1
Fabry's Disease	3	0	Cystinosis	0	1
Lead Nephropathy	2	0			
Fanconi Syndrome	1	0	Amyloid	14	0
Hyperparathyroidism	1	0	Congenital Renal Hypoplasia & Dysplasia	9	0
Malakoplakia	1	0	Light Chain Nephropathy	1	0
Nail-Patella Syndrome	1	0	Oto-Branchio Renal Syndrome	1	1
Oxalosis	1	0	Congenital Nephrotic Syndrome	0	1
Renal Mucormycosis	1	0			
Renal Tuberculosis	1	2	Multiple Myeloma	16	4
Sarcoidosis	1	2	Renal Cell Carcinoma	10	2
Sjogrens Syndrome	1	0	Transitional Cell Carcinoma	6	0
			Radiation Nephritis	3	0
Obstructive Nephropathy	12	6	Chronic Leukaemia	1	0
Ureteric Obstructive Nephropathy	6	0	Juvenile Nephronophthisis	1	0
Lower Urinary Tract Abnormalities	5	0	(L) Renal Cell - (R) Amyloid	1	0
Prune Belly Syndrome (3)					
(L)PUJ Obstruction-(R)Unknown (1)			Haemolytic Uraemic Syndrome	9	1
(R) Renal Agenesis (1)			Cortical Necrosis	6	1
Neuropathic Bladder	5	0	Loss Single Kidney	3	0
Bladder Neck Obstruction	2	0	Acute Tubular Necrosis	1	0
Posterior Urethral Valves	2	0	Nephrocalcinosis	1	0
Megaureter	1	0			
Obstructed Megaureter	1	0			
Spina Bifida or Myelomeningocoele	1	1			

Figure 49

Glomerulonephritis and Diabetic Nephropathy
No Biopsy Performed 1999

Disease	Qld	NSW/ACT	Vic.	Tas.	SA	NT	WA	Aust.	N. Z.
GN	71 (20%)	183 (22%)	145 (14%)	6 (0%)	43 (9%)	16 (50%)	54 (31%)	**518 (20%)**	**84 (24%)**
Diabetes	63 (86%)	121 (78%)	118 (79%)	7 (100%)	31 (84%)	22 (91%)	58 (90%)	**420 (82%)**	**147 (95%)**

Figure 50

Glomerulonephritis
No Biopsy Performed 1993 - 1999

No Biopsy	1993	1994	1995	1996	1997	1998	1999
Australia	379 (26%)	458 (26%)	481 (23%)	480 (24%)	503 (26%)	514 (23%)	518 (20%)
New Zealand	62 (19%)	64 (31%)	82 (28%)	74 (23%)	78 (23%)	71 (25%)	84 (24%)

Figure 51

Biopsy of New Patients 1999

Biopsy	Primary Renal Disease	Qld	NSW/ACT	Vic.	Tas.	SA	NT	WA	Aust.	N. Z.
Yes	Analgesic	1	6	1	0	1	0	0	**9**	**1**
	Diabetes I - Insulin	2	5	6	0	1	0	1	**15**	**1**
	Diabetes II - Insulin Req.	0	8	10	0	0	0	0	**18**	**3**
	Diabetes II - Non Insulin	7	14	9	0	4	2	5	**41**	**4**
	Glomerulonephritis	57	143	124	6	39	8	37	**414**	**64**
	Hypertension	4	10	10	0	5	1	2	**32**	**3**
	Miscellaneous	10	26	18	2	7	1	10	**74**	**10**
	Polycystic	0	1	1	0	0	0	0	**2**	**0**
	Reflux	0	6	4	0	1	0	0	**11**	**0**
	Uncertain	2	1	1	0	1	0	0	**5**	**2**
	Sub Total	**83**	**220**	**184**	**8**	**59**	**12**	**55**	**621**	**88**
No	Analgesic	28	46	6	0	4	0	3	**87**	**1**
	Diabetes I - Insulin	8	16	15	4	4	0	10	**57**	**16**
	Diabetes II - Insulin Req.	15	47	39	0	11	4	14	**130**	**47**
	Diabetes II - Non Insulin	31	31	39	3	11	16	28	**159**	**76**
	Glomerulonephritis	14	40	21	0	4	8	17	**104**	**20**
	Hypertension	30	42	38	1	12	1	26	**150**	**37**
	Miscellaneous	22	18	32	3	7	2	16	**100**	**23**
	Polycystic	17	47	21	0	9	0	19	**113**	**26**
	Reflux	14	22	18	3	3	1	3	**64**	**12**
	Uncertain	42	22	29	1	16	6	7	**123**	**22**
	Sub Total	**221**	**331**	**258**	**15**	**81**	**38**	**143**	**1087**	**280**
	Total	**304**	**551**	**442**	**23**	**140**	**50**	**198**	**1708**	**368**

Figure 52

Biopsy Rate of New Patients with Diabetic Nephropathy 1-Jan-99 to 31-Dec-99

	Biopsy	Qld	NSW/ACT	Vic.	Tas.	SA	NT	WA	Aust.	N.Z.
Diabetes Type 1	No	8	16	15	4	4	0	10	**57**	**16**
	Yes	2	5	6	0	1	0	1	**15**	**1**
	Total	**10**	**21**	**21**	**4**	**5**	**0**	**11**	**72**	**17**
Diabetes Type 2 Insulin Requiring	No	15	47	39	0	11	4	14	**130**	**47**
	Yes	0	8	10	0	0	0	0	**18**	**3**
	Total	**15**	**55**	**49**	**0**	**11**	**4**	**14**	**148**	**50**
Diabetes Type 2 Non Insulin Requ.	No	31	31	39	3	11	16	28	**159**	**76**
	Yes	7	14	9	0	4	2	5	**41**	**4**
	Total	**38**	**45**	**48**	**3**	**15**	**18**	**33**	**200**	**80**

Figure 53

New Patients with Biopsy of Glomerulonephritis, Hypertension and Diabetic Nephropathy 1998 to 1999

	Renal Disease	Biopsy	Age Groups 00-14	15-24	25-34	35-44	45-54	55-64	65-74	75-on	Total
Australia	Glomerulo-nephritis	No	1	10	17	26	32	37	62	37	**222**
		Yes	7	39	93	141	162	164	151	53	**810**
		Total	**8**	**49**	**110**	**167**	**194**	**201**	**213**	**90**	**1032**
	Diabetes	No	0	1	35	75	131	155	191	44	**632**
		Yes	0	3	9	22	42	32	28	8	**144**
		Total	**0**	**4**	**44**	**97**	**173**	**187**	**219**	**52**	**776**
	Hypertension	No	0	0	2	4	14	39	135	101	**295**
		Yes	0	0	1	5	8	12	35	16	**77**
		Total	**0**	**0**	**3**	**9**	**22**	**51**	**170**	**117**	**372**
New Zealand	Glomerulo-nephritis	No	0	1	4	3	6	10	8	6	**38**
		Yes	5	12	20	18	20	22	15	5	**117**
		Total	**5**	**13**	**24**	**21**	**26**	**32**	**23**	**11**	**155**
	Diabetes	No	0	1	11	28	82	116	54	5	**297**
		Yes	0	0	0	0	4	5	3	2	**14**
		Total	**0**	**1**	**11**	**28**	**86**	**121**	**57**	**7**	**311**
	Hypertension	No	0	0	0	4	7	14	34	16	**75**
		Yes	0	0	0	2	2	3	6	1	**14**
		Total	**0**	**0**	**0**	**6**	**9**	**17**	**40**	**17**	**89**

Figure 54

Lithium Toxicity as Primary Renal Disease of New Patients 1995 to 1999

	Gender	Age Groups 00-14	15-24	25-34	35-44	45-54	55-64	65-74	75-on	Total
Australia	Male	0	0	1	0	3	0	4	0	**8**
	Female	0	0	0	2	7	7	3	0	**19**
	Total	**0**	**0**	**1**	**2**	**10**	**7**	**7**	**0**	**27**
New Zealand	Female	0	0	0	1	1	2	0	1	**5**
	Total	**0**	**0**	**0**	**1**	**1**	**2**	**0**	**1**	**5**

Figure 55

Cyclosporin A Toxicity as Primary Renal Disease Related to Previous Non Renal Organ Transplantation New Patients 1995 to 1999

	Organ	Age Groups 00-14	15-24	25-34	35-44	45-54	55-64	65-74	75-on	Total
Australia	Lung	0	0	2	2	2	1	0	0	**7**
	Liver	0	0	0	0	1	0	0	0	**1**
	Heart-Lung	0	0	0	0	1	0	0	0	**1**
	Heart	0	0	0	2	0	5	2	0	**9**
	Total	**0**	**0**	**2**	**4**	**4**	**6**	**2**	**0**	**18**
New Zealand	Heart	0	0	0	1	1	1	1	0	**4**
	Total	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**0**	**4**

Figure 56 **Australia**

Analgesic Nephropathy 1992 - 1999

Number of New Patients

State	1992	1993	1994	1995	1996	1997	1998	1999
Queensland	22	34	20	24	17	23	23	29
New South Wales/ACT	61	71	65	56	68	43	53	52
Victoria	6	10	5	4	5	6	10	7
Tasmania	0	0	1	0	0	0	0	0
South Australia	7	5	4	3	0	1	7	5
Northern Territory	0	0	0	1	2	0	0	0
Western Australia	4	4	1	7	4	5	6	3
Australia	**100**	**124**	**96**	**95**	**96**	**78**	**99**	**96**

Percentage of New Patients

State	1992	1993	1994	1995	1996	1997	1998	1999
Queensland	12%	17%	9%	10%	7%	8%	8%	10%
New South Wales/ACT	15%	16%	14%	11%	12%	8%	10%	9%
Victoria	2%	4%	2%	1%	1%	2%	2%	2%
Tasmania	0%	0%	4%	0%	0%	0%	0%	0%
South Australia	8%	7%	4%	3%	0%	1%	6%	4%
Northern Territory	0%	0%	0%	3%	4%	0%	0%	0%
Western Australia	4%	4%	1%	5%	3%	4%	4%	2%
Australia	**9%**	**11%**	**7%**	**7%**	**7%**	**5%**	**6%**	**6%**

Patients per million Population

State	1992	1993	1994	1995	1996	1997	1998	1999
Queensland	7.2	10.9	6.2	7.3	5.0	6.7	6.6	8.2
New South Wales/ACT	9.7	11.2	10.2	8.7	10.4	6.5	7.9	7.7
Victoria	1.3	2.2	1.1	0.8	1.1	1.3	2.1	1.4
Tasmania	0	0	2.1	0	0	0	0	0
South Australia	4.7	3.4	2.7	2.0	0	0.6	4.7	3.3
Northern Territory	0	0	0	5.7	11.2	0	0	0
Western Australia	2.4	2.3	0.5	4.0	2.2	2.7	3.2	1.6
Australia	**5.7**	**7.0**	**5.3**	**5.2**	**5.2**	**4.1**	**5.2**	**5.0**

Figure 57 **Australia**

Analgesic Nephropathy 1993 - 1999

	1993	1994	1995	1996	1997	1998	1999
Analgesic	124 (7)	96 (5)	95 (5)	96 (5)	78 (4)	99 (5)	96 (5)
Non Analgesic	1034 (59)	1218 (69)	1283 (72)	1332 (73)	1405 (76)	1511 (81)	1612 (85)
Total	**1158 (66)**	**1314 (74)**	**1378 (76)**	**1428 (78)**	**1483 (80)**	**1610 (86)**	**1708 (90)**

Australian States 1999

	Qld	NSW/ACT	Vic.	Tas.	SA	NT	WA
Analgesic	29 (8)	52 (8)	7 (1)	0 (0)	5 (3)	0 (0)	3 (2)
Non Analgesic	275 (79)	499 (74)	435 (93)	23 (49)	135 (91)	50 (259)	195 (104)
Total	**304 (87)**	**551 (82)**	**442 (94)**	**23 (49)**	**140 (94)**	**50 (259)**	**198 (106)**

( ) Per million population in each State

LIKELIHOOD OF TRANSPLANTATION

31 March 2000

Australia

The proportion of all dialysis patients who are on the transplant list has continued the steady decline from 36% (1995) to 26% (2000) which reflects the ageing of the dialysis population. Amongst those <65 years old, the majority were on the active list, temporarily off it, or were awaiting assessment shown in Figure 58. The highest proportion "on the list" was reported in the home haemodialysis group and the lowest in the hospital haemodialysis group as shown in Figure 59. Patient refusal was higher amongst those using home dialysis (haemodialysis or peritoneal dialysis). Poor general health was more common amongst hospital haemodialysis and CAPD patients.

For patients <65 yrs the waiting list ratios are shown in Figure 59 for each State and Australia: range "on the list" Northern Territory 13%, New South Wales 55%. If those awaiting assessment or temporarily off the list are included then the range is Northern Territory 53%, South Australia 69%. Several States have a high proportion still awaiting assessment which suggest their transplant status was not determined before dialysis commenced.

The age related waiting list ratios for each State and for Australia is shown in Figures 61, 62. As expected, the majority of those <45 years were "on the list" but only 43% and 28% in the 45-54 and 55-64 year age groups respectively. The State ratios are influenced in part by the variation in the proportion not yet assessed.

Only 26% of all 6,022 patients were reported to be on the active waiting list. The majority of patients dialysed at 31st March were not likely to be transplanted because of poor general health, non-renal disease, malignancy or age. Of those considered for the waiting list, a small group was temporarily "off the list" (2.5%) and a larger group was awaiting assessment for the list (9.5%). See Figure 58.

However, in the age group <65 years, the majority of the 3580 patients were on the active waiting list (41%), temporarily off the list (4%) or awaiting assessment (14%). A small group, (5%) were reported to have refused the option of transplantation: 4% of those not transplanted, 8% of those previously transplanted. See Figure 60.

As expected, most young dialysis patients were likely to be transplanted. The active list proportion decreased from 72% (15-24) to only 43% (45-54) and 28% (55-64). The proportion of middle aged patients (45-54 years) likely to be transplanted ranged from 14% (Northern Territory) to 58% (New South Wales/ACT) and for those 55-64 years ranged from 3% (Northern Territory) to 37% (New South Wales/ACT). Few elderly patients were likely to be transplanted: 13% (New South Wales/ACT).

New Zealand

Of 1,249 patients dialysing at 31st March, (25%) were awaiting transplantation, (3%) were temporarily off the list and (19%) were awaiting assessment.

Of patients <55 years old, there were 272 of 567 patients (48%) awaiting transplantation (including those temporarily off the list). Of patients <65 years, 27% were unfit (hospital haemodialysis 37%, satellite haemodialysis 20% and CAPD 29%). See Figures 58, 60-64.

Figure 58

Likelihood of Transplantation 31-Mar-2000

Likelihood of Transplant	Australia							New Zealand					
	Number of Patients	Peritoneal Dialysis			Haemodialysis			Number of Patients	Peritoneal Dialysis		Haemodialysis		
		PD		CAPD					PD	CAPD			
		Hosp.	Home		Hosp.	Home	Sat.		Home		Hosp.	Home	Sat.
On Waiting List	1587 (26%)	3	106	255	286	410	527	311 (25%)	25	104	48	93	41
Temporarily Off List	136 (2.5%)	1	7	24	39	21	44	41 (3%)	4	16	13	5	3
Awaiting Assessment	570 (9.5%)	2	22	167	146	41	192	241 (19%)	5	135	67	20	14
Patient Refusal	217 (4%)	0	5	63	44	50	55	114 (9%)	5	75	16	12	6
Medically Unfit	1512 (25%)	5	48	344	536	98	481	400 (32%)	17	206	124	35	18
Malignancy	139 (2.5%)	0	1	19	45	25	49	17 (2%)	2	8	2	4	1
Age	1700 (28%)	12	42	474	505	37	630	83 (7%)	0	51	27	4	1
Other Reasons	141 (2.5%)	0	2	26	49	13	51	42 (3%)	1	20	6	10	5
Total	**6002 (100%)**	**23**	**233**	**1372**	**1650**	**695**	**2029**	**1249 (100%)**	**59**	**615**	**303**	**183**	**89**

Likelihood of Transplantation: Age <65 years 31-Mar-2000
Related to Site and Method of Dialysis - Australian States

State	PD	CAPD	Hosp. HD	Home HD	Sat. HD	Total
Queensland	**(33)**	**(134)**	**(258)**	**(45)**	**(83)**	**(553)**
On Waiting List	43%	32%	24%	51%	33%	**31%**
Temporarily Off List	12%	5%	8%	4%	6%	**7%**
Awaiting Assessment	12%	21%	11%	11%	13%	**14%**
Patient Refusal	3%	5%	4%	7%	5%	**4%**
Medically Unfit	27%	33%	47%	25%	39%	**39%**
Malignancy	0%	1%	1%	0%	1%	**<1%**
Age	0%	1%	<1%	0%	0%	**<1%**
Other	3%	2%	5%	2%	3%	**4%**
New South Wales / ACT	**(95)**	**(269)**	**(266)**	**(384)**	**(283)**	**(1297)**
On Waiting List	65%	37%	43%	69%	55%	**54%**
Temporarily Off List	1%	1%	2%	2%	2%	**2%**
Awaiting Assessment	9%	13%	11%	6%	11%	**10%**
Patient Refusal	2%	8%	4%	6%	4%	**5%**
Medically Unfit	21%	35%	31%	11%	23%	**23%**
Malignancy	1%	1%	2%	3%	2%	**2%**
Age	0%	3%	1%	<1%	<1%	**1%**
Other	1%	2%	6%	3%	3%	**3%**
Victoria	**(21)**	**(178)**	**(121)**	**(128)**	**(477)**	**(925)**
On Waiting List	47%	31%	23%	60%	39%	**38%**
Temporarily Off List	10%	4%	7%	6%	5%	**5%**
Awaiting Assessment	14%	26%	17%	8%	14%	**16%**
Patient Refusal	0%	6%	0%	9%	4%	**4%**
Medically Unfit	19%	25%	40%	12%	23%	**24%**
Malignancy	0%	<1%	7%	2%	3%	**3%**
Age	10%	6%	2%	3%	9%	**7%**
Other	0%	2%	4%	<1%	3%	**3%**
Tasmania	**(4)**	**(8)**	**(34)**	**(3)**	**(11)**	**(60)**
On Waiting List	75%	26%	21%	67%	27%	**29%**
Temporarily Off List	0%	0%	3%	33%	0%	**3%**
Awaiting Assessment	0%	38%	21%	0%	18%	**20%**
Patient Refusal	0%	1%	6%	0%	9%	**7%**
Medically Unfit	25%	1%	35%	0%	37%	**30%**
Malignancy	0%	0%	2%	0%	0%	**3%**
Age	0%	1%	0%	0%	9%	**3%**
Other	0%	0%	8%	0%	0%	**5%**
South Australia	**(10)**	**(29)**	**(50)**	**(15)**	**(112)**	**(216)**
On Waiting List	60%	24%	22%	60%	48%	**40%**
Temporarily Off List	0%	10%	0%	<7%	3%	**3%**
Awaiting Assessment	40%	24%	38%	<7%	18%	**24%**
Patient Refusal	0%	0%	4%	<7%	2%	**2%**
Medically Unfit	0%	31%	28%	20%	22%	**24%**
Malignancy	0%	>3%	4%	0%	3%	**3%**
Age	0%	>3%	4%	0%	1%	**2%**
Other	0%	>3%	0%	0%	3%	**2%**
Northern Territory	**(4)**	**(11)**	**(13)**	**(0)**	**(116)**	**(144)**
On Waiting List	50%	18%	0%	0%	13%	**13%**
Temporarily Off List	0%	18%	0%	0%	6%	**6%**
Awaiting Assessment	0%	27%	77%	0%	34%	**36%**
Patient Refusal	25%	9%	0%	0%	3%	**4%**
Medically Unfit	25%	27%	23%	0%	33%	**32%**
Malignancy	0%	0%	0%	0%	2%	**2%**
Age	0%	0%	0%	0%	0%	**0%**
Other	0%	0%	0%	0%	9%	**7%**
Western Australia	**(13)**	**(115)**	**(88)**	**(27)**	**(142)**	**(385)**
On Waiting List	54%	29%	19%	44%	44%	**34%**
Temporarily Off List	0%	0%	2%	0%	<1%	**1%**
Awaiting Assessment	8%	23%	17%	7%	4%	**13%**
Patient Refusal	0%	6%	3%	19%	4%	**5%**
Medically Unfit	38%	28%	38%	11%	33%	**31%**
Malignancy	0%	3%	6%	11%	4%	**5%**
Age	0%	3%	2%	4%	2%	**2%**
Other	0%	9%	13%	4%	8%	**9%**

( ) Number of Patients

Figure 60

Likelihood of Transplantation: Age <65 years 31-Mar-2000

Likelihood of Transplantation	Australia								New Zealand							
	Related to Previous Transplant			Related to Site and Method of Dialysis					Related to Previous Transplant			Related to Site and Method of Dialysis				
	No Previous Transplant	Previous Unsuccessful Transplant	Total	PD	CAPD	Hosp. HD	Home HD	Sat. HD	No Previous Transplant	Previous Unsuccessful Transplant	Total	PD	CAPD	Hosp. HD	Home HD	Sat. HD
	(2941)	(639)	(3580)	(180)	(744)	(830)	(602)	(1224)	(779)	(135)	(914)	(52)	(414)	(204)	(158)	(86)
On Waiting List	41%	42%	**41%**	57%	33%	29%	65%	41%	30%	49%	**33%**	46%	23%	23%	57%	48%
Temporarily Off List	3%	5%	**4%**	4%	3%	5%	3%	4%	3%	10%	**4%**	7%	4%	6%	3%	3%
Awaiting Assessment	15%	13%	**14%**	12%	20%	16%	7%	14%	23%	9%	**21%**	10%	26%	24%	11%	16%
Patient Refusal	4%	8%	**5%**	2%	6%	3%	7%	4%	9%	8%	**9%**	10%	12%	7%	6%	7%
Medically Unfit	28%	23%	**27%**	22%	30%	38%	12%	26%	29%	18%	**27%**	23%	29%	37%	15%	20%
Malignancy	2%	3%	**2%**	1%	1%	3%	3%	3%	1%	1%	**1%**	2%	1%	<1%	2%	1%
Age	3%	1%	**3%**	1%	4%	1%	1%	4%	<1%	0%	**<1%**	0%	0%	<1%	0%	0%
Other	4%	5%	**4%**	1%	3%	5%	2%	4%	4%	5%	**4%**	2%	5%	2%	6%	5%

Figure 61

Patients Awaiting Transplant
Age Related 31-Mar-2000

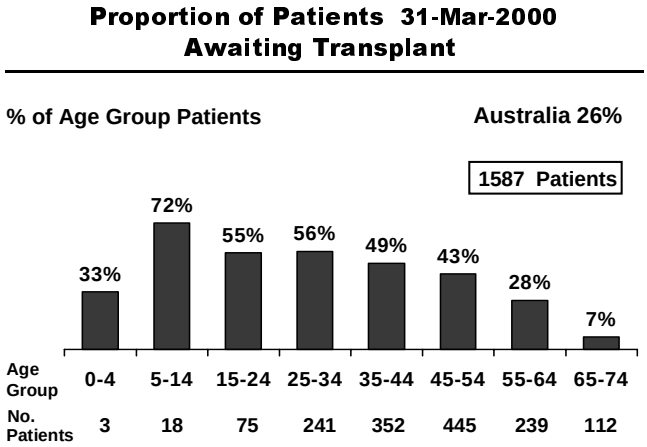
State	Age Groups								Total
	00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	
Queensland	0	1	11	30	39	50	38	20	**189**
New South Wales/ACT	1	11	44	80	168	214	176	75	**771**
Victoria	1	3	10	70	81	111	80	5	**361**
Tasmania	0	0	1	6	2	4	4	1	**18**
South Australia	0	1	3	24	19	23	17	6	**93**
Northern Territory	0	0	0	1	9	8	1	0	**19**
Western Australia	1	2	6	30	34	35	23	5	**136**
Australia	**3**	**18**	**75**	**241**	**352**	**445**	**339**	**112**	**1587**
New Zealand	**0**	**5**	**19**	**53**	**79**	**84**	**58**	**13**	**311**

Figure 62

Proportion (%) of Dialysis Patients Awaiting Transplant
Age Related 31-Mar-2000

State	Number of Patients	Age Groups								Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	
Queensland	970	0%	50%	44%	40%	33%	32%	22%	7%	**19%**
New South Wales/ACT	2195	100%	92%	70%	61%	67%	58%	37%	13%	**35%**
Victoria	1600	25%	50%	42%	60%	46%	42%	24%	1%	**23%**
Tasmania	97	0%	0%	100%	55%	17%	24%	21%	4%	**19%**
South Australia	368	0%	50%	33%	75%	45%	35%	27%	6%	**25%**
Northern Territory	171	0%	0%	0%	8%	24%	14%	3%	0%	**11%**
Western Australia	601	50%	67%	50%	59%	41%	12%	19%	3%	**23%**
Australia	**6002**	**33%**	**72%**	**55%**	**56%**	**49%**	**43%**	**28%**	**7%**	**26%**
New Zealand	**1249**	**0%**	**63%**	**43%**	**62%**	**48%**	**32%**	**17%**	**5%**	**25%**

Figure 63



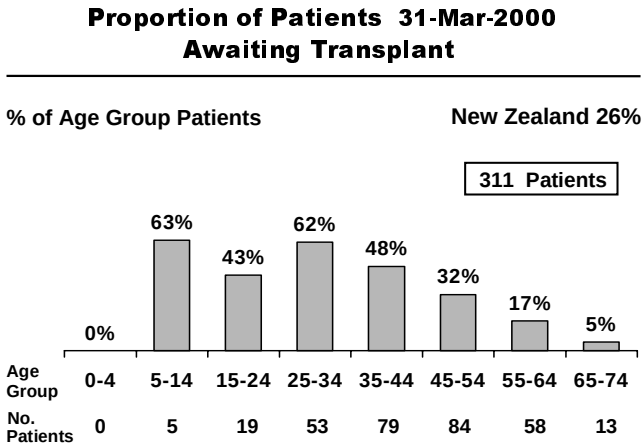
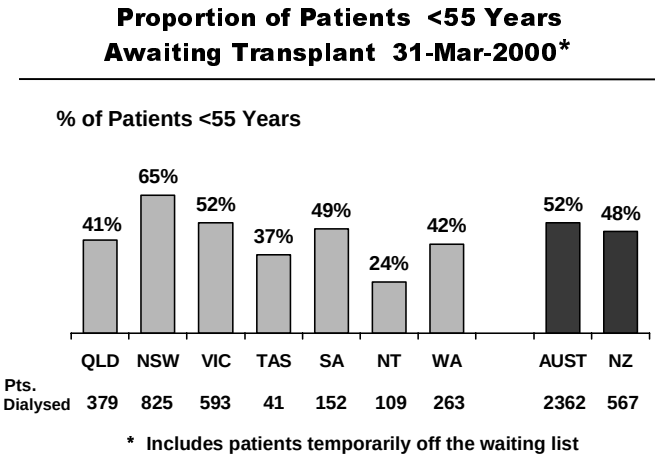


Figure 64



* Includes patients temporarily off the waiting list

DEATHS

Introduction

Death rate is reported as number of patients died/ total number of months of treatment of all patients treated at any time during the year. It is expressed as deaths per 100 patient years [pt yrs] at risk.

For this report, as in previous years, death is attributed to the dialysis modality at the time of death.

This report contains two forms of reporting the incidence of death:

- Rate related to number of treatment years
- Proportion of all patients treated

Australia

Dialysis Dependent

Death rates per 100 patient years [pt yrs]

The number of deaths increased 6% compared to the previous year. There were 952 deaths (16.5 deaths per 100 pt yrs at risk), representing 12.9% of patients treated at any time during the past year; 62% of patients were 65 years or older. Continuous peritoneal dialysis (19.0 deaths per 100 pt yrs at risk) 11.9% of patients dialysed; haemodialysis (15.5 deaths per 100 pt yrs at risk) 11.2% of patients dialysed. See Figures 69 and 74.

Transplant Dependent

There were 111 deaths (2.2 deaths per 100 pt yrs at risk) of patients with a transplant; 2.0% of patients with a functioning graft during the year. The cadaver donor recipient death rate was 2.6 per 100 pt yrs, the living donor rate 0.5 per 100 pt yrs. These results were similar to those of last year. The death rate in relation to age is shown in Figure 70 and 74.

New Zealand

Dialysis Dependent

Death Rate per 100 Patient Years [pt yrs]

There were 191 deaths (16.3 deaths per 100 pt yrs at risk) see Figure 71; 12.6% of patients dialysed, see Figure 74; haemodialysis (17.8 deaths per 100 pt yrs at risk) 11.3% of patients dialysed, CAPD (15.2 deaths per 100 pt yrs at risk) 10.6% of patients dialysed. See Figure 73 and 81, and Appendix III at Website (www.anzdata.org.au).

Transplant Dependent

There was a decrease in the number of deaths (2.4 deaths per 100 pt yrs at risk) see Figure 72: 23 deaths (2.2% at risk) see Figure 74. Cadaver donor recipient death rate was 2.7 per 100 pt yrs, living donor 1.6 per 100 pt yrs.

Figure 65

Death Rates by States
All Dialysis Patients 1994 - 1999

Year	Qld	NSW/ACT	Vic.	SA	WA	Aust.	N. Z.
1994	20.1	13.9	14.0	13.9	14.6	**15.2**	**18.0**
1995	16.8	13.6	15.4	16.1	13.0	**14.9**	**18.9**
1996	17.7	14.3	14.0	23.4	14.5	**15.6**	**14.7**
1997	16.5	16.4	12.5	20.3	17.1	**15.7**	**15.8**
1998	19.3	16.7	15.7	15.6	13.6	**16.6**	**16.5**
1999	20.7	15.9	14.1	15.2	17.4	**16.5**	**16.3**

Figure 66

Death Rates by States
Dialysis Modality & Age Groups 1999

Age Group	Treatment	Qld	NSW/ACT	Vic.	SA	WA	Aust.	N.Z.
Age 45-64 yrs	All Patients	16.6	11.4	12.0	11.1	11.8	**13.1**	**16.1**
	CAPD	15.6	12.1	12.2	15.3	14.6	**13.8**	**14.6**
	Haemodialysis	15.9	10.7	12.1	10.7	10.9	**12.5**	**17.3**
Age 65-84 yrs	All Patients	30.5	24.7	21.2	22.8	34.4	**25.4**	**26.1**
	CAPD	28.9	30.2	21.8	24.5	28.4	**27.6**	**21.8**
	Haemodialysis	29.4	20.3	20.8	21.8	36.6	**24.0**	**34.0**

Cause of Death

Australia

Dialysis patients

Cardiac events (42.5%) were the most common cause of death followed by "social causes", infection and vascular. Myocardial infarction (22%) and "cardiac arrest" (15%) formed the majority of the cardiac group. These results are similar to 1998.

The site of infection was most commonly septicaemia followed by the peritoneum and the lung. The detail of the site and identity of the organisms can be found at Website (www.anzdata.org.au)

Withdrawal of treatment was responsible for 21% of deaths; mostly in the older age group. Patient initiated withdrawal was more common (130 patients) compared to the caring team ceasing therapy (74 patients). The number of cases in the age group 55-84 years increased from 1998. Five patients under 35 years withdrew from treatment.

The number of deaths from malignancy (5%) 50 cases, was lower than last year (6.5%) 58 cases. There were two deaths from sclerosing peritonitis.

Transplant patients

Malignancy was the most common cause of death again: 25% (28 cases) of 111 deaths, most in the age group 45-74 years. There were 18 deaths due to infection, mainly septicaemia and lung.

Death of Young Adults
15-24, 25-34 years of age

There were seven deaths in the age group **15-24 years**, the youngest being 16 years; six males and one female, six Caucasoid and one Aboriginal. All were haemodialysis dependent. Causes of death were: two cardiac arrests, two hyperkalaemia, one myocardial infarction, one basal ganglia infarction and one failing heart transplant.

There were 28 deaths in the age group **25-34 years**: 14 males and 14 females. Nineteen were Caucasoid, seven Aboriginal and two Asian. Thirteen had glomerulonephritis and five had reflux nephropathy, four had lower urinary tract abnormalities, three had diabetic nephropathy and one had CyA nephrotoxicity from a previous lung transplant. Thirteen had been transplanted and five had received subsequent transplants.

Five died with a functioning transplant, 19 were haemodialysis dependent (nine hospital, eight satellite and one home). Causes of death were: eleven cardiac, four refused further treatment, four infection, three vascular, two malignancy, one therapy ceased, one suicide, one respiratory arrest and one with chronic degenerative encephalopathy.

New Zealand See Figure 68

Dialysis patients

There was a 7% increase in deaths (191 in 1999) from 178 last year. Carciac causes 50%, "social" 20%, infection 16% and vascular and miscellaneous both 7%. There was a large increase in treatment withdrawal, 38 patients (20%) compared to 19 patients (11%) in 1998.

Transplant patients

Cardiac and malignant conditions remained the most frequent causes of death.

Figure 67 — Australia

Cause of Death - Dialysis and Transplant Dependent 1999

	Dialysis	Transplant		Dialysis	Transplant
Cardiac			**Vascular**		
Cardiac Arrest	139	13	Bowel Infarction	13	1
Hyperkalaemia	10	0	Cerebrovascular Accident	67	10
Hypertensive Cardiac Failure	4	0	Gastrointestinal Haemorrhage	9	1
Myocardial Infarction	104	12	Haemorrhage Dialysis Access Site	4	0
Myocardial Infarction (presumed)	107	6	Haemorrhage from elsewhere	3	0
Other Causes of Cardiac Failure	27	1	Pulmonary Embolus	7	0
Pulmonary Oedema	11	3	Ruptured Aortic Aneurysm	2	1
Haemorrhagic Pericarditis	2	0	Haemorrhage from Transplant Artery	0	2
Total	**404 (42.5%)**	**35 (32%)**	**Total**	**105 (11%)**	**15 (13.5%)**
Infection			**Social**		
CNS - viral	1 (a)	0	Accidental	2	1
CNS - fungal	1 (b)	1 (f)	Patient refused further treatment	130	1
CNS - other	1 (c)	0	Suicide	4	2
Lung - bacterial	9	3	Therapy ceased	74	1
Lung - viral	0	1 (e)	**Total**	**210 (22%)**	**5 (4.5%)**
Lung - other	11 (c)	2 (c)			
Urinary Tract - bacterial	2	2			
Wound - bacterial	9	0			
Wound - other	2 (c)	0			
Shunt - bacterial	1	0			
Shunt - other	1 (c)	0	**Miscellaneous**		
Peritoneum - bacterial	24	0	Cachexia	15	1
Peritoneum - fungal	2 (d)	0	Chronic Respiratory Failure	8	1
Peritoneum - other	2 (c)	0	Hepatic Failure	6	0
Septicaemia - bacterial	21	2	Malignancy	50	28
Septicaemia - fungal	1 (d)	1 (f)	Other	10	4
Septicaemia - other	13 (c)	3 (c)	Pancreatitis	3	1
Liver - bacterial	1	0	Perforation Abdominal Viscus	10	2
Other Site - bacterial	19	2	Sclerosing Peritonitis	2	0
Other Site - viral	1 (e)	0	Unknown	5	0
Other Site - other	2 (c)	1 (c)	Uraemia - graft failure	0	1
Total	**124 (13%)**	**18 (16%)**	**Total**	**109 (11.5%)**	**38 (34%)**
			Total Deaths	**952 (100%)**	**111 (100%)**

(a) Herpes Zoster (b) Cryptococcus (c) Organism not isolated (d) Candida (e) CMV (f) Aspergillus

Figure 68 — New Zealand

Cause of Death - Dialysis and Transplant Dependent 1999

	Dialysis	Transplant		Dialysis	Transplant
Cardiac			**Vascular**		
Cardiac Arrest	31	2	Bowel Infarction	2	0
Hyperkalaemia	1	0	Cerebrovascular Accident	7	1
Haemorrhagic Pericarditis	1	0	Haemorrhage from elsewhere	2	0
Myocardial Infarction	22	3	Ruptured Aortic Aneurysm	0	1
Myocardial Infarction (presumed)	34	0	Pulmonary Embolus	1	0
Other Causes of Cardiac Failure	6	2	G.I. Haemorrhage	1	0
Total	**95 (50%)**	**7 (30%)**	**Total**	**13 (7%)**	**2 (9%)**
Infection			**Social**		
CNS - viral	0	1 (a)	Accidental	1	0
CNS - fungal	0	1 (b)	Patient refused further Treatment	17	0
Lung - bacterial	0	1	Therapy ceased	21	0
Lung -viral	0	2 (c) (d)	**Total**	**39 (20%)**	**0 (0%)**
Lung - other	3 (e)	0			
Wound - bacterial	3	0			
Wound - other	1 (e)	0			
Peritoneum - bacterial	7	0	**Miscellaneous**		
Septicaemia - bacterial	5	0	Cachexia	5	0
Septicaemia - other	1 (e)	0	Malignancy	6	8
Liver - other	1 (e)	0	Other	2	0
Other Site - bacterial	7	0	Perforated Abdominal Viscus	1	0
Other Site - other	2 (e)	0	Uraemia - graft failure	0	1
Total	**30 (16%)**	**5 (22%)**	**Total**	**14 (7%)**	**9 (39%)**
			Total Deaths	**191 (100%)**	**23 (100%)**

(a) Herpes Zoster (b) Aspergillus (c) Adenovirus (d) Varicella (e) Organism not isolated

Figure 69 **Australia**

Death Rates Calculated as Deaths Per 100 Patient Years
Dialysis Patients 1999

	Age Groups						All Ages
	00-14	15-24	25-44	45-64	65-84	85-94	
All Dialysis							
All Patients Death Rate	**0**	**5.2**	**6.1**	**13.1**	**25.4**	**44.3**	**16.5**
No. of Deaths	0	7	67	289	577	12	**952**
No. at Risk	49	177	1387	2764	2958	38	**7373**
Diabetic Death Rate	**0**	**0**	**11.1**	**21.3**	**34.4**	**0**	**24.3**
No. of Deaths	0	0	18	104	125	0	**247**
No. at Risk	0	3	212	649	520	2	**1386**
Non Diabetic Death Rate	**0**	**5.3**	**5.2**	**10.7**	**23.7**	**46.6**	**14.8**
No. of Deaths	0	7	49	185	452	12	**705**
No. at Risk	49	174	1175	2115	2438	36	**5987**
CAPD ★							
All Patients Death Rate	**0**	**0**	**7.1**	**13.8**	**27.6**	**43.8**	**19.0**
No. of Deaths	0	0	15	73	176	3	**267**
No. at Risk	6	38	333	779	1000	9	**2165**
Diabetic Death Rate	**0**	**0**	**20.2**	**22.7**	**42.5**	**0**	**29.3**
No. of Deaths	0	0	9	35	49	0	**93**
No. at Risk	0	3	77	239	195	2	**516**
Non Diabetic Death Rate	**0**	**0**	**3.6**	**10.2**	**24.3**	**74.8**	**16.0**
No. of Deaths	0	0	6	38	127	3	**174**
No. at Risk	6	35	256	540	805	7	**1649**
Haemodialysis ★							
All Patients Death Rate	**0**	**7.6**	**5.8**	**12.5**	**24.0**	**43.8**	**15.5**
No. of Deaths	0	7	49	202	376	9	**643**
No. at Risk	18	135	1154	2179	2195	30	**5711**
Diabetic Death Rate	**0**	**0**	**7.3**	**19.3**	**29.3**	**0**	**20.9**
No. of Deaths	0	0	8	60	69	0	**137**
No. at Risk	0	0	158	474	367	1	**1000**
Non Diabetic Death Rate	**0**	**7.6**	**5.6**	**10.9**	**23.1**	**44.1**	**14.5**
No. of Deaths	0	7	41	142	307	9	**506**
No. at Risk	18	135	996	1705	1828	29	**4711**

★ Treatment at Death

Figure 70 **Australia**

Death Rates Calculated as Deaths Per 100 Patient Years
Transplant Patients 1999

	Age Groups									All Ages
	00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
All Transplants										
All Patients Death Rate	**0**	**0**	**0**	**0.7**	**0.9**	**1.3**	**3.0**	**7.4**	**20.2**	**2.2**
No. of Deaths	0	0	0	5	10	17	33	37	9	**111**
No. at Risk	17	96	282	751	1127	1309	1164	527	46	**5319**
Diabetic Death Rate	**0**	**0**	**0**	**2.5**	**1.9**	**2.0**	**3.9**	**8.3**	**0**	**2.6**
No. of Deaths	0	0	0	1	2	2	2	1	0	**8**
No. at Risk	0	0	1	45	119	110	56	11	0	**342**
Non Diabetic Death Rate	**0**	**0**	**0**	**0.6**	**0.8**	**1.3**	**3.0**	**7.3**	**20.2**	**2.2**
No. of Deaths	0	0	0	4	8	15	31	36	9	**103**
No. at Risk	17	96	281	706	1008	1199	1108	516	46	**4977**
Cadaver Transplants										
All Patients Death Rate	**0**	**0**	**0**	**0.8**	**0.9**	**1.4**	**3.3**	**7.8**	**21.2**	**2.6**
No. of Deaths	0	0	0	4	7	15	33	37	9	**105**
No. at Risk	2	39	123	490	833	1119	1050	498	46	**4200**
Diabetic Death Rate	**0**	**0**	**0**	**2.8**	**2.5**	**2.2**	**4.7**	**9.1**	**0**	**3.1**
No. of Deaths	0	0	0	1	2	2	2	1	0	**8**
No. at Risk	0	0	1	40	90	96	47	11	0	**285**
Non Diabetic Death Rate	**0**	**0**	**0**	**0.7**	**0.7**	**1.3**	**3.3**	**7.8**	**21.1**	**2.6**
No. of Deaths	0	0	0	3	5	13	31	36	9	**97**
No. at Risk	2	39	122	450	743	1023	1003	487	46	**3915**
Living Donor Transplants										
All Patients Death Rate	**0**	**0**	**0**	**0.4**	**1.1**	**1.1**	**0**	**0**	**0**	**0.5**
No. of Deaths	0	0	0	1	3	2	0	0	0	**6**
No. at Risk	15	57	158	260	295	188	115	29	2	**1119**
Diabetic Death Rate	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
No. of Deaths	0	0	0	0	0	0	0	0	0	**0**
No. at Risk	0	0	0	5	29	12	10	1	0	**57**
Non Diabetic Death Rate	**0**	**0**	**0**	**0.4**	**1.2**	**1.2**	**0**	**0**	**0**	**0.6**
No. of Deaths	0	0	0	1	3	2	0	0	0	**6**
No. at Risk	15	57	158	255	266	176	105	28	2	**1062**

Figure 71 **New Zealand**

Death Rates Calculated as Deaths Per 100 Patient Years
Dialysis Patients 1999

	Age Groups						All Ages
	00-14	15-24	25-44	45-64	65-84	85-94	
All Dialysis							
All Patients Death Rate	**0**	**2.4**	**7.5**	**16.1**	**26.1**	**56.0**	**16.3**
No. of Deaths	0	1	19	90	79	2	**191**
No. at Risk	14	50	314	719	412	6	**1515**
Diabetic Death Rate	**0**	**0**	**12.9**	**18.5**	**37.2**	**0**	**21.8**
No. of Deaths	0	0	7	51	34	0	**92**
No. at Risk	0	1	102	582	182	0	**556**
Non Diabetic Death Rate	**0**	**2.4**	**6.0**	**13.8**	**21.3**	**56.0**	**13.2**
No. of Deaths	0	1	12	39	45	2	**99**
No. at Risk	14	49	247	361	282	6	**959**
CAPD ★							
All Patients Death Rate	**0**	**6.2**	**5.1**	**14.6**	**21.8**	**37.8**	**15.2**
No. of Deaths	0	1	5	44	41	1	**92**
No. at Risk	2	22	130	431	276	6	**867**
Diabetic Death Rate	**0**	**0**	**7.2**	**16.4**	**37.2**	**0**	**20.0**
No. of Deaths	0	0	2	29	51	0	**52**
No. at Risk	0	0	38	250	88	0	**376**
Non Diabetic Death Rate	**0**	**6.2**	**4.3**	**12.0**	**15.2**	**37.8**	**11.6**
No. of Deaths	0	1	3	15	20	1	**40**
No. at Risk	2	22	92	181	188	6	**491**
Haemodialysis ★							
All Patients Death Rate	**0**	**0**	**8.9**	**17.3**	**34.0**	**0**	**17.8**
No. of Deaths	0	0	13	42	38	0	**93**
No. at Risk	5	27	201	391	194	1	**819**
Diabetic Death Rate	**0**	**0**	**19.7**	**19.6**	**37.5**	**0**	**23.7**
No. of Deaths	0	0	5	18	13	0	**36**
No. at Risk	0	1	39	168	62	0	**270**
Non Diabetic Death Rate	**0**	**0**	**6.6**	**15.9**	**32.4**	**0**	**15.4**
No. of Deaths	0	0	8	24	25	0	**57**
No. at Risk	5	26	162	223	132	1	**549**

★ Treatment at Death

Figure 72 **New Zealand**

Death Rates Calculated as Deaths Per 100 Patient Years
Transplant Patients 1999

	Age Groups									All Ages
	00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
All Transplants										
All Patients Death Rate	**0**	**0**	**0**	**0.6**	**1.2**	**2.1**	**6.9**	**1.3**	**15.9**	**2.4**
No. of Deaths	0	0	0	1	3	5	11	1	2	**23**
No. at Risk	3	21	56	176	260	253	180	78	14	**1041**
Diabetic Death Rate	**0**	**0**	**0**	**0**	**3.9**	**0**	**5.8**	**0**	**0**	**2.6**
No. of Deaths	0	0	0	0	1	0	1	0	0	**2**
No. at Risk	0	0	0	6	28	26	20	4	0	**84**
Non Diabetic Death Rate	**0**	**0**	**0**	**0.6**	**0.9**	**2.3**	**7.0**	**1.4**	**15.9**	**2.4**
No. of Deaths	0	0	0	1	2	5	10	1	2	**21**
No. at Risk	3	21	56	170	232	227	160	74	14	**957**
Cadaver Transplants										
All Patients Death Rate	**0**	**0**	**0**	**0**	**1.1**	**2.0**	**7.0**	**1.4**	**17.2**	**2.7**
No. of Deaths	0	0	0	0	2	4	10	1	2	**19**
No. at Risk	1	6	18	96	189	208	160	72	13	**763**
Diabetic Death Rate	**0**	**0**	**0**	**0**	**4.5**	**0**	**5.8**	**0**	**0**	**3.1**
No. of Deaths	0	0	0	0	1	0	1	0	0	**2**
No. at Risk	0	0	0	4	25	19	19	4	0	**71**
Non Diabetic Death Rate	**0**	**0**	**0**	**0**	**0.6**	**2.2**	**7.2**	**1.5**	**17.2**	**2.6**
No. of Deaths	0	0	0	0	1	4	9	1	2	**17**
No. at Risk	1	6	18	92	164	189	141	68	13	**692**
Living Donor Transplants										
All Patients Death Rate	**0**	**0**	**0**	**1.4**	**1.6**	**2.5**	**5.7**	**0**	**0**	**1.6**
No. of Deaths	0	0	0	1	1	1	1	0	0	**4**
No. at Risk	2	15	38	80	71	45	20	6	1	**278**
Diabetic Death Rate	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
No. of Deaths	0	0	0	0	0	0	0	0	0	**0**
No. at Risk	0	0	0	1	4	7	1	0	0	**13**
Non Diabetic Death Rate	**0**	**0**	**0**	**1.4**	**1.7**	**3.0**	**5.8**	**0**	**0**	**1.7**
No. of Deaths	0	0	0	1	1	1	1	0	0	**4**
No. at Risk	2	15	38	79	67	38	19	6	1	**265**

Figure 73

Death as a Proportion of Dialysis Treated Patients 1994 - 1999

		1994	1995	1996	1997	1998	1999
Australia	**All Dialysis**	11.7%	11.6%	12.1%	12.3%	12.9%	12.9%
	CAPD	10.6%	10.4%	13%	11.4%	11.9%	12.3%
	Haemodialysis	10.3%	10.2%	9.7%	10.9%	11.3%	11.2%
	All Patients 55-64 years	14%	10%	13%	14%	12%	12.5%
	CAPD	11%	8%	14%	12%	9%	9%
	Haemodialysis	12%	10%	10%	13%	11%	12%
	All Patients 65-74 years	18%	18%	18%	18%	18%	19%
	CAPD	17%	17%	18%	16%	16%	16%
	Haemodialysis	16%	16%	14%	17%	16%	17%
New Zealand	**All Dialysis**	13.7%	14%	11.5%	12.3%	12.7%	12.6%
	CAPD	14.3%	14.3%	10.3%	11.7%	12.1%	10.6%
	Haemodialysis	9.1%	10.6%	10%	8.8%	9.7%	11.3%

Figure 74

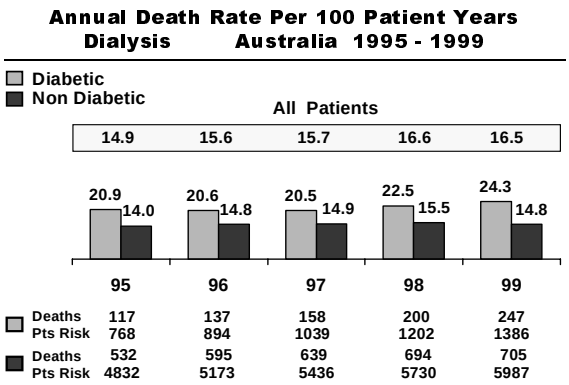
Dialysis and Transplant Patient Deaths ∗
Deaths as a Proportion of All Patients Treated During the Year 1999

Mode of Treatment	No. of Pts.	Age Groups										Total Deaths
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85-94	
Australia												
All Patients												
CAPD	2165	0%	0%	0%	3%	5%	9%	9%	16%	20%	33%	**12.3% (267)**
Haemodialysis	5711	0%	0%	5%	4%	4%	6%	12%	17%	18%	30%	**11.2% (643)**
All Dialysis Pts ★	7373	0%	0%	4%	4%	5%	8%	12.5%	19%	21%	31.5%	**12.9% (952)**
Transplant Pts	5319	0%	0%	0%	<1%	<1%	1%	3%	7%	19.5%	0%	**2.0% (111)**
★ Includes (42) patients having PD at death												
Diabetic Patients												
CAPD	516	0%	0%	0%	4%	15%	16%	13%	25%	24%	0%	**18.0% (93)**
Haemodialysis	1000	0%	0%	0%	2.5%	5.9%	7.6%	17%	19%	17%	0%	**13.7% (137)**
All Diabetic Dx ★	1386	0%	0%	0%	4%	10%	12%	19%	24.5%	22%	0%	**17.8% (247)**
Diabetic Tx	342	0%	0%	0%	2%	2%	2%	3.5%	9%	0%	0%	**2.3% (8)**
★ Includes (17) patients having PD at death												
Non Diabetic Patients												
CAPD	1649	0%	0%	0%	3%	2%	6%	8%	14%	19%	43%	**10.5% (174)**
Haemodialysis	4711	0%	0%	5%	4%	4%	6%	10%	16%	18%	31%	**10.7% (506)**
Non Diabetic Pts ★	5987	0%	0%	4%	4%	4%	6.5%	10.5%	17%	20%	33%	**11.7% (705)**
Non Diabetic Tx	4977	0%	0%	0%	<1%	<1%	1%	3%	7%	19.5%	0%	**2.0% (103)**
★ Includes (25) patients having PD at death												
New Zealand												
All Patients												
CAPD	867	0%	0%	4.5%	2%	5%	9%	11%	14%	17%	17%	**10.6% (92)**
Haemodialysis	819	0%	0%	0%	7%	6%	10%	11%	20%	18%	0%	**11.3% (93)**
All Dialysis Pts ★	1515	0%	0%	2%	7%	6%	11%	14%	18.5%	21%	33%	**12.6% (191)**
Transplant Pts	1041	0%	0%	0%	<1%	1%	2%	6%	1%	14%	0%	**2.2% (23)**
★ Includes (6) patients having PD at death												
Diabetic Patients												
CAPD	376	0%	0%	0%	0%	7%	10%	13%	23%	33%	0%	**13.8% (52)**
Haemodialysis	270	0%	0%	0%	0%	15%	11.5%	10%	24%	0%	0%	**13.3% (36)**
All Diabetic Dx ★	556	0%	0%	0%	0%	12.5%	13.5%	15%	26%	23%	0%	**16.5% (92)**
Diabetic Tx	84	0%	0%	0%	0%	3.5%	0%	5%	0%	0%	0%	**2.3% (2)**
★ Includes (4) patients having PD at death												
Non Diabetic Patients												
CAPD	491	0%	0%	4.5%	3%	4%	8%	9%	9%	15%	17%	**8.1% (40)**
Haemodialysis	549	0%	0%	0%	8%	3%	9%	12%	18%	20%	0%	**10.3% (57)**
Non Diabetic Pts ★	959	0%	0%	2%	7%	3%	9%	12%	14%	21%	33%	**10.3%(99)**
Non Diabetic Tx	957	0%	0%	0%	<1%	<1%	2%	6%	1%	14%	0%	**2.1% (21)**
★ Includes (2) patients having PD at death												

∗ Expressed as (%) of all patients, non diabetic, and diabetic patients treated by dialysis or with a functioning transplant in 1999

Note: some patients will have been treated by both CAPD and haemodialysis

Figure 75



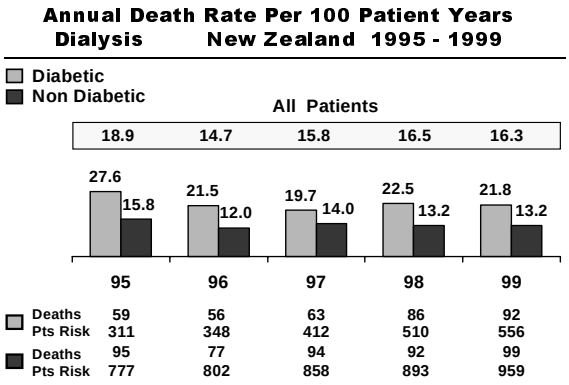
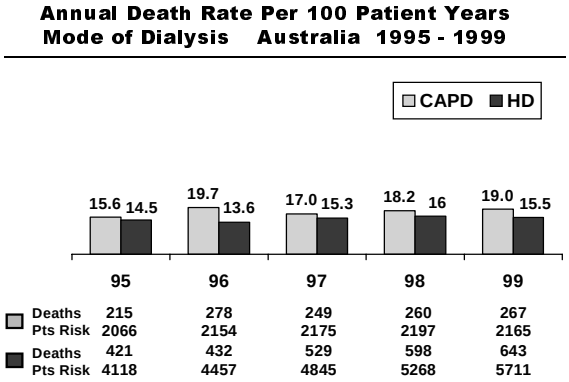


Figure 76



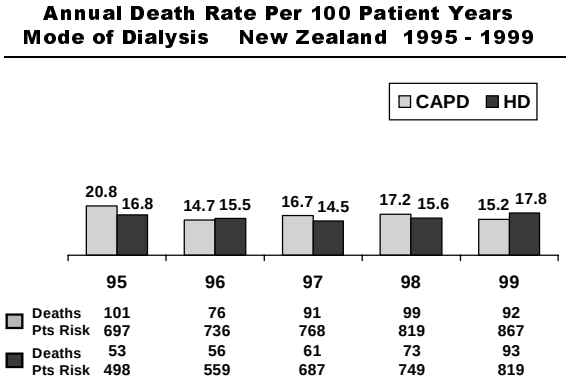
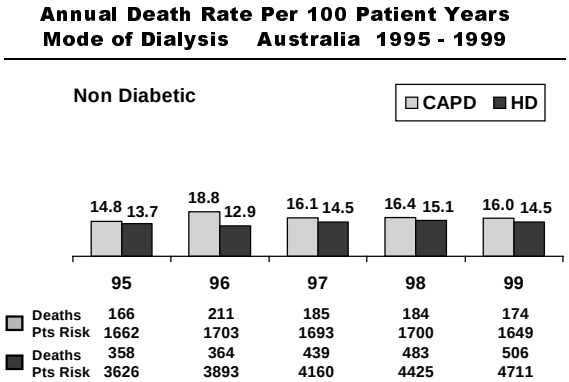


Figure 77



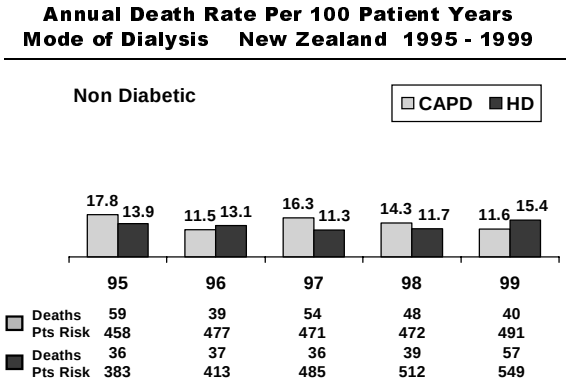
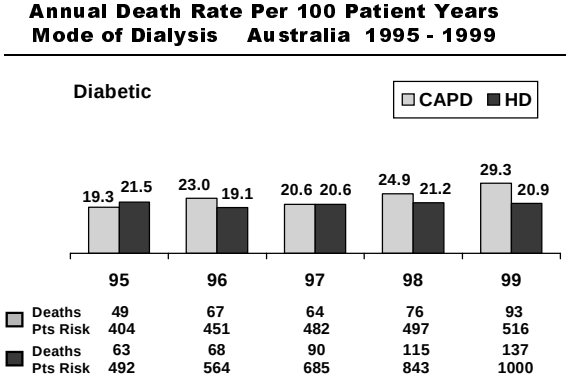
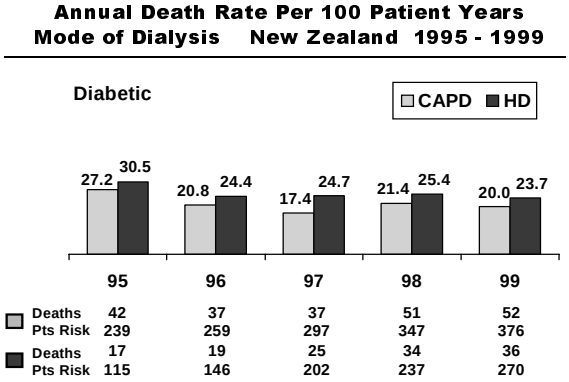


Figure 78





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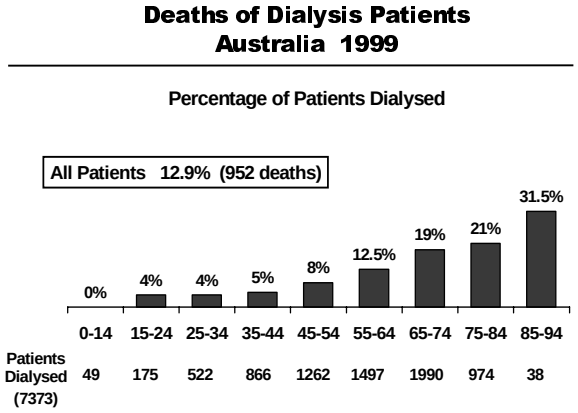

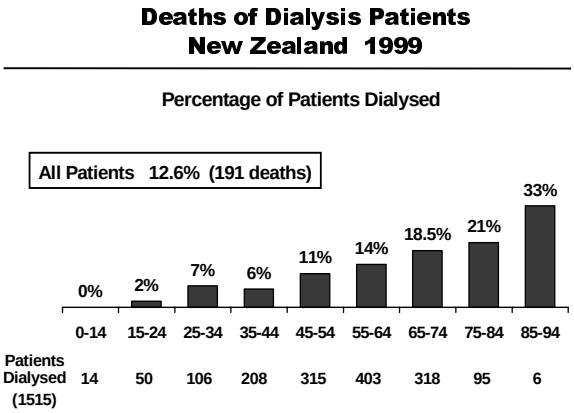

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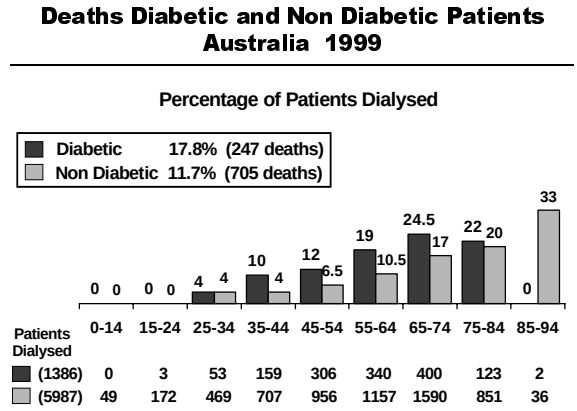

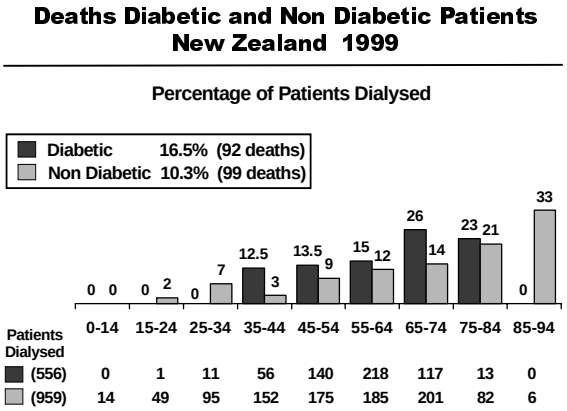

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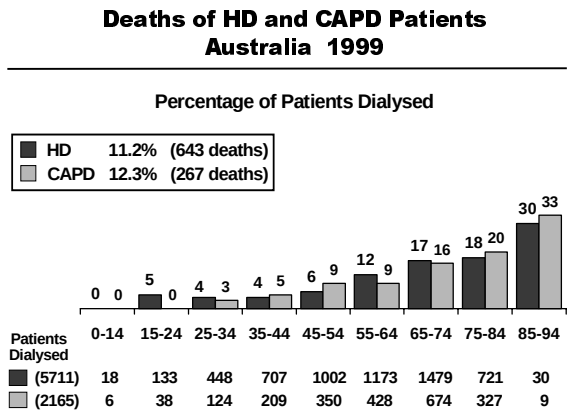


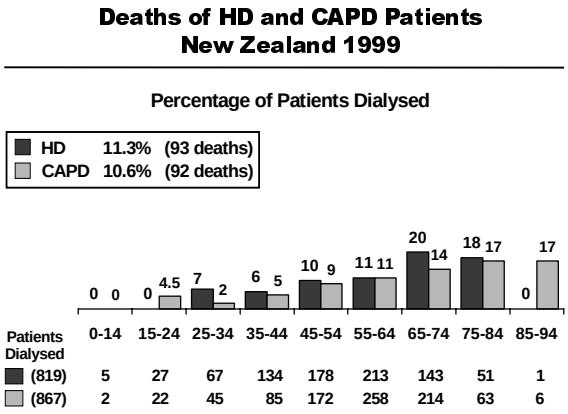
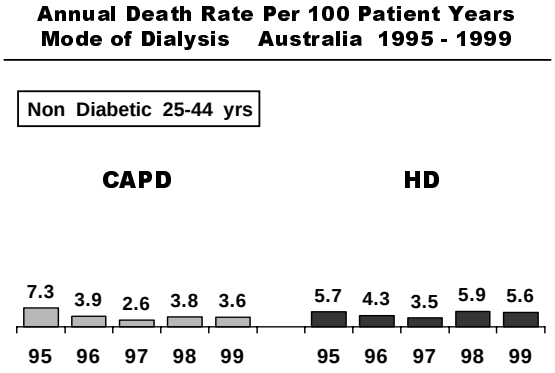


Figure 82



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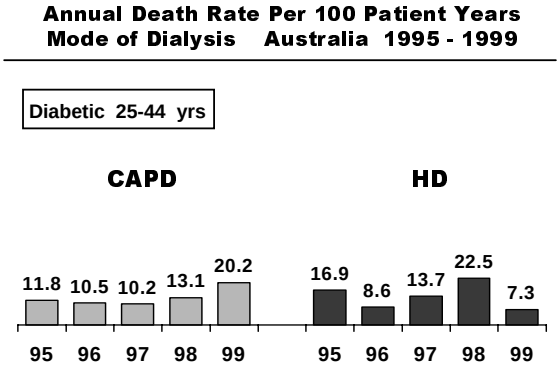
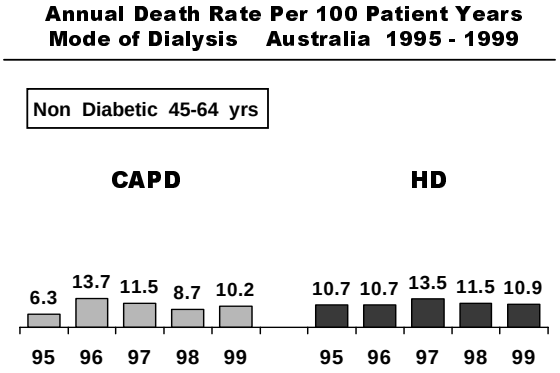
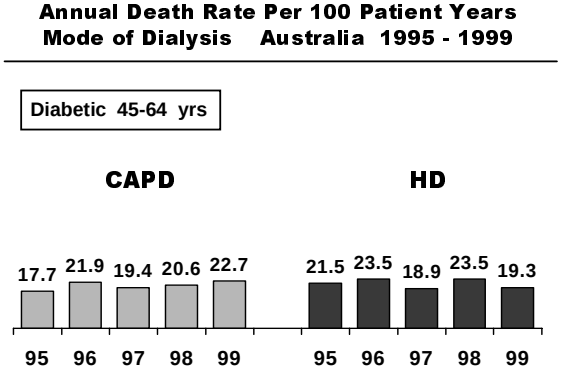
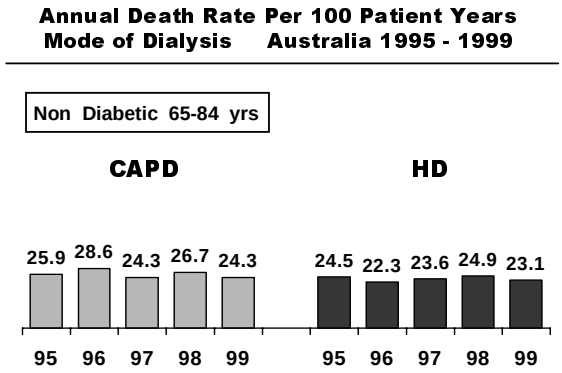








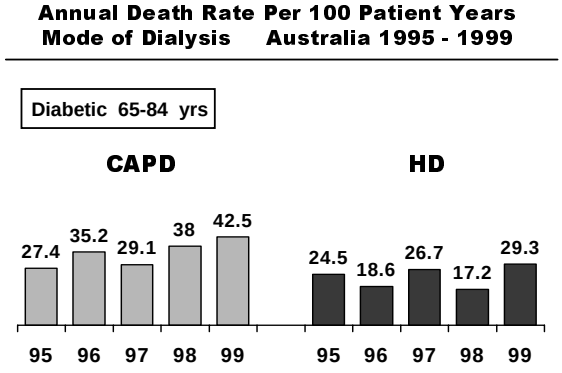


Figure 84

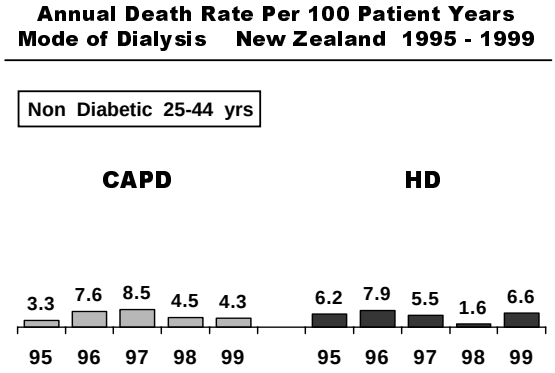
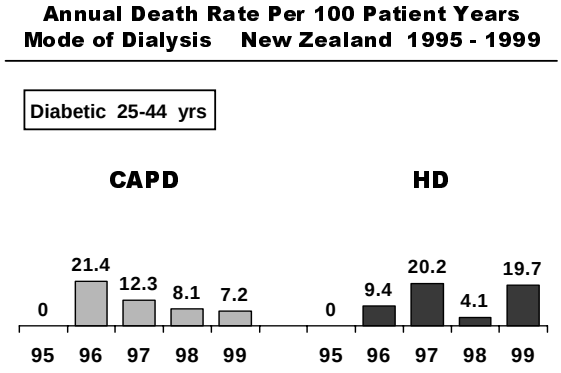
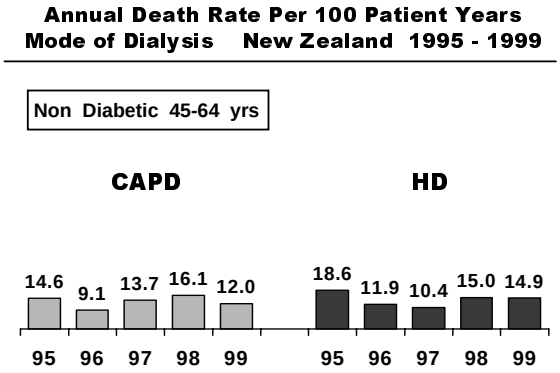
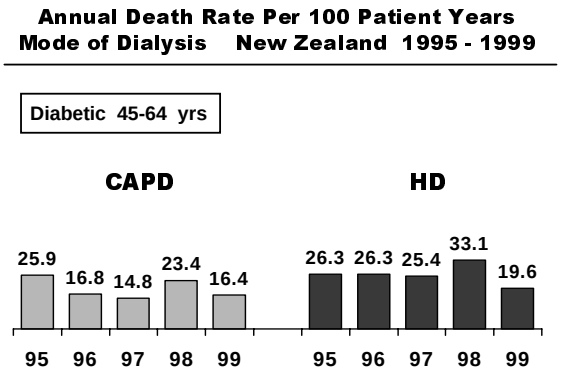
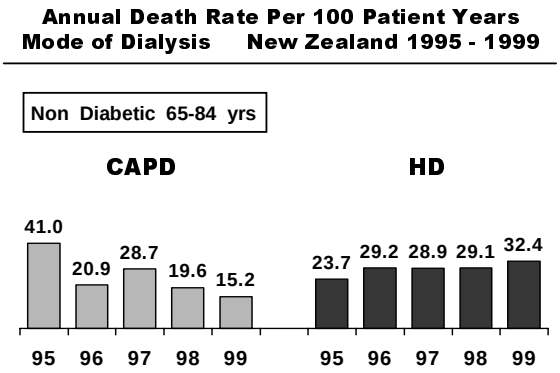


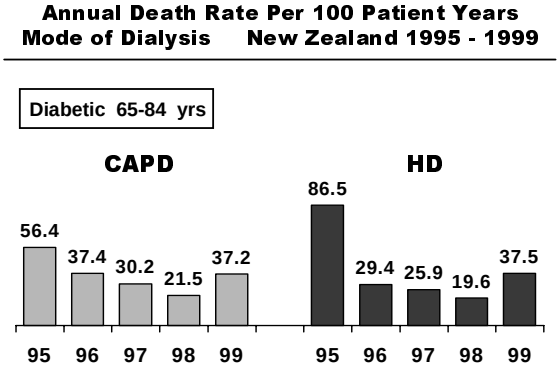
Figure 85











Deaths From Malignancy

Australia

There were 78 fatal malignancies in patients dialysis dependent (50) or with a functioning transplant (28), during 1999.

Dialysis Dependent

Twenty four of the 50 patients had cancer diagnosed before or within days of their first dialysis; 29% due to myeloma and 21% due to renal or transitional cell carcinoma of the urinary tract. A further eight tumours were identified in less than nine months after the first dialysis. Three patients had dialysed for more than five years. Two patients had had a previous renal transplant.

There were eleven tumours of the urinary tract, eight cases with myeloma, nine tumours of the lung and one lymphoma. The myeloma patients had had a median survival from diagnosis of 17 months (range 2-48 months).

Transplant Dependent

There were 28 deaths (38, 1998) in this group of patients. Ten died from skin cancer: two melanoma, three Merkel Cell and five squamous cell carcinomas. Eighteen died from non-skin cancer: three lymphoma, two pancreas, two lung and two oesophagus.

New Zealand

Dialysis Dependent

There were six deaths due to malignancy: one diagnosed before dialysis and one had a previous transplant.

Transplant Dependent

There were eight deaths; five were non-skin tumours.

Figure 86

Deaths from Malignancy 1999
Dialysis and Transplant Dependent

	Dx	Tx	Total
Australia			
Adenocarcinoma			
Breast	2 (#1)	1	**3**
Cervix	1	0	**1**
Colon	2 (#1)	1	**3**
Kidney	7 (#3)	1	**8**
Lung	3 (★1#1)	0	**3**
Ovary	0	1	**1**
Pancreas	0	2	**2**
Prostate	1 (#1)	0	**1**
Stomach	1 (#1)	1	**2**
Unknown Site	1	1	**2**
Leukaemia	3 (#3)	1	**4**
Lymphoma			
Adnexal	0	1	**1**
Brain	0	1	**1**
Gastrointestinal Tract	1	0	**1**
Liver	0	1	**1**
Melanoma			
Back	0	1	**1**
R. Lower Leg	1 (#1)	0	**1**
Unknown skin site	0	1	**1**
Merkel Cell	0	3	**3**
Myeloma	8 (#8)	0	**8**
Squamous Cell Carcinoma			
Breast	1 (#1)	0	**1**
Lung	4 (★1#1)	1	**5**
Nasopharangeal	1	0	**1**
Oesophagus	0	2	**2**
Skin	0	5	**5**
Stomach	1	0	**1**
Tongue	1	0	**1**
Unkown Site	1	0	**1**
Vagina	0	1	**1**
Transitional Cell Carcinoma			
Bladder	3 (#2)	0	**3**
Kidney	1 (#1)	0	**1**
Other			
Astrocytoma - brain	0	1	**1**
Basaloid - anal canal	1	0	**1**
Hepatocellular - liver	1	0	**1**
Meningioma - brain	1	0	**1**
Small Cell - lung	2	1	**3**
Unknown - unknown site	1	0	**1**
Total Deaths from Malignancy	**50**	**28**	**78**

★ (2 patients) Previous transplants
(24 patients) Diagnosed pre dialysis/within days of commencing

New Zealand			
Adenocarcinoma			
Kidney	1	0	**1**
Sigmoid Colon	1	0	**1**
Unknown Site	0	1	**1**
Uterus	0	1	**1**
Melanoma			
Ear	1 (★1)	0	**1**
Myeloma	1	0	**1**
Squamous Cell Carcinoma			
Lung	0	1	**1**
Skin	0	3	**3**
Transitional Cell Carcinoma			
Bladder	1 (#1)	0	**1**
Other			
Carcinoid - unknown site	1	0	**1**
Hepatoma - liver	0	1	**1**
Seminoma - testes	0	1	**1**
Total Deaths from Malignancy	**6**	**8**	**14**

★ (1 patient) Previous transplant
(1 patient) Diagnosed pre dialysis

Withdrawal from Dialysis Treatment

Australia

The number of deaths continued to rise substantially from 125 (1996), to 161 (1998), to 204 in 1999. The majority (130, 63%) were patient refusal of further treatment. Fifty four of the 204 patients were diabetics. The majority of all deaths were amongst the age group 65-84 years (72%).

Twenty three percent of all deaths 65-74 years, 30% of these 75-84 years were due to withdrawal of treatment: more than half refused further treatment.

Most CAPD cases were female and haemodialysis were male. The median duration of dialysis of those in the 75-84 year group was 37.5 months.

Five young patients were <35 years; three males and two females; four after refusing further treatment: 17% of all deaths in this age group. Further detail of this cause of death over the last five years can be found at Website (www.anzdata.org.au).

New Zealand

There were 38 deaths in 1999 (19 in 1998): 27% of all deaths of patients 65-74 years, 35% of those 75-84 years of age were due to treatment withdrawal. Twelve of the 38 patients had diabetic nephropathy.

Figure 87

Age Group Related Treatment Withdrawal 1999

	Mode of Treatment	Gender	Age Groups								Total
			00-24	25-34	35-44	45-54	55-64	65-74	75-84	85-94	
Australia	IPD/CCPD	Female	0	0	0	0	0	2	0	0	**2**
		Male	0	0	0	0	1 (1)	5 (3)	0	0	**6 (4)**
	CAPD	Female	0	1	1 (1)	2 (1)	1 (1)	12 (3)	12 (2)	1	**30 (8)**
		Male	0	0	0	1	5 (3)	8 (2)	9 (2)	0	**23 (7)**
	Haemodialysis	Female	0	1	0	2	17 (3)	33 (11)	11 (2)	1	**65 (16)**
		Male	0	3	3	7 (4)	8 (4)	27 (7)	28 (4)	2	**78 (19)**
	Total		**0**	**5**	**4 (1)**	**12 (5)**	**32 (12)**	**87 (26)**	**60 (10)**	**4**	**204 (54)**
New Zealand	CCPD	Male	0	0	0	1	1	0	0	0	**2**
	CAPD	Female	0	0	1	1	0	1	1	0	**4**
		Male	0	0	0	1 (1)	3 (3)	4 (2)	2 (1)	0	**10 (7)**
	Haemodialysis	Female	0	0	0	1	3 (1)	9 (2)	0	0	**13 (3)**
		Male	0	1	0	2 (2)	0	2	4	0	**9 (2)**
	Total		**0**	**1**	**1**	**6 (3)**	**7 (4)**	**16 (4)**	**7 (1)**	**0**	**38 (12)**

( ) Diabetics

Figure 88

Treatment Withdrawal 1996 - 1999

	Year	Mode of Treatment	Age Groups								Total
			00-24	25-34	35-44	45-54	55-64	65-74	75-84	85-94	
Australia	1996	CAPD	1	0	2 (1)	1 (1)	8 (7)	23 (8)	9	2	**46 (17)**
		HD	0	1	2 (1)	12 (4)	15 (2)	27	17	2	**76 (7)**
	1997	CAPD	0	1 (1)	1	2 (2)	12 (7)	16 (3)	9	0	**41 (13)**
		HD	0	2	3 (1)	5	17 (2)	42 (8)	20 (2)	2	**91 (13)**
	1998	CAPD	0	1 (1)	4 (1)	3 (1)	2	20 (5)	22 (3)	0	**52 (11)**
		HD	0	4 (1)	4 (1)	6	21 (6)	37 (6)	29 (1)	1	**102 (15)**
	1999	CAPD	0	1	1 (1)	3 (1)	6 (4)	20 (5)	21 (4)	1	**53 (15)**
		HD	0	4	3	9 (4)	25 (7)	60 (18)	39 (6)	3	**143 (35)**
New Zealand	1996	CAPD	0	1	0	4 (3)	6 (3)	6	4	0	**21 (6)**
		HD	0	0	0	1	4 (1)	2 (1)	3 (1)	0	**10 (3)**
	1997	CAPD	0	0	1 (1)	2 (1)	3 (1)	6 (2)	2	0	**14 (5)**
		HD	0	0	0	1 (1)	2 (1)	3 (2)	1	0	**7 (4)**
	1998	CAPD	0	0	0	1 (1)	2 (2)	7 (2)	2	0	**12 (5)**
		HD	0	0	0	1 (1)	2 (1)	1	3	0	**7 (2)**
	1999	CAPD	0	0	1	2 (1)	3 (3)	5 (2)	3 (1)	0	**14 (7)**
		HD	0	1	0	3 (2)	3 (1)	11 (2)	4	0	**22 (5)**

( ) Diabetics

METHOD AND LOCATION OF DIALYSIS

Australia

During the past year, although there has been a further increase in the total number of dialysis patients, the distribution of these patients across the modalities is still slowly changing. These are depicted in Figure 89, 91, 92.

There were 5,964 patients (314 per million) receiving dialysis treatment at the completion of the year to 31st December 1999. See Figure 90 and 93. The majority (72%) were out of hospital: 38% were dialysing at home and 33% were dialysing in satellite centres. However, over the past ten years, home haemodialysis has decreased from 20% of all dialysis patients to now being 11% of the total. CAPD numbers have remained similar to last year. The major growth area has been in satellite haemodialysis centres, many of these distant from the parent hospital.

As noted in the previous report, satellite centres vary considerably in the nature and activity of patients catered for, the degree of independence of the patients, the nurse:patient ratios and the degree of training of the staff.

Twenty four percent of all patients were using CAPD, 27% using hospital based haemodialysis, 33% satellite haemodialysis, and 11% home haemodialysis. In the modal age group 65-74 years, 33% were dialysing in hospital, 33% in a satellite centre and 34% at home.

The number of dialysis dependent patients increased by 7% in 1999 (6% in 1998). The actual increase in the number of dialysis patients has been 415 in 1999, 352 in 1998 and 304 in 1997. Home based dialysis has declined and satellite dialysis increased by 14%. Continuous Cycling Peritoneal Dialysis (CCPD) increased in March 2000 by 22% to 231 patients, from 189 in 1999 and 154 in March 1998. The growth in total dialysis patients since 1991 is 90%, increasing from 3,139 patients (1991) to 5,964 patients (1999).

Forty percent of patients were 65 years and older; 26 patients were 85 years or more. An increase occurred in all age groups 15 years or older, especially 65-84 years.

The effect of age on selection of dialysis method and location is shown in the Appendix. For those <15 years, peritoneal dialysis was used in 70% (83% in 1998), for 25-34 years it was 22%, for 65-84 years it was 31%, and for the 85 years and older group it was 27%.

The number of patients rose in all States except Tasmania. There was a considerable population adjusted increase in Victoria, South Australia and Western Australia.

The number of dialysis patients in relation to population in each State is shown in Figure 90.

In relation to State population, the highest prevalence of dialysis patients was in the Northern Territory (840 per million), Victoria (340 per million), New South Wales/ ACT (325 per million) and Western Australia (321 per million). The number in South Australia increased to (247 per million) from (219 per million) in 1998.

New Zealand

There was a 9.2% increase in dialysis patients (1,227 patients, 322 per million), mainly in the age group of 45 to 84 years. Home haemodialysis decreased from 200 to 177 patients in 1999. Sixty nine percent of patients used some form of home dialysis (79% of these as peritoneal dialysis patients).
See Figure 89, 90 and 94-96.

Home CCPD continues to become more popular, the number increasing by 56% (56 patients in March 2000, 36 patients in March 1999). PD remains a dominant mode of dialysis (55% in 1999, 56% in 1998). Together satellite and hospital haemodialysis account for 31% of patients in 1999, compared to 26% in 1998.

Between 1995 and 1999 there has been a total growth in patients on PD of 28% compared to a 143% growth in hospital and satellite haemodialysis over the same period. Over the five years the proportion of patients on PD has dropped from 62% to 55%, and the proportion on hospital or satellite HD has risen from 18% to 31% of total patients. In contrast home haemodialysis accounted for 20% in 1995, dropping to 14% by 1999.

Figure 89

Method and Location of Dialysis 1992 - 1999

	Mode of Treatment		1992	1993	1994	1995	1996	1997	1998	1999
Australia	PD	CCPD/IPD	49	41	63	95	129	177	216	261
		CAPD	1034	1182	1283	1429	1460	1448	1407	1403
		Total	**1083**	**1223**	**1346**	**1524**	**1589**	**1625**	**1623**	**1664**
	HD	Hospital	979	1085	1195	1271	1359	1475	1525	1636
		Home	611	645	625	627	642	636	655	681
		Satellite	714	752	934	1107	1303	1461	1746	1983
		Total	**2304**	**2482**	**2754**	**3005**	**3304**	**3572**	**3926**	**4300**
New Zealand	PD	CCPD/IPD	3	3	8	25	28	33	35	52
		CAPD	375	413	485	499	533	547	597	621
		Total	**378**	**416**	**493**	**524**	**561**	**580**	**632**	**673**
	HD	Hospital	103	126	113	151	180	238	243	296
		Home	194	179	174	172	192	190	200	177
		Satellite	1	1	6	4	4	12	48	81
		Total	**298**	**306**	**293**	**327**	**376**	**440**	**491**	**554**

Figure 90

State Distribution of Dialysis Dependent Patients 1992 - 1999

Dialysis Patients

State	1992	1993	1994	1995	1996	1997	1998	1999
Queensland	511	558	610	682	733	809	884	952
New South Wales/ACT	1329	1471	1610	1763	1937	1999	2088	2187
Victoria	856	920	1049	1130	1222	1326	1449	1600
Tasmania	62	63	67	92	98	109	101	97
South Australia	295	308	322	329	312	317	326	369
Northern Territory	54	78	91	112	129	146	156	162
Western Australia	280	307	351	421	462	491	545	597
Australia	**3387**	**3705**	**4100**	**4529**	**4893**	**5197**	**5549**	**5964**
New Zealand	**676**	**722**	**786**	**851**	**937**	**1020**	**1123**	**1227**

Per Million Population

State	1992	1993	1994	1995	1996	1997	1998	1999
Queensland	168	179	191	208	219	238	256	272
New South Wales/ACT	212	233	253	275	298	304	314	325
Victoria	192	206	234	251	269	288	311	340
Tasmania	132	134	142	194	207	230	214	206
South Australia	202	211	219	223	211	214	219	247
Northern Territory	320	464	532	644	726	780	821	840
Western Australia	168	183	206	243	262	273	298	321
Australia	**193**	**210**	**230**	**251**	**268**	**280**	**296**	**314**
New Zealand	**192**	**203**	**218**	**233**	**252**	**271**	**296**	**322**

Figure 91

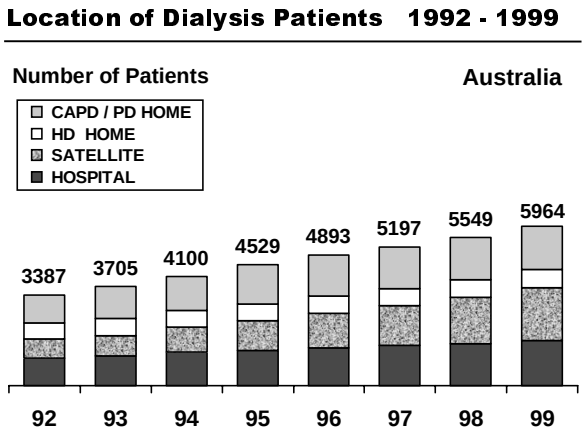


Figure 92

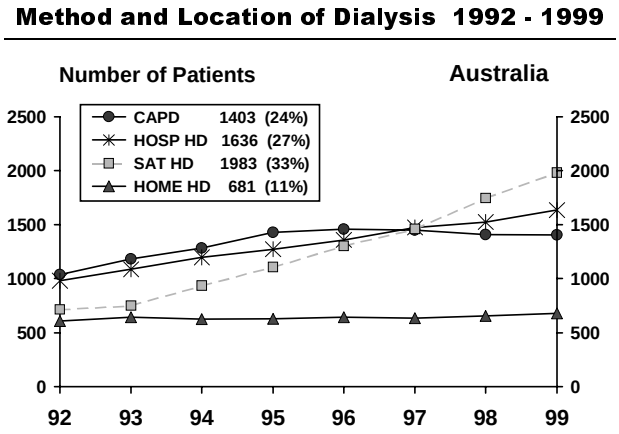
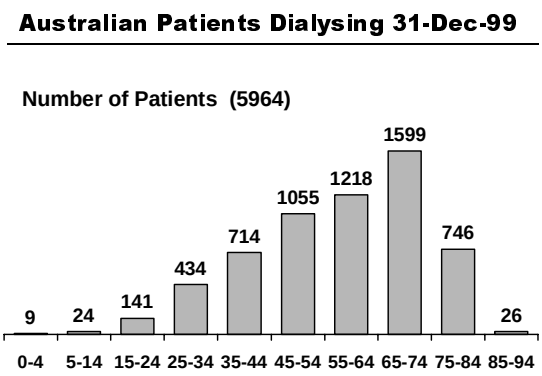


Figure 93



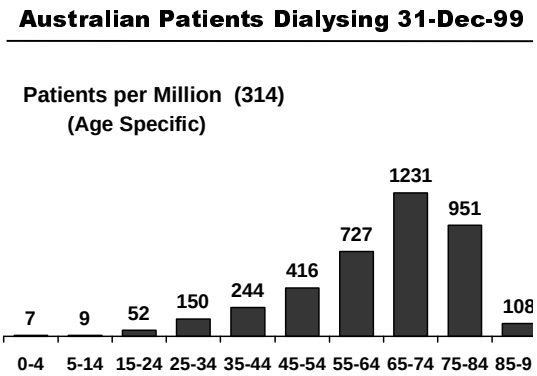


Figure 94

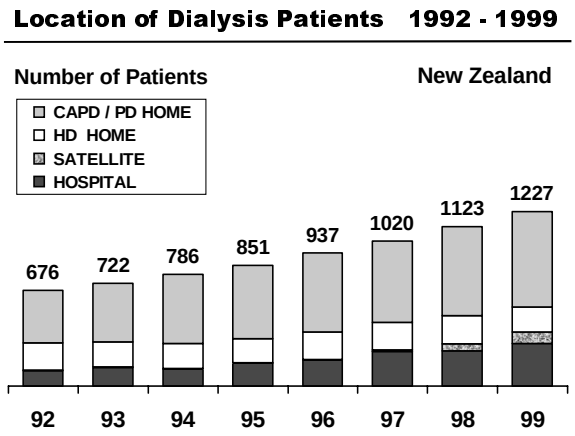


Figure 95

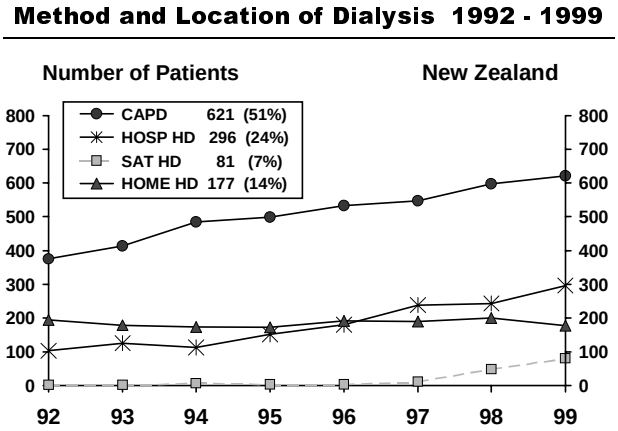
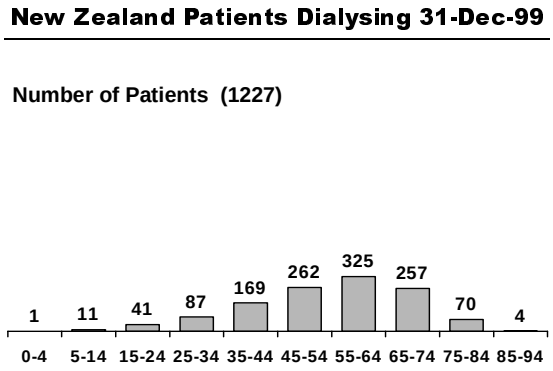
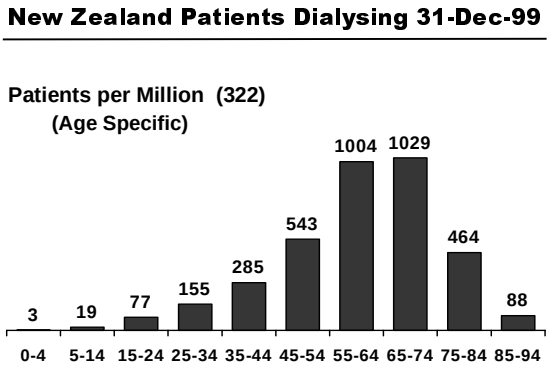


Figure 96





PERITONEAL DIALYSIS

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Stock and Flow

Australia

Of the 12,421 patients treated since 1978, 1,403 (11%) were still alive on CAPD at 31 December 1999. CAPD treated 24% (25% 1998) of all dialysis patients, and CCPD 3.9%, together accounting for 70% of all home dialysis. Of the 12,421 patients, 379 patients (3%) had had at least five years of continuous CAPD treatment. See Figure 100.

CCPD has increased rapidly from 161 patients in 1998 (189 in 1999) to 231 patients as at March 2000, reflecting the increased use of automated cyclers.

In relation to age, the proportion of all dialysis patients (65-74 years and 75-84 years) using CAPD was 27% (30% and 29% respectively in 1998); range 22% (25-34 years) to 27% (65-74 years and 75-84 years). See Figure 101 and 102.

The annual stock and flow of patients during the period 1992-99 is shown in Figure 98 and 99.

The State prevalence of CAPD ranged from 10% (Northern Territory), 16% (South Australia), 20% (Victoria and Tasmania), 25% (New South Wales/ACT), 27% (Queensland) and 29% (Western Australia). With the exception of Victoria and the Northern Territory, relative prevalence decreased in the other States at the end of 1999. See Figure 97.

There were 696 new CAPD patients in the calendar year 1999, a rise of 2% compared to the previous year; of whom 332 (48%) started dialysis with CAPD and 364 (52%) previously had haemodialysis or peritoneal dialysis or a failed transplant. See Figure 98.

New patients over the age of 65 rose from 299 in 1998 to 325 in 1999, reflecting a 9% growth in total numbers in this age group. This compared to an 18% growth in new haemodialysis patients in the same older age groups.

There were 267 deaths (19.0 deaths per 100 pt yrs; 12.3% of patients at risk): 0 deaths per 100 pt yrs; 0% (15-24 years), 7.1 deaths per 100 pt yrs; 4.5% (25-44 years), 13.8 deaths per 100 pt yrs; 9.3% (45-64 years), 27.6 deaths per 100 pt yrs; 17.6.% (65-84 years). See Figure 69 and Appendix II at Website (www.anzdata.org.au).

There were only 67 patients receiving a transplant in 1999 compared to 96 in 1998; 5% of all patients treated, (8.5% of patients <65 years treated during the year). See Figure 98.

Permanent transfer (>12 months) to another form of dialysis, normally haemodialysis, rose from 387 patients (28% of patients dialysed) to 402 patients (29%) in 1999. Most transfers to another form of dialysis were permanent (402/547). See Figure 98.

The primary renal disease of new patients to CAPD was 29% for both glomerulonephritis and diabetic nephropathy. See Figure 101.

New Zealand

The annual stock and flow of patients during the period 1992 to 1999 is shown in Figures 98 and 99. Of the 3,329 treated, 621 (19%) were alive at 31 December 1999, 162 (4.8%) had had more than five years continuous treatment. See Figure 100.

Together CAPD and CCPD accounted for 55% of all dialysis patients, and 79% of all patients dialysing at home.

Modal age group was 55-64 years (29%), 7% <35 years (9% 1998), 34% >65 years (30% 1998). See Figures 101,106.

There were 261 new CAPD patients in the calendar year 1999 (252 in 1998), 63% as initial dialysis treatment; 21% were 45-54 years, 8% <35 years, 32% >65 years. See Figures 98 and 106. For more detail see Appendix III at Website (www.anzdata.org.au).

There were 92 deaths in 1999 (99, 1998), 15.2 deaths per 100 pt yrs, (10.6% of patients at risk; 3.8% 25-44 years, 10.2% 45-64 years, 14.8% 65-84 years). For more detail see Figures 71, 73, 79-81, and Appendix III at Website (www.anzdata.org.au).

Thirty nine patients were transplanted in 1999 (32, 1998), 6% of patients dialysed, 9% of patients <65 years old. See Figure 98.

The proportion of patients in each age group using CAPD range from 38% (25-34 years) to 62% (65-74 years). See Figure 105.

Figure 97

Proportion (%) CAPD of all HD and PD Patients 1992 - 1999

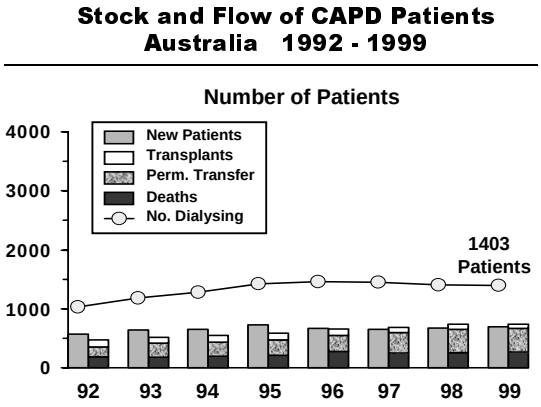
State	1992	1993	1994	1995	1996	1997	1998	1999
Queensland	39%	39%	38%	39%	33%	33%	30%	27%
New South Wales/ACT	28%	30%	29%	31%	32%	30%	29%	25%
Victoria	30%	32%	30%	27%	24%	21%	19%	20%
Tasmania	53%	46%	54%	57%	47%	36%	29%	20%
South Australia	21%	21%	22%	17%	16%	17%	18%	16%
Northern Territory	2%	4%	7%	12%	13%	8%	10%	10%
Western Australia	42%	45%	46%	47%	41%	37%	32%	29%
Australia	**31%**	**32%**	**31%**	**32%**	**30%**	**28%**	**25%**	**24%**
New Zealand	**56%**	**57%**	**62%**	**59%**	**57%**	**54%**	**53%**	**51%**

Figure 98

Stock and Flow of CAPD Patients 1992 - 1999

	1992	1993	1994	1995	1996	1997	1998	1999
Australia								
Patients new to CAPD	569	640	651	729	671	647	680	696
First Dialysis Treatment	228	258	269	301	293	288	316	332
Previous Dialysis (HD/IPD)	318	363	358	406	362	341	349	353
Failed Transplant	23	19	24	22	16	18	15	11
Transplanted	115	106	116	116	103	91	96	67
Deaths	190	176	199	215	278	249	260	267
Never Transplanted	178	166	187	204	267	241	250	255
Previous Transplant	12	10	12	11	11	8	10	12
Permanent Transfers Out (>12/12)	168	239	234	260	274	345	387	402
Temporary Transfers (<12/12)	117	115	132	131	166	139	152	145
Patients Dialysing at 31 December	1034	1182	1283	1429	1460	1448	1407	1403
Patients Dialysing at Home 31 December	1001	1155	1253	1398	1428	1422	1377	1375
% of all Home Dialysis Patients (HD/PD)	61%	63%	66%	67%	66%	64%	62%	61%
New Zealand								
Patients new to CAPD	163	176	221	212	224	218	252	261
First Dialysis Treatment	112	89	134	134	127	113	150	164
Previous Dialysis (HD/IPD)	44	82	78	74	91	100	99	91
Failed Transplant	7	5	9	4	6	5	3	6
Transplanted	45	23	30	43	46	39	32	39
Deaths	61	88	92	101	76	91	99	92
Never Transplanted	57	80	83	97	70	87	94	88
Previous Transplant	4	8	9	4	6	4	5	4
Permanent Transfers Out (>12/12)	23	37	36	57	70	83	79	107
Temporary Transfers (<12/12)	8	22	28	8	29	49	38	49
Patients Dialysing at 31 December	375	413	485	499	533	547	597	621
Patients Dialysing at Home 31 December	368	406	480	495	529	541	591	617
% of all Home Dialysis Patients HD/PD	65%	69%	73%	72%	71%	71%	72%	73%

Figure 99



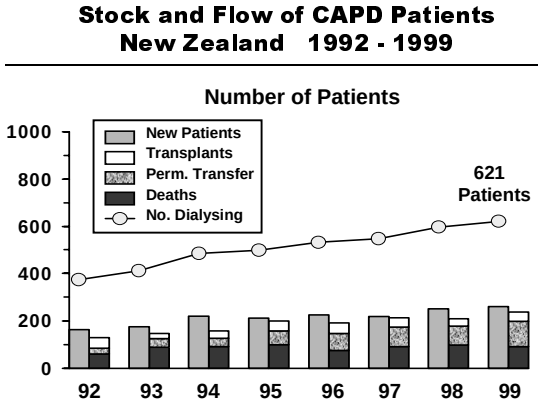


Figure 100

Continuous Period of CAPD

	Months													
	0-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48	49-60	61-72	73-84	85-96	97-108	>109
Australia														
1st Treatment 10,052 Pts	2902	2044	1448	1014	796	507	384	304	324	181	78	41	16	13
All Treatments 12,421 Pts	3803	2536	1770	1221	939	601	446	344	382	206	89	45	22	17
New Zealand														
1st Treatment 2,859 Pts	605	461	399	350	269	209	183	91	151	66	25	28	10	12
All Treatments 3,328 Pts	766	548	458	391	308	235	198	96	166	72	31	28	13	18

Figure 101 **Australia**

Stock and Flow of CAPD Patients 1992 - 1999

Age Groups	1992	1993	1994	1995	1996	1997	1998	1999
New Patients ★								
00-14 years	11	14	15	11	6	3	4	5
15-24 years	21	26	24	23	15	18	17	16
25-34 years	48	45	51	43	43	45	39	35
35-44 years	72	64	55	101	79	68	69	69
45-54 years	84	79	118	132	99	98	105	114
55-64 years	168	182	149	172	155	145	147	132
65-74 years	146	193	190	194	212	199	213	228
75-84 years	19	36	47	51	58	71	84	96
85-94 years	0	1	2	2	4	0	2	1
Total	**569**	**640**	**651**	**729**	**671**	**647**	**680**	**696**
Patients Dialysing								
00-14 years	10	13	12	9	7	3	1	4
15-24 years	30	39	42	38	34	32	26	20
25-34 years	77	77	86	80	74	84	81	77
35-44 years	123	127	128	162	167	162	144	119
45-54 years	136	152	187	235	237	234	230	236
55-64 years	308	327	320	350	343	300	290	301
65-74 years	301	374	401	436	461	461	454	436
75-84 years	48	72	104	115	132	170	176	205
85-94 years	1	1	3	4	5	2	5	5
Total	**1034**	**1182**	**1283**	**1429**	**1460**	**1448**	**1407**	**1403**
Primary Renal Disease ★								
Glomerulonephritis	217	192	200	245	208	208	215	205
Analgesic Nephropathy	58	78	53	60	59	46	51	61
Hypertension	51	74	75	65	93	82	81	68
Polycystic Disease	33	38	42	42	32	35	41	32
Reflux Nephropathy	35	35	32	33	31	34	31	25
Diabetic Nephropathy	98	112	136	172	157	161	163	201
Miscellaneous	46	63	60	68	49	33	52	54
Uncertain	31	48	53	44	42	48	46	50
Total	**569**	**640**	**652**	**729**	**671**	**647**	**680**	**696**

★ New patients receiving first CAPD treatment

Proportion (%) Age Distribution 1992 - 1999

Age Groups	1992	1993	1994	1995	1996	1997	1998	1999
New Patients								
00-14 years	2%	2%	2%	2%	1%	<1%	<1%	<1%
15-24 years	4%	4%	4%	3%	2%	3%	3%	2%
25-34 years	8%	7%	8%	6%	6%	7%	6%	5%
35-44 years	13%	10%	8%	14%	12%	11%	10%	10%
45-54 years	15%	13%	18%	18%	14%	15%	15%	16%
55-64 years	29%	28%	23%	23%	23%	22%	22%	19%
65-74 years	26%	30%	29%	27%	32%	31%	31%	33%
75-84 years	3%	6%	7%	7%	9%	11%	12%	14%
85-94 years	0%	<1%	1%	<1%	1%	0%	<1%	<1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Patients Dialysing								
00-14 years	1%	1%	1%	1%	<1%	<1%	<1%	<1%
15-24 years	3%	3%	3%	3%	2%	2%	2%	1%
25-34 years	7%	7%	7%	6%	5%	6%	6%	5%
35-44 years	12%	11%	10%	11%	11%	11%	10%	8%
45-54 years	13%	13%	15%	16%	16%	16%	16%	17%
55-64 years	30%	27%	25%	24%	23%	21%	21%	21%
65-74 years	29%	32%	31%	31%	32%	32%	32%	31%
75-84 years	5%	6%	8%	8%	9%	12%	13%	15%
85-94 years	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure 102 **New Zealand**

Stock and Flow of CAPD Patients 1992 - 1999

Age Groups	1992	1993	1994	1995	1996	1997	1998	1999
New Patients ★								
00-14 years	5	6	4	5	5	1	5	3
15-24 years	7	3	7	9	12	7	8	4
25-34 years	13	21	23	16	12	10	18	12
35-44 years	25	23	33	27	28	21	20	23
45-54 years	36	36	53	55	57	47	45	56
55-64 years	47	54	68	53	63	59	82	77
65-74 years	28	31	31	40	44	63	60	61
75-84 years	2	2	2	7	3	9	13	23
85-94 years	0	0	0	0	0	1	1	2
Total	**163**	**176**	**221**	**212**	**224**	**218**	**252**	**261**
Patients Dialysing								
00-14 years	10	8	6	6	0	1	1	0
15-24 years	11	10	12	13	19	21	18	13
25-34 years	31	39	46	41	38	35	35	33
35-44 years	51	64	73	77	65	59	63	64
45-54 years	84	88	113	124	134	126	123	127
55-64 years	111	119	138	134	160	160	176	178
65-74 years	69	73	85	91	102	119	145	160
75-84 years	8	12	12	13	15	25	33	42
85-94 years	0	0	0	0	0	1	3	4
Total	**375**	**413**	**485**	**499**	**533**	**547**	**597**	**621**
Primary Renal Disease ★								
Glomerulonephritis	50	33	55	61	49	45	45	50
Analgesic Nephropathy	2	1	2	0	0	0	1	1
Hypertension	24	27	28	31	25	36	36	32
Polycystic Disease	4	10	8	6	17	8	10	16
Reflux Nephropathy	12	8	9	6	15	7	8	9
Diabetic Nephropathy	51	66	87	80	90	97	123	115
Miscellaneous	13	17	24	21	21	17	15	18
Uncertain	7	14	8	7	7	8	14	20
Total	**163**	**176**	**221**	**212**	**224**	**218**	**252**	**261**

★ New patients receiving first CAPD treatment

Proportion (%) Age Distribution 1992 - 1999

Age Groups	1992	1993	1994	1995	1996	1997	1998	1999
New Patients								
00-14 years	3%	3%	2%	2%	2%	<1%	2%	1%
15-24 years	4%	2%	3%	4%	5%	3%	3%	2%
25-34 years	8%	12%	10%	8%	5%	5%	7%	5%
35-44 years	16%	13%	15%	13%	13%	10%	8%	9%
45-54 years	22%	20%	25%	26%	26%	22%	18%	21%
55-64 years	29%	31%	30%	25%	28%	26%	33%	30%
65-74 years	17%	18%	14%	19%	20%	29%	24%	23%
75-84 years	1%	1%	1%	3%	1%	4%	5%	9%
85-94 years	0%	0%	0%	0%	0%	<1%	<1%	<1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Patients Dialysing								
00-14 years	3%	2%	1%	1%	0%	<1%	<1%	0%
15-24 years	3%	2%	2%	3%	4%	4%	3%	2%
25-34 years	8%	9%	10%	8%	7%	6%	6%	5%
35-44 years	14%	16%	15%	15%	12%	11%	11%	10%
45-54 years	22%	21%	23%	25%	25%	23%	21%	20%
55-64 years	30%	29%	29%	27%	30%	29%	29%	29%
65-74 years	18%	18%	18%	18%	19%	22%	24%	26%
75-84 years	2%	3%	2%	3%	3%	5%	6%	7%
85-94 years	0%	0%	0%	0%	0%	<1%	<1%	1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Australia 1999

Figure 103

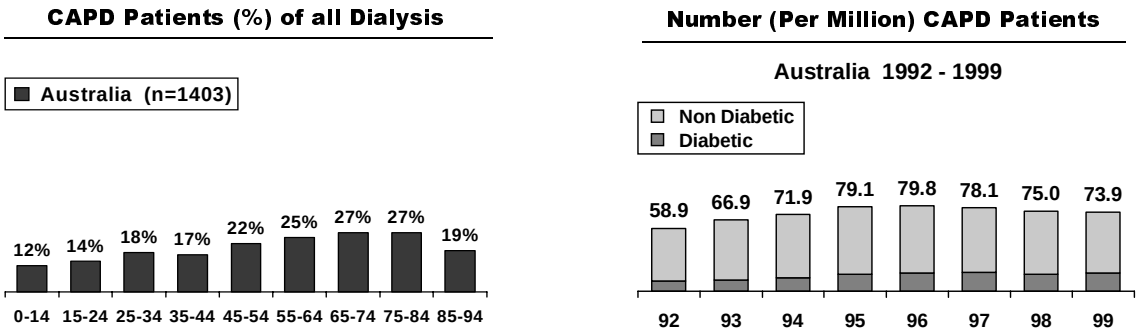
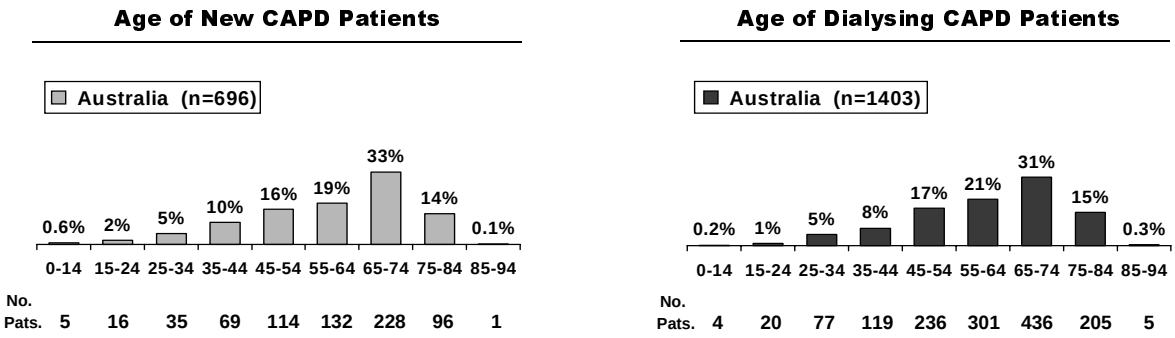


Figure 104



New Zealand 1999

Figure 105

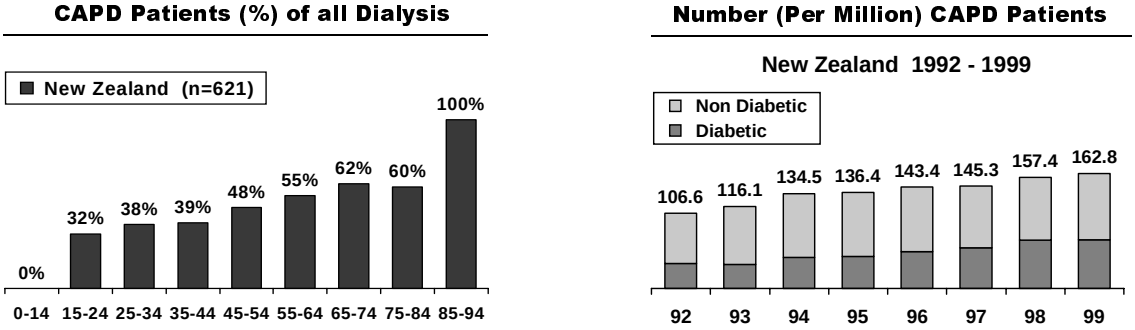
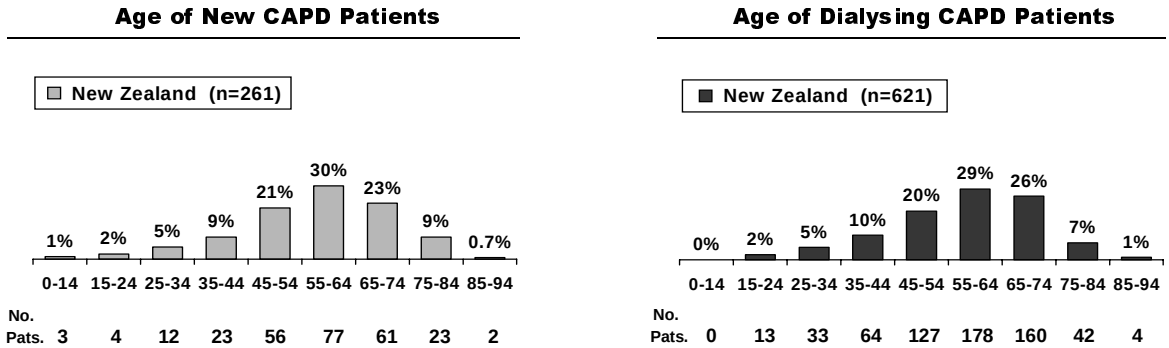


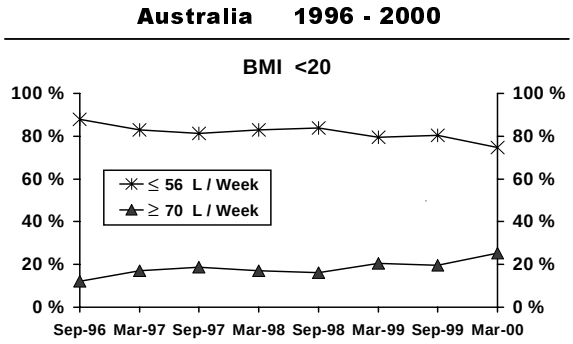
Figure 106

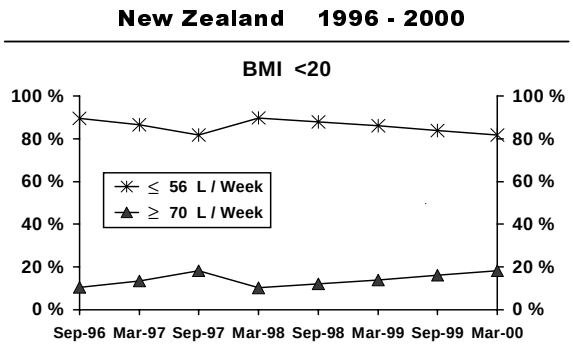


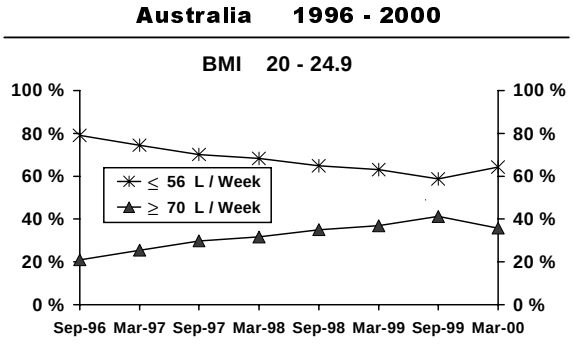
CAPD Litres Per Week

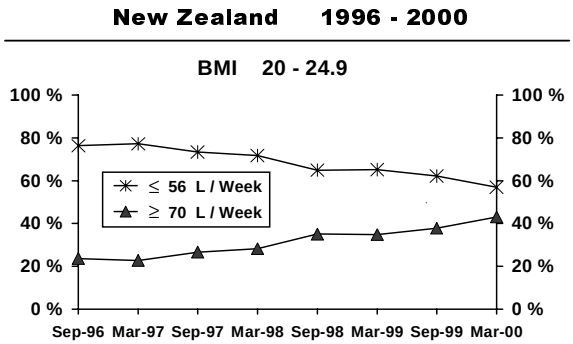
Figure 107

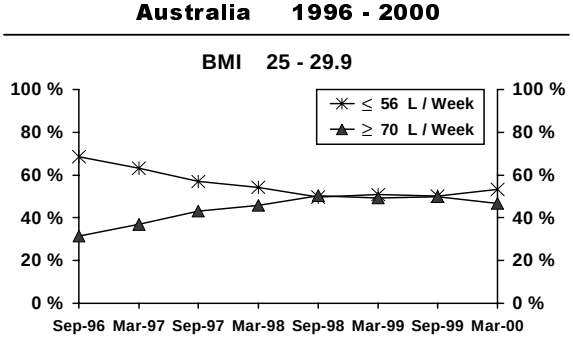
Relationship of BMI to Weekly Dialysate Volume

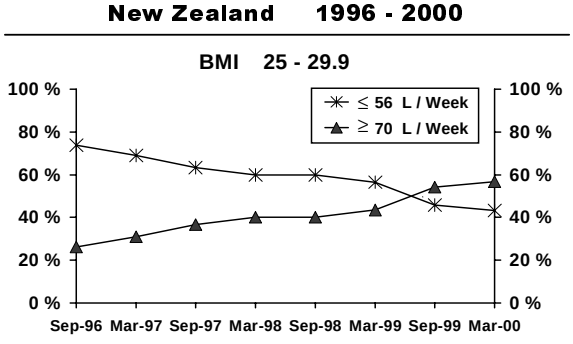


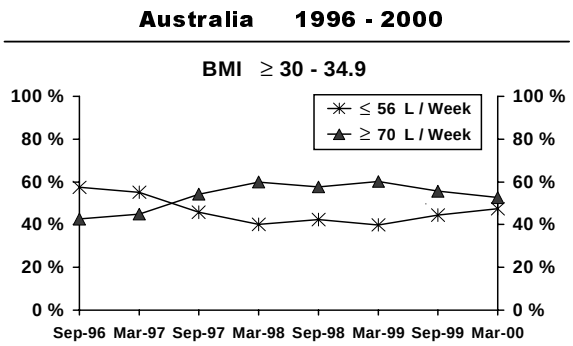












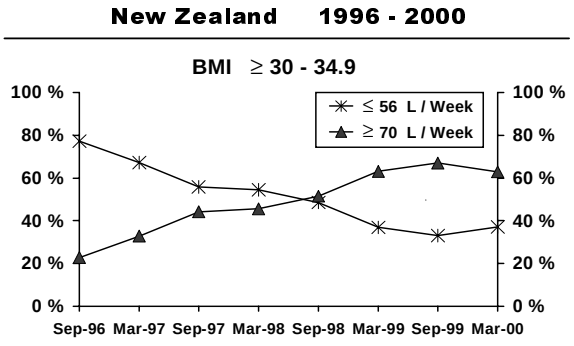


Figure 108

Volume of Dialysate per Week

	Age Groups	March 1997					March 2000				
			Litres per Week					Litres per Week			
		No. Pts	42	56	70	84	No. Pts	42	56	70	84
Australia	45-64	(545)	4%	65%	25%	5%	(483)	3%	51%	36%	11%
	65-74	(415)	6%	71%	20%	2%	(399)	4%	56%	29%	10%
	75-84	(109)	6%	82%	11%	1%	(171)	6%	61%	28%	6%
New Zealand	45-64	(282)	3%	72%	20%	5%	(303)	3%	42%	41%	15%
	65-74	(97)	10%	61%	22%	7%	(141)	2%	49%	38%	11%
	75-84	(15)	20%	53%	27%	0%	(44)	2%	54%	41%	2%

PERITONITIS

AUSTRALIA

See Figures 109-111.

The median survival peritonitis free period remains 16.6 months overall with 23% of patients completely free of peritonitis by three years.

There is a striking difference between Caucasoid and Aboriginal, Maori and Pacific Islander peritonitis free periods. These trends are evident both in 1992-1995 and 1996-1999 cohorts of patients in the age groups 35-54 years and 55-64 years.

NEW ZEALAND

See Figures 109-111.

The median survival peritonitis free period is 11.3 months overall with 18.6% of patients remaining completely free of peritonitis by three years.

Median peritonitis free survival is lower for Maori and Pacific Islanders in comparison with those of Caucasoid origin.

Figure 109

First CAPD Treatment to First Episode of Peritonitis Related to Age at Entry 1996 to 31-Dec-1999

Survival	Age Groups						All
	00-14	15-34	35-54	55-64	65-74	> 75	
Australia	n=17	n=233	n=694	n=577	n=850	n=316	n=2687
3 months	75 + 10.8 10	84 + 2.4 175	84 + 1.4 521	85 + 1.5 447	85 + 1.2 648	82 + 2.2 224	84 + 0.7 2025
6 months	33 + 13.3 3	67 + 3.3 113	73 + 1.7 382	75 + 1.8 356	74 + 1.5 492	72 + 2.7 166	73 + 0.9 1512
9 months	20 + 13.0 1	59 + 3.6 89	65 + 2.0 290	67 + 2.0 282	64 + 1.8 361	63 + 3.0 122	64 + 1.0 1145
1 year	20 + 13.0 1	53 + 3.7 72	59 + 2.1 219	61 + 2.2 223	56 + 1.9 277	56 + 3.2 90	58 + 1.0 882
2 years		34 + 4.1 22	39 + 2.5 73	42 + 2.6 75	37 + 2.2 89	34 + 3.7 28	38 + 1.2 287
3 years		26 + 4.8 6	25 + 2.9 17	30 + 3.1 22	22 + 2.5 22	21 + 4.3 6	25 + 1.4 73
New Zealand	n=14	n=81	n=297	n=282	n=229	n=52	n=955
3 months	65 + 14.0 6	86 + 3.8 68	85 + 2.0 241	84 + 2.2 227	87 + 2.2 183	81 + 5.6 37	85 + 1.1 762
6 months	44 + 15.7 4	75 + 4.9 53	69 + 2.7 177	66 + 2.9 156	73 + 3.1 135	63 + 7.5 17	69 + 1.5 542
9 months	22 + 13.5 2	63 + 5.7 38	56 + 3.0 128	53 + 3.2 107	64 + 3.4 110	58 + 8.1 12	57 + 1.7 397
1 year	11 + 10.2 1	53 + 6.1 27	47 + 3.1 93	41 + 3.3 75	58 + 3.6 90	47 + 9.6 7	48 + 1.8 293
2 years		33 + 6.6 9	30 + 3.2 41	21 + 3.1 17	36 + 3.9 31		28 + 1.8 98
3 years		18 + 6.7 4	21 + 3.3 10	15 + 3.6 1	23 + 4.4 6		19 + 1.9 21

% Survival + S.E. and Numbers at risk

Figure 110

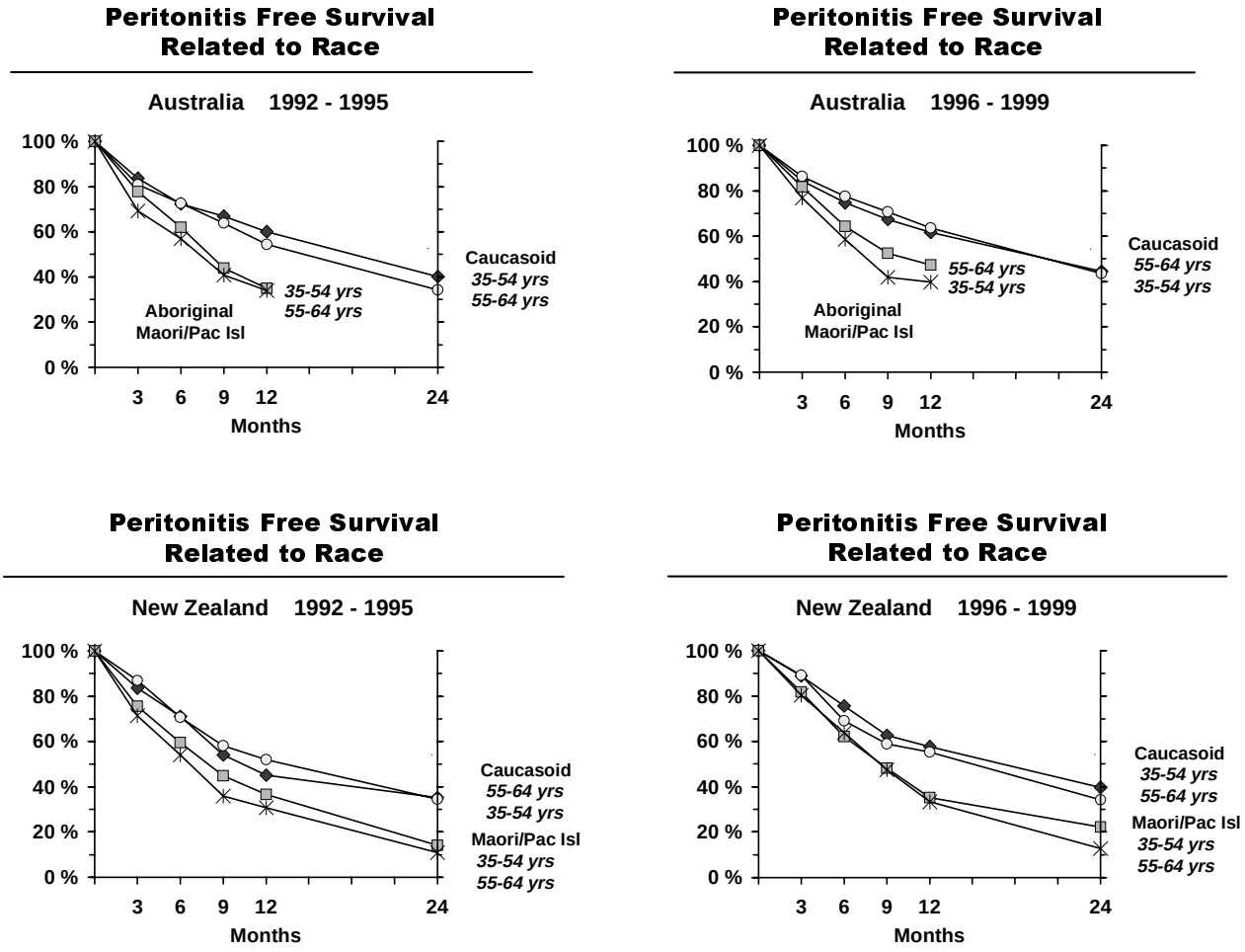
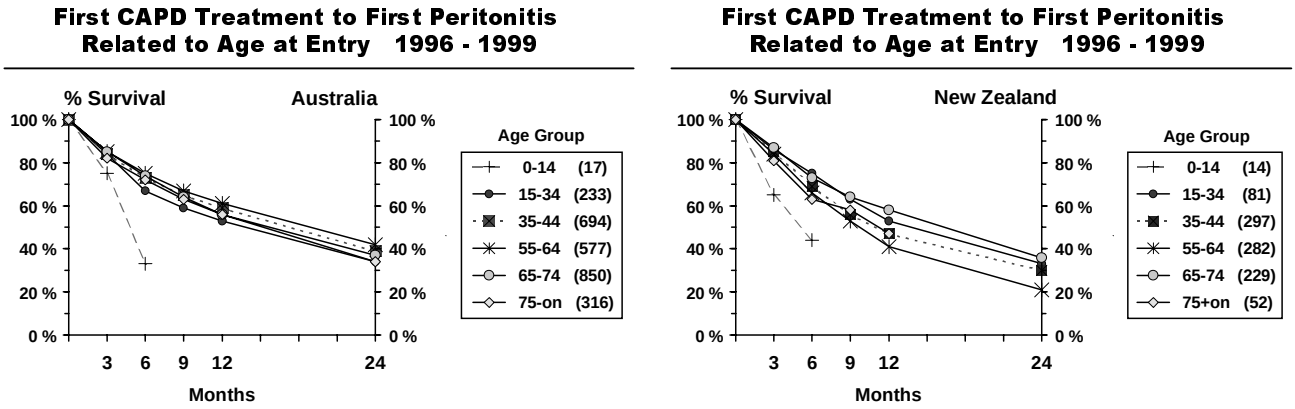


Figure 111



Body Mass Index

In Australia, underweight patients (BMI ≤25) who commence on CAPD are more likely to survive longer than overweight patients (BMI ≥27.5). See Figure 113. Underweight patients also have improved technique survival compared to all other patients.

In contrast, patients who have a large weight gain in the first year of CAPD treatment (change in BMI ≥2.5), have a better CAPD technique survival than those who do not, whereas they have no significant difference in overall survival. See Figures 114-116.

Figure 112

Gender and Body Mass Index (BMI) 1980 - 1999

	Survival Period	Female BMI		Male BMI	
		<25	>25	<25	>25
Australia	0-4 years	650 (86%)	607 (90.3%)	630 (87.6%)	673 (93.6%)
	>4 years	106 (14%)	65 (9.7%)	89 (12.4%)	46 (6.4%)
New Zealand	0-4 years	152 (82.2%)	270 (89.1%)	171 (87.7%)	294 (89.1%)
	>4 years	33 (17.8%)	33 (10.9%)	24 (12.3%)	36 (10.9%)

Figure 113

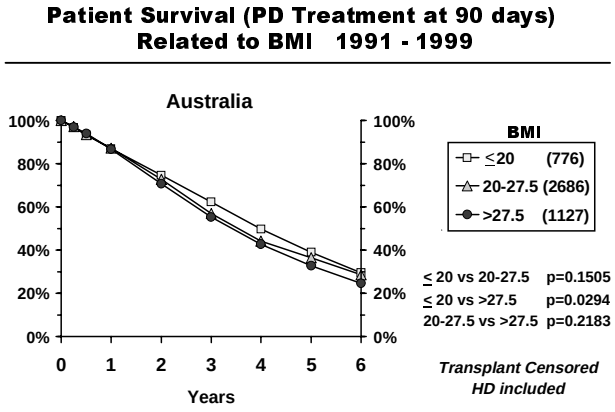
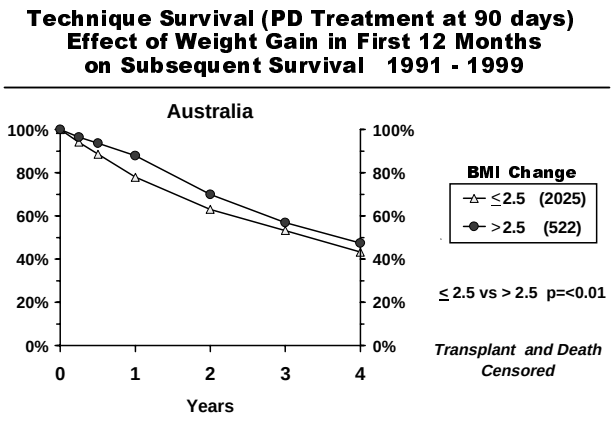


Figure 114



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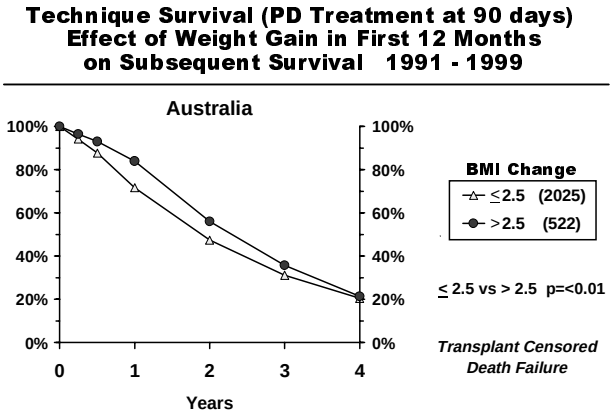

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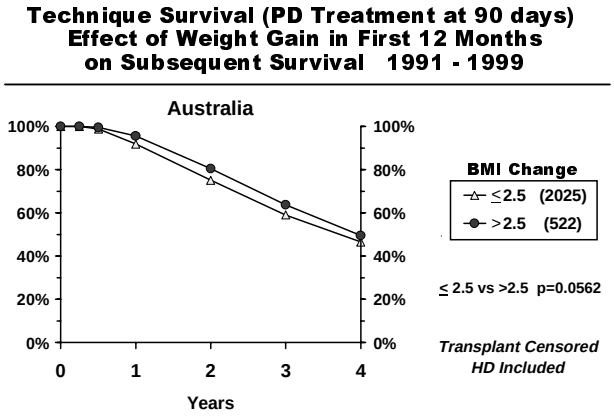


DIALYSIS ADEQUACY

32.5% of Australian CAPD patients, and 25.2% of New Zealand CAPD patients were achieving a Kt/V (total) of <1.8 which is suggested as a minimum requirement for adequate dialysis despite the majority of these patients being maintained on ≥70L of dialysate per week. See Figures 117 and 118. It is clear from Figure 119 that residual GFR plays a significant role in determining the total amount of clearance (Kt/V) that can be achieved.

Figure 117

KT/V Related to Volume of Dialysate
Australia March 2000

Prescribed Dialysate Volume	Achieved KT/V (Total) ≤ 1.8	> 1.8
≤ 56 L / week	96 (22.1%)	338 (77.9%)
≥ 70 L / week	145 (26.5%)	403 (73.5%)
	241	741

Figure 118

KT/V Related to Volume of Dialysate
New Zealand March 2000

Prescribed Dialysate Volume	Achieved KT/V (Total) ≤ 1.8	> 1.8
≤ 56 L / week	41 (21.5%)	150 (78.5%)
≥ 70 L / week	70 (28.1%)	179 (71.9%)
	111	329

Figure 119

Relationship of Residual GFR to KT/V
March 2000

	Residual GFR	KT/V (Total) ± S.E
Aust	≤ 1 ml / min	1.99 ± 0.03
	≥ 1 ml / min	2.31 ± 0.03
NZ	≤ 1 ml / min	1.97 ± 0.03
	≥ 1 ml / min	2.35 ± 0.04

Technique Survival
Censored for Death or Transplantation

Peritoneal dialysis is a self-care therapy utilising a limited single dialysing space, and technique failure resulting in transfer to haemodialysis is related to factors which compromise the use of this dialysing space (infection, technical factors), the patients ability to continue with the therapy (social) or the efficiency of treatment.

In Figure 120 primary and secondary reasons for technique failure are shown grouped into four major categories of infection, dialysis, technical and social. Reporting of secondary reasons is likely to be incomplete. A list of other reasons for technique failure is provided as a separate Figure 121.

Figure 120

Causes of Technique Failure April 1995 to March 2000
Excluding Death, Transplantation, Recovery of Renal Function

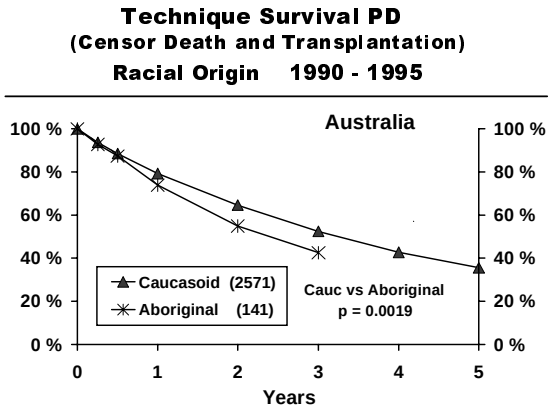
Causes of Technique Failure	Australia		New Zealand	
	Primary	Secondary	Primary	Secondary
Recurrent/persistent peritonitis	530	15	159	2
Acute peritonitis	388	7	113	4
Tunnel/exit site infection	200	6	18	0
Total Infective Complications	**1118 (39%)**	**28 (1%)**	**290 (43%)**	**6 (1%)**
Inadequate solute clearance	254	13	64	1
Inadequate fluid ultrafiltration	211	11	43	1
Total Dialysis Failure	**465 (16%)**	**24 (<1%)**	**107 (16%)**	**2 (<1%)**
Dialysate leak	207	29	42	5
Catheter block	30	2	12	-
Catheter fell out	13	-	1	-
Hernia	102	7	9	-
Abdominal pain	18	2	6	-
Abdominal surgery	87	6	17	-
Multiple adhesions	5	-	7	-
Hydrothorax	3	-	3	1
Haemoperitoneum	2	1	-	-
Scrotal oedema	1	-	-	-
Total Technical Failure	**468 (16%)**	**47 (2%)**	**97 (14%)**	**6 (1%)**
Unable to manage self care	248	8	35	1
Patient preference	477	21	137	3
Total Social Reasons	**725 (25%)**	**29 (1%)**	**172 (25%)**	**4 (<1%)**

Figure 121

Other Causes of Technique Failure April 1995 to March 2000
Excluding Death, Transplantation, Recovery of Renal Function

Other Causes of Technique Failure	Australia		New Zealand	
	Primary	Secondary	Primary	Secondary
Transfer Overseas	12	-	1	-
Diverticulitis	20	-	4	-
Excessive Fluid Ultrafiltration	1	-	-	-
Sclerosing Peritonitis	10	1	7	-
Peritoneal Infection	2	-	1	-
Pregnancy	1	-	-	-
Haematuria	1	-	-	-
Other Surgery	10	-	1	-
CCPD Machine not Available	2	1	1	-
Poor Nutrition	2	-	-	-
End Machine Trial	3	-	-	-
Pleural Effusion	2	-	1	-
Weight Gain	2	-	-	-
Abdominal Abscess	3	-	-	-
Hypotension	1	-	-	-
Improved Adequacy	1	-	-	-
Stress Incontinence	1	-	-	-
Total Other Reasons	**74 (3%)**	**2 (<1%)**	**16 (2%)**	**-**

Figure 122



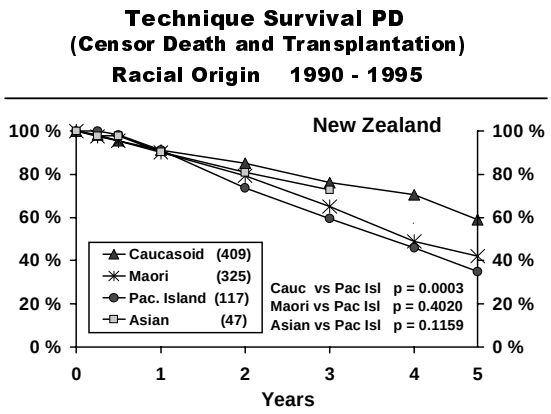
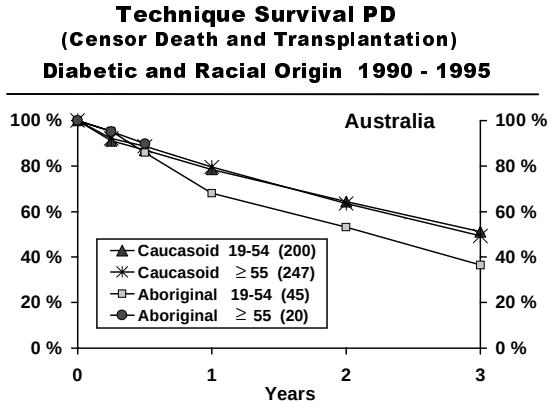


Figure 123



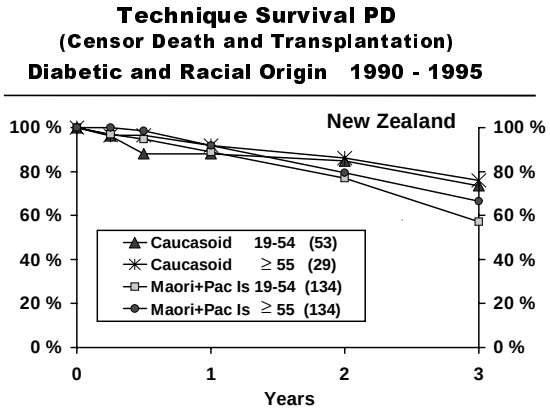
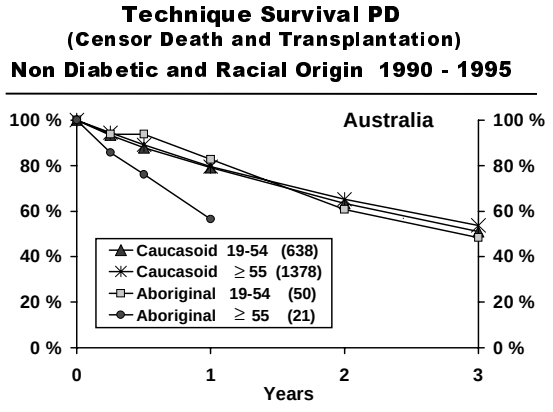
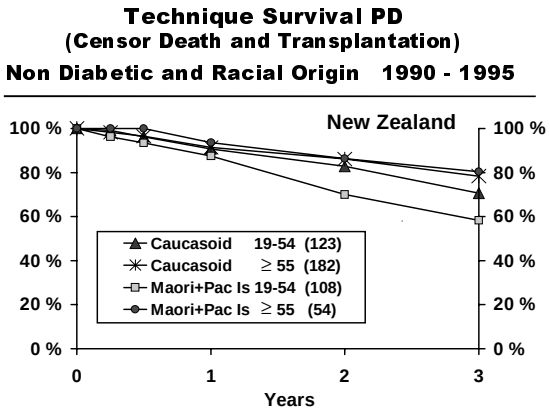


Figure 124





Peritoneal Transport Status

Dialysate/plasma creatinine ratios (D/P creatinine) measured at the end of a standardised four hour exchange (PET) provide a measure of peritoneal transport status.

The Registry commenced collection of this data in October 1998 in patients new to CAPD with the aim of using these measurements as another predictor of outcome.

Only 464 patients (Australia) and 138 patients (New Zealand) had data supplied: 78% of all new patients in Australia and 58% of all new patients in New Zealand.

The mean D/P creatinine ratios tend to be higher than proposed international means (Twardowski) with 32% of Australian and 42% of New Zealand patients commencing CAPD being classified in the high transport category but only 3% of Australian patients and 10% of New Zealand patients in the low transport category.

These data must be viewed in the context of a large group without reported results.

Diabetics in both countries tended to be under-represented in the high transport category.

Figure 125

PET D/P Creatinine at Four Hours
New PD Patients from 1-Oct-98

	Australia		New Zealand	
	Diabetic	Non Diabetic	Diabetic	Non Diabetic
Mean + ISD	0.80	0.82	0.87	0.89
Mean	0.69	0.70	0.68	0.72
Mean – ISD	0.58	0.58	0.49	0.55

Figure 126

Peritoneal Transport Status
New Patients 1-Oct-1998 to 31-Mar-2000

	Australia		New Zealand	
	Diabetic	Non Diabetic	Diabetic	Non Diabetic
High *(0>=0.8)*	34 (29%)	114 (33%)	21 (39%)	38 (45%)
High Average *(0.65-0.8)*	41 (35%)	128 (37%)	14 (26%)	26 (31%)
Low Average *(0.50-0.64)*	38 (32%)	97 (28%)	12 (22%)	13 (16%)
Low *(<0.5)*	4 (3%)	8 (2%)	7 (13%)	7 (8%)

HAEMODIALYSIS

Associate Professor Peter Kerr

Monash Medical Centre, Victoria

Stock and Flow

Australia

The annual stock and flow of haemodialysis patients during the period 1992-99 is shown in Figures 128, 129 and 138.

There were 4,300 patients (227 per million) receiving treatment at 31st December 1999, an increase of 10% (10% in 1998); 38% hospital based (39% in 1998), 46% in satellite (limited or self care) centres (44% in 1998) and 16% at home (17% in 1998). The proportion of patients receiving satellite haemodialysis increased in 1999 by 14%, compared to the previous year (20% in 1998 and 12% in 1997).

The proportion of all dialysis patients who were using home haemodialysis in each State, shown in Figure 127, was less than 10% except for New South Wales/ACT 20%. Queensland, South Australia and Tasmania rose slightly.

A total of 1,494 patients received haemodialysis for the first time during the year, a 6% increase; 85% had no previous dialysis nor a transplant. The modal age group was 65-74 years (28%). There has been a greater than 300% increase in diabetic patients since 1992. See Figure 138.

Of the 4,300 patients dialysing, 38% were 65 years or over, 10% less than 35 years old. There was a 23% increase in the number of new patients commencing haemodialysis aged 75 years or more compared to 48% in 1998. See Figure 131 and 138. The proportion of all dialysis patients in each age group who were using haemodialysis is shown in Figure 132. For more detail regarding age and mode of haemodialysis in each State see Appendix II at Website (www.anzdata.org.au).

There were 329 transplants, a 9% decrease from 358 in 1998.

There were 643 deaths, representing 15.6 deaths per 100 patient years (11.3% of patients at risk). See Figure 129. For more detail of cause of death see Appendix II at Website (www.anzdata.org.au).

There was a moderate increase (30%) in the number of permanent transfers (> 12 months). The majority (76%) of all transfers were permanent.

New Zealand

The annual stock and flow of haemodialysis patients during the period 1992-99 is shown in Figures 133, 134 and 139.

There were 554 patients (145 per million) receiving treatment at 31st December 1999, a 13% increase (12% in 1998). Hospital based haemodialysis increased to 53% of all haemodialysis (49% in 1998), and home dialysis decreased to 32% (41% in 1998). Modal age group 55-64 years (25%): 22% >65 years; 13% <35 years. See Figure 136. The proportion of all dialysis patients who were using home haemodialysis is shown in Figure 127.

There were 255 patients who received haemodialysis for the first time, a 4% decrease from 1998, 73% having their initial dialysis treatment. Modal age group 45-64 years (52%), 11% <35 years, 27% >65 years. See Figure 134 and 135 and Appendix III at Website (www.anzdata.org.au).

Sixty two haemodialysis patients received transplants in 1999 (59 in 1998), 11% of all patients dialysing, 14% of patients <65 years dialysed.

There were 93 deaths, 17.8 deaths per 100 patient years, (11.4% of patients at risk); more in the young and old groups. See Figure 134.

Permanent transfers for >12 months remained steady at 109 (96 in 1998). The proportion of dialysis patients in each age group using haemodialysis is shown in Figure 137. Most middle aged and elderly patients used peritoneal dialysis.

Figure 127

Proportion (%) Home Haemodialysis
Of all HD and PD Dialysis Patients 1992 - 1999

State	1992	1993	1994	1995	1996	1997	1998	1999
Queensland	6%	6%	5%	4%	3%	3%	3%	5%
New South Wales/ACT	25%	25%	22%	21%	21%	21%	21%	20%
Victoria	21%	20%	17%	14%	13%	10%	10%	9%
Tasmania	3%	5%	3%	1%	1%	1%	2%	3%
South Australia	11%	11%	9%	8%	7%	5%	4%	5%
Northern Territory	0%	0%	0%	0%	0%	0%	0%	0%
Western Australia	10%	9%	8%	8%	7%	7%	5%	5%
Australia	**18%**	**17%**	**15%**	**14%**	**13%**	**12%**	**12%**	**11%**
New Zealand	**29%**	**25%**	**22%**	**20%**	**20%**	**19%**	**18%**	**14%**

Figure 128

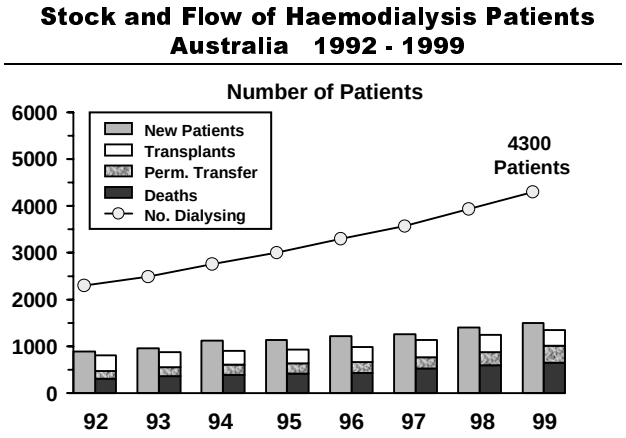


Figure 129

Australia

Stock and Flow of Haemodialysis Patients 1992 - 1999

	1992	1993	1994	1995	1996	1997	1998	1999
Patients new to Haemodialysis	886	965	1116	1140	1211	1261	1405	1494
First Dialysis Treatment	728	767	920	950	1012	1061	1177	1272
Previous Dialysis (PD/CAPD)	134	179	178	167	175	182	202	187
Failed Transplant	24	19	18	23	24	18	26	35
Transplanted	341	322	301	297	329	352	358	329
Deaths	313	365	390	421	432	529	598	643
Never Transplanted	257	303	335	372	372	467	534	574
Previous Transplant	56	62	55	49	60	62	64	69
Permanent Transfers Out (>12/12)	158	192	218	218	229	248	287	373
Temporary Transfers (<12/12)	88	108	121	102	139	125	137	119
Patients Dialysing at 31 December	2304	2482	2754	3005	3304	3572	3926	4300
Patients Dialysing at Home 31 December	611	645	625	627	642	636	655	681
% of all Home Dialysis Patients (HD/PD)	37%	35%	33%	30%	29%	29%	29%	30%

Figure 130

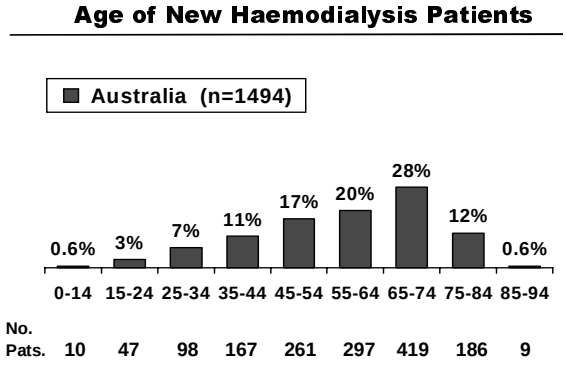


Figure 131

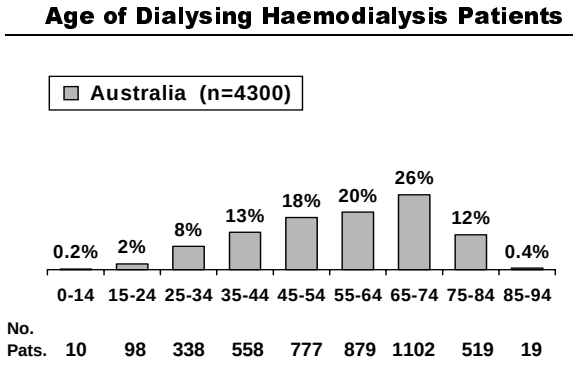


Figure 132

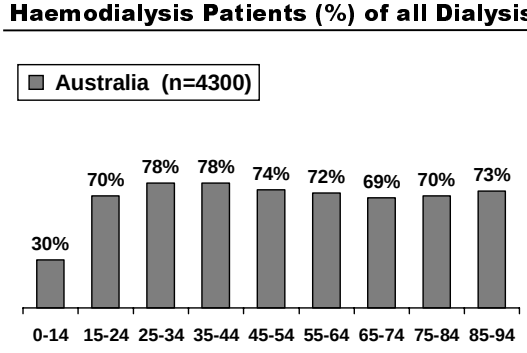


Figure 133

Stock and Flow of Haemodialysis Patients
New Zealand 1992 - 1999

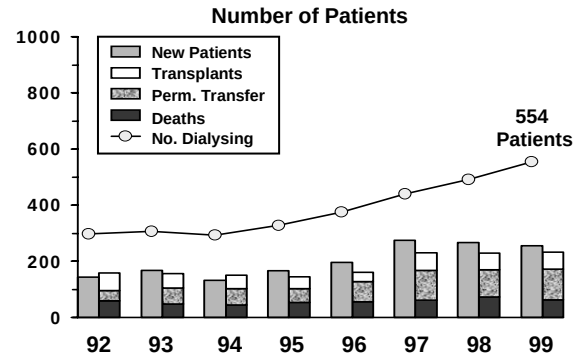


Figure 134 **New Zealand**

Stock and Flow of Haemodialysis Patients 1992 - 1999

	1992	1993	1994	1995	1996	1997	1998	1999
Patients new to Haemodialysis	143	168	132	165	197	274	266	255
First Dialysis Treatment	121	128	103	133	144	188	203	185
Previous Dialysis (PD/CAPD)	19	35	23	28	47	73	54	61
Failed Transplant	3	5	6	4	6	13	9	9
Transplanted	62	51	48	41	32	63	59	62
Deaths	59	47	43	53	56	61	73	93
Never Transplanted	48	34	34	40	45	57	65	85
Previous Transplant	11	13	9	13	11	4	8	8
Permanent Transfers Out (>12/12)	37	58	60	50	72	106	96	109
Temporary Transfers (<12/12)	5	21	22	11	13	21	35	24
Patients Dialysing at 31 December	298	306	293	327	376	440	491	554
Patients Dialysing at Home 31 December	194	179	174	172	192	190	200	177
% of all Home Dialysis Patients (HD/PD)	34%	30%	26%	25%	26%	25%	24%	21%

Figure 135

Age of New Haemodialysis Patients

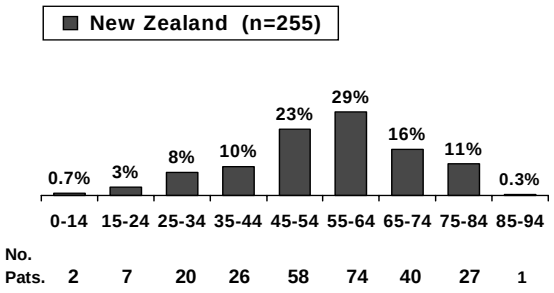


Figure 136

Age of Dialysing Haemodialysis Patients

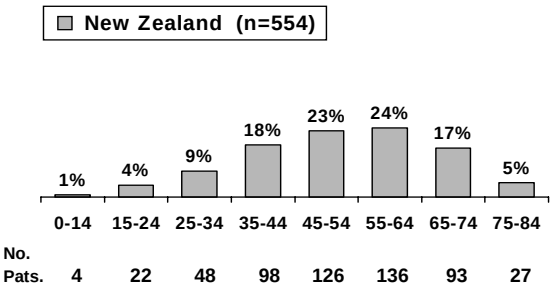


Figure 137

Haemodialysis Patients (%) of all Dialysis

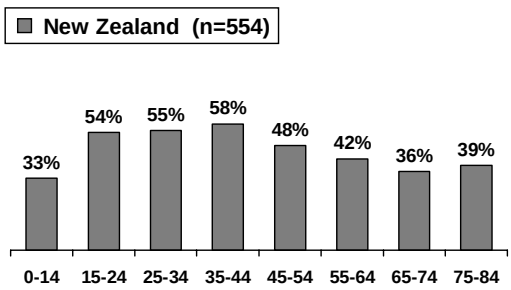


Figure 138 **Australia**

Stock and Flow of Haemodialysis Patients 1992 - 1999

Age Groups	1992	1993	1994	1995	1996	1997	1998	1999
New Patients ★								
00-14 years	6	5	11	12	12	10	6	10
15-24 years	61	50	60	58	43	54	44	47
25-34 years	101	94	98	101	109	108	107	98
35-44 years	103	122	151	139	145	169	180	167
45-54 years	163	163	208	214	200	197	255	261
55-64 years	240	245	246	247	267	272	293	297
65-74 years	185	234	286	280	330	344	362	419
75-84 years	27	51	54	88	102	106	154	186
85-94 years	0	1	2	1	3	1	4	9
Total	**886**	**965**	**1116**	**1140**	**1211**	**1261**	**1405**	**1494**
Patients Dialysing								
00-14 years	6	4	12	14	12	10	6	10
15-24 years	101	107	109	107	105	98	93	98
25-34 years	242	262	287	297	299	319	325	338
35-44 years	314	349	386	415	462	486	526	558
45-54 years	423	455	493	544	581	633	707	777
55-64 years	544	555	617	660	716	772	837	879
65-74 years	567	631	698	770	867	927	1010	1102
75-84 years	107	118	150	194	258	315	405	519
85-94 years	0	1	2	4	4	12	17	19
Total	**2304**	**2482**	**2754**	**3005**	**3304**	**3572**	**3926**	**4300**
Primary Renal Disease ★								
Glomerulonephritis	347	347	400	404	424	440	468	469
Analgesic Nephropathy	74	101	81	79	78	67	83	81
Hypertension	73	80	113	91	142	154	169	164
Polycystic Disease	76	74	77	98	83	72	92	102
Reflux Nephropathy	56	54	56	51	54	60	62	64
Diabetic Nephropathy	109	136	191	213	220	259	309	349
Miscellaneous	100	109	123	134	136	133	137	152
Uncertain	51	64	75	70	74	76	85	113
Total	**886**	**965**	**1116**	**1140**	**1211**	**1261**	**1405**	**1494**

★ New patients receiving first haemodialysis treatment

Proportion (%) Age Distribution 1992 - 1999

Age Groups	1992	1993	1994	1995	1996	1997	1998	1999
New Patients								
00-14 years	<1%	<1%	1%	1%	1%	1%	<1%	<1%
15-24 years	7%	5%	5%	5%	4%	4%	3%	3%
25-34 years	11%	10%	9%	9%	9%	9%	8%	7%
35-44 years	12%	13%	13%	12%	12%	13%	13%	11%
45-54 years	18%	17%	19%	19%	16%	16%	18%	17%
55-64 years	27%	25%	22%	21%	22%	21%	21%	20%
65-74 years	21%	24%	26%	25%	27%	27%	26%	28%
75-84 years	3%	5%	5%	8%	8%	9%	11%	12%
85-94 years	<1%	<1%	<1%	<1%	<1%	<1%	<1%	1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Patients Dialysing								
00-14 years	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
15-24 years	4%	4%	4%	4%	3%	3%	2%	2%
25-34 years	11%	11%	10%	10%	9%	9%	8%	8%
35-44 years	14%	14%	14%	14%	14%	13%	13%	13%
45-54 years	18%	18%	18%	18%	18%	18%	18%	18%
55-64 years	23%	22%	23%	22%	22%	22%	21%	20%
65-74 years	25%	25%	25%	26%	26%	26%	26%	26%
75-84 years	5%	5%	5%	6%	8%	9%	10%	12%
85-94 years	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure 139 **New Zealand**

Stock and Flow of Haemodialysis Patients 1992 - 1999

Age Groups	1992	1993	1994	1995	1996	1997	1998	1999
New Patients ★								
00-14 years	0	0	2	1	0	2	3	2
15-24 years	13	13	8	5	17	13	12	7
25-34 years	18	26	20	14	10	29	24	20
35-44 years	18	29	19	22	36	31	35	26
45-54 years	29	37	34	47	44	66	55	58
55-64 years	42	40	33	49	47	67	80	74
65-74 years	21	20	15	24	38	59	47	40
75-84 years	2	3	1	3	5	7	10	27
85-94 years	0	0	0	0	0	0	0	1
Total	**143**	**168**	**132**	**165**	**197**	**274**	**266**	**255**
Patients Dialysing								
00-14 years	0	0	1	0	0	2	4	4
15-24 years	25	21	18	15	20	19	18	22
25-34 years	46	51	48	48	47	54	51	48
35-44 years	52	53	54	60	71	83	101	98
45-54 years	71	79	65	79	94	108	100	126
55-64 years	64	59	64	78	80	102	127	136
65-74 years	35	38	39	41	57	63	75	93
75-84 years	5	5	4	6	7	9	15	27
85-94 years	0	0	0	0	0	0	0	0
Total	**298**	**306**	**293**	**327**	**376**	**440**	**491**	**554**
Primary Renal Disease ★								
Glomerulonephritis	45	52	45	53	59	66	56	72
Analgesic Nephropathy	1	0	0	0	1	1	2	2
Hypertension	23	18	18	15	26	29	31	27
Polycystic Disease	12	9	4	11	11	16	17	13
Reflux Nephropathy	9	11	2	6	4	19	11	6
Diabetic Nephropathy	31	54	41	57	67	107	107	101
Miscellaneous	17	16	15	15	17	25	22	21
Uncertain	5	8	7	8	12	11	20	13
Total	**143**	**168**	**132**	**165**	**197**	**274**	**266**	**255**

★ New patients receiving first haemodialysis treatment

Proportion (%) Age Distribution 1992 - 1999

Age Groups	1992	1993	1994	1995	1996	1997	1998	1999
New Patients								
00-14 years	0%	0%	2%	<1%	0%	<1%	1%	<1%
15-24 years	9%	8%	6%	3%	9%	5%	5%	3%
25-34 years	13%	16%	15%	9%	5%	11%	9%	8%
35-44 years	13%	17%	14%	13%	19%	11%	13%	10%
45-54 years	20%	22%	26%	29%	23%	24%	21%	23%
55-64 years	29%	24%	26%	29%	23%	25%	30%	29%
65-74 years	15%	12%	11%	15%	19%	21%	18%	16%
75-84 years	1%	1%	<1%	2%	2%	3%	3%	11%
85-94 years	0%	0%	0%	0%	0%	0%	0%	<1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Patients Dialysing								
00-14 years	0%	0%	<1%	0%	0%	1%	1%	<1%
15-24 years	8%	7%	6%	5%	5%	4%	4%	4%
25-34 years	16%	17%	16%	15%	13%	12%	10%	9%
35-44 years	18%	17%	19%	18%	19%	19%	21%	18%
45-54 years	24%	26%	22%	24%	25%	25%	20%	23%
55-64 years	21%	19%	22%	24%	21%	23%	26%	24%
65-74 years	12%	12%	13%	12%	15%	14%	15%	17%
75-84 years	1%	2%	1%	2%	2%	2%	3%	5%
85-94 years	0%	0%	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Blood Flow Rates

Australia Figures 140 and 141

The trend towards a prescribed blood flow rate of 300 mls/minute or higher has accelerated rapidly from approximately 15% of all patients in 1994 to 66% in March 2000; 9% were now prescribed less than 250 mls/minute.

New Zealand Figures 140 and 141

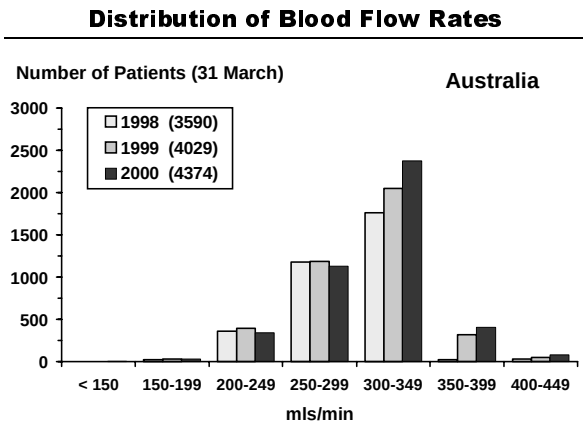
In March 2000, 43% of patients were using 300 ml/minute or higher compared to 6% in 1996. There were 19% still using <250 mls/minute, many of these receiving long session duration dialysis.

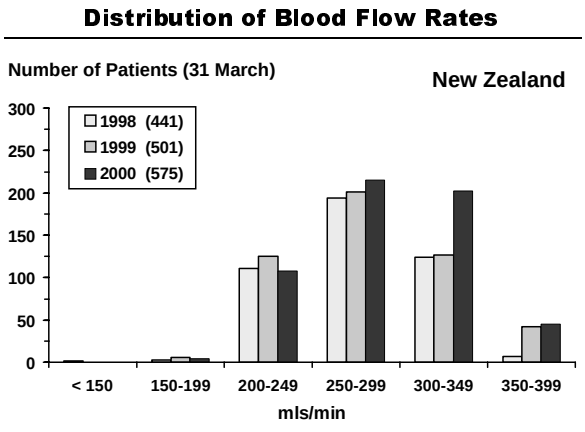
Figure 140

Blood Flow Rates (mls/minute) 1992 - 2000

Country		No. Pts	Mls/Minute					
			<200	200-249	250-299	300-349	350-399	>400
Australia	March 2000	4374	1%	8%	26%	54%	9%	2%
	March 1999	4029	1%	10%	29%	51%	8%	1%
	March 1998	3590	1%	10%	33%	49%	6%	1%
	March 1997	3342	<1%	15%	37%	43%	4%	<1%
	March 1996	3041	<1%	18%	45%	33%	3%	<1%
	March 1995	2765	2%	24%	50%	22%	1%	1%
	March 1994	2547	<3%	39%	44%	13%	1%	<1%
	March 1993	2278	<3%	41%	43%	12%	<1%	<1%
	March 1992	2175	<3%	47%	42%	7%	<1%	<1%
New Zealand	March 2000	575	1%	19%	37%	35%	8%	<1%
	March 1999	501	1%	25%	40%	26%	8%	0%
	March 1998	441	1%	25%	44%	28%	2%	0%
	March 1997	390	1%	30%	47%	21%	<1%	0%
	March 1996	352	1%	42%	51%	5%	<1%	0%
	March 1995	297	1%	43%	51%	4%	<1%	<1%
	March 1994	296	<1%	51%	45%	2%	1%	<1%
	March 1993	288	1%	54%	39%	4%	<1%	1%
	March 1992	293	0%	56%	39%	2%	<1%	2%

Figure 141





Frequency and Hours of Dialysis

Australia

See Figures 142-145.

Of the 4,374 patients, there were still 80 receiving dialysis twice a week (2%); almost all patients (97%) dialysed three times per week. There has not been a significant trend to daily dialysis.

There was a continuing trend towards longer duration of each dialysis treatment. Of the patients dialysing three times per week 32% were dialysing for five hours or longer (32% 1998) ; only 8% (8% 1998) received less than four hours. Forty four percent of patients dialysed for 4-4.4 hours. Amongst patients dialysing only twice per week, 25% received less than four hours, and only 1% more than five hours each treatment.

The median weekly dialysis treatment period of all haemodialysis patients was 12 hours; range 4-26 hours.

New Zealand

See Figures 142-145.

There were 575 patients (97%) dialysing three times per week.

The majority dialysed for five hours or more, three times a week; most of the remainder dialysed for four hours.

Only seven patients (1%) dialysed less than four hours thrice weekly.

The trend was towards five hours as the standard treatment. Median weekly treatment was 15 hours, range 8-30 hours per week.

Figure 142

Duration and Number of Treatments Per Week 31-Mar-2000

Country	Sessions per week	Hours of Each Treatment										Total
		<2.5	2.5-2.9	3-3.4	3.5-3.9	4-4.4	4.5-4.9	5-5.4	5.5-5.9	6-6.4	> 6.5	
Australia	1	0	0	1	1	4	0	1	0	0	0	**7**
	2	1	0	10	9	34	11	14	1	0	0	**80**
	3	3	5	102	210	1861	711	1132	120	70	13	**4228**
	4	0	1	7	6	19	6	8	1	1	1	**50**
	5	0	0	1	1	0	0	0	0	0	0	**2**
	6	3	2	2	0	0	0	0	0	0	1	**8**
	Total	**7**	**8**	**123**	**227**	**1918**	**728**	**1155**	**122**	**71**	**15**	**4374**
New Zealand	1	0	0	0	0	1	0	0	0	0	0	**1**
	2	0	0	0	0	3	3	4	0	1	0	**11**
	3	0	0	4	3	196	70	188	16	39	39	**555**
	4	0	0	1	0	0	3	3	1	0	0	**8**
	Total	**0**	**0**	**5**	**3**	**200**	**76**	**195**	**17**	**40**	**39**	**575**

Figure 143

Number of Sessions Per Week (At 31-Mar) 1995 - 2000

Country	Sessions per week	1995	1996	1997	1998	1999	2000
Australia	1	<1%	<1%	<1%	<1%	<1%	<1%
	2	3%	3%	3%	2%	2%	2%
	3	96%	96%	96%	97%	97%	96%
	3.5	0%	<1%	<1%	<1%	<1%	<1%
	4	<1%	<1%	<1%	<1%	<1%	1%
	5	0%	0%	0%	<1%	<1%	<1%
	6	0%	0%	0%	0%	<1%	<1%
	Total	**2765**	**3041**	**3342**	**3590**	**4029**	**4374**
New Zealand	1	<1%	0%	0%	<1%	0%	<1%
	2	6%	6%	3%	3%	2%	2%
	3	92%	92%	95%	95%	97%	97%
	3.5	0%	1%	0%	0%	0%	0%
	4	2%	1%	2%	2%	1%	1%
	Total	**297**	**352**	**390**	**441**	**501**	**575**

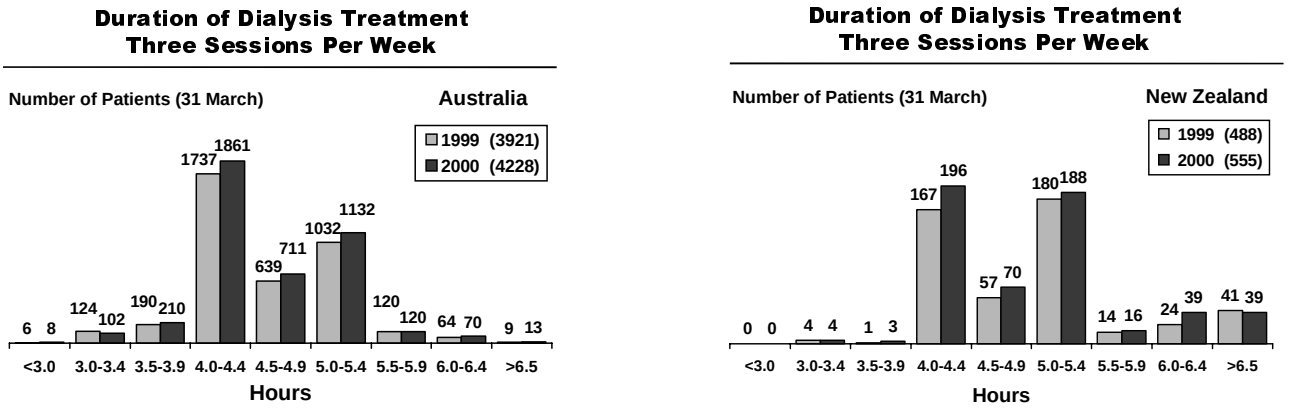
Figure 144

Duration of Haemodialysis Per Week 31-Mar-2000

Country	No. Pts	Hours of Haemodialysis Per Week							
		<9	9-11	12-14	15-17	18-20	21-23	24-26	>27
Australia	4263	1%	8%	59%	29%	2%	<1%	<1%	0%
New Zealand	574	<1%	2%	47%	36%	8%	5%	2%	<1%

Excludes patients on haemofiltration and haemodiafiltration
Frequency between 2 and 4 sessions weekly

Figure 145



Membrane Type and Surface Areas

Australia See Figures 146 and 147.

The trend away from cuprophan continues (4% of total, down from 11% in March 1999, and 17% in March 1998). The major change was a surge in the use of low flux polysulfone now 46% (37% in 1999). Only 8% of patients receive high flux dialysis. Haemophan decreased from 25% to 20%.

The trend to larger surface area dialysers continues, in part due to the increased use of polysulfone dialysers which require a larger surface area to achieve adequate clearances.

New Zealand See Figures 146 and 147.

The cuprophan usage declined to 13% in 2000 (21% in 1999) while that of haemophan and low flux polysulphone increased to 50% and 30% respectively. High flux dialysis is non-existent.

Figure 146

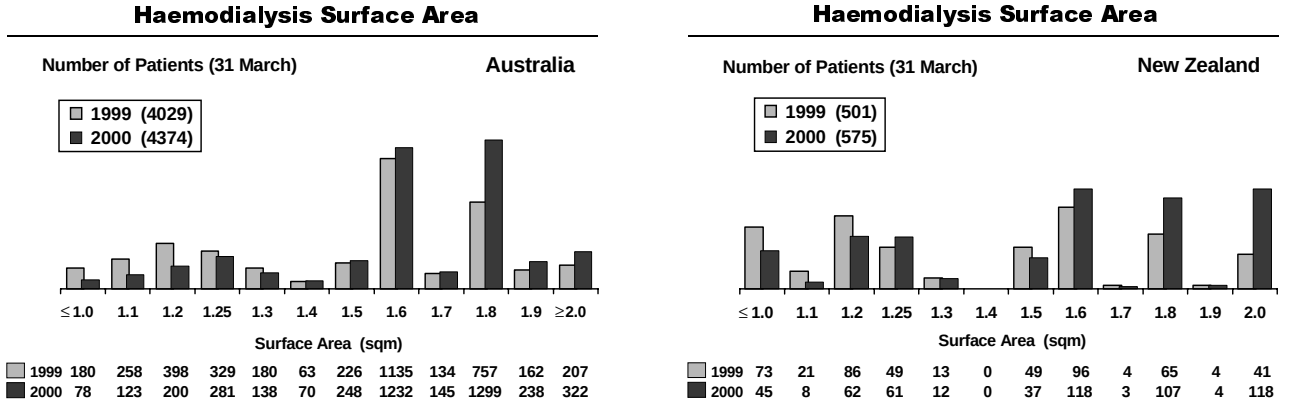


Figure 147

Haemodialyser Membrane Types by Surface Area
Patients on Haemodialysis 31-Mar-2000

Country	Dialyser Membrane Type	Flux	Square Metres					Total
			<1.0	1.0-1.4	1.5-1.7	1.8-1.9	>1.9	
Australia	Cellulose Acetate	Low	12	83	303	16	81	**495 (11%)**
	Cellulose Triacetate	Low	0	16	32	214	5	**267 (6%)**
	Cuprophan	Low	1	36	88	4	45	**174 (4%)**
	Diacetate	Low	0	0	0	0	11	**11 (<1%)**
	Exebrane	High	0	2	11	16	0	**29 (<1%)**
	Haemophan	Low	17	163	540	0	144	**864 (20%)**
	Poly/Carbonate/Ether/Co-polymer	Low	1	16	0	8	0	**25 (<1%)**
	Polyacrylonitrile	High	0	0	0	1	0	**1 (<1%)**
	Polyamide Haemo-diafiltration	High	0	2	10	0	2	**14 (<1%)**
	Polysulphone	High	0	87	0	203	0	**290 (7%)**
	Polysulphone	Low	37	281	622	1075	0	**2015 (46%)**
	Polysynthane	Low	0	102	18	0	34	**154 (4%)**
	Sureflex	Low	3	31	1	0	0	**35 (<1%)**
	Total		**71**	**819**	**1625**	**1537**	**322**	**4374 (100%)**
New Zealand	Cellulose Acetate	Low	0	8	10	1	0	**19 (3.5%)**
	Cuprophan	Low	0	25	41	10	0	**76 (13%)**
	Haemophan	Low	0	37	107	23	118	**285 (50%)**
	Poly/Carbonate/Ether/Co-polymer	Low	0	17	0	3	0	**20 (3.5%)**
	Polysulphone	Low	40	61	0	74	0	**175 (30%)**
	Total		**40**	**148**	**158**	**111**	**118**	**575 (100%)**

Urea Reduction Ratio (URR)

Overall, data has not been reported on 20% of Australian patients and 45% of New Zealand patients.

Less than 10% of patients in Australia are reported to have a URR <60% and less than 20% have a URR <65%.

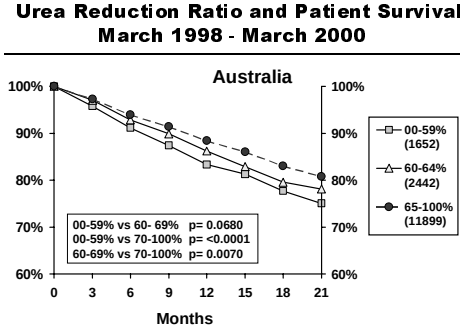
There appears to be a clear survival disadvantage for those with a URR <60%.

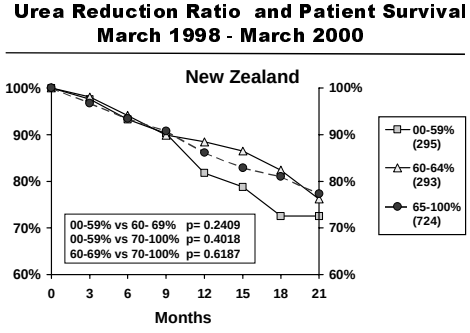
Figure 148

Urea Reduction Ratio (URR) of Patients Alive on Haemodialysis
At 30-Sep-1998 and 31-Mar-2000

Reported URR	Australia				New Zealand			
	30-Sep-98	31-Mar-99	30-Sep-99	31-Mar-00	30-Sep-98	31-Mar-99	30-Sep-99	31-Mar-00
00-39%	<1%	<1%	<1%	<1%	0%	0%	<1%	0%
40-49%	1%	1%	1%	1%	1%	2%	3%	4%
50-59%	10%	8%	8%	7%	19%	15%	21%	18%
60-64%	16%	16%	14%	13%	29%	24%	20%	21%
65-69%	26%	26%	25%	24%	20%	24%	28%	26%
70-74%	26%	26%	26%	26%	17%	18%	16%	13%
75-79%	14%	17%	17%	18%	11%	13%	7%	12%
80-100%	6%	6%	9%	11%	3%	4%	5%	6%
Total Pts	**2982**	**3238**	**3444**	**3571**	**195**	**224**	**348**	**391**

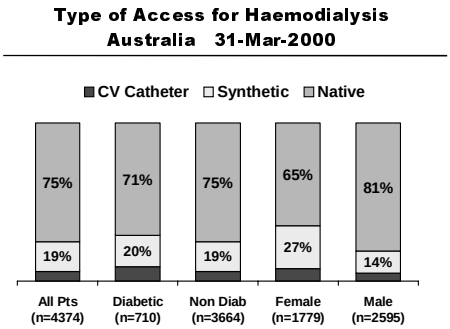
Figure 149





The rate of native fistula use for haemodialysis access remains relatively high in both Australia and New Zealand, especially amongst non-diabetics. There are some interstate variances in rates of non-native access use which may reflect local preferences, surgical practices or differences in patient population. The rates for access revision and declotting cannot be fused to determine primary patency due to the manner in which the data has been collected.

Figure 150



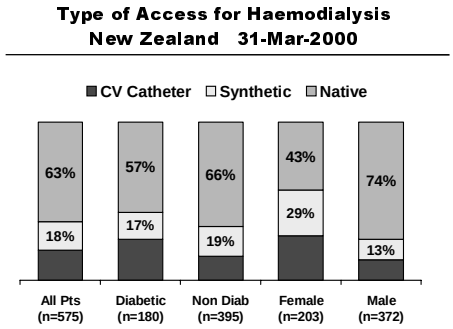


Figure 151

Percentage Synthetic Fistulae/Grafts March 2000

		Diabetic	Non Diabetic
		(n=710)	(n=3664)
Queensland	n=676	21.5% (107)	12.7% (569)
New South Wales/ACT	n=1531	32.1% (190)	28.4% (1341)
Victoria	n=1239	16.6% (199)	13.0% (1040)
Tasmania	n=73	6.7% (15)	8.6% (58)
South Australia	n=296	17.1% (41)	9.4% (255)
Northern Territory	n=90	4.8% (62)	10.0% (90)
Western Australia	n=407	15.6% (96)	20.3% (311)
Australia	**n=4374**	**20.1% (710)**	**18.8% (3664)**

		(n=180)	(n=395)
New Zealand	**n=575**	**17.2% (180)**	**18.7% (395)**

Figure 152

Percentage of Non Native Access

	Australia (n=4374)		New Zealand (n=575)	
	Grafts	Catheters	Grafts	Catheters
Total HD Population	19.0%	6.0%	18.0%	19.0%
Diabetics	20.1%	8.6%	17.2%	25.5%
Female	26.8%	7.8%	28.6%	28.1%

Figure 153

Access in Previous Six Months

Revision of Access

		Native	Grafts	Catheters
Australia	**n=4374**	**8.6%**	**26.2%**	**24.9%**
Diabetics	n=710	10.3%	27.3%	26.2%
Female	n=1779	9.9%	24.3%	28.1%
New Zealand	**n-575**	**8.5%**	**26.7%**	**5.6%**

Declotting of Access

Australia	**n=4374**	**4.0%**	**21.6%**	**19.5%**
Diabetic	n=710	5.3%	25.8%	24.6%
Female	n=1779	4.7%	18.4%	20.9%
New Zealand	**n-575**	**4.1%**	**19.0%**	**8.4%**

TRANSPLANTATION

RENAL TRANSPLANTS PERFORMED IN 1999

(Figures 154-157)

AUSTRALIA

The 453 operations performed in 1999 is a decrease of 14% compared to 1998 (518 operations). This represents a transplant rate of 24 per million of population (28 per million in 1998 and 27 per million in 1997).

The living donor transplant rate has continued to increase (37% in 1999, 31% in 1998 and 29% in 1997).

The proportion of patients receiving dialysis who were transplanted in 1999 was 6.1% compared to 7.4% in 1998. For dialysing patients in the 15-59 year age group, the percentage was 10.5% in 1999 and 12.2% 1998.

Of the kidneys transplanted, 89% were for primary recipients compared to 85% in 1998.

The transplant rate in Australia has dropped slightly in 1999. However, the number and proportion of living donor transplants has continued to increase. The cadaveric donor transplant number for 1999 is the lowest since 1976 and makes up for all of the reduced transplant rate.

NEW ZEALAND

The number of operations (112) performed in 1999 represents a transplant rate of 29 per million (an increase of 6% from 1998).

The percentage of living donors rose to 38% of all operations compared to 29% in 1998.

The number of operations represents 7.3% of all dialysed patients and 10.7% of dialysed patients in the age group 15-59 years. Of the grafts performed in 1999, 87% were to primary recipients.

In New Zealand, the number and proportion of living donors represents a continuation of the trend of increase over the last few years. The cadaveric transplant number has been stable over the last three years.

Figure 154

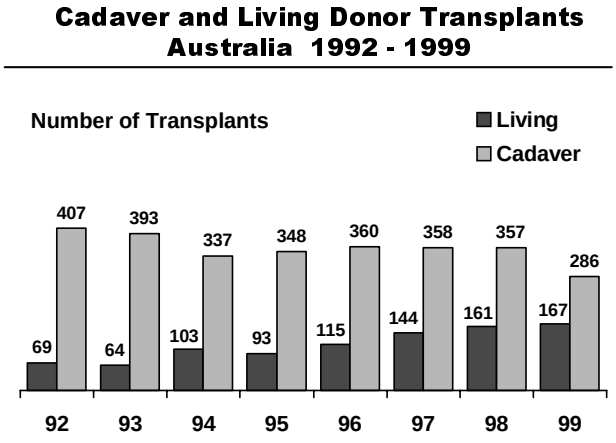
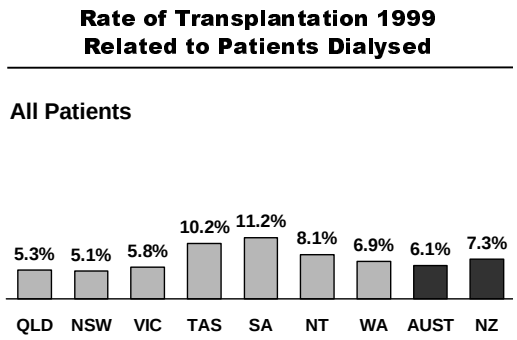


Figure 155

Number of Renal Transplant Operations ( ) Living Donors

Year	Australia						New Zealand				
	1st	2nd	3rd	4th	5th	Total	1st	2nd	3rd	4th	Total
1963	5	1	0	0	0	**6 (1)**	0	0	0	0	**0**
1964	2	0	0	0	0	**2 (0)**	0	0	0	0	**0**
1965	12	1	1	0	0	**14 (3)**	1	0	0	0	**1 (1)**
1966	18	2	0	0	0	**20 (5)**	10	3	0	0	**13 (0)**
1967	69	2	0	0	0	**71 (2)**	18	4	1	0	**23 (1)**
1968	97	10	0	0	0	**107 (0)**	17	4	0	0	**21 (2)**
1969	149	12	0	0	0	**161 (0)**	39	5	0	0	**44 (0)**
1970	168	12	2	0	0	**182 (1)**	21	3	1	0	**25 (0)**
1971	207	22	1	0	0	**230 (1)**	26	6	0	0	**32 (1)**
1972	183	16	0	0	0	**199 (2)**	43	8	0	0	**51 (1)**
1973	213	30	1	0	0	**244 (7)**	50	10	2	0	**62 (0)**
1974	224	35	4	0	0	**263 (6)**	35	5	1	0	**41 (3)**
1975	271	29	3	1	0	**304 (7)**	61	13	0	0	**74 (2)**
1976	223	41	4	0	0	**268 (10)**	38	13	1	0	**52 (1)**
1977	265	57	4	0	0	**326 (16)**	46	10	2	0	**58 (4)**
1978	269	43	2	0	0	**314 (17)**	43	11	3	0	**57 (11)**
1979	293	35	5	0	0	**333 (34)**	61	13	3	2	**79 (16)**
1980	287	63	9	0	0	**359 (36)**	57	13	4	0	**74 (18)**
1981	306	588	9	1	0	**374 (35)**	51	8	1	0	**60 (10)**
1982	321	72	6	0	0	**399 (53)**	48	17	0	0	**65 (8)**
1983	272	63	10	2	0	**347 (48)**	69	25	4	0	**98 (11)**
1984	362	72	10	1	0	**445 (48)**	63	11	0	0	**74 (16)**
1985	318	79	17	1	0	**415 (36)**	60	25	3	0	**88 (6)**
1986	366	63	7	2	0	**438 (32)**	79	19	6	1	**105 (13)**
1987	309	58	21	3	0	**391 (39)**	57	17	4	1	**79 (20)**
1988	391	62	10	2	1	**466 (46)**	61	11	6	0	**78 (8)**
1989	433	46	10	2	0	**491 (48)**	71	11	1	0	**83 (12)**
1990	387	45	9	2	0	**443 (59)**	86	14	2	0	**102 (23)**
1991	385	70	11	3	0	**469 (77)**	62	10	4	1	**77 (13)**
1992	403	57	13	3	0	**476 (69)**	105	5	5	0	**115 (17)**
1993	383	63	6	4	1	**457 (64)**	69	13	2	0	**84 (20)**
1994	384	41	12	2	1	**440 (103)**	70	11	1	1	**83 (20)**
1995	370	60	11	0	0	**441 (93)**	84	7	3	0	**94 (24)**
1996	416	50	9	0	0	**475 (115)**	88	7	1	0	**96 (26)**
1997	444	51	6	1	0	**502 (144)**	101	10	1	0	**112 (31)**
1998	443	62	11	2	0	**518 (161)**	95	10	1	0	**106 (31)**
1999	402	42	9	0	0	**453 (167)**	97	11	4	0	**112 (42)**

Figure 156



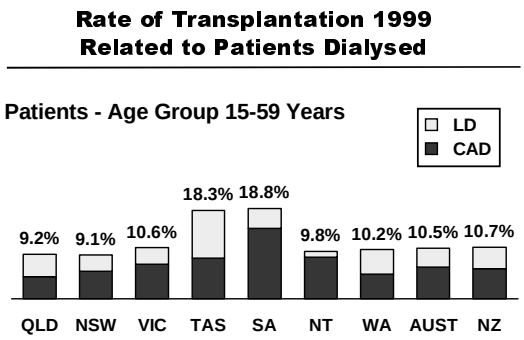
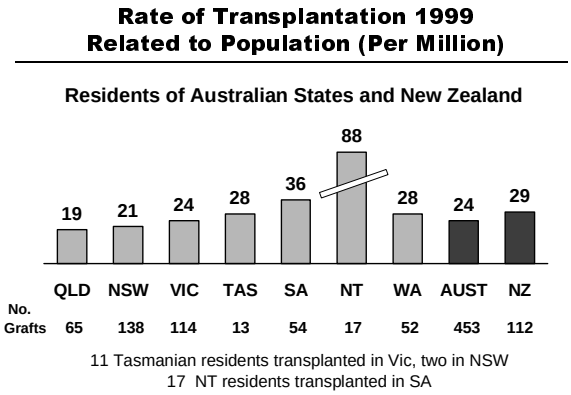


Figure 157



11 Tasmanian residents transplanted in Vic, two in NSW
17 NT residents transplanted in SA

Age of Recipients

Australia

The median age of transplanted recipients in 1999 was 43.8 years compared to 43 years in 1998. Forty eight percent of recipients fell into the 35-54 year age group. Twenty two percent of recipients in 1999 were over 54 years of age compared to 20% in 1998. The age range was 1.7 to 68.9 years. (Figure 158).

The transplantation rate per million for each age group and as a percentage of dialysed patients for each age group is shown in Figure 159 and 160.

New Zealand

The median age of transplant recipients in 1999 was 42.7 years similar to 1998. (Figure 158).

Recipients aged between 35 and 54 years comprised 45% of the total. Twenty seven percent of recipients in 1999 were over 54 years of age.

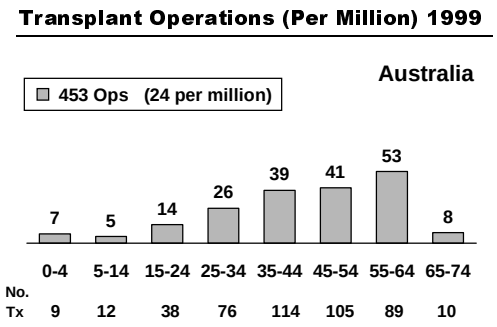
The age range was 2.8 to 71.3 years. (Figure 159 and 160).

Figure 158

Graft Number and Age of Patients Transplanted 1-Jan-1999 to 31-Dec-1999

	Donor Source	Graft No.	Age Groups									Total
			00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
Australia	Cadaver	1	0	5	10	35	59	71	59	9	0	**248**
		2	0	0	4	10	7	6	5	0	0	**32**
		3	0	0	1	1	1	1	1	1	0	**6**
	Living Donor	1	9	7	21	28	39	27	23	0	0	**154**
		2	0	0	2	1	6	0	1	0	0	**10**
		3	0	0	0	1	2	0	0	0	0	**3**
	Total		**9**	**12**	**38**	**76**	**114**	**105**	**89**	**10**	**0**	**453**
New Zealand	Cadaver	1	1	0	3	5	15	10	22	3	0	**59**
		2	0	0	0	3	2	2	1	0	0	**8**
		3	0	0	0	1	1	1	0	0	0	**3**
	Living Donor	1	0	2	6	9	11	6	4	0	0	**38**
		2	0	0	0	1	2	0	0	0	0	**3**
		3	0	0	1	0	0	0	0	0	0	**1**
	Total		**1**	**2**	**10**	**19**	**31**	**19**	**27**	**3**	**0**	**112**

Figure 159



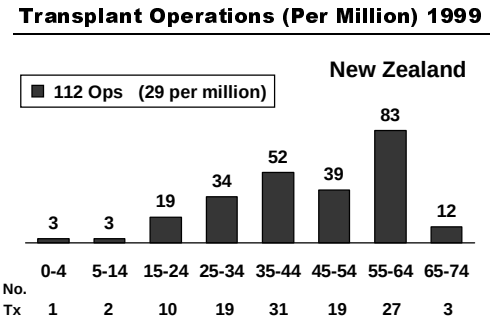
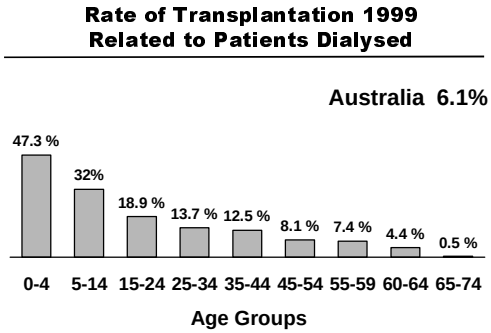
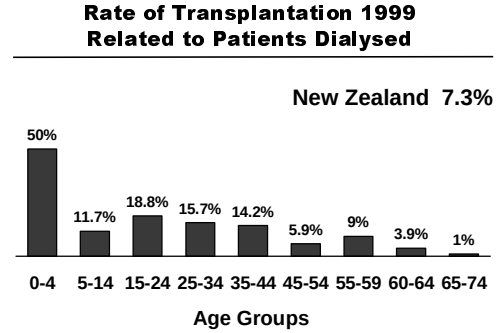


Figure 160





Race of Transplant Recipients

Australia (Figures 161 and 163)

In the 15-59 year age group in 1999, 12.4% of dialysed Caucasoid patients were transplanted. This figure has fallen slowly over the last five years. For Australian Aboriginals, the corresponding transplant rate for 1999 was 4.8%. The absolute number (20) is a decrease from the absolute high (26) of 1998.

New Zealand (Figures 162 and 163)

In the 15-59 year age group, 1999 has seen a small decline in the number of Maori patients accepted onto dialysis programs and the continued increase of Pacific Islanders. The proportion of Maori and Pacific Islanders in this age group who have received a renal transplant in 1999 was 5.1% and 5% respectively, compared to 17.4% for Caucasoid dialysis patients.

Figure 161 **Australia**

Transplantation Rate - Age Group 15-59 years 1989 - 1999

Year	Caucasoid			Aboriginal			All Patients		
	Dialysed	Tx	Rate	Dialysed	Tx	Rate	Dialysed	Tx	Rate
1989	1900	367	19.3%	123	18	14.6%	2213	422	19.0%
1990	1922	318	16.5%	146	18	12.3%	2265	373	16.4%
1991	1963	363	18.4%	160	12	7.5%	2328	401	17.2%
1992	2005	349	17.4%	184	17	9.2%	2445	402	16.4%
1993	2077	328	15.7%	223	10	4.4%	2572	375	14.5%
1994	2225	334	15.0%	272	12	4.4%	2804	369	13.1%
1995	2322	317	13.6%	323	13	4.0%	2998	365	12.1%
1996	2450	358	14.6%	363	8	2.2%	3191	402	12.5%
1997	2527	359	14.2%	415	18	4.3%	3367	426	12.6%
1998	2656	357	13.4%	449	26	5.8%	3558	436	12.2%
1999	2733	322	11.7%	475	20	4.2%	3682	387	10.5%

Figure 162 **New Zealand**

Transplantation Rate - Age Group 15-59 years 1989-1999

Year	Caucasoid			Maori			Pacific Islander			All Patients		
	Dialysed	Tx	Rate	Dialysed	Tx	Rate	Dialysed	Tx	Rate	Dialysed	Tx	Rate
1989	309	48	15.5%	151	12	7.9%	53	9	16.9%	527	72	13.6%
1990	318	68	21.3%	156	9	5.7%	62	8	12.9%	553	89	16.0%
1991	314	44	14.0%	188	15	7.9%	61	5	8.1%	579	67	11.5%
1992	336	80	23.8%	203	11	5.4%	64	3	4.7%	626	104	16.6%
1993	318	53	16.6%	211	4	1.8%	88	3	3.4%	642	63	9.8%
1994	317	52	16.4%	228	11	4.8%	96	5	5.2%	673	71	10.5%
1995	332	54	16.3%	241	11	4.5%	114	6	5.2%	728	78	10.7%
1996	349	58	16.6%	261	7	2.6%	130	7	5.3%	786	79	10.0%
1997	371	73	19.6%	279	9	3.2%	134	3	2.2%	828	91	10.9%
1998	372	60	16.1%	321	14	4.3%	151	7	4.6%	898	86	9.5%
1999	383	67	17.4%	313	16	5.1%	157	8	5.0%	915	98	10.7%

Australian State Transplantation Activity 1999

The population related rate of transplantation for each transplant region is shown in Figure 164 and 165. Those transplants performed for Tasmania and Northern Territory patients have been included in figures for Victoria and South Australia respectively.

For the sixth consecutive year, South Australia/Northern Territory has the highest transplant rate (42 per million) in 1999. The rate in the other States was between 18 and 27 per million.

The population related transplant rate has been calculated for residents of each State and the Northern Territory and is shown in Figure 157.

In addition, the rates as a percentage of all patients and the 15-59 year age group are shown in Figure 156.

There has been a significant increase in the rate of Northern Territory residents transplanted compared to previous years (58 per million in 1998 and 88 per million in 1999).

There was a fall in rates in all States except Western Australia and the Northern Territory. Queensland was the lowest (19 per million) in 1999 compared to (28 per million) in 1998.

Figure 163

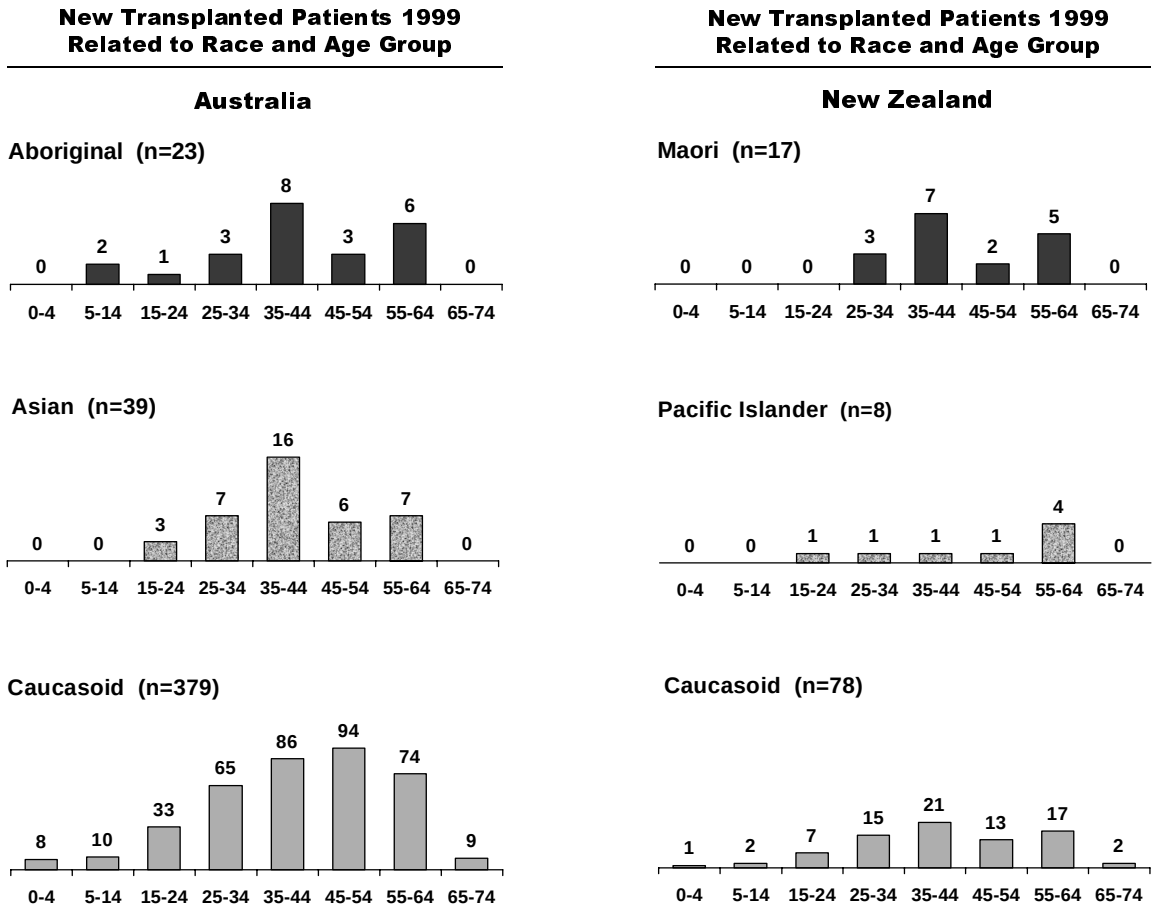


Figure 164

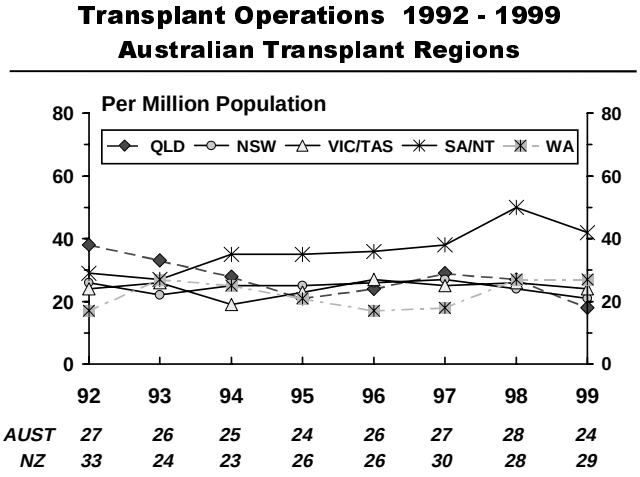
Australia

Transplants in each Region 1992 - 1999
Number of Operations (Per Million Population)

State	1992	1993	1994	1995	1996	1997	1998	1999
Queensland	114 (38)	102 (33)	88 (28)	69 (21)	80 (24)	98 (29)	93 (27)	64 (18)
New South Wales/ACT	166 (26)	136 (22)	158 (25)	161 (25)	171 (26)	179 (27)	160 (24)	142 (21)
Victoria/Tasmania ★	120 (24)	129 (26)	94 (19)	116 (23)	134 (27)	128 (25)	131 (26)	126 (24)
South Australia/NT ★	47 (29)	44 (27)	57 (35)	58 (35)	60 (36)	64 (38)	84 (50)	70 (42)
Western Australia	29 (17)	46 (27)	43 (25)	37 (21)	30 (17)	33 (18)	50 (27)	51 (27)
Australia	**476 (27)**	**457 (26)**	**440 (25)**	**441 (24)**	**475 (26)**	**502 (27)**	**518 (28)**	**453 (24)**

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

Figure 165



Transplant Survival - Primary Cadaveric Grafts
Australia

The patient and graft survivals for primary cadaveric grafts for each year since 1989 are shown in Figure 166. Graphical representations of some years is shown in Figure 167. For grafts performed in 1998, the 12 month patient and graft survival was 95% and 91% respectively.

The five year graft survival for transplants performed in primary recipients in 1994 is 72% with 84% of recipients still being alive at five years.

Figure 166 **Australia**

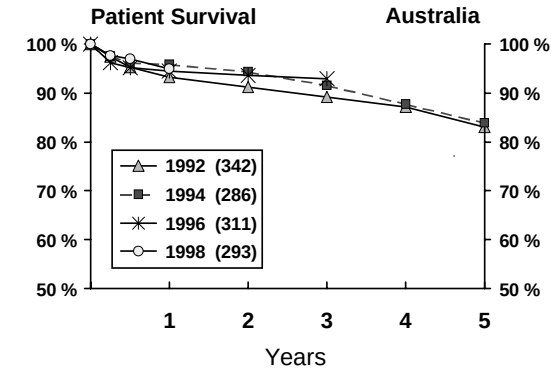
Primary Cadaver Patient and Graft Survival 1989 - 1999

Year of Transplant		Survival											
		1 month		3 months		6 months		1 year		3 years		5 years	
Patient Survival													
1989	n=390	99 + 0.4	388	97 + 0.8	380	96 + 1.0	373	94 + 1.2	368	90 + 1.5	350	85 + 1.8	329
1990	n=334	99 + 0.7	329	96 + 1.1	320	94 + 1.3	315	93 + 1.4	311	88 + 1.8	294	85 + 2.0	284
1991	n=313	99 + 0.6	309	95 + 1.2	298	95 + 1.3	296	93 + 1.4	292	89 + 1.8	278	85 + 2.0	267
1992	n=342	99 + 0.5	339	97 + 0.9	333	95 + 1.1	326	93 + 1.4	319	89 + 1.7	305	83 + 2.0	284
1993	n=323	98 + 0.7	318	98 + 0.9	315	96 + 1.1	309	95 + 1.2	307	92 + 1.5	298	87 + 1.9	280
1994	n=286	99 + 0.6	283	98 + 0.9	279	96 + 1.1	275	96 + 1.2	274	92 + 1.6	262	84 + 2.2	239
1995	n=290	100 + 0.3	289	98 + 0.8	285	96 + 1.1	279	96 + 1.2	278	92 + 1.6	266	-	
1996	n=311	99 + 0.6	307	96 + 1.1	299	95 + 1.2	296	95 + 1.3	294	93 + 1.5	289	-	
1997	n=313	98 + 0.7	308	98 + 0.8	306	97 + 1.0	303	96 + 1.1	300	-		-	
1998	n=293	99 + 0.6	290	98 + 0.9	286	97 + 1.0	284	95 + 1.3	277	-		-	
1999	n=248	99 + 0.6	246	98 + 0.9	242	96 + 1.3	171	-		-		-	
Graft Survival													
1989	n=390	94 + 1.2	366	91 + 1.5	355	87 + 1.7	341	85 + 1.8	333	77 + 2.1	301	72 + 2.3	279
1990	n=334	92 + 1.5	308	89 + 1.7	297	87 + 1.8	291	86 + 1.9	287	78 + 2.3	260	72 + 2.5	240
1991	n=313	91 + 1.6	286	88 + 1.9	275	86 + 2.0	269	84 + 2.1	262	76 + 2.4	239	72 + 2.6	224
1992	n=342	91 + 1.5	312	90 + 1.6	307	88 + 1.8	300	86 + 1.9	293	79 + 2.2	269	72 + 2.4	247
1993	n=323	92 + 1.5	296	89 + 1.7	288	87 + 1.9	281	85 + 2.0	276	81 + 2.2	260	73 + 2.5	237
1994	n=286	95 + 1.3	271	94 + 1.4	268	92 + 1.6	262	91 + 1.7	259	83 + 2.2	236	72 + 2.7	204
1995	n=290	96 + 1.2	277	94 + 1.4	272	91 + 1.7	263	90 + 1.8	260	83 + 2.2	242	-	
1996	n=311	94 + 1.4	291	91 + 1.6	284	90 + 1.7	279	89 + 1.8	276	84 + 2.1	262	-	
1997	n=313	94 + 1.4	293	92 + 1.5	288	90 + 1.7	283	89 + 1.8	279	-		-	
1998	n=293	97 + 1.1	283	95 + 1.3	278	94 + 1.4	276	91 + 1.6	267	-		-	
1999	n=248	95 + 1.4	236	94 + 1.6	231	91 + 1.8	161	-		-		-	

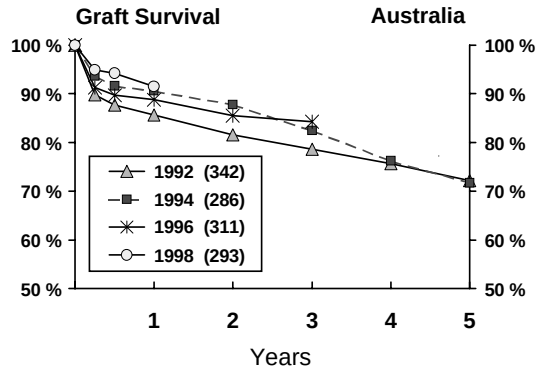
% Survival + S.E. / Number at Risk
n = Number of Patients

Figure 167

Primary Cadaver Patient Survival 1992 - 1998
Related to Year of Transplant



Primary Cadaver Graft Survival 1992 - 1998
Related to Year of Transplant



Transplant Survival - Primary Cadaveric Grafts

New Zealand

For recipients of primary cadaveric grafts performed in 1998, the 12 month patient and graft survivals were 91% and 87% respectively.

The five year patient and graft survivals for primary cadaveric grafts performed in 1994 were 84% and 63% respectively.

Figure 168 **New Zealand**

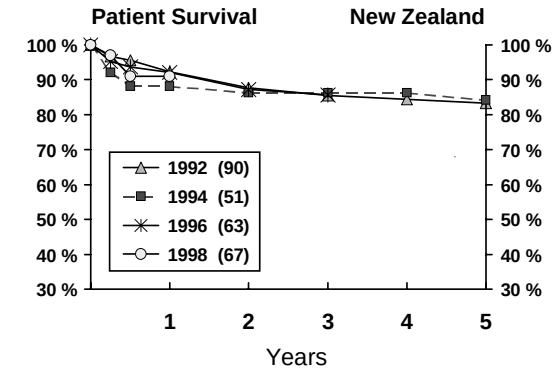
Primary Cadaver Patient and Graft Survival 1989 - 1999

Year of Transplant		Survival											
		1 month		3 months		6 months		1 year		3 years		5 years	
Patient Survival													
1989	n=59	100 + 0.0	59	95 + 2.9	56	93 + 3.3	55	88 + 4.2	52	76 + 5.5	45	66 + 6.2	39
1990	n=65	94 + 3.0	61	91 + 3.6	59	91 + 3.6	59	89 + 3.8	58	83 + 4.7	54	77 + 5.2	50
1991	n=50	100 + 0.0	50	96 + 2.8	48	96 + 2.8	48	96 + 2.8	48	88 + 4.6	44	78 + 5.9	39
1992	n=90	99 + 1.1	89	97 + 1.9	87	96 + 2.2	86	92 + 2.8	83	86 + 3.7	77	83 + 3.9	74
1993	n=53	96 + 2.6	51	91 + 4.0	48	89 + 4.4	47	83 + 5.2	44	81 + 5.4	43	72 + 6.2	38
1994	n=51	96 + 2.7	49	92 + 3.8	47	88 + 4.5	45	88 + 4.5	45	86 + 4.8	44	84 + 5.1	43
1995	n=63	98 + 1.6	62	97 + 2.2	61	95 + 2.7	60	94 + 3.1	59	90 + 3.7	57	-	
1996	n=63	98 + 1.6	62	95 + 2.7	60	94 + 3.1	59	92 + 3.4	58	86 + 4.4	54	-	
1997	n=72	99 + 1.4	71	96 + 2.4	69	96 + 2.4	69	96 + 2.4	69	-		-	
1998	n=67	99 + 1.5	66	97 + 2.1	65	91 + 3.5	61	91 + 3.5	61	-		-	
1999	n=59	93 + 3.3	55	92 + 3.6	54	92 + 3.6	41	-		-		-	
Graft Survival													
1989	n=59	92 + 3.6	54	80 + 5.2	47	76 + 5.5	45	69 + 6.0	41	61 + 6.4	36	54 + 6.5	32
1990	n=65	92 + 3.3	60	86 + 4.3	56	86 + 4.3	56	83 + 4.7	54	72 + 5.5	47	63 + 6.0	41
1991	n=50	88 + 4.6	44	84 + 5.2	42	82 + 5.4	41	82 + 5.4	41	74 + 6.2	37	62 + 6.9	31
1992	n=90	91 + 3.0	82	87 + 3.6	78	83 + 3.9	75	80 + 4.2	72	76 + 4.5	68	73 + 4.7	65
1993	n=53	85 + 4.9	45	81 + 5.4	43	79 + 5.6	42	74 + 6.1	39	68 + 6.4	36	57 + 6.8	30
1994	n=51	80 + 5.6	41	78 + 5.8	40	76 + 5.9	39	75 + 6.1	38	71 + 6.4	36	63 + 6.8	32
1995	n=63	94 + 3.1	59	92 + 3.4	58	90 + 3.7	57	84 + 4.6	53	79 + 5.1	50	-	
1996	n=63	89 + 4.0	56	87 + 4.2	55	86 + 4.4	54	84 + 4.6	53	76 + 5.4	48	-	
1997	n=72	90 + 3.5	65	88 + 3.9	63	88 + 3.9	63	85 + 4.2	61	-		-	
1998	n=67	96 + 2.5	64	93 + 3.2	62	87 + 4.2	58	87 + 4.2	58	-		-	
1999	n=59	86 + 4.5	51	85 + 4.7	50	85 + 4.7	39	-		-		-	

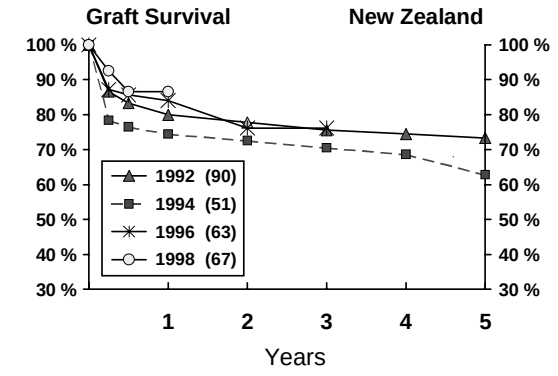
% Survival + S.E. / Number at Risk
n = Number of Patients

Figure 169

Primary Cadaver Patient Survival 1992 - 1998
Related to Year of Transplant



Primary Cadaver Graft Survival 1992 - 1998
Related to Year of Transplant



AUSTRALIAN TRANSPLANT SURVIVAL - SUBSEQUENT CADAVERIC GRAFTS

Patient and graft survivals for second or subsequent cadaveric grafts are examined in three year cohorts, 1997-99; 1994-96; 1991-93; 1988-90 and 1985-87. (Figures 170 and 172)

Figure 170 **Australia**

Second and Subsequent Cadaver Patient and Graft Survival 1985 - 1999

Year of Transplant		Survival					
		1 month	3 months	6 months	1 year	3 years	5 years
Patient Survival							
1985-87	n=238	100 + 0.4 237	97 + 1.2 231	96 + 1.2 229	95 + 1.4 226	88 + 2.2 208	80 + 2.6 190
1988-90	n=170	99 + 0.8 168	97 + 1.3 165	94 + 1.8 160	92 + 2.0 157	87 + 2.6 148	81 + 3.0 138
1991-93	n=214	100 + 0.5 213	98 + 1.0 209	97 + 1.2 207	95 + 1.5 203	91 + 1.9 195	85 + 2.4 182
1994-96	n=158	99 + 0.9 156	97 + 1.2 154	97 + 1.2 154	96 + 1.5 152	92 + 2.1 146	-
1997-99	n=147	100 + 0.0 147	98 + 1.2 144	97 + 1.4 137	96 + 1.7 109	-	-
Graft Survival							
1985-87	n=238	83 + 2.4 198	78 + 2.7 186	76 + 2.8 180	72 + 2.9 172	59 + 3.2 139	52 + 3.2 122
1988-90	n=170	86 + 2.6 147	84 + 2.8 142	80 + 3.1 136	78 + 3.2 132	66 + 3.6 112	61 + 3.8 103
1991-93	n=214	83 + 2.6 178	80 + 2.7 172	79 + 2.8 170	78 + 2.8 167	73 + 3.0 157	64 + 3.3 138
1994-96	n=158	87 + 2.7 137	84 + 2.9 132	82 + 3.0 130	81 + 3.1 128	73 + 3.5 116	-
1997-99	n=147	93 + 2.1 137	90 + 2.5 132	90 + 2.5 127	86 + 2.9 96	-	-

% Survival + S.E. / Number at Risk
n = Number of Patients

Figure 171

Second and Subsequent Cadaver Patient Survival Related to Years of Transplant 1985 - 1999

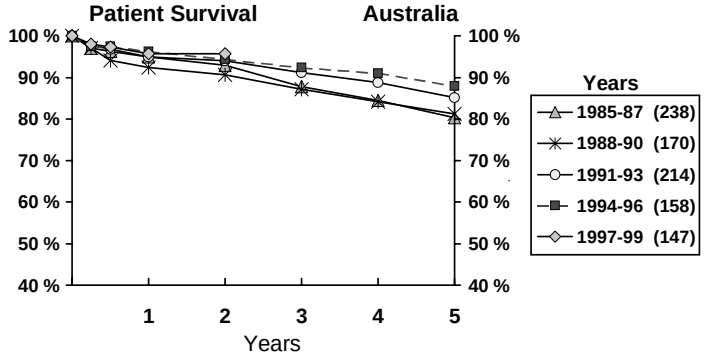
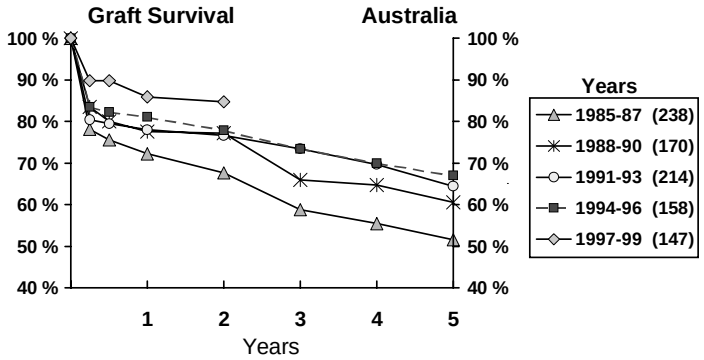


Figure 172

Second and Subsequent Cadaver Graft Survival Related to Years of Transplant 1985 - 1999



LIVING DONOR TRANSPLANTS

AUSTRALIA

The year 1999 saw the largest number and proportion of living donor transplants being performed in Australia representing 37% of all transplant operations.

This ongoing increase since 1994 continues. (Figure 173). The proportion of unrelated donors rose from 22% to 26% of living donors. Seventy seven percent of the living unrelated donors were spouses in 1999. Sixty seven percent of the living donors in 1999 and 56% in 1998 were female. (Figure 178). Most of the unrelated donors were spouses. Since 1996, the increase in living donor transplants was due to increases in unrelated donors.

Figure 174 shows the age-related proportion of living donor transplants for the years 1995 and 1999. The overall proportion of living donor transplants continued to rise between these years. The proportion of living donors increased in all age groups except the 5-14 year group, the largest increase was in the 55-64 year age group.

The proportion of living donor transplants for each State and New Zealand for recipients aged 25-44 years is shown in Figure 175 for the years 1992-95 and 1996-99. There have been increases in all regions.

NEW ZEALAND

Thirty eight percent of grafts were from a living donor (29% in 1998 and 28% in 1997). There were nine living unrelated donors, slightly less than in 1998. Fifty five percent of living donors were female. (Figure 178). As in Australia there has been a significant increase in the proportion of living donors for recipients aged 25-44 years comparing 1992-95 and 1996-99. (Figure 175).

TIMING OF LIVING DONOR TRANSPLANTS

The timing of living donor transplants is shown in Figure 176 and 177. New Zealand has over this period had a higher proportion of living transplants performed before dialysis commencement.

For the years 1996-99, the proportion of predialysis living donor transplants was greatest in South Australia/ Northern Territory (24%) and least in Western Australia (9%).

Figure 173 **Australia**

Living Donor Operations as Proportion (%) of Annual Transplantation

Recipient Age Groups	Year of Transplantation							
	1992	1993	1994	1995	1996	1997	1998	1999
00-04 years	43%	60%	67%	83%	50%	100%	67%	100%
05-14 years	73%	55%	73%	65%	50%	60%	47%	58%
15-24 years	31%	22%	44%	36%	36%	57%	54%	61%
25-34 years	15%	23%	24%	26%	32%	44%	37%	39%
35-44 years	19%	13%	24%	21%	27%	27%	32%	41%
45-54 years	4%	7%	17%	12%	12%	18%	21%	26%
55-64 years	2%	5%	13%	5%	13%	10%	21%	27%
65-74 years	0%	5%	8%	0%	18%	0%	19%	0%
All Recipients	**14%**	**14%**	**23%**	**21%**	**24%**	**29%**	**31%**	**37%**

Figure 174

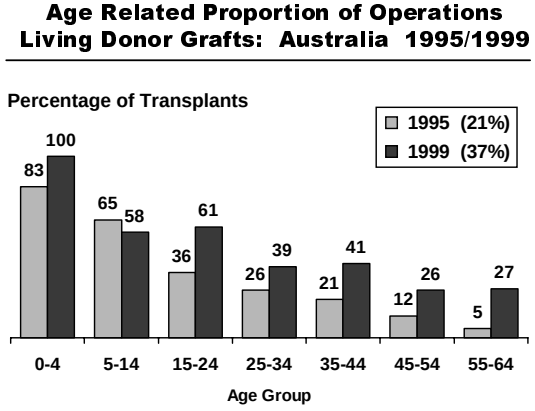


Figure 175

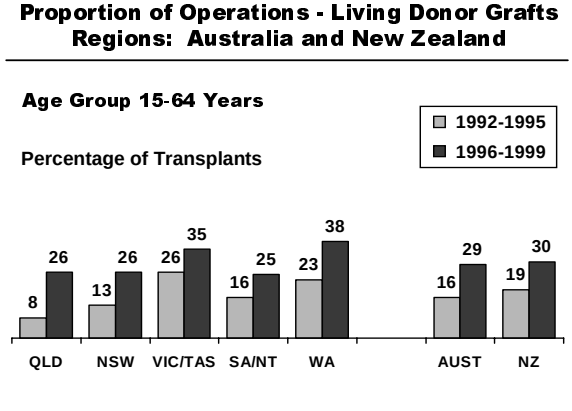


Figure 176

Timing of Living Donor Transplantation in Relation to Date of Dialysis Start by Year 1992 - 1999

		1992	1993	1994	1995	1996	1997	1998	1999
Australia	Pre-dialysis	13%	12%	11%	14%	16%	19%	17%	19%
	<1 month post dialysis	13%	10%	4%	1%	6%	5%	4%	4%
	1-5.9 months post dialysis	30%	28%	30%	26%	15%	21%	23%	15%
	6-11.9 months post dialysis	16%	18%	20%	21%	15%	15%	20%	18%
	>12 months post dialysis	28%	32%	35%	38%	48%	40%	35%	44%
New Zealand	Pre-dialysis	20%	25%	21%	10%	32%	21%	32%	24%
	<1 month post dialysis	0%	6%	0%	10%	4%	0%	0%	0%
	1-5.9 months post dialysis	20%	13%	11%	14%	12%	17%	21%	21%
	6-11.9 months post dialysis	20%	19%	26%	14%	8%	10%	4%	8%
	>12 months post dialysis	40%	38%	42%	52%	44%	52%	43%	47%

Figure 177

Timing of Living Donor Transplantation Australian Regions and N.Z. 1996/1999

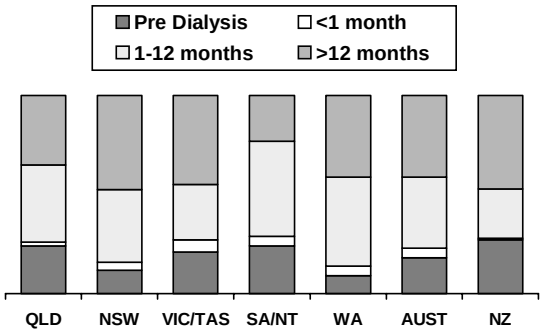


Figure 178

Source of Living Donor Kidney 1992 - 1999

Source	Australia								New Zealand							
	1992	1993	1994	1995	1996	1997	1998	1999	1992	1993	1994	1995	1996	1997	1998	1999
Total Living Donors	**69**	**64**	**103**	**93**	**115**	**144**	**161**	**167**	**17**	**20**	**20**	**24**	**26**	**31**	**31**	**42**
Related	**(68)**	**(60)**	**(94)**	**(87)**	**(96)**	**(125)**	**(126)**	**(124)**	**(17)**	**(19)**	**(20)**	**(23)**	**(25)**	**(23)**	**(19)**	**(33)**
Mother	25	19	27	34	26	39	27	32	2	6	9	3	11	6	4	9
Father	10	9	14	16	24	22	25	28	4	3	5	4	5	6	5	5
Brother	12	17	19	8	17	29+	28+	17	2	6	2	5	3	3	6	9
Sister	14x	7	28	15	18x	23+	32	28	7x	2	3	8x	5	5	2	6
Offspring	2	5	4	6	6	3	5	8	2	1	1	3	0	3	2	2
Grandfather	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0
Grandmother	0	1	0	2	2	0	4	3	0	0	0	0	0	0	0	0
Cousin	3	0	1	2	1	4	1	5	0	0	0	0	0	0	0	1
Nephew	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Niece	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Uncle	0	1	1	2	1	1	0	1	0	1	0	0	0	0	0	0
Aunt	0	0	0	0	1	2	4	1	0	0	0	0	1	0	0	1
Unrelated	**(1)**	**(4)**	**(9)**	**(6)**	**(19)**	**(19)**	**(35)**	**(43)**	**(0)**	**(1)**	**(0)**	**(1)**	**(1)**	**(8)**	**(12)**	**(9)**
Wife	1	1	2	1	10	10	17	23	0	0	0	1	0	4	7	4
Husband	0	2	4	3	3	8	13	10	0	0	0	0	1	1	2	3
Mother in Law	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Stepmother	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Adoptive Mother	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sister in Law	0	0	0	1	2	0	1	1	0	1	0	0	0	1	0	0
Brother in Law	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Partner	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0
Uncle	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	2	0	0	1	3	9	0	0	0	0	0	1	3	1

\+ Twin (non identical) x Twin (identical)

FUNCTIONING TRANSPLANTS AT 31-Dec-1999
TRANSPLANT OPERATIONS 1963 - 1999

Figure 179

Summary of Renal Transplantation

Transplants		Australia 1963 - 1999		New Zealand 1965 - 1999	
		Performed	Functioning ★	Performed	Functioning ★
Cadaver	First	8623	3388	1610	609
	Second	1390	482	327	84
	Third	215	75	63	20
	Fourth	29	12	6	1
	Fifth	2	2	0	0
Living Donor	First	1427	980	372	239
	Second	135	87	36	19
	Third	18	13	4	3
	Fourth	3	2	0	0
	Fifth	1	1	0	0
Total		**11843**	**5042**	**2418**	**975**

★ Lost to follow up not included

AUSTRALIA

There have been 11,843 operations performed on 10,050 patients since 1963. Of these, 5,042 were functioning at 31st December 1999, which represents 266 patients per million of population. Fifteen percent of operations and 13% of functioning grafts were regrafts. Living donor transplants accounted for 13% of operations and 21% of functioning grafts. The number of operations performed by each hospital during this period is shown in Appendix II at Website (www.anzdata.org.au).

The number of functioning grafts at the end of 1999 represents a 4% increase over the previous year, an annual rate of increase which has remained steady. (Figure 180,181). Eighty seven percent of the functioning grafts were primary and 79% were from cadaveric donors. The number of functioning grafts from living donors increased by 14% from 953 to 1,083 patients.

The prevalence of functioning grafts in each State is shown in Figure 180 and 182. South Australia/Northern Territory has the highest prevalence of functioning renal transplants at 369 per million.

The lowest prevalence was recorded in Western Australia (232 per million) an increase from 216 in 1998.

Patients with functioning grafts were in excess of those dependent on dialysis in South Australia and Tasmania. (Appendix I)

The age dependence on a functioning transplant as a proportion of patients on renal replacement therapy is shown in Figure 185. The proportion drops with age and the proportion of patients depending on living donor grafts is greater in the younger age groups, particularly those aged 5-14 years. (Figure 184).

The modal age group for transplant dependent patients was 45-54 years and the mean and median ages were 47.8 and 48.8 years respectively. (Figure 184,186). The modal age group for living donor recipients was 25-34 years and 68% of recipients dependent on living donor grafts were less than 45 years of age.

The racial distribution of recipients with functioning grafts was Caucasoid 90%, Asian 6%, Aboriginal 2% and Others 2%. (Figure 188).

The 5,042 grafts functioning at the end of 1999 represent 43% of all kidneys transplanted since 1963. Twenty seven percent of grafts were functioning more than 10 years, 5% more than 20 years and now there are 20 recipients with grafts functioning 30 years or longer. Twenty two percent of functioning grafts were from living donors. (Figure 187).

NEW ZEALAND

There have been 2,418 operations performed on 1,982 patients since 1965 with 975 grafts (256 per million) still functioning at 31st December 1999. (Figure 180, 181). This represents a 5% increase from the previous year. Eighteen percent of operations and 13% of functioning grafts were regrafts. Kidneys from living donors accounted for 17% of operations and 26% of functioning grafts. The number of operations performed by individual hospitals is shown in Appendix III at Website (www.anzdata.org.au).

The age related dependence on a transplant and the living or cadaveric donor source are shown in Figure 185.

The majority were male (59%) and the racial distribution was Caucasoid 80%, Maori 10%, Pacific Islander 4%, Asian 5% and Other <1%. (Figure 188).

The majority (65%) of functioning grafts were in the 25-54 year age group and the mean and median ages were 46.1 and 46.1 years respectively. The modal age group for living donors was 25-34 years. (Figure 184).

The 975 grafts functioning at the end of 1999 represent 40% of all kidneys transplanted since 1965. The longest surviving grafts have reached 32 years. Forty one grafts have been functioning for more than 20 years and five for more than 30 years. Twenty seven percent of functioning grafts were from living donors. (Figure 187).

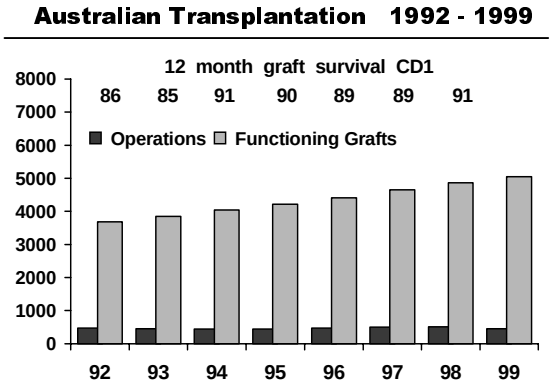
Figure 180

Functioning Transplants
By Transplanting State, Australia and New Zealand 1992 - 1999
( ) Per Million Population

Year	Qld	NSW/ACT	Vic./Tas ★	SA/NT ★	WA	Aust.	N.Z.
1992	688 (227)	1316 (210)	962 (195)	429 (264)	292 (176)	**3687 (210)**	**676 (192)**
1993	738 (237)	1349 (214)	1027 (208)	425 (261)	316 (188)	**3855 (218)**	**705 (198)**
1994	784 (245)	1410 (222)	1050 (212)	459 (280)	342 (201)	**4045 (227)**	**730 (203)**
1995	808 (247)	1471 (229)	1094 (220)	478 (290)	359 (207)	**4210 (233)**	**782 (214)**
1996	842 (251)	1540 (237)	1153 (230)	515 (311)	363 (206)	**4413 (241)**	**822 (221)**
1997	894 (263)	1622 (246)	1217 (240)	539 (323)	377 (210)	**4649 (251)**	**878 (233)**
1998	937 (271)	1667 (251)	1284 (250)	582 (347)	396 (216)	**4866 (260)**	**929 (245)**
1999	949 (270)	1712 (255)	1327 (256)	622 (369)	432 (232)	**5042 (266)**	**975 (256)**

★ For calculation of Population Related totals, the population of these States were amalgamated
Patients lost to follow up are not included
Vic/Tas includes patients transplanted in Tasmania prior to 1975 (one only functioning transplant since 1990)

Figure 181



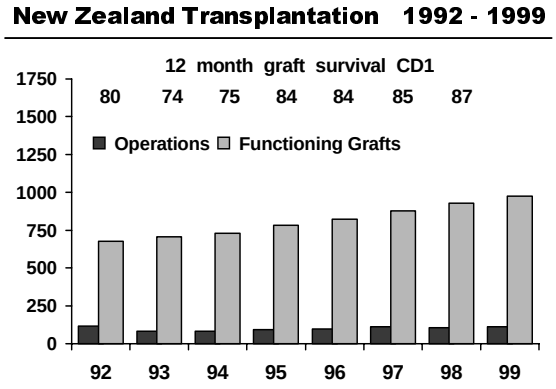


Figure 182

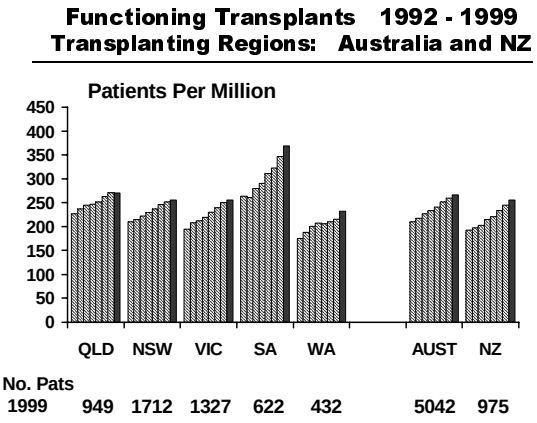


Figure 183

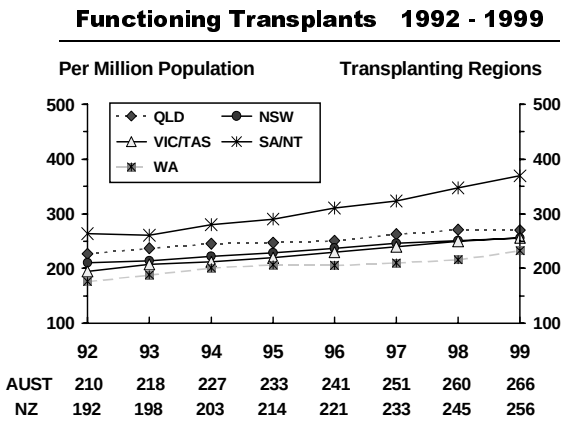
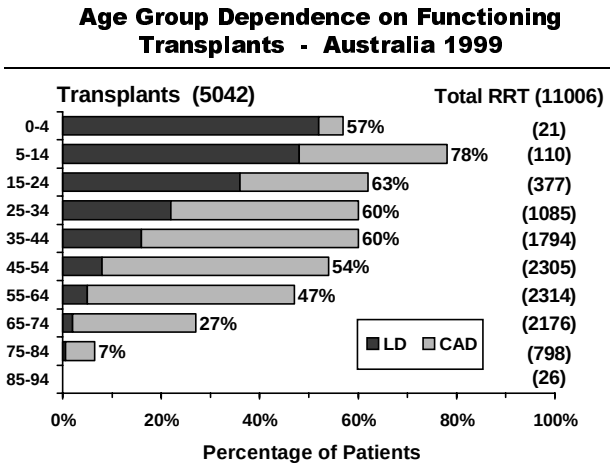


Figure 184

Age of All Functioning Transplant Patients (31-Dec-1999)

Donor Source	Graft No.	Age Groups									Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
Australia		**12**	**86**	**236**	**651**	**1080**	**1250**	**1096**	**579**	**52**	**5042**
Cadaver	1	1	30	74	330	624	903	884	495	47	**3388**
	2	0	3	22	65	134	125	88	42	3	**482**
	3	0	0	3	15	22	23	8	4	0	**75**
	4	0	0	0	1	5	3	2	1	0	**12**
	5	0	0	0	0	1	1	0	0	0	**2**
	Total	**1**	**33**	**99**	**411**	**786**	**1055**	**982**	**542**	**50**	**3959**
Living Donor	1	11	47	131	216	259	169	110	35	2	**980**
	2	0	6	6	20	28	22	3	2	0	**87**
	3	0	0	0	2	6	4	1	0	0	**13**
	4	0	0	0	2	0	0	0	0	0	**2**
	5	0	0	0	0	1	0	0	0	0	**1**
	Total	**11**	**53**	**137**	**240**	**294**	**195**	**114**	**37**	**2**	**1083**
New Zealand		**2**	**16**	**52**	**148**	**239**	**248**	**174**	**84**	**12**	**975**
Cadaver	1	1	4	14	58	135	168	145	73	11	**609**
	2	0	1	1	17	31	21	9	4	0	**84**
	3	0	0	0	4	7	8	1	0	0	**20**
	4	0	0	0	0	0	1	0	0	0	**1**
	Total	**1**	**5**	**15**	**79**	**173**	**198**	**155**	**77**	**11**	**714**
Living Donor	1	1	11	36	62	58	45	18	7	1	**239**
	2	0	0	0	6	7	5	1	0	0	**19**
	3	0	0	1	1	1	0	0	0	0	**3**
	Total	**1**	**11**	**37**	**69**	**66**	**50**	**19**	**7**	**1**	**261**

Figure 185



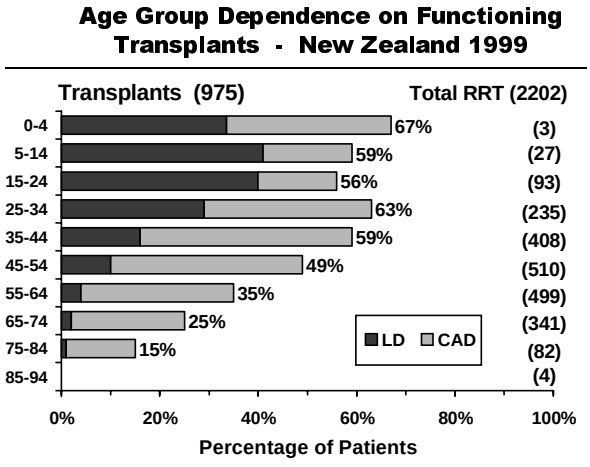
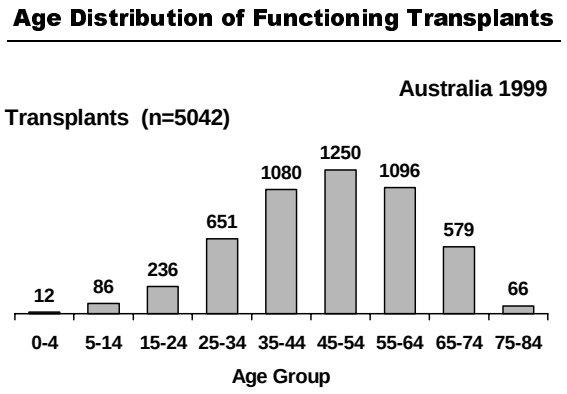
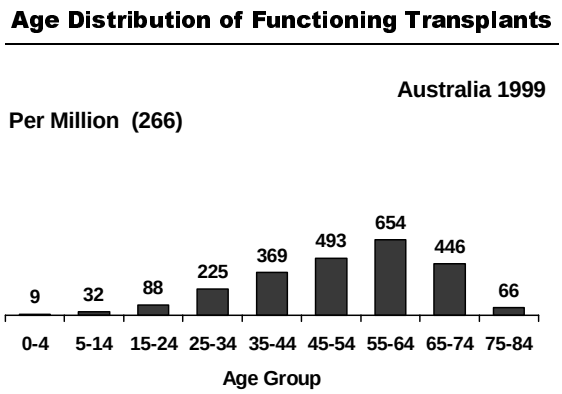
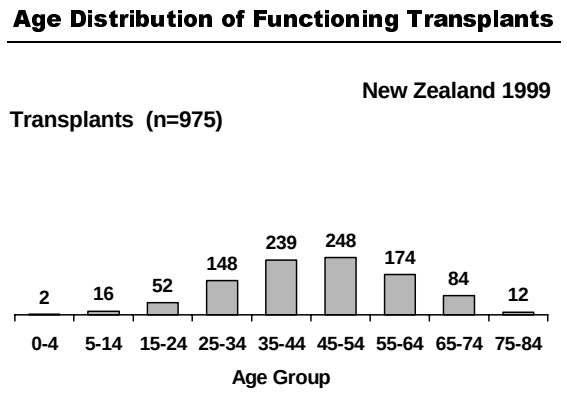


Figure 186







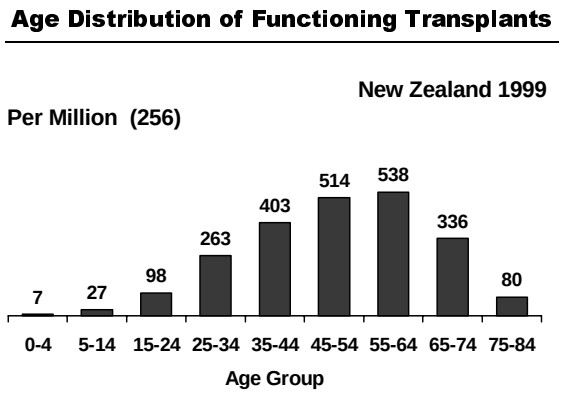
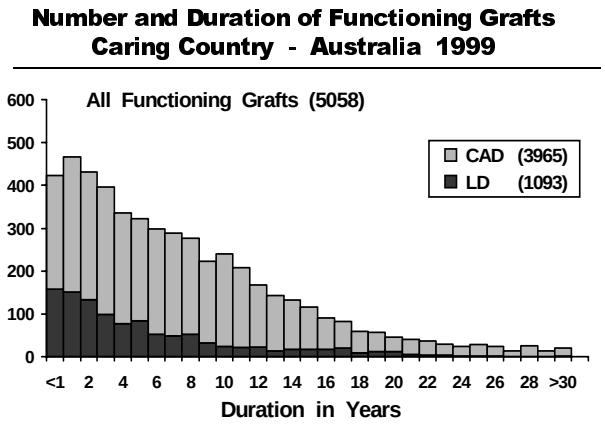


Figure 187



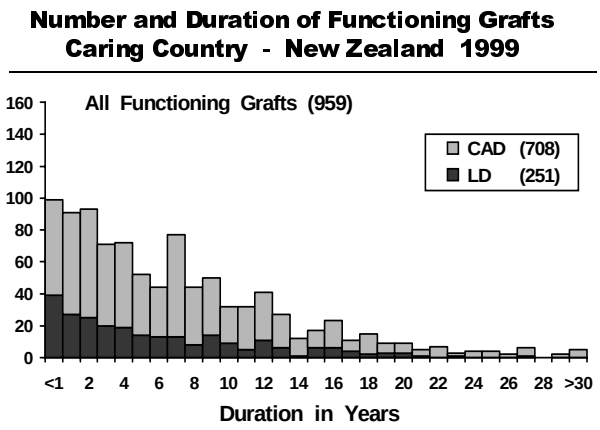
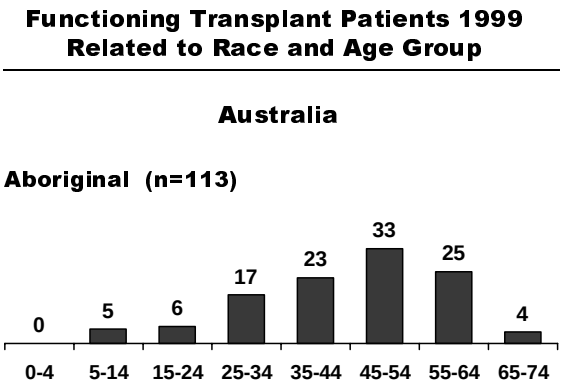
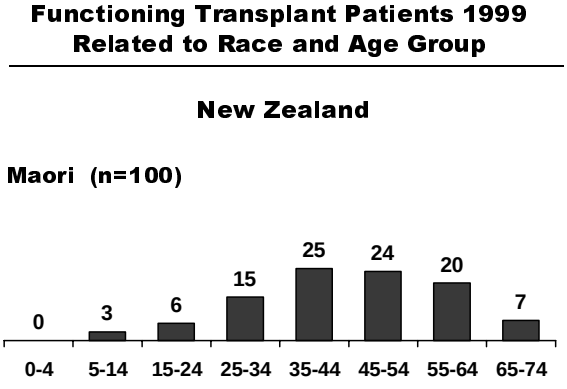
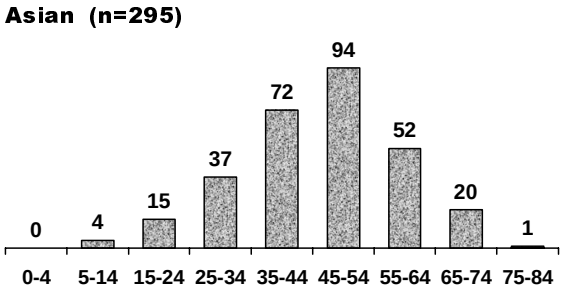
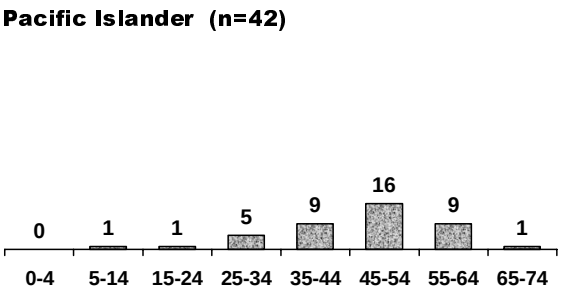


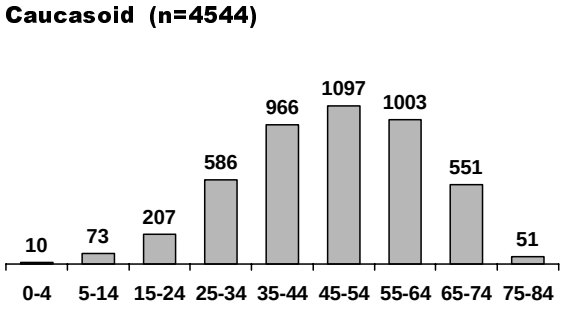
Figure 188


Functioning Transplant Patients 1999
Related to Race and Age Group
Australia
Aboriginal (n=113)
0 5 6 17 23 33 25 4
0-4 5-14 15-24 25-34 35-44 45-54 55-64 65-74


Functioning Transplant Patients 1999
Related to Race and Age Group
New Zealand
Maori (n=100)
0 3 6 15 25 24 20 7
0-4 5-14 15-24 25-34 35-44 45-54 55-64 65-74


Asian (n=295)
0 4 15 37 72 94 52 20 1
0-4 5-14 15-24 25-34 35-44 45-54 55-64 65-74 75-84


Pacific Islander (n=42)
0 1 1 5 9 16 9 1
0-4 5-14 15-24 25-34 35-44 45-54 55-64 65-74


Caucasoid (n=4544)
10 73 207 586 966 1097 1003 551 51
0-4 5-14 15-24 25-34 35-44 45-54 55-64 65-74 75-84

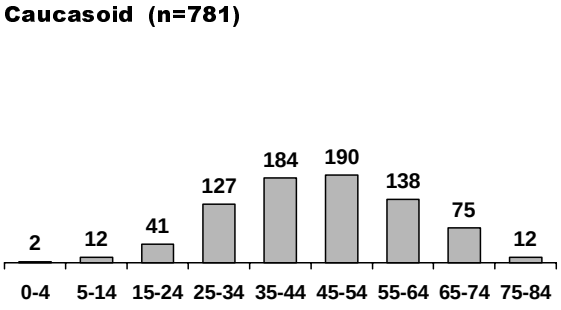

Caucasoid (n=781)
2 12 41 127 184 190 138 75 12
0-4 5-14 15-24 25-34 35-44 45-54 55-64 65-74 75-84

Figure 189

The incidence of delayed graft function decreased for both primary and subsequent cadaver grafts from 1979 to 1994-5. In the last few years there has been an increase with a rate in 1999 for primary grafts of 24% and for regrafts of 42%. In general the incidence of delayed graft function is greater for regrafts compared to primary grafts.

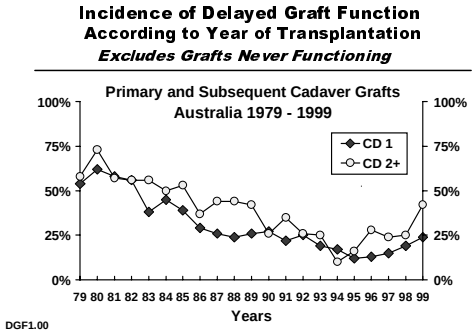


Figure 190

The incidence of delayed graft function in living donor grafts has also decreased since 1980. Again the rate is higher for regrafts.

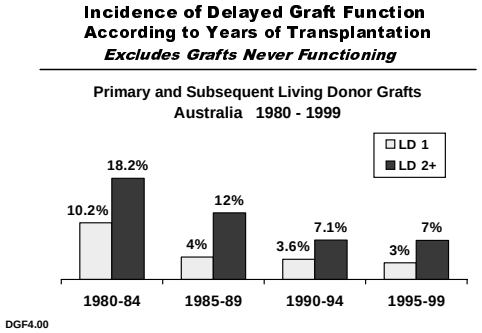


Figure 191

Queensland has a significantly lower incidence of delayed function in recipients of primary cadaveric grafts whereas New South Wales has the highest incidence. New Zealand has a lower rate of delayed function than Australia.

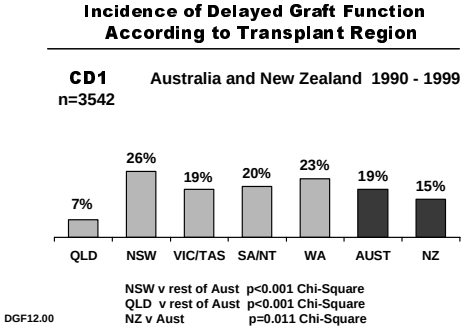


Figure 192

Primary cadaveric grafts with delayed function have a significantly inferior survival in the long term. The difference in outcome for immediate and delayed function appears after the first year and increases such that it is approximately 10% at nine years.

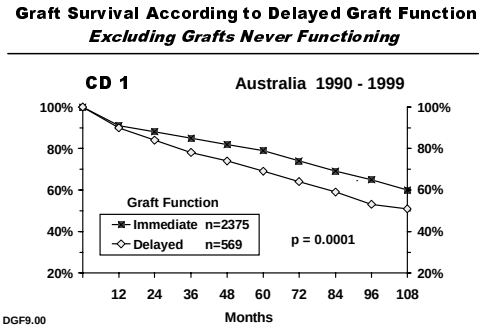


Figure 193

The length of dialysis dependence in grafts with delayed function is the major determinant of poorer outcome. Dialysis requirement for more than seven days leads to a significantly poorer outcome, whereas delayed function lasting less than seven days does not impact negatively on outcome compared to grafts with immediate function.

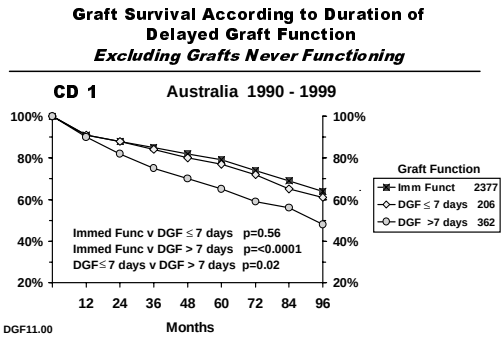


Figure 194

The mean serum creatinine is greater at twelve months post primary cadaver transplant for both short and prolonged delayed function compared to grafts with immediate function.

Mean Serum Creatinine at 12 Months According to Delayed Graft Function

CD1 Australia 1990 - 1999

Function	Mean Creatinine (µmol/L)	SD
Immediate *n=2035*	141	69
Delayed ≤ 7 days *n=174*	158	69
Delayed >7 days *n=303*	188	146

p= <0.001 (Anova)

DGF25.00

Figure 195

Primary cadaver recipients who were receiving peritoneal dialysis immediately prior to transplantation had a lower rate of delayed function compared with those on haemodialysis.

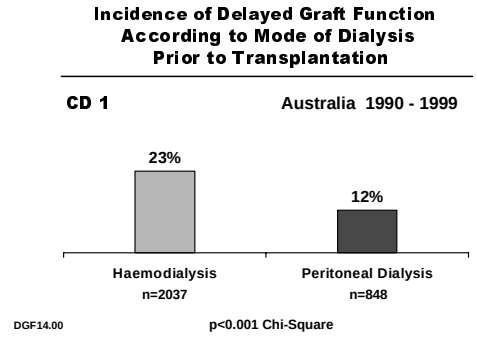


Figure 196

Increasing total ischaemia time is associated with an increase in the incidence of delayed function in primary cadaver recipients.

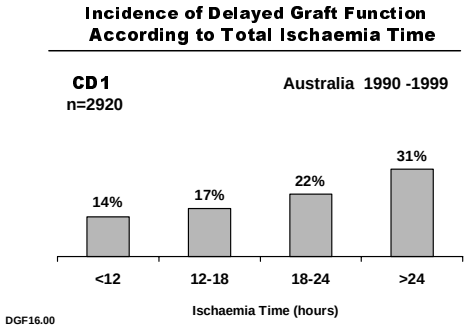


Figure 197

Delayed function rate increases with degree of sensitization of the recipient suggesting that immunological factors may play a role in some cases.

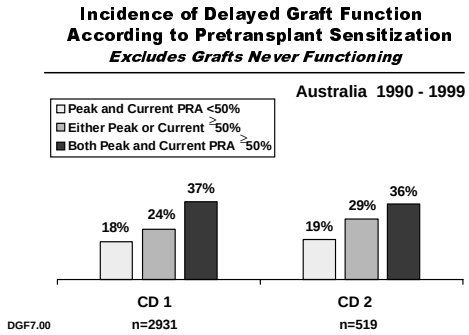


Figure 198

The rate of delayed graft function and grafts which never function increases with increasing age of the cadaveric donor. Although there has been no increase in the proportion of donors >55 years over the last ten years, the acceptance of more marginal donors with nephrovascular disease may be contributing to the increased rate of delayed graft function in the last 4-5 years.

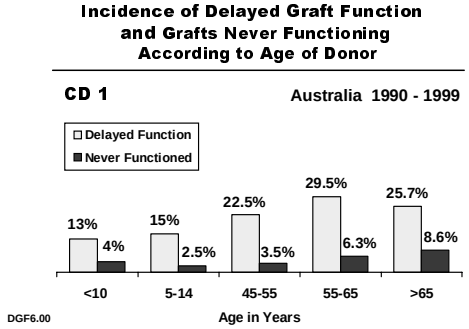


Figure 199

Donor factors which on univariate analysis have a significant effect ($p < 0.05$) on the rate of delayed function in primary cadaveric recipients.

Donor Factors Contributing Significantly* to Delayed Graft Function in Primary Cadaveric Grafts
Australia 1990 - 1999

Factor	n	Immediate	Delayed
All Grafts	2944	81%	19%
Donor Age			
<50 years	2375	84%	16%
≥50 years	569	71%	29%
Donor Death			
CVA	1396	78%	22%
Trauma	1186	85%	15%
Terminal Creatinine			
<120	2391	82%	18%
121-200	395	74%	26%
>200	63	65%	35%
Donor history of HT	248	73%	27%
Kidney only donor	699	73%	27%
Donor Rx Prostacyclin	792	87%	13%
UW solution for Preservation	1692	83%	17%

*p <0.05

DGF17.00

Figure 200

The incidence of biopsy-proven rejection in the first month post transplant is increased if delayed function lasts for more than seven days. In addition there is a greater incidence of vascular rejection.

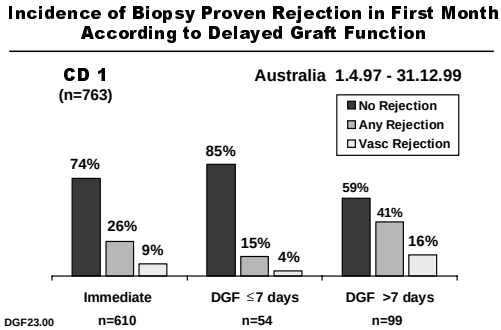


Figure 201 **Australia**

Immunosuppressive Therapy - Primary Cadaver Graft 1993 - 1999

	Year	Cya /Aza/Pred	Cya/MMF/Pred	Cya/Aza	Cya/MMF	Tacrolimus Combination	Sirolimus Trial Combination	Other	Total
Initial treatment	1993	237 (74%)	51 (16%)	16 (5%)	0	0	0	18 (6%)	**322**
	1994	236 (83%)	0	38 (13%)	0	3 (1%)	0	8 (3%)	**285**
	1995	227 (79%)	0	14 (4%)	0	22 (8%)	9	27 (9%)	**289**
	1996	241 (78%)	5 (2%)	23 (7%)	1 (<1%)	0	22 (7%)	18 (6%)	**310**
	1997	125 (40%)	111 (36%)	2 (1%)	14 (4%)	1 (<1%)	42 (13%)	17 (5%)	**312**
	1998	33 (11%)	143 (49%)	1 (<1%)	20 (7%)	2 (1%)	71 (24%)	24 (8%)	**293**
	1999	17 (7%)	101 (41%)	2 (1%)	36 (15%)	34 (14%)	23 (9%)	34 (14%)	**247**
Treatment at 1 month	1993	222 (75%)	46 (15%)	7 (2%)	0	0	0	22 (7%)	**297**
	1994	228 (84%)	0	21 (8%)	0	3 (1%)	0	21 (8%)	**273**
	1995	225 (81%)	1 (<1%)	3 (1%)	0	24 (9%)	0	25 (9%)	**278**
	1996	217 (74%)	20 (7%)	11 (4%)	3 (1%)	6 (2%)	0	35 (12%)	**292**
	1997	99 (33%)	123 (42%)	0	10 (3%)	7 (2%)	2 (1%)	56 (19%)	**297**
	1998	26 (9%)	159 (56%)	0	10 (4%)	8 (3%)	44 (15%)	37 (13%)	**284**
	1999	13 (5%)	121 (51%)	0	9 (4%)	43 (18%)	29 (12%)	25 (11%)	**238**
Treatment at 3 months	1993	223 (77%)	45 (16%)	5 (2%)	0	0	0	15 (5%)	**288**
	1994	234 (88%)	0	12 (4%)	0	4 (1%)	0	17 (6%)	**267**
	1995	221 (81%)	3 (1%)	2 (1%)	0	23 (8%)	0	23 (8%)	**272**
	1996	212 (74%)	26 (9%)	7 (2%)	1 (<1%)	12 (4%)	0	27 (9%)	**285**
	1997	87 (30%)	130 (45%)	2 (1%)	6 (2%)	6 (2%)	1 (<1%)	56 (19%)	**288**
	1998	22 (8%)	161 (58%)	1 (<1%)	7 (3%)	12 (4%)	40 (14%)	34 (12%)	**277**
	1999	13 (6%)	114 (49%)	0	9 (4%)	50 (22%)	21 (9%)	24 (10%)	**231**
Treatment at 6 months	1993	211 (75%)	44 (16%)	12 (4%)	0	0	0	16 (6%)	**283**
	1994	222 (84%)	0	18 (7%)	0	4 (2%)	0	19 (7%)	**263**
	1995	205 (77%)	3 (1%)	11 94%)	0	21 (8%)	0	25 (9%)	**265**
	1996	200 (71%)	26 (9%)	13 (5%)	1 (<1%)	12 (4%)	0	30 (11%)	**282**
	1997	90 (32%)	132 (47%)	3 (1%)	9 (3%)	6 (2%)	1 (<1%)	42 (15%)	**282**
	1998	21 (8%)	152 (55%)	2 (1%)	14 (5%)	17 (6%)	40 (14%)	30 (11%)	**276**
	1999	12 (7%)	871 (49%)	0	10 (6%)	21 (13%)	18 (11%)	24 (14%)	**166**
Treatment at 12 months	1993	180 (65%)	33 (12%)	38 (14%)	5 (2%)	0	0	22 (8%)	**278**
	1994	193 (75%)	0	42 (16%)	0	3 (1%)	0	21 (8%)	**259**
	1995	175 (67%)	2 (1%)	36 (14%)	0	19 (7%)	0	28 (11%)	**260**
	1996	163 (59%)	28 (10%)	37 (13%)	5 (2%)	13 (5%)	0	31 (11%)	**277**
	1997	92 (33%)	108 (39%)	14 95%)	16 96%)	7 (3%)	2 (1%)	39 (14%)	**278**
	1998	24 (9%)	127 (47%)	5 (3%)	31 (12%)	22 (8%)	36 (13%0	23 (9%)	**268**
	1999	-	-	-	-	-	-	-	**-**

ORGAN DONOR PROCUREMENT

Organ Donors in Australia and New Zealand

(Summarised from the Australia and New Zealand Organ Donation Registry Report 2000)
For more detail please refer to Website: www.anzdata.org.au

Editors K.Herbertt and G.Russ

In 1999 donor figures include three donors from Australia (one Victoria, one New South Wales, one South Australia) and one from New Zealand who went to the operating room, but no organs were retrieved. The reasons were; the discovery of malignancy (two), medical condition excluded transplantation and trauma to organs discovered during surgery.

In 1999, there was a range of 20 dpmp in South Australia to 6 dpmp in Queensland. New Zealand has had a decrease from 12 to 10 dpmp.

Figure 202

Number of Donors 1995 - 1999

	1995		1996		1997		1998		1999	
Queensland	34	(10)	35	(10)	37	(11)	40	(12)	20	(6)
New South Wales/ACT	67	(10)	69	(11)	69	(10)	65	(10)	50	(7)
Victoria	38	(8)	49	(11)	42	(9)	40	(9)	42	(9)
Tasmania	4	(8)	1	(2)	5	(11)	0	(0)	6	(13)
South Australia	23	(16)	25	(17)	25	(17)	35	(24)	30	(20)
Northern Territory	1	(6)	3	(17)	4	(21)	3	(16)	3	(16)
Western Australia	17	(10)	12	(7)	8	(4)	13	(7)	13	(7)
Australia	**184**	**(10)**	**194**	**(11)**	**190**	**(10)**	**196**	**(10)**	**164**	**(9)**
New Zealand	**35**	**(10)**	**36**	**(10)**	**42**	**(11)**	**46**	**(12)**	**39**	**(10)**

( ) Donors Per Million of Population
Refer to Appendix for the number of donors by State and Hospital and population

Figure 203

Donors per Thousand Deaths 1992 - 1998

Year	Qld	NSW/ACT	Vic.	Tas.	SA	NT	WA	Aust.	N.Z.
1992	3.2	1.53	1.32	1.07	1.83	0	1.41	1.75	0
1993	2.19	1.68	1.67	1.65	1.99	3.99	1.84	1.82	1.25
1994	1.74	1.59	0.8	1.54	1.96	1.29	1.55	1.44	1.29
1995	1.64	1.46	1.17	1.07	2.04	1.23	1.64	1.47	1.29
1996	1.56	1.49	1.5	0.26	2.15	3.89	1.09	1.51	1.27
1997	1.71	1.46	1.28	1.32	2.16	4.5	0.73	1.47	1.52
1998	1.83	1.36	1.21	0	2.98	3.57	1.21	1.52	1.76
1999	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.39

Donor Profile

The mean age for donors has decreased slightly from 40.4 to 39.3 years. In 1999 there were 11 donors (7%) older than 65 years. This is five fewer than last year. The oldest donor was 77.1 years. (Figure 205).

New Zealand has seen an increase in mean and median ages over the past five years (mean 34.3 to 42.7 years and median 34.8 to 49.0 years). In 1999 there were four donors (10%) older than 65 years, the eldest being 73.2 years. (Figure 205).

When comparing Australian States, the mean age ranged from the highest in New South Wales 42.7 years to the lowest 24.3 years in the Northern Territory. (Figure 204).

The gender distribution by Australian States and New Zealand is shown in Figure 206.

Figure 204 **Australia**

Mean Age of Donors 1995 - 1999

	Qld	NSW/ACT	Vic.	Tas.	SA	NT	WA	Aust.
1995	34.4	37.2	38.8	23.4	40.2	43.4	42.0	**37.6**
1996	30.5	39.4	43.0	47.1	38.5	36.8	35.0	**38.3**
1997	37.5	40.1	43.8	38.1	45.3	33.5	28.7	**40.4**
1998	35.7	42.7	43.4	0	40.3	44.7	33.9	**40.4**
1999	40.0	42.7	40.1	35.8	35.4	24.3	36.5	**39.3**

Figure 205

Age of Male and Female Donors 1995 - 1999

	Year	Mean (years)			Median (years)			Range in Years
		All	Female	Male	All	Female	Male	
Australia	1995	37.6	40.0	36.4	38.1	41.7	35.2	3.0 - 72.0
	1996	38.3	40.3	36.9	38.5	46.1	36.2	1.45 - 74.2
	1997	40.4	42.4	39.3	43.1	41.9	43.6	2.5 - 76.1
	1998	40.4	43.8	37.7	43.2	46.2	37.2	0.94 - 73.7
	1999	39.3	43.2	36.4	42.5	47.5	36.2	0.21 - 77.1
New Zealand	1995	34.2	34.0	34.3	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
	1997	34.8	37.3	33.2	26.4	46.0	23.7	7.1 - 71.6
	1998	38.0	45.0	34.5	35.9	50.1	32.5	2.8 - 69.7
	1999	42.7	45.5	39.3	49.0	50.4	40.3	3.1 - 73.2

Figure 206

Gender of Donors 1989 - 1999

	Female		Male		Total
Queensland	155	36%	280	64%	**435**
New South Wales/ACT	316	40%	465	60%	**781**
Victoria	212	44%	274	56%	**486**
Tasmania	12	32%	26	68%	**38**
South Australia	111	42%	154	58%	**265**
Northern Territory	1	4%	22	96%	**23**
Western Australia	68	42%	95	58%	**163**
Australia	**875**	**40%**	**1316**	**60%**	**2191**
New Zealand 1993-99	**113**	**42%**	**154**	**58%**	**267**

Cause of Death - All Donors

Figure 208 shows the cause of death for all organ donors in Australia since 1989 and for New Zealand since 1993. The primary cause of death was cerebrovascular accident (CVA) (47% of all Australian donors and 51% of all New Zealand donors).

Figure 210 shows detailed cause of death by gender for 1999.

Figure 207 shows CVA is responsible for 89% of all deaths in donors 55 years and older, whereas in the 15-34 year age group, trauma accounted for 64% of all deaths, compared to 59% in 1998.

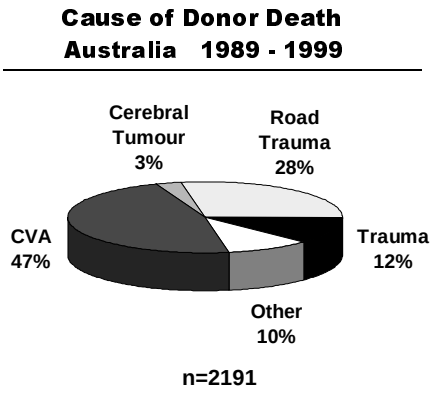
Figure 209 shows a breakdown by Australian States of the major causes of death for total donors in the last eleven years. Of the larger States, in both Queensland and Western Australia trauma (road and non-road) exceeds CVA as a cause of donor death.

Figure 207

Cause of Donor Death Related to Age Group 1999

	Australia					New Zealand				
	0-14	15-34	35-54	55 on	Total	0-14	15-34	35-54	55 on	Total
CVA	3	9	37	39	**88**	1	0	15	8	**24**
Trauma (road)	10	23	3	1	**37**	3	3	2	0	**8**
Trauma (non-road)	0	9	6	3	**18**	0	1	2	1	**4**
Other	5	9	6	1	**21**	0	3	0	0	**3**
Total	**18**	**50**	**52**	**44**	**164**	**4**	**7**	**19**	**9**	**39**

Figure 208



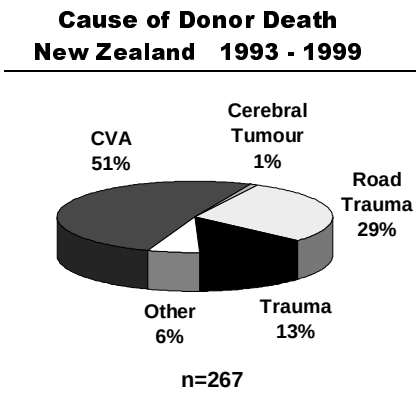


Figure 209

Cause of Donor Death 1989 - 1999

	Qld	NSW/ACT	Vic.	Tas.	SA	NT	WA	Aust.	N.Z. *
CVA	41%	51%	51%	45%	44%	17%	45%	**47%**	**51%**
Trauma (road)	31%	25%	26%	29%	25%	39%	39%	**28%**	**29%**
Trauma (non-road)	16%	13%	9%	18%	13%	22%	7%	**12%**	**13%**
Other	12%	11%	14%	8%	18%	22%	9%	**13%**	**7%**

* N.Z. 1993 - 1999

Figure 210

Cause of Donor Death 1999

Causes of Death		Australia			New Zealand		
		Male	Female	Total	Male	Female	Total
CVA	Cerebral Infarct	7	2	**9**	0	0	**0**
	Intracranial Haemorrhage	33	46	**79**	7	17	**24**
Road Trauma	Cyclist	2	0	**2**	1	0	**1**
	Motor Bike Accident	2	2	**4**	1	0	**1**
	Motor Vehicle Accident	13	6	**19**	2	3	**5**
	Pedestrian	7	2	**9**	1	0	**1**
	Other Road Accident	3	0	**3**	0	0	**0**
Other Trauma	Fall	9	4	**13**	4	0	**4**
	Felony / Crime - Assault	2	0	**2**	0	0	**0**
	Gunshot	2	0	**2**	0	0	**0**
	OtherTtrauma	1	0	**1**	0	0	**0**
Hypoxia Anoxia	Aspiration	1	0	**1**	0	0	**0**
	Asthma	2	1	**3**	0	0	**0**
	Carbon Monoxide	1	0	**1**	0	0	**0**
	Cardiac Arrest	1	0	**1**	1	0	**1**
	Choking	1	0	**1**	0	0	**0**
	Drowning	2	0	**2**	0	0	**0**
	Drug Overdose	1	0	**1**	0	0	**0**
	Epilepsy	0	1	**1**	0	0	**0**
	Fat Embolus	0	0	**0**	0	1	**1**
	Hanging	1	1	**2**	1	0	**1**
Cerebral Tumour	Glioma (malignant)	1	0	**1**	0	0	**0**
	Meningioma (benign)	0	1	**1**	0	0	**0**
	Meningioma (malignant)	0	1	**1**	0	0	**0**
Other	Cerebral Oedema	1	2	**3**	0	0	**0**
	Meningitis (pneumococcal)	0	1	**1**	0	0	**0**
	Meningitis (strep. pneumoniae)	1	0	**1**	0	0	**0**
Total		**94**	**70**	**164**	**18**	**21**	**39**

Organs Requested

From the 164 Australian organ donors in 1999, specific organs requested were: kidneys 98%, liver 98%, heart 90%, lungs 85% and pancreas 48%.

From the 39 New Zealand donors in 1999, specific organs requested were: kidneys 100%, liver 92%, heart 77%, lungs 79% and pancreas 69%.

Figure 211

Trend to Multiple Organ Retrieval 1995 - 1999

No. of Organs	Australia					New Zealand				
	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
Single	18%	27%	24%	23%	17%	29%	17%	33%	20%	21%
Two	20%	24%	23%	32%	30%	31%	44%	31%	50%	44%
Three	33%	25%	23%	19%	27%	20%	25%	33%	16%	23%
Four	26%	18%	24%	20%	23%	20%	14%	3%	12%	10%
Five	3%	6%	6%	6%	3%	0%	0%	0%	2%	2%

Figure 212 **Australia**

State by State Comparison of Multiple Organ Retrieval 1999

No. of Organs	Qld	NSW/ACT	Vic.	Tas.	SA	NT	WA
Single	4 (20%)	13 (26.5%)	5 (12%)	1 (17%)	3 (10%)	0 (0%)	1 (8%)
Two	7 (35%)	13 (26.5%)	14 (34%)	0 (0%)	7 (24%)	1 (33%)	6 (46%)
Three	5 (25%)	13 (26.5%)	8 (20%)	2 (33%)	12 (41%)	1 (33%)	3 (23%)
Four	4 (20%)	8 (16.5%)	12 (29%)	3 (50%)	6 (21%)	1 (33%)	3 (23%)
Five	0 (0%)	2 (4%)	2 (5%)	0 (0%)	1 (4%)	0 (0%)	0 (0%)

NB: 2 kidneys = 1 organ 2 lungs = 1 organ

(On occasions when only one kidney is retrieved, this is also defined as one organ)

Organ Recipients Transplanted

Australia had 3.4 organs used for transplantation in 1999 compared to New Zealand at 3.1.

For the purpose of this calculation, the number of recipients transplanted is used, rather than the number of organs.

Northern Territory had the highest number of organs transplanted, 4 per donor, followed by Queensland and Tasmania 3.7. These figures exclude tissue transplantation.

Figure 213

Organ Recipients Transplanted per Donor 1999 (1998)

	Qld	NSW/ACT	Vic.	Tas.	SA	NT	WA	Aust.	N.Z.
No. Organs Transplanted	74 (146)	156 (227)	143 (127)	22 (0)	105 (99)	12 (15)	46 (52)	**558 (666)**	**122 (132)**
No. of Donors	20 (40)	50 (65)	42 (40)	6 (0)	30 (35)	3 (3)	13 (13)	**164 (196)**	**39 (46)**
Average per Donor	3.7 (3.7)	3.1 (3.5)	3.4 (3.2)	3.7 (0)	3.5 (2.8)	4.0 (5)	3.5 (4)	**3.4 (3.4)**	**3.1 (2.9)**

Double lungs = 1 organ (1 recipient)

Two kidneys = 2 organs

KIDNEY DONATION

Figure 214

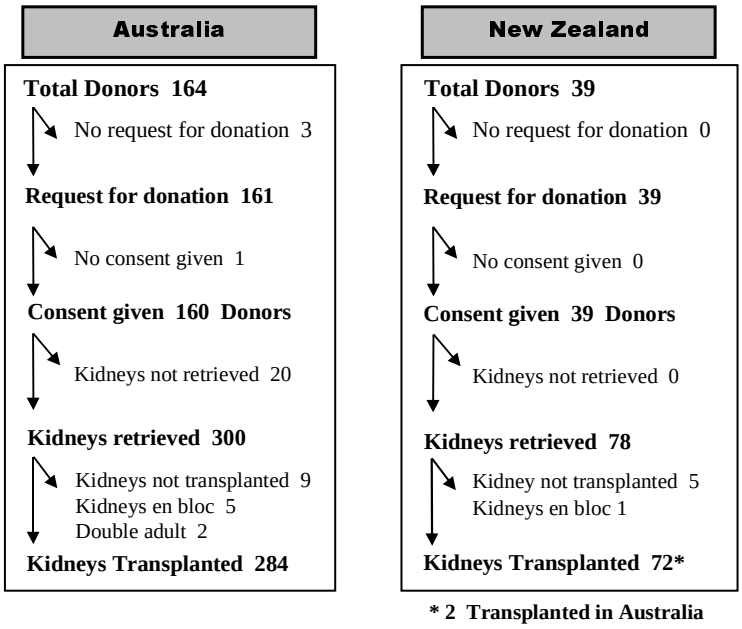
Age of Kidney Donors 1994 - 1999

	Year	00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	Total
Australia	1994	5 (3)	10	46	23	27	32	17	10	1	**171**
	1995	4 (2)	9	39	31	33	29	23 (1)*	10	0	**178**
	1996	5 (3)	10	36	29	36	39	25	8	0	**188**
	1997	3 (2)	8	32	21	36	46	21	12	3	**182**
	1998	1 (1)	10	37	22	32	33	34 (1*)	14 (1x)	0	**183**
	1999	4 (3)	11 (2)	24	22	17	32	29	9 (1x)	2 (1x)	**150**
New Zealand	1994	1 (1)	0	4	8	7	10	4	1	0	**35**
	1995	0	4	9	6	7	5	2	2	0	**35**
	1996	0	2	12	3	3	9	6	1	0	**36**
	1997	0	4	14	4	3	9	7	1	0	**42**
	1998	1 (1)	4	8	6	8	7	6	1	0	**41**
	1999	0	3 (1)	3	4	4	14	5	4	0	**37**

( ) En-Bloc Kidneys * Horseshoe Kidney (Adult) x Double Adult

Figure 215

Outcome of Request for Kidney Donation 1999



*** 2 Transplanted in Australia**

HEPATITIS C ANTIBODY

The concern that Hepatitis C might spread in dialysis units has not been reflected in any notable increase in positive cases in recent years. Many of those with positive antibody results had commenced dialysis before 1990. This was the period without effective screening procedures for both HIV and Hepatitis C. While there may well have been cases of transmission by contaminated blood this would appear to be very low risk while current preventive measures are in place. The prevalence rate each year has barely changed over the last 10 years.

Those units with higher rates have been operating for at least 20 years, reflecting the sporadic clusters of non-A, non-B Hepatitis, which we now recognise as mostly Hepatitis C, that occurred before transfusion donor screening.

The lower rate in transplanted patients may reflect the short period of dialysis treatment, and the recent improvement in success of transplantation. Many of the Hepatitis C cases were young patients who had unsuccessful grafts in the 1970-80 period or were sensitised from repeated transfusion in the pre-Erythropoietin era.

There is no notable difference in positive Hepatitis C antibody results in relation to site or type of dialysis, or the State in which treatment was received.

Figure 216

Hepatitis C Status of Tested Patients Alive At the End of Each Survey Year March 1993 - 2000

Country	Year	Hepatitis Status	Treatment at end March Each Survey Period	
			Dialysis	Transplant
Australia	April March 1992 - 1993	Positive	4%	5%
		Negative	96%	95%
	April March 1993 - 1994	Positive	4%	5%
		Negative	96%	95%
	April March 1994 - 1995	Positive	3%	5%
		Negative	97%	95%
	April March 1995 - 1996	Positive	3%	4%
		Negative	97%	96%
	April March 1996 - 1997	Positive	3%	4%
		Negative	97%	96%
	April March 1997 - 1998	Positive	3%	4%
		Negative	97%	96%
	April March 1998 - 1999	Positive	3%	4%
		Negative	97%	96%
	April March 1999 - 2000	Positive	3%	4%
		Negative	97%	96%
New Zealand	April March 1992 - 1993	Positive	2%	4%
		Negative	98%	96%
	April March 1993 - 1994	Positive	2%	4%
		Negative	98%	96%
	April March 1994 - 1995	Positive	2%	3%
		Negative	98%	97%
	April March 1995 - 1996	Positive	2%	4%
		Negative	98%	96%
	April March 1996 - 1997	Positive	2%	4%
		Negative	98%	96%
	April March 1997 - 1998	Positive	2%	3%
		Negative	98%	97%
	April March 1998 - 1999	Positive	2%	3%
		Negative	98%	97%
	April March 1999 - 2000	Positive	2%	3%
		Negative	98%	97%

Those not tested have been excluded

Figure 217

Hepatitis C Status of Current Patients Related to Year of First Treatment

Country	Current Mode of Treatment	Hepatitis Status at 31 Mar 2000	Year of First Treatment	
			Pre 1990	1990-2000
Australia	Dialysis	Positive	13%	2%
		Negative	87%	98%
	Transplant	Positive	7%	1%
		Negative	93%	99%
New Zealand	Dialysis	Positive	8%	1%
		Negative	92%	99%
	Transplant	Positive	6%	2%
		Negative	94%	98%

Figure 218

Hepatitis C Status of Patients Alive By Mode of Treatment 31 March 2000

Country	Mode of Treatment	Hepatitis Status	Total
Australia	CAPD	Positive	2%
		Negative	98%
	Home HD	Positive	4%
		Negative	96%
	Home PD	Positive	1%
		Negative	99%
	Hospital HD	Positive	3%
		Negative	97%
	Hospital PD	Positive	0%
		Negative	100%
	Satellite HD	Positive	4%
		Negative	96%
New Zealand	CAPD	Positive	2%
		Negative	98%
	Home HD	Positive	3%
		Negative	97%
	Home PD	Positive	0%
		Negative	100%
	Hospital HD	Positive	2%
		Negative	98%
	Satelitte HD	Positive	1%
		Negative	99%

Figure 219

Hepatitis C Status of Patients Alive By Australian State 31 March 2000

	Hepatitis Status	Dialysis	Transplant
Queensland	Positive	2%	2%
	Negative	98%	98%
New South Wales/ACT	Positive	4%	4%
	Negative	96%	96%
Victoria	Positive	3%	3%
	Negative	97%	97%
Tasmania	Positive	0%	0%
	Negative	100%	100%
South Australia	Positive	5%	6%
	Negative	95%	94%
Northern Territory	Positive	4%	2%
	Negative	96%	98%
Western Australia	Positive	2%	4%
	Negative	98%	96%

PAEDIATRIC REPORT

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Introduction

With the advent of the new millenium it seems appropriate to focus this year's report on the relatively recent paediatric and adolescent experience. Thus this report looks predomiantly at the last decade (1 January 1990 to 31 December 1999) - the emphasis being on transplantation.

Incidence of End Stage Renal Failure (Disease): ESRD

Figure 220 shows the numbers of paediatric and adolescent patients presenting with ESRD from 1-Jan-90 to 31-Dec-99.

Children ≤2 years of age accounted for 20% of Australian children (<15 years of age) and 12.5% of New Zealand children presenting with ESRD over the decade.

Figure 221 shows the trends in mode of treatment over the past five years. In Australia, hospital based haemodialysis was consistently favoured for adolescents as did hospital based peritoneal dialysis for small children (0-4 years). Renal transplantation has accounted for 19-24% of first treatment choices for children in Australia.

Figure 220

Incidence of End Stage Renal Disease
1-Jan-1990 to 31-Dec-1999

Country	Year	Age Range in Years					
		00-02	03-04	05-09	10-14	Total	15-19
Australia	1990	3	1	6	8	**18**	25
	1991	6	2	4	8	**20**	18
	1992	5	2	5	13	**25**	29
	1993	3	1	3	12	**19**	21
	1994	0	4	10	14	**28**	19
	1995	10	2	9	11	**32**	15
	1996	8	4	11	7	**30**	14
	1997	2	5	6	13	**26**	21
	1998	7	2	5	11	**25**	20
	1999	7	0	5	9	**21**	17
	Total	**51**	**23**	**64**	**106**	**244**	**199**
New Zealand	1990	0	0	0	5	**5**	4
	1991	0	2	1	3	**6**	3
	1992	1	0	3	3	**7**	7
	1993	2	2	1	3	**8**	2
	1994	0	1	2	3	**6**	3
	1995	1	0	3	1	**5**	7
	1996	2	1	5	2	**10**	5
	1997	1	0	3	3	**7**	3
	1998	0	0	0	5	**5**	6
	1999	1	0	0	4	**5**	6
	Total	**8**	**6**	**18**	**32**	**64**	**46**

Figure 221

Mode of First Treatment Related to Age and Year of Entry
1-Jan-1995 to 31-Dec-1999

Country	Year	First Treatment	Age Range in Years				
			00-04	05-09	10-14	Total	15-19
Australia	1995	Hospital CAPD	1	2	2	**5**	3
		Hospital HD	0	2	4	**6**	10
		Hospital PD	10	4	1	**15**	1
		Transplant - No Dx	1	1	4	**6**	1
		Sub-Total	12	9	11	**32**	15
	1996	Hospital CAPD	2	1	1	**4**	1
		Hospital HD	1	4	1	**6**	8
		Hospital PD	9	4	1	**14**	2
		Satellite HD	0	0	0	**0**	1
		Transplant - No Dx	0	2	4	**6**	2
		Sub-Total	12	11	7	**30**	14
	1997	Hospital CAPD	0	0	1	**1**	2
		Hospital HD	0	1	3	**4**	14
		Hospital PD	4	5	6	**15**	0
		Satellite PD	0	0	1	**1**	0
		Transplant - No Dx	3	0	2	**5**	5
		Sub-Total	7	6	13	**26**	21
	1998	Hospital CAPD	1	0	0	**1**	1
		Hospital HD	0	2	2	**4**	12
		Hospital PD	8	3	4	**15**	5
		Transplant - No Dx	0	0	5	**5**	2
		Sub-Total	9	5	11	**25**	20
	1999	Hospital CAPD	0	2	1	**3**	1
		Hospital HD	2	0	2	**4**	12
		Hospital PD	3	2	4	**9**	3
		Transplant - No Dx	2	1	2	**5**	1
		Sub-Total	7	5	9	**21**	17
	Total		**47**	**36**	**51**	**134**	**87**
New Zealand	1995	Hospital CAPD	1	3	1	**5**	4
		Hospital HD	0	0	0	**0**	3
		Sub-Total	1	3	1	**5**	7
	1996	Hospital CAPD	1	1	1	**3**	1
		Hospital HD	0	0	0	**0**	4
		Hospital PD	2	1	0	**3**	0
		Transplant - No Dx	0	3	1	**4**	0
		Sub-Total	3	5	2	**10**	5
	1997	Hospital CAPD	0	0	1	**1**	3
		Hospital PD	1	2	0	**3**	0
		Transplant - No Dx	0	1	2	**3**	0
		Sub-Total	1	3	3	**7**	3
	1998	Hospital CAPD	0	0	3	**3**	2
		Hospital HD	0	0	1	**1**	3
		Hospital PD	0	0	1	**1**	0
		Transplant - No Dx	0	0	0	**0**	1
		Sub-Total	0	0	5	**5**	6
	1999	Hospital CAPD	0	0	1	**1**	2
		Hospital HD	0	0	0	**0**	3
		Hospital PD	1	0	2	**3**	1
		Transplant - No Dx	0	0	1	**1**	0
		Sub-Total	1	0	4	**5**	6
	Total		**6**	**11**	**15**	**32**	**27**

Figure 222 shows the mode of current treatment (31-Dec-99) by age, and Country (State). For children in Australia and New Zealand the ratio of transplanted children : children on dialysis varies from 1.7:1 (New Zealand) to 4.1:1 (Victoria/Tasmania) and the mean is 2.6:1. For adolescents the ratios vary from 1.1:1 (New Zealand) to 5.5:1 (South Australia and Western Australia) - the mean being 1.9:1.

Figure 222

Mode of Current Treatment Related to Age
Country and State 31-Dec-1999

Country	State	Current Treatment	Age Range in Years				
			00-04	05-09	10-14	Total	15-19
Australia	Queensland	Haemodialysis	0	0	0	**0**	6
		Peritoneal Dialysis	1	1	1	**3**	3
		Transplant	0	5	7	**12**	17
		Sub-Total	1	6	8	**15**	26
	New South Wales	Haemodialysis	1	1	3	**5**	12
		Peritoneal Dialysis	0	1	6	**7**	7
		Transplant	5	9	15	**29**	29
		Sub-Total	6	11	24	**41**	48
	Victoria	Haemodialysis	1	1	2	**4**	3
		Peritoneal Dialysis	3	1	1	**5**	4
		Transplant	5	13	16	**34**	19
		Sub-Total	9	15	19	**43**	26
	Tasmania	Transplant	0	1	2	**3**	2
		Sub-Total	0	1	2	**3**	2
	South Australia	Haemodialysis	1	0	0	**1**	2
		Peritoneal Dialysis	0	2	1	**3**	0
		Transplant	0	3	4	**7**	7
		Sub-Total	1	5	5	**11**	9
	Northern Territory	Transplant	0	0	1	**1**	4
		Sub-Total	0	0	1	**1**	4
	Western Australia	Haemodialysis	0	0	0	**0**	1
		Peritoneal Dialysis	2	2	1	**5**	1
		Transplant	2	7	3	**12**	11
		Sub-Total	4	9	4	**17**	13
	Total		**21**	**47**	**63**	**131**	**128**
New Zealand		Haemodialysis	0	0	4	**4**	7
		Peritoneal Dialysis	1	2	5	**8**	9
		Transplant	2	5	11	**18**	17
	Total		**3**	**7**	**20**	**30**	**33**

Causes of Death

Figure 223 shows a summary of deaths in children and adolescents between 1963 and 1982, and from 1982 to 1999. Figure 224 details the causes of death in children and adolescents over the past decade.

Figure 223

Cause of Paediatric Deaths 1963-1982 1983-1999

Time Period	Country	Cause of Death	Age Range in Years				
			00-04	05-09	10-14	Total	15-19
1963-1982	Australia	Cardiac	1	5	5	**11**	11
		Vascular	0	0	9	**9**	11
		Infection	4	0	5	**9**	12
		Social	0	0	2	**2**	1
		Miscellaneous	1	3	3	**7**	7
		Total	**6**	**8**	**24**	**38**	**42**
	New Zealand	Cardiac	0	0	1	**1**	5
		Vascular	0	0	0	**0**	3
		Infection	0	1	0	**1**	2
		Social	0	0	0	**0**	2
		Miscellaneous	0	1	0	**1**	2
		Total	**0**	**2**	**1**	**3**	**14**
1983-1999	Australia	Cardiac	1	3	3	**7**	13
		Vascular	0	1	3	**4**	4
		Infection	7	1	1	**9**	9
		Social	5	1	1	**7**	7
		Malignancy	1	1	1	**3**	0
		Miscellaneous	2	2	3	**7**	1
		Total	**16**	**9**	**12**	**37**	**34**
	New Zealand	Cardiac	2	1	1	**4**	9
		Vascular	0	0	0	**0**	1
		Infection	1	1	0	**2**	1
		Social	0	1	0	**1**	0
		Miscellaneous	0	0	0	**0**	1
		Total	**3**	**3**	**1**	**7**	**12**

Figure 224

Cause of Paediatric Deaths 1990-1999

Country	Cause of Death	Age Range in Years				
		00-04	05-15	10-14	Total	15-19
Australia	Myocardial Infarction	0	0	0	**0**	1
	Pulmonary Oedema	0	0	1	**1**	3
	Cardiac Arrest	0	2	1	**3**	2
	Other Causes Cardiac Failure	0	1	0	**1**	2
	Cerebrovascular Accident	0	0	1	**1**	1
	Other Haemorrhage	0	1	0	**1**	0
	Patient Refused Treatment	0	0	0	**0**	1
	Suicide	0	0	0	**0**	1
	Therapy Ceased	3	1	0	**4**	1
	Accidental	0	0	0	**0**	2
	Pancreatitis	0	1	1	**2**	0
	Malignancy	1	0	1	**2**	0
	Other Causes	1	0	0	**1**	1
	Immunodeficiency - Infection	1	0	0	**1**	0
	Chronic Respiratory Failure	0	1	0	**1**	0
	CNS - Fungal	0	0	0	**0**	2
	Lung - Other	0	0	0	**0**	1
	Urinary Tract - Bacterial	1	0	0	**1**	0
	Peritoneum - Bacterial	1	0	0	**1**	0
	Peritoneum - Other	0	0	0	**0**	1
	Septicaemia - Viral	0	0	1	**1**	2
	Septicaemia - Other	1	0	0	**1**	1
	Other Site - Bacterial	1	0	0	**1**	0
	Total	**10**	**7**	**6**	**23**	**22**
New Zealand	Myocardial Infarction	0	0	1	**1**	1
	Hyperkalaemia	1	0	0	**1**	0
	Hypertensive Cardiac Failure	0	0	0	**0**	1
	Cardiac Arrest	0	1	0	**1**	1
	Other Causes Cardiac Failure	0	0	0	**0**	2
	Cachexia	0	0	0	**0**	1
	Peritoneum - Bacterial	1	0	0	**1**	0
	Peritoneum - Fungal	0	1	0	**1**	0
	Other Site - Fungal	0	0	0	**0**	1
	Total	**2**	**2**	**1**	**5**	**7**

The causes of death over the last decade are further analysed in relation to mode of therapy in Figure 225.

Figure 225

Cause of Paediatric Dialysis and Transplant Deaths 1990-1999

Country	Mode of Treatment	Cause of Death	Age Range in Years				
			00-04	05-09	10-14	Total	15-19
Australia	Haemodialysis	Myocardial Infarction	0	0	0	**0**	1
		Pulmonary Oedema	0	0	0	**0**	2
		Cardiac Arrest	0	0	1	**1**	1
		Other Causes Cardiac Failure	0	0	0	**0**	1
		Cerebrovascular Accident	0	0	1	**1**	1
		Patient Refused Treatment	0	0	0	**0**	1
		Suicide	0	0	0	**0**	1
		Therapy Ceased	0	0	0	**0**	1
		Pancreatitis	0	0	1	**1**	0
		Immunodeficiency - Infection	1	0	0	**1**	0
		Septicaemia - Viral	0	0	0	**0**	1
		Sub-Total	1	0	3	**4**	10
	Peritoneal Dialysis	Pulmonary Oedema	0	0	0	**0**	1
		Cardiac Arrest	0	1	0	**1**	1
		Other Causes Cardiac Failure	0	0	0	**0**	1
		Other Haemorrhage	0	1	0	**1**	0
		Therapy Ceased	2	1	0	**3**	0
		Pancreatitis	0	1	0	**1**	0
		Other Causes	1	0	0	**1**	1
		Chronic Respiratory Failure	0	1	0	**1**	0
		Lung - Other	0	0	0	**0**	1
		Urinary Tract - Bacterial	1	0	0	**1**	0
		Peritoneium - Bacterial	1	0	0	**1**	0
		Peritoneum - Other	0	0	0	**0**	1
		Septicaemia - Other	1	0	0	**1**	0
		Other Site - Bacterial	1	0	0	**1**	0
		Sub-Total	7	5	0	**12**	6
	Transplant	Pulmonary Oedema	0	0	1	**1**	0
		Cardiac Arrest	0	1	0	**1**	0
		Other Causes Cardiac Failure	0	1	0	**1**	0
		Therapy Ceased	1	0	0	**1**	0
		Accidental	0	0	0	**0**	2
		Malignancy	1	0	1	**2**	0
		CNS - Fungal	0	0	0	**0**	2
		Septicaemia - Viral	0	0	1	**1**	1
		Septicaemia - Other	0	0	0	**0**	1
		Sub-Total	2	2	3	**7**	6
	Total		**10**	**7**	**6**	**23**	**22**
New Zealand	Haemodialysis	Myocardial Infarction	0	0	0	**0**	1
		Cardiac Arrest	0	1	0	**1**	1
		Other Causes Cardiac Failure	0	0	0	**0**	1
		Other Site - Fungal	0	0	0	**0**	1
		Sub-Total	0	1	0	**1**	4
	Peritoneal Dialysis	Myocardial Infarction	0	0	1	**1**	0
		Hyperkalaemia	1	0	0	**1**	0
		Hypertensive Cardiac Failure	0	0	0	**0**	1
		Other Causes Cardiac Failure	0	0	0	**0**	1
		Cachexia	0	0	0	**0**	1
		Peritoneum - Bacterial	1	0	0	**1**	0
		Peritoneum - Fungal	0	1	0	**1**	0
		Sub-Total	2	1	1	**4**	3
	Total		**2**	**2**	**1**	**5**	**7**

Of note are the number of deaths related to "Therapy Ceased" and the overall number of deaths especially sepsis or infection related deaths in patients on peritoneal based therapy.

PATIENT AND GRAFT SURVIVAL

Figure 226 and 227 show patient and graft survival data over the last decade for paediatric and adolescent patients receiving cadaver and live donor transplants.

Figure 226 **Australia**

Primary and Subsequent Grafts
Patient and Graft Survival 1990 -1999

Graft	Age Range	Survival in Years					
		0	1	3	5	7	10
Patient Survival							
CD1	0-2	100 + 0 (6)	100 + 0 (6)	100 + 0 (6)	77 + 20 (3)	77 + 20 (1)	
	3-4	100 + 0 (9)	100 + 0 (9)	100 + 0 (8)	100 + 0 (5)	100 + 0 (5)	100 + 0 (2)
	0-4	100 + 0 (15)	100 + 0 (15)	100 + 0 (14)	90 + 9 (8)	90 + 9 (6)	90 + 9 (2)
	5-9	100 + 0 (22)	95 + 4 (21)	95 + 4 (15)	95 + 4 (8)	95 + 4 (3)	95 + 4 (1)
	10-14	100 + 0 (28)	96 + 4 (27)	96 + 4 (22)	96 + 4 (17)	96 + 4 (10)	96 + 4 (2)
	0-14	100 + 0 (65)	97 + 2 (63)	97 + 2 (51)	94 + 3 (33)	94 + 3 (19)	94 + 3 (5)
	15-19	100 + 0 (69)	97 + 2 (67)	94 + 3 (54)	94 + 3 (45)	89 + 5 (28)	85 + 6 (2)
LRD1	0-2	100 + 0 (16)	81 + 10 (13)	81 + 10 (8)	81 + 10 (5)	81 + 10 (4)	
	3-4	100 + 0 (17)	100 + 0 (17)	100 + 0 (9)	100 + 0 (6)	100 + 0 (2)	
	0-4	100 + 0 (33)	91 + 5 (30)	91 + 5 (17)	91 + 5 (11)	91 + 5 (6)	
	5-9	100 + 0 (24)	100 + 0 (24)	100 + 0 (20)	100 + 0 (13)	100 + 0 (10)	100 + 0 (2)
	10-14	100 + 0 (51)	100 + 0 (51)	98 + 2 (42)	98 + 2 (27)	98 + 2 (19)	
	0-14	100 + 0 (108)	97 + 2 (105)	96 + 2 (79)	96 + 2 (51)	96 + 2 (35)	96 + 2 (2)
	15-19	100 + 0 (61)	95 + 3 (58)	92 + 4 (44)	92 + 4 (34)	92 + 4 (21)	92 + 4 (1)
2nd and Subsequent Grafts CD or LRD	0-2						
	3-4	100 + 0 (2)	100 + 0 (2)	100 + 0 (1)	100 + 0 (1)	100 + 0 (1)	
	0-4	100 + 0 (2)	100 + 0 (2)	100 + 0 (1)	100 + 0 (1)	100 + 0 (1)	
	5-9	100 + 0 (6)	100 + 0 (6)	100 + 0 (3)	100 + 0 (1)	100 + 0 (1)	
	10-14	100 + 0 (12)	100 + 0 (12)	100 + 0 (10)	89 + 10 (7)	89 + 10 (5)	
	0-14	100 + 0 (20)	100 + 0 (20)	100 + 0 (14)	92 + 7 (9)	92 + 7 (7)	
	15-19	100 + 0 (22)	91 + 6 (20)	86 + 7 (17)	81 + 9 (12)	81 + 9 (9)	81 + 9 (1)
Graft Survival							
CD1	0-2	100 + 0 (6)	100 + 0 (6)	100 + 0 (6)	78 + 20 (3)	78 + 20 (1)	
	3-4	100 + 0 (9)	89 + 10 (8)	89 + 10 (7)	71 + 18 (3)	71 + 18 (3)	
	0-4	100 + 0 (15)	93 + 6 (14)	93 + 6 (13)	74 + 13 (6)	74 + 13 (4)	
	5-9	100 + 0 (22)	77 + 9 (17)	77 + 9 (12)	77 + 9 (7)	77 + 9 (3)	77 + 9 (1)
	10-14	100 + 0 (28)	89 + 6 (25)	78 + 8 (18)	74 + 9 (13)	74 + 9 (7)	57 + 16 (1)
	0-14	100 + 0 (65)	86 + 4 (56)	81 + 5 (43)	74 + 6 (26)	74 + 6 (14)	54 + 13 (2)
	15-19	100 + 0 (69)	87 + 4 (60)	66 + 6 (37)	59 + 6 (27)	41 + 7 (13)	
LRD1	0-2	100 + 0 (16)	69 + 12 (11)	69 + 12 (7)	69 + 12 (5)	69 + 12 (4)	
	3-4	100 + 0 (17)	94 + 6 (16)	94 + 6 (8)	94 + 6 (5)	94 + 6 (2)	
	0-4	100 + 0 (33)	82 + 7 (27)	82 + 7 (15)	82 + 7 (10)	82 + 7 (6)	
	5-9	100 + 0 (24)	96 + 4 (23)	96 + 4 (19)	89 + 8 (12)	79 + 12 (8)	79 + 12 (2)
	10-14	100 + 0 (51)	88 + 5 (45)	88 + 5 (37)	85 + 5 (23)	76 + 8 (14)	
	0-14	100 + 0 (108)	88 + 3 (95)	88 + 3 (71)	85 + 4 (45)	77 + 5 (28)	77 + 5 (2)
	15-19	100 + 0 (61)	90 + 4 (55)	87 + 4 (41)	85 + 5 (30)	75 + 7 (17)	
2nd and Subsequent Grafts CD or LRD	0-2	100 + 0					
	3-4	100 + 0 (2)	50 + 35 (1)	50 + 35 (1)	50 + 35 (1)	50 + 35 (1)	
	0-4	100 + 0 (2)	50 + 35 (1)	50 + 35 (1)	50 + 35 (1)	50 + 35 (1)	
	5-9	100 + 0 (6)	100 + 0 (6)	100 + 0 (3)	100 + 0 (1)	100 + 0 (1)	
	10-14	100 + 0 (12)	92 + 8 (11)	74 + 13 (8)	64 + 15 (5)	64 + 15 (3)	
	0-14	100 + 0 (20)	90 + 7 (18)	79 + 9 (12)	72 + 11 (7)	72 + 11 (5)	
	15-19	100 + 0 (22)	77 + 9 (17)	68 + 10 (13)	39 + 11 (5)	39 + 11 (2)	

% Survival + S.E. / Number at Risk

Figure 227 **New Zealand**

Primary and Subsequent Grafts
Patient and Graft Survival 1990 -1999

Graft	Age Range	Survival in Years											
		0		1		3		5		7		10	
Patient Survival													
CD1	0-2	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)		
	3-4	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)				
	0-4	100 + 0	(2)	100 + 0	(2)	100 + 0	(2)	100 + 0	(2)	100 + 0	(1)		
	5-9	100 + 0	(3)	100 + 0	(3)	100 + 0	(2)	100 + 0	(1)	100 + 0	(1)		
	10-14	100 + 0	(5)	100 + 0	(5)	100 + 0	(5)	100 + 0	(2)				
	0-14	100 + 0	(10)	100 + 0	(10)	100 + 0	(9)	100 + 0	(5)	100 + 0	(2)		
	15-19	100 + 0	(11)	91 + 9	(10)	71 + 14	(7)	71 + 14	(6)	47 + 17	(4)		
LRD1	0-2	100 + 0	(2)	100 + 0	(2)	100 + 0	(1)						
	3-4	100 + 0	(3)	100 + 0	(3)	100 + 0	(2)	100 + 0	(2)				
	0-4	100 + 0	(5)	100 + 0	(5)	100 + 0	(3)	100 + 0	(2)				
	5-9	100 + 0	(11)	100 + 0	(11)	100 + 0	(10)	100 + 0	(4)	100 + 0	(2)		
	10-14	100 + 0	(22)	100 + 0	(22)	100 + 0	(18)	100 + 0	(14)	100 + 0	(8)	100 + 0	(1)
	0-14	100 + 0	(38)	100 + 0	(38)	100 + 0	(31)	100 + 0	(20)	100 + 0	(10)	100 + 0	(1)
	15-19	100 + 0	(6)	100 + 0	(6)	100 + 0	(5)	80 + 18	(4)	80 + 18	(1)		
2nd and Subsequent Grafts CD or LRD	0-2												
	3-4												
	0-4												
	5-9	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)				
	10-14	100 + 0	(2)	100 + 0	(2)	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)		
	0-14	100 + 0	(3)	100 + 0	(3)	100 + 0	(2)	100 + 0	(2)	100 + 0	(1)		
	15-19	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)		
Graft Survival													
CD1	0-2	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)		
	3-4	100 + 0	(1)	100 + 0	(1)								
	0-4	100 + 0	(2)	100 + 0	(2)	50 + 35	(1)	50 + 35	(1)	50 + 35	(1)		
	5-9	100 + 0	(3)	100 + 0	(3)	100 + 0	(2)						
	10-14	100 + 0	(5)	80 + 18	(4)	80 + 18	(4)	80 + 18	(1)				
	0-14	100 + 0	(10)	90 + 9	(9)	79 + 13	(7)	66 + 16	(2)	66 + 16	(1)		
	15-19	100 + 0	(11)	73 + 13	(8)	44 + 15	(4)	33 + 15	(3)	33 + 15	(3)		
LRD1	0-2	100 + 0	(2)	100 + 0	(2)	100 + 0	(1)						
	3-4	100 + 0	(3)	67 + 27	(2)	67 + 27	(2)	67 + 27	(2)				
	0-4	100 + 0	(5)	80 + 18	(4)	80 + 18	(3)	80 + 18	(2)				
	5-9	100 + 0	(11)	100 + 0	(11)	80 + 13	(8)	80 + 13	(3)	80 + 13	(1)		
	10-14	100 + 0	(22)	95 + 4	(21)	90 + 7	(16)	84 + 9	(12)	74 + 12	(6)		
	0-14	100 + 0	(38)	95 + 4	(36)	86 + 6	(27)	82 + 7	(17)	75 + 9	(7)		
	15-19	100 + 0	(6)	100 + 0	(6)	82 + 16	(4)	61 + 22	(3)	61 + 22	(1)		
2nd and Subsequent Grafts CD or LRD	0-2	100 + 0											
	3-4	100 + 0											
	0-4	100 + 0											
	5-9	100 + 0	(1)	100 + 0	(1)								
	10-14	100 + 0	(2)	50 + 35	(1)								
	0-14	100 + 0	(3)	67 + 27	(2)								
	15-19	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)	100 + 0	(1)		

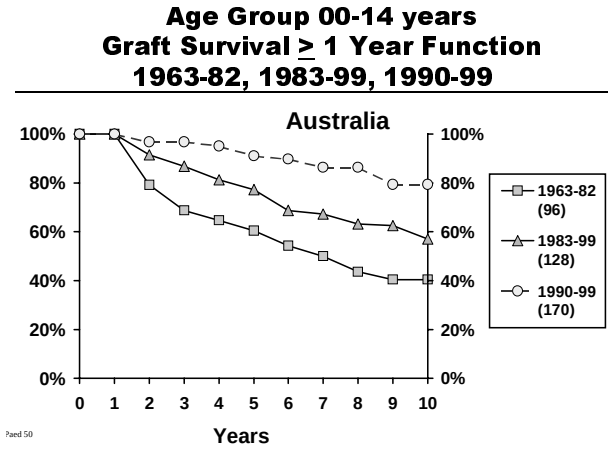
% Survival + S.E. / Number at Risk

Grafts Surviving One Year - Analysis by Era

Figure 228 and 229 show graft survival data for paediatric patients and adolescent patients in Australia and New Zealand.

The data relates only to grafts which have survived one year thus eliminating early graft losses from the analysis. Whilst the data in New Zealand is equivocal, the Australian data for patients <15 years shows not only progressive improvement in graft survival at ten years in the most recent era, the combined rate of graft attrition over time is less - a factor clearly not observed in the adolescents.

Figure 228



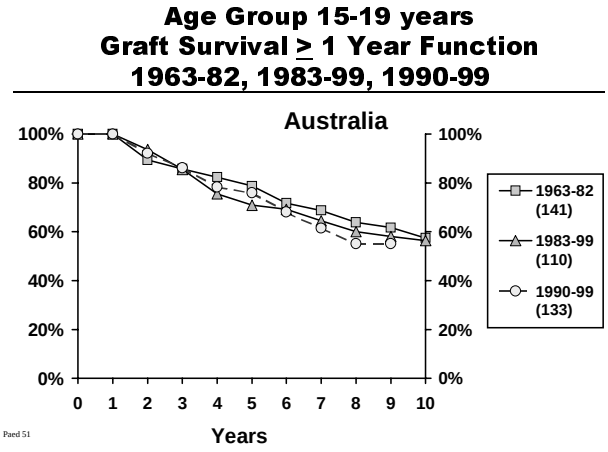
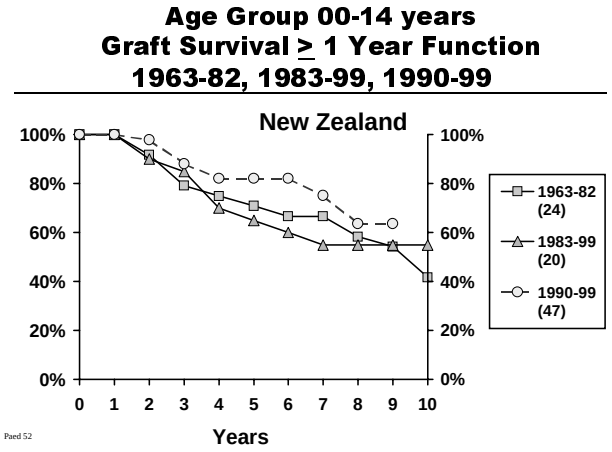
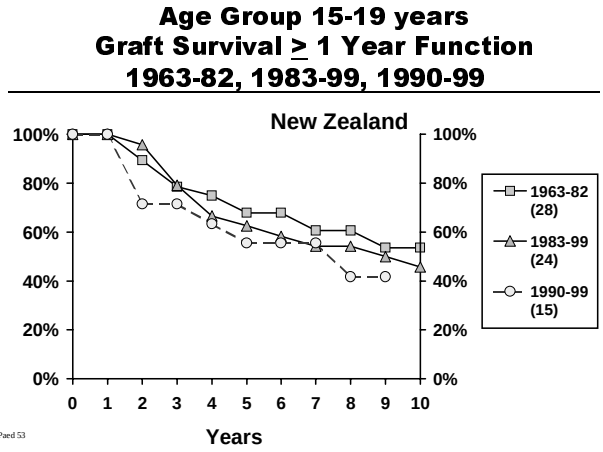


Figure 229



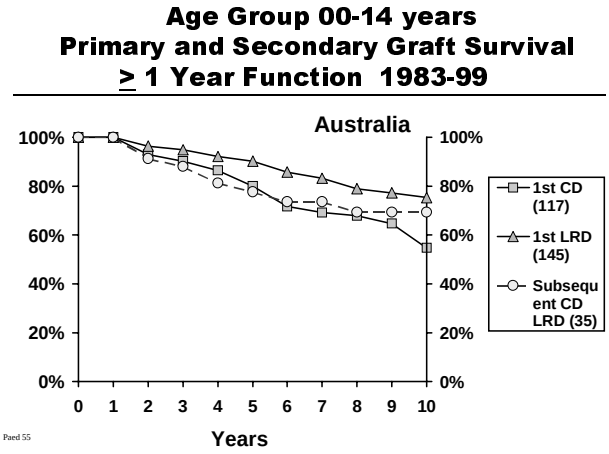


Analysis by Donor Source

Figure 230 and 231, show similar data (era 1983-1999) analysed by donor source. Again differences between children (0-14 years) and adolescents (15-19 years) are observed.

Perhaps the most striking observations are the persisting poor outcomes in adolescents for both cadaveric and second and subsequent grafts.

Figure 230



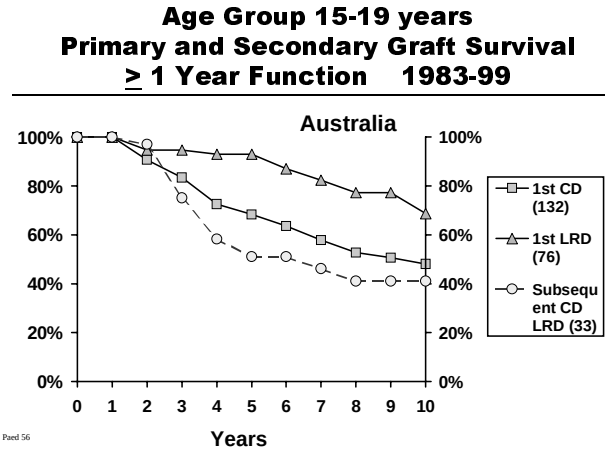
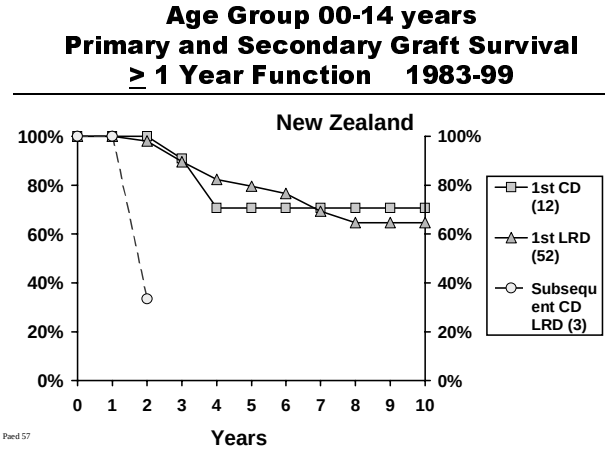
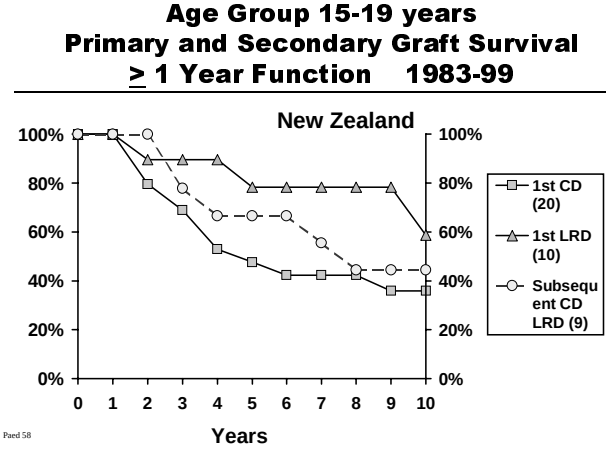


Figure 231

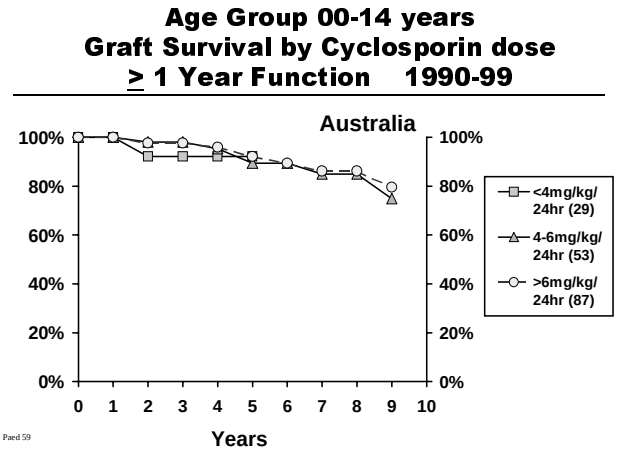




Analysis by Cyclosporin Dose

For grafts surviving ≥ one year, Figure 232 and 233, show Australian and New Zealand data analysed by Cyclosporin doses. The data is difficult to interpret given the patient numbers but certainly the Australian paediatric data shows no discernible effect of dose over time (no account has been taken in this analysis of the dose of Cyclosporin Sparing agents such as Diltiazem). Up until 1999, most patients were monitored using trough Cyclosporin blood levels.

Figure 232



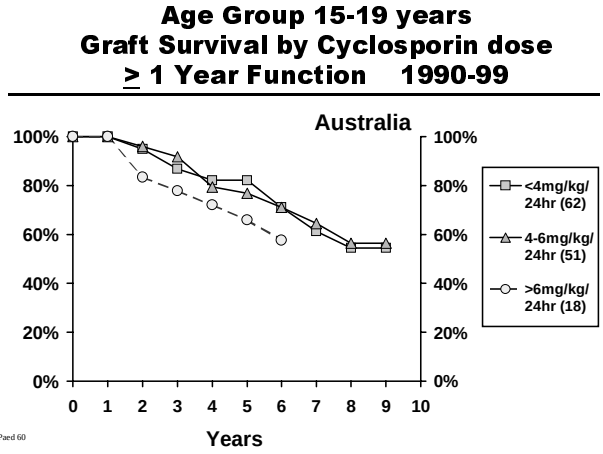
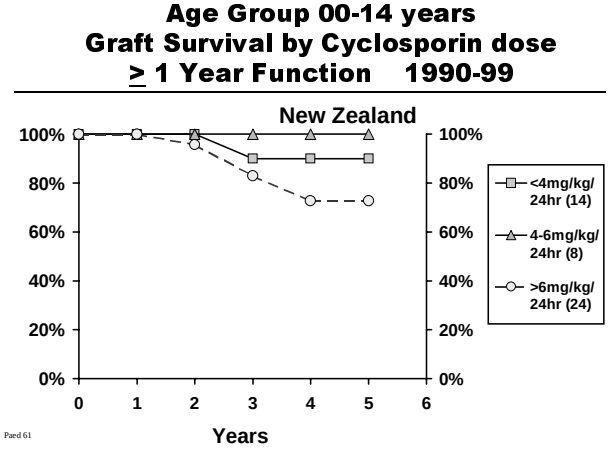


Figure 233



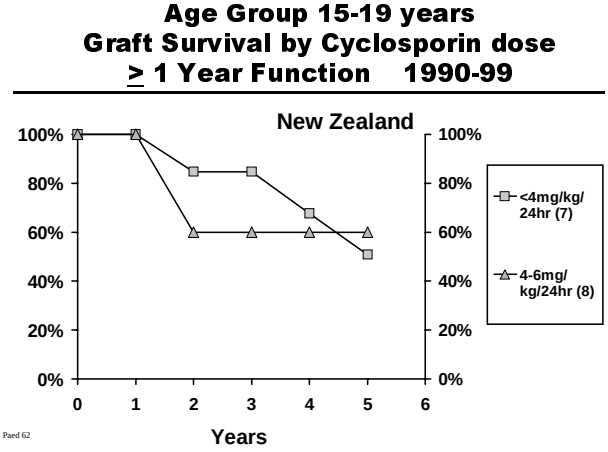


Figure 234

Trends in Primary Immunosuppression for All Grafts 1990-1999
Number of Patients *

Country	Age Group	Immunosuppression	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Australia	<15 years	Azathioprine	19	17	22	16	14	26	27	17	7	5
		Prednisolone	20	18	21	16	14	24	27	21	20	20
		Cyclosporin A	18	18	21	16	14	25	29	22	19	20
		Mycophenolate/Mofetil	0	0	0	0	0	0	1	5	13	15
		Tacrolimus	0	0	0	0	0	0	0	1	0	1
		Other	0	0	0	0	0	0	0	0	0	0
		Cytolytics	7	0	0	3	0	2	6	3	9	5
	15-19 years	Azathioprine	17	25	19	15	17	13	11	10	1	1
		Prednisolone	18	22	18	16	17	11	10	14	10	10
		Cyclosporin A	15	26	21	16	16	12	10	15	12	9
		Mycophenolate/Mofetil	0	0	0	0	0	0	0	6	10	9
		Tacrolimus	0	0	0	0	0	1	0	0	0	1
		Other	0	0	0	1	0	0	0	1	1	0
		Cytolytics	5	2	3	0	0	2	1	2	0	2
New Zealand	<15 years	Azathioprine	4	4	2	9	6	6	8	5	1	0
		Prednisolone	4	4	3	9	6	6	8	5	4	3
		Cyclosporin A	4	4	3	9	6	6	8	5	4	3
		Mycophenolate/Mofetil	0	0	0	0	0	0	0	0	3	3
		Tacrolimus	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Cytolytics	2	0	0	1	0	0	0	0	0	0
	15-19 years	Azathioprine	4	3	3	1	4	0	1	0	1	0
		Prednisolone	4	3	3	1	4	0	1	0	2	0
		Cyclosporin A	3	3	3	1	4	0	1	0	2	0
		Mycophenolate/Mofetil	0	0	0	0	0	0	0	0	1	0
		Tacrolimus	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Cytolytics	0	0	1	0	0	0	0	0	0	0

* Any one patient could have had one or more immunosuppressant as part of primary immunosuppression.

1999 Data not included as it is incomplete.

Number of patients having OKT3, ATGAM, etc., as **prophylaxis** only, in the first month.

The most notable change in the last four to five years has clearly been the increasing acceptance of Mycophenolate/Mofetil (MMF) as a major antiproliferative agent and Tacrolimus (Tacr) as an alternative calcineurin antagonist to Cyclosporin A (CyA). No information is available on the reasons for choosing any particular immunosuppressant agent. There has been continued use of cytolytics (OKT3, ATGAM, etc) even as prophylaxis into the late 1990's - part of the explanation may relate to its use in second and subsequent grafts and/or in primary non-function. There is not sufficient data yet from 1998 and 1999 to show the use of anti-CD25 agents.

CANCER IN PAEDIATRIC AND ADOLESCENT GRAFT RECIPIENTS

Figures 235 to 237, show the incidence of cancer in adolescent and paediatric renal transplant recipients compared to adult recipients. In each instance (skin cancer and non skin cancer) the incidence over 20 years approximately doubles in adolescents compared to children and quadruples in adults compared to children.

Figure 235

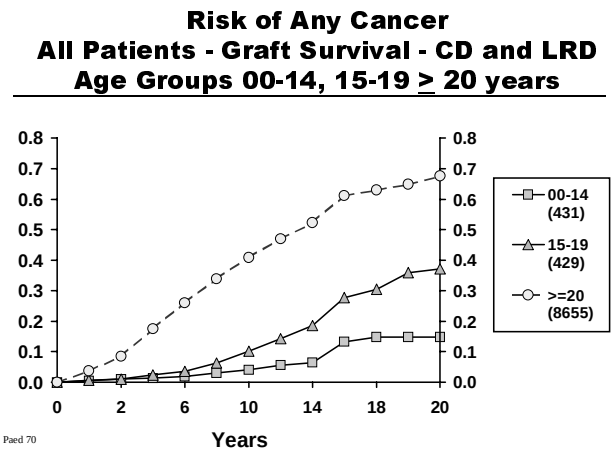


Figure 236

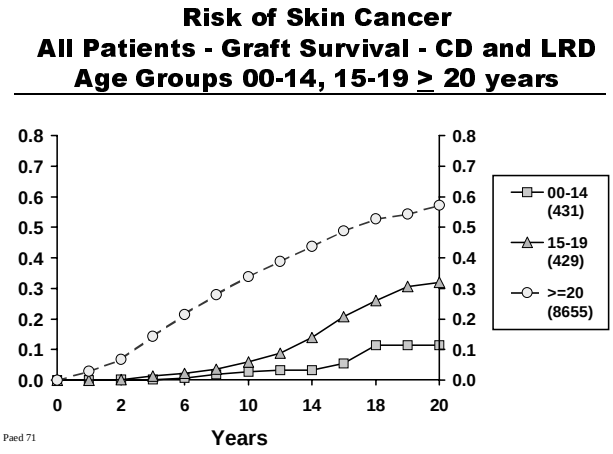


Figure 237

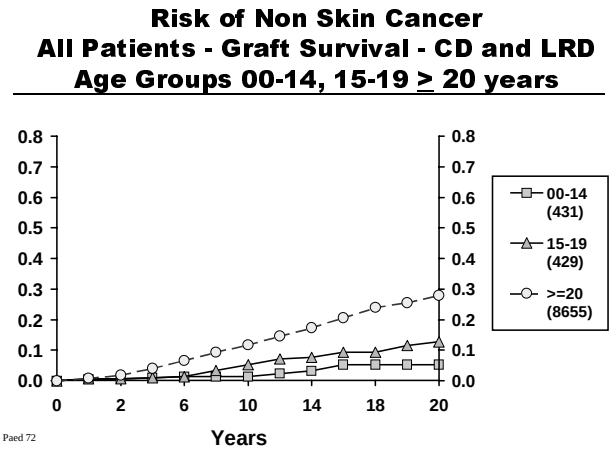


Figure 238 shows the accumulated experience of paediatric patients developing skin cancer.

For skin cancers (either BCC's or SCC's) the median interval between transplantation and diagnosis of the first skin cancer lesion is approximately 15 years.

Figure 238

Skin Cancer in Paediatric Patients

Type of Skin Cancer	Number of Cases	Age at First Treatment	Age at Transplant	Age at Diagnosis
		Median Range		
Squamous Cell Carcinoma (SCC)	22	12.6 (7.8-14.8)	13.3 (8.2-16.7)	28.3 (18.4-45.0)
Basal Cell Carcinoma (BCC)	12	12.1 (9.1-14.7)	13.3 (9.8-15.1)	27.8 (14.7-41.3)
Merkle Cell	1	14.8	15.2	29.5
Total	**35**	**12.5 (7.8-14.8)**	**13.3 (8.2-16.7)**	**28.4 (14.7-45.0)**

Figure 239 shows all non-skin cancers occurring in children with ESRF. The high incidence of cancer of the kidney in very young children most proably represents Wilm's Tumour.

Figure 239

Non Skin Cancers in Children with End Stage Renal Failure

	Number of Cases	Sites	Age at First Treatment	Age at Transplant	At at Diagnosis
Squamous Cell Ca. (SCC)	3	Cervix (2), Mouth	4.9, 11.1, 12.4	14.4, 11.6, 15.1	29.8, 24.9, 23.9
Adenocarcinoma	2	Tx Kidney, Thyroid	13.9, 13.8	15.1, 14.8	40.7, 23.2
Lymphoma	4	Mediastinum, Bowel (2), Neck	11.2, 7.8, 7.9, 13.5	12.1, 7.9, 8.5, 14.2	28.3 (18.4-45.0)
Leukaemia	1	Haemopoietic	14.9	14.9	19.8
Kaposi Sarcoma	1	Lymph Nodes	10.3	10.4	11.1
Lymphoproliferative	3	Tx Kidney, Lymph Nodes (2)	11.6, 1.0, 2.1	12.7, 1.6, 2.4	13.9, 2.4, 2.5
Melanoma	1	Back	11.9	13.7	24.3
Other	6	Thyroid, Kidney (5)	10.5,6.3,5.6,2.2,4.9,0.6	12.5, -,6.0, -,7.3,1.7	33.4,3.5,0.3,0.9,4.5,2.2
Unknown	1	Unknown Primary	13.7	14.1	24.1
Total	**22**				

Concluding Remarks

The 1990's is notable in paediatric renal transplantation for improved graft outcomes, and the simultaneous introduction of a range of immunosuppressants increasing the available options to achieve these outcomes. As we progress through 2000 and beyond, Clinicians involved in the care of children and adolescents will need to be mindful of a number of issues - the list is by no means exhaustive, nor necessarily addressed in the current report.

* Improving the outlook for adolescents.

* Examining the factors explaining the continual attrition rate of grafts over time (chronic renal allograft dysfunction).

* Learning more from our adult institution Colleagues about those other factors influencing short and long term graft outcome and patient outcome - e.g. cardiovascular risk factors.

* Tailoring our immunosuppression in individual children to minimize toxicity (infection and cancer) but at the same time providing adequate immunosuppression for the best possible long term outcome.

* Addressing the factors inhibiting normal growth and development.

* Improving the quality of the questions we ask when we collect Registry data.

Registries are important to clinicians and patients but will not replace intervention studies in the form of randomised control trials in answering key questions such as those above.