

CHAPTER 3

DEATHS

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INTRODUCTION

AUSTRALIA

DIALYSIS DEPENDENT

The total number of deaths was 1,322 (14.8 deaths per 100 patient years at risk) in 2006 among dialysis dependent patients.

For those treated with peritoneal dialysis, 288 deaths occurred (14.9 deaths per 100 patient years at risk) and for haemodialysis there were 1034 deaths (14.8 deaths per 100 patient years at risk) (Figure 3.5).

The death rate for each State/Territory per 100 patient years at risk is shown in Figures 3.1 and 3.2. These figures are crude (not adjusted for age or comorbidity). It can be seen death rates have been constant for several years. It should be noted that direct comparisons between haemodialysis and peritoneal dialysis are subject to considerable confounding by the difference in comorbidity distribution.

FUNCTIONING TRANSPLANT

There were 137 deaths (2.0 deaths per 100 patient years at risk) of patients with a functioning transplant.

The deceased donor recipient death rate was 113 deaths (2.5 per 100 patient years) and the live donor recipient death rate 24 deaths (1.1 per 100 patient years).

Figure 3.3 shows the age specific mortality rates for patients treated with dialysis or transplantation relative to the Australian population rates for 2006.

The death rate in relation to age is shown in Figure 3.6.

NEW ZEALAND

DIALYSIS DEPENDENT

There were 330 deaths (17.2 deaths per 100 patient years at risk) in 2006.

For those treated with peritoneal dialysis, 152 deaths occurred (20.8 deaths per 100 patient years at risk) and for haemodialysis there were 152 deaths (15.0 deaths per 100 patient years at risk) shown in Figure 3.7.

FUNCTIONING TRANSPLANT

There were 31 deaths (2.5 deaths per 100 patient years at risk) in 2006.

The mortality rate for recipients of deceased donor kidneys was 27 deaths (3.3 per 100 patient years) and live donor recipients 4 deaths (0.9 per 100 patient years) shown in Figure 3.8.

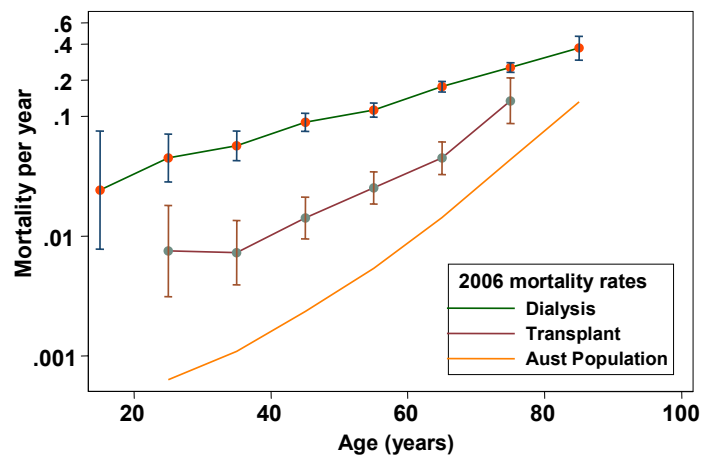
See Appendix III at the Website (www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm)

Figure 3.1

| Death Rates by States 1997 - 2006 All Dialysis Patients (per 100 patient years) | | | | | | | | | | |
|--|------|------|------|------|------|------|------|------|-------------|-------------|
| Year | QLD | NSW | ACT | VIC | TAS | SA | NT | WA | Aust | NZ |
| 1997 | 16.5 | 16.7 | 12.2 | 12.5 | 15.3 | 20.5 | 18.4 | 17.1 | 15.8 | 15.9 |
| 1998 | 19.3 | 16.9 | 15.3 | 15.8 | 25.9 | 15.7 | 15.8 | 13.6 | 16.7 | 16.6 |
| 1999 | 20.7 | 16.0 | 14.7 | 14.1 | 23.9 | 15.2 | 17.6 | 17.3 | 16.5 | 16.4 |
| 2000 | 16.9 | 16.5 | 13.5 | 14.0 | 14.7 | 14.3 | 20.0 | 16.3 | 15.7 | 19.2 |
| 2001 | 18.6 | 15.3 | 14.2 | 14.3 | 23.4 | 14.3 | 15.0 | 21.9 | 16.2 | 18.6 |
| 2002 | 17.4 | 15.1 | 11.4 | 13.6 | 12.0 | 12.3 | 14.8 | 16.6 | 14.9 | 15.2 |
| 2003 | 17.0 | 14.0 | 9.0 | 14.9 | 20.7 | 14.1 | 15.1 | 15.9 | 15.0 | 15.8 |
| 2004 | 16.3 | 16.1 | 11.6 | 15.0 | 18.1 | 16.2 | 15.2 | 12.4 | 15.4 | 17.3 |
| 2005 | 14.8 | 14.4 | 12.2 | 13.6 | 16.4 | 13.7 | 13.9 | 17.4 | 14.5 | 16.4 |
| 2006 | 18.1 | 13.6 | 11.6 | 13.3 | 14.2 | 14.1 | 16.0 | 17.4 | 14.8 | 17.2 |

Figure 3.2

| Death Rates by States Dialysis Modality and Age Groups 2006 (per 100 patient years) | | | | | | | | | | | |
|--|-----------------|------|------|------|------|------|------|------|------|-------------|-------------|
| Age Group | Treatment | QLD | NSW | ACT | VIC | TAS | SA | NT | WA | Aust | NZ |
| 45-64 years | All Dx Patients | 12.8 | 8.8 | 10.0 | 10.2 | 1.6 | 9.1 | 14.9 | 10.2 | 10.3 | 15.4 |
| | PD | 10.4 | 8.2 | - | 10.4 | - | 7.5 | 10.8 | 7.6 | 8.8 | 19.4 |
| | HD | 13.6 | 8.9 | 12.5 | 10.2 | 1.9 | 9.5 | 15.3 | 11.1 | 10.7 | 13.2 |
| 65-84 years | All Dx Patients | 25.3 | 19.6 | 17.0 | 17.5 | 29.7 | 18.4 | 30.1 | 26.5 | 20.8 | 24.2 |
| | PD | 24.4 | 22.3 | 8.8 | 21.2 | 41.8 | 20.2 | - | 22.9 | 22.2 | 25.0 |
| | HD | 25.6 | 18.6 | 19.9 | 16.8 | 27.4 | 18.0 | 31.5 | 27.6 | 20.4 | 23.5 |

Figure 3.3
Age Specific Mortality Rates for Patients Treated with Dialysis or Transplantation Relative to the Australian Population 2006


Aust 2006 population rates from ABS

CAUSE OF DEATHS

AUSTRALIA

DIALYSIS DEPENDENT

Cardiac events (35%) were the most common cause of death reported, followed by “social causes” (34%), miscellaneous (12%), infection (10%) and vascular (9%). Myocardial infarction (18%) and “cardiac arrest” (14%) formed the majority of the cardiac group. Of the “social” causes, most were withdrawal related to various comorbidities, particularly malignancy and cardiovascular disease.

The site of infection was most commonly reported as lung, followed by “septicaemia”, peritoneum, other sites and wound infection.

The details of the site and identity of the organisms can be found at the Website (www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm).

Withdrawal from treatment was reported as the cause for 33% of deaths, mostly in the older age groups. Twenty seven percent were diabetics. There were five patients \leq 30 years of age and 120 patients were \geq 80 years of age; the oldest was 94 years.

There were 86 patients (7%) who died from malignancy compared to 82 patients in 2005. A further 65 patients (5%) withdrew from dialysis due to malignancy.

FUNCTIONING TRANSPLANT

Amongst those with a functioning transplant, malignancy was the most common cause of death (32%), followed by cardiac (30%), then infection (15%), vascular (13%) and “social causes” (5%).

DEATHS OF YOUNG ADULTS

15-24 YEARS OF AGE

There were four deaths in the age group 15-24 years; three males and one female; three haemodialysis dependent and one with a functioning transplant. The three haemodialysis deaths were due to cardiac arrest, a motor vehicle accident and withdrawal from dialysis due to cerebrovascular disease, while the functioning transplant patient died from varicella septicaemia.

25-34 YEARS OF AGE

There were 23 deaths in this age group; ten males and thirteen females. Five died with a functioning transplant, eleven were treated with haemodialysis (eight hospital and three satellite) and seven with automated peritoneal dialysis (two hospital and five home). Five of the dialysis patients had previous failed transplants.

Causes of death were: cardiac, eight (including three home and one hospital APD, two satellite and one hospital haemodialysis and one functioning transplant); withdrawal from dialysis, seven (four hospital and one satellite haemodialysis, one hospital, one home APD);

25-34 YEARS OF AGE (Continued)

infection, five (three functioning transplants and two hospital haemodialysis); vascular, one (home APD), hepatic failure, one (hospital haemodialysis) and malignancy, one (functioning transplant).

There were six were Type 1 and two Type 2 diabetics.

NEW ZEALAND

DIALYSIS DEPENDENT

Cardiac events comprised the most common cause of death (39%). Other causes were “social” (27%), infection (15%), miscellaneous (10%) and vascular (9%).

Treatment withdrawal was reported in 89 patients (27%). Thirty seven percent were diabetics. There were three patients under 35 years of age and 17 patients \geq 80 years of age; the oldest was 90 years.

There were 21 patients (6%) who died from malignancy compared to 15 patients (5%) in 2005. A further 18 patients (5%) withdrew from dialysis in 2006 due to malignancy.

FUNCTIONING TRANSPLANT

Amongst the 31 deaths of patients with a functioning transplant, the causes were malignancy (48%), cardiac (32%), infection (13%) and “social causes” (3%). There were no vascular transplant deaths in 2006.

DEATHS OF YOUNG ADULTS

15-24 YEARS OF AGE

Two patients between 15-24 years of age died: one male and one female: one Caucasoid and one Pacific Person. One was having hospital haemodialysis and withdrew from treatment and one having home CAPD had a cardiac arrest.

25-34 YEARS OF AGE

Ten patients between 25-34 years of age died: four males and six females. Five were Caucasoid, three Maori and two Pacific People.

Three were from cardiac causes (one hospital and two home haemodialysis), two were vascular events (both hospital haemodialysis), three from other causes (one hospital haemodialysis and two home CAPD) and two withdrew from dialysis (both having home CAPD), due to malignancy and psychosocial causes.

One dialysis patient had previously been transplanted. Three were Type 1 and two Type 2 diabetics. One had a multiple myeloma.

| Figure 3.4 | | | | | | |
|---|------------------------------------|------------------|--------------------|-------------------|-------------------|------------------|
| Cause of Death by RRT Modality 1-Jan-2006 to 31-Dec-2006 | | | | | | |
| Cause of Death | | Australia | | New Zealand | | |
| | | Dialysis | Transplant | Dialysis | Transplant | |
| Cardiac | Cardiac arrest | 179 | 17 | 50 | 5 | |
| | Haemorrhagic Pericarditis | 1 | - | - | - | |
| | Hyperkalaemia | 6 | 1 | 3 | - | |
| | Hypertensive cardiac failure | 5 | 1 | 1 | - | |
| | Myocardial infarction | 116 | 11 | 26 | 2 | |
| | Myocardial infarction (presumed) | 122 | 10 | 44 | 2 | |
| | Other causes of cardiac failure | 20 | - | 4 | - | |
| | Pulmonary oedema | 15 | 1 | - | 1 | |
| | Sub Total | 464 (35%) | 41 (30%) | 128 (39%) | 10 (32%) | |
| Infection | CNS - bacterial | - | - | 1 | 1 | |
| | CNS - viral | - | 1 (g) | - | - | |
| | CNS - fungal | 1 (a) | 1 (h) | - | - | |
| | Lung - bacterial | 32 | 6 | 7 | 2 | |
| | Lung - viral | 2 (b,c) | - | - | - | |
| | Lung - fungal | 2 (a) | 3 (a,h) | - | - | |
| | Lung - protozoa | - | 1 (i) | - | - | |
| | Lung - other | 5 (d) | - | - | - | |
| | Urinary tract - bacterial | 2 | - | - | - | |
| | Wound - bacterial | 12 | 1 | 4 | - | |
| | Wound - other | 1 (d) | - | - | - | |
| | Shunt - bacterial | - | - | 1 | - | |
| | Peritoneum - bacterial | 18 | - | 17 | - | |
| | Peritoneum - fungal | 1 (a) | - | 5 (a,j) | - | |
| | Septicaemia - bacterial | 31 | 3 | 5 | 1 | |
| | Septicaemia - viral | - | 1 (b) | - | - | |
| | Septicaemia - fungal | 2 (a) | - | - | - | |
| | Septicaemia - other | 7 (d) | 1 (d) | 1 (d) | - | |
| | Liver - viral | 1 (e) | - | - | - | |
| | Liver - fungal | 1 (f) | - | - | - | |
| | Other site - bacterial | 14 | 3 | 7 | - | |
| | Other site - fungal | 1 (a) | - | - | - | |
| | Other site - other | 1 (d) | - | 1 (d) | - | |
| | Sub Total | 134 (10%) | 21 (15%) | 49 (15%) | 4 (13%) | |
| Vascular | Bowel infarction | 24 | 4 | 6 | - | |
| | Cerebrovascular accident | 63 | 6 | 17 | - | |
| | Gastrointestinal haemorrhage | 14 | 1 | 4 | - | |
| | Haemorrhage - dialysis access site | 5 | - | - | - | |
| | Haemorrhage - elsewhere | 3 | 2 | 2 | - | |
| | Haemorrhage - transplant artery | - | 1 | - | - | |
| | Pulmonary embolus | 6 | 3 | 2 | - | |
| | Ruptured aortic aneurysm | 4 | 1 | - | - | |
| | Sub Total | 119 (9%) | 18 (13%) | 31 (9%) | - | |
| Social | Accident | 3 | - | - | 1 | |
| | Patient refused further treatment | 1 | - | - | - | |
| | Suicide | 4 | - | - | - | |
| | Therapy ceased | 9 | - | 4 | - | |
| | Withdrawal - access problems | 27 | - | 5 | - | |
| | Withdrawal - cardiovascular | 62 | 1 | 10 | - | |
| | Withdrawal - cerebrovascular | 44 | - | 10 | - | |
| | Withdrawal - malignancy | 65 | - | 18 | - | |
| | Withdrawal - peripheral vascular | 54 | - | 9 | - | |
| | Withdrawal - psychosocial | 178 | 5 | 33 | - | |
| | Sub Total | 447 (34%) | 6 (5%) | 89 (27%) | 1 (3%) | |
| Miscellaneous | Bone marrow depression | 1 | - | - | - | |
| | Cachexia | 16 | 1 | 3 | - | |
| | Chronic respiratory failure | 17 | - | 2 | 1 | |
| | Hepatic failure | 9 | 1 | 1 | - | |
| | Malignancy | 86 | 44 | 21 | 15 | |
| | Other | 7 | 2 | 2 | - | |
| | Pancreatitis | 3 | - | - | - | |
| | Perforation abdominal viscus | 9 | 1 | 1 | - | |
| | Sclerosing peritonitis | 2 | 1 | 1 | - | |
| | Uraemia caused by graft failure | - | 1 | - | - | |
| | Unknown | 8 | - | 2 | - | |
| | | Sub Total | 158 (12%) | 51 (37%) | 33 (10%) | 16 (52%) |
| | | Total | 1322 (100%) | 137 (100%) | 330 (100%) | 31 (100%) |

(a) candida (b) varicella (c) virus presumed (d) organism not isolated (e) hepatitis B (f) stentrophomonas maltophilia
 (g) herpes zoster (h) aspergillus (i) pneumocystis (j) fungus not specified

| Figure 3.5 | | Australia | | | | | | |
|--|--------------|------------------|--------------|--------------|--------------|----------------|-----------------|--|
| Death Rates, Dialysis Patients 2006 (per 100 patient years) | | | | | | | | |
| * Treatment at Death | | | | | | | | |
| Age Groups | 00-14 | 15-24 | 25-44 | 45-64 | 65-84 | >=85 | All Ages | |
| All Dialysis | | | | | | | | |
| All Patients Death Rate | 4.1 | 2.6 | 5.5 | 10.3 | 20.8 | 31.7 | 14.8 | |
| No. of Deaths | 1 | 3 | 67 | 342 | 837 | 72 | 1322 | |
| Years of Risk | 24 | 115 | 1223 | 3327 | 4022 | 226 | 8940 | |
| Diabetic Death Rate | - | - | 9.7 | 14.6 | 23.0 | 25.6 | 17.8 | |
| No. of Deaths | - | - | 21 | 160 | 233 | 7 | 421 | |
| Years of Risk | - | 2 | 217 | 1096 | 1014 | 27 | 2358 | |
| Non Diabetic Death Rate | 4.1 | 2.7 | 4.6 | 8.2 | 20.1 | 32.6 | 13.7 | |
| No. of Deaths | 1 | 3 | 46 | 182 | 604 | 65 | 901 | |
| Years of Risk | 24 | 112 | 1006 | 2231 | 3007 | 199 | 6582 | |
| Peritoneal Dialysis * | | | | | | | | |
| All Patients Death Rate | 5.3 | - | 6.6 | 8.8 | 22.2 | 31.6 | 14.9 | |
| No. of Deaths | 1 | - | 17 | 63 | 196 | 11 | 288 | |
| Years of Risk | 18 | 28.7 | 256 | 713 | 880 | 34 | 1932 | |
| Diabetic Death Rate | - | - | 17.6 | 13.6 | 28.2 | 84.0 | 20.4 | |
| No. of Deaths | - | - | 10 | 35 | 66 | 2 | 113 | |
| Years of Risk | - | 1 | 56 | 258 | 234 | 2 | 552 | |
| Non Diabetic Death Rate | 5.3 | - | 3.5 | 6.2 | 20.1 | 27.8 | 12.7 | |
| No. of Deaths | 1 | - | 7 | 28 | 130 | 9 | 175 | |
| Years of Risk | 18 | 27 | 199 | 454 | 646 | 32 | 1379 | |
| Haemodialysis * | | | | | | | | |
| All Patients Death Rate | - | 3.5 | 5.2 | 10.7 | 20.4 | 31.7 | 14.8 | |
| No. of Deaths | - | 3 | 50 | 279 | 641 | 61 | 1034 | |
| Years of Risk | 5 | 86 | 967 | 2614 | 3141 | 192 | 7007 | |
| Diabetic Death Rate | - | - | 6.9 | 21.4 | 21.4 | 20.0 | 17.1 | |
| No. of Deaths | - | - | 11 | 125 | 167 | 5 | 308 | |
| Years of Risk | - | - | 160 | 838 | 780 | 25 | 1805 | |
| Non Diabetic Death Rate | - | 3.5 | 8.7 | 8.7 | 20.1 | 33.5 | 14.0 | |
| No. of Deaths | - | 3 | 39 | 154 | 474 | 56 | 726 | |
| Years of Risk | 5 | 84 | 807 | 1776 | 2361 | 167 | 5202 | |

| Figure 3.6 | | Australia | | | | | | | | | |
|--|--------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------|--|
| Death Rates, Transplant Patients 2006 (per 100 patient years) | | | | | | | | | | | |
| Age Groups | 00-04 | 05-14 | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65-74 | 75-84 | All Ages | |
| All Transplants | | | | | | | | | | | |
| All Patients Death Rate | - | - | 0.4 | 0.7 | 0.7 | 1.4 | 2.5 | 4.7 | 14.1 | 2.0 | |
| No. of Deaths | - | - | 1 | 5 | 10 | 24 | 39 | 39 | 19 | 137 | |
| Years of Risk | 13 | 129 | 273 | 690 | 1388 | 1674 | 1540 | 821 | 135 | 6667 | |
| Diabetic Death Rate | - | - | - | 4.4 | 2.4 | 4.2 | 5.5 | 3.0 | - | 3.9 | |
| No. of Deaths | - | - | - | 2 | 4 | 8 | 6 | 1 | - | 21 | |
| Years of Risk | - | - | - | 45 | 165 | 189 | 109 | 33 | - | 543 | |
| Non Diabetic Death Rate | - | - | 0.4 | 0.5 | 0.5 | 1.1 | 2.3 | 4.8 | 14.2 | 1.9 | |
| No. of Deaths | - | - | 1 | 3 | 6 | 16 | 33 | 38 | 19 | 116 | |
| Years of Risk | 13 | 129 | 273 | 645 | 1223 | 1485 | 1430 | 788 | 134 | 6124 | |
| Deceased Donor Transplants | | | | | | | | | | | |
| All Patients Death Rate | - | - | - | 1.2 | 0.4 | 1.7 | 2.8 | 4.8 | 14.7 | 2.5 | |
| No. of Deaths | - | - | - | 4 | 4 | 20 | 34 | 33 | 18 | 113 | |
| Years of Risk | 2 | 40 | 98 | 323 | 881 | 1149 | 1192 | 688 | 122 | 4500 | |
| Diabetic Death Rate | - | - | - | 2.7 | 0.7 | 3.4 | 5.7 | 4.2 | - | 3.0 | |
| No. of Deaths | - | - | - | 1 | 1 | 5 | 5 | 1 | - | 13 | |
| Years of Risk | - | - | - | 37 | 141 | 147 | 88 | 23 | 1 | 439 | |
| Non Diabetic Death Rate | - | - | - | 1.0 | 0.4 | 1.5 | 2.6 | 4.8 | 14.8 | 2.5 | |
| No. of Deaths | - | - | - | 3 | 3 | 15 | 29 | 32 | 18 | 100 | |
| Years of Risk | 2 | 40 | 98 | 286 | 740 | 1002 | 1104 | 664 | 121 | 4061 | |
| Live Donor Transplants | | | | | | | | | | | |
| All Patients Death Rate | - | - | 0.6 | 0.3 | 1.2 | 0.8 | 1.4 | 4.5 | 7.8 | 1.1 | |
| No. of Deaths | - | - | 1 | 1 | 6 | 4 | 5 | 6 | 1 | 24 | |
| Years of Risk | 11 | 88 | 755 | 366 | 506 | 525 | 347 | 133 | 12 | 2167 | |
| Diabetic Death Rate | - | - | - | 12.7 | 12.6 | 7.1 | 4.7 | - | - | 7.7 | |
| No. of Deaths | - | - | - | 1 | 3 | 3 | 1 | - | - | 8 | |
| Years of Risk | - | - | - | 7 | 23 | 42 | 21 | 9 | - | 104 | |
| Non Diabetic Death Rate | - | - | 0.6 | - | 0.6 | 0.2 | 1.2 | 4.8 | 7.8 | 0.8 | |
| No. of Deaths | - | - | 1 | - | 3 | 1 | 4 | 6 | 1 | 16 | |
| Years of Risk | 11 | 88 | 175 | 358 | 482 | 483 | 325 | 124 | 12 | 2063 | |

| Figure 3.7 | | New Zealand | | | | | | |
|--|--------------|--------------------|--------------|--------------|--------------|----------------|-----------------|--|
| Death Rates, Dialysis Patients 2006 (per 100 patient years) | | | | | | | | |
| * Treatment at Death | | | | | | | | |
| Age Groups | 00-14 | 15-24 | 25-44 | 45-64 | 65-84 | >=85 | All Ages | |
| All Dialysis | | | | | | | | |
| All Patients Death Rate | 10.3 | 4.2 | 7.5 | 15.4 | 24.2 | 55.6 | 17.2 | |
| No. of Deaths | 1 | 2 | 24 | 131 | 161 | 11 | 330 | |
| Years of Risk | 9 | 48 | 319 | 852 | 664 | 19 | 1914 | |
| Diabetic Death Rate | - | - | 19.7 | 17.2 | 25.8 | - | 20.4 | |
| No. of Deaths | - | - | 12 | 74 | 67 | - | 153 | |
| Years of Risk | - | - | 60 | 430 | 259 | 1 | 751 | |
| Non Diabetic Death Rate | 10.3 | 4.2 | 4.6 | 13.5 | 23.2 | 58.6 | 15.2 | |
| No. of Deaths | 1 | 2 | 12 | 57 | 94 | 11 | 177 | |
| Years of Risk | 9 | 48 | 258 | 422 | 405 | 18 | 1162 | |
| Peritoneal Dialysis * | | | | | | | | |
| All Patients Death Rate | 12.3 | 5.8 | 8.8 | 19.4 | 25.0 | 70.6 | 20.8 | |
| No. of Deaths | 1 | 1 | 8 | 57 | 78 | 7 | 152 | |
| Years of Risk | 8 | 17 | 90 | 294 | 312 | 9 | 732 | |
| Diabetic Death Rate | - | - | 29.3 | 21.6 | 27.6 | - | 24.3 | |
| No. of Deaths | - | - | 5 | 35 | 30 | - | 70 | |
| Years of Risk | - | - | 17 | 162 | 108 | - | 288 | |
| Non Diabetic Death Rate | 12.3 | 5.8 | 4.1 | 16.7 | 23.6 | 70.6 | 18.5 | |
| No. of Deaths | 1 | 1 | 3 | 22 | 48 | 7 | 82 | |
| Years of Risk | 8 | 17 | 73 | 131 | 203 | 9 | 443 | |
| Haemodialysis * | | | | | | | | |
| All Patients Death Rate | - | 3.2 | 7.0 | 13.2 | 23.5 | 40.6 | 15.0 | |
| No. of Deaths | - | 1 | 16 | 74 | 83 | 4 | 178 | |
| Years of Risk | 1 | 30 | 228 | 558 | 352 | 9 | 1182 | |
| Diabetic Death Rate | - | - | 16.0 | 14.6 | 24.5 | - | 17.9 | |
| No. of Deaths | - | - | 7 | 39 | 37 | - | 83 | |
| Years of Risk | - | - | 43 | 267 | 150 | 1 | 463 | |
| Non Diabetic Death Rate | - | 3.2 | 4.9 | 12.0 | 22.8 | 45.2 | 13.2 | |
| No. of Deaths | - | 1 | 9 | 35 | 46 | 4 | 95 | |
| Years of Risk | 1 | 30 | 184 | 290 | 201 | 8 | 7.8 | |

| Figure 3.8 | | New Zealand | | | | | | | | | |
|--|--------------|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------|--|
| Death Rates, Transplant Patients 2006 (per 100 patient years) | | | | | | | | | | | |
| Age Groups | 00-04 | 05-14 | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65-74 | 75-84 | All Ages | |
| All Transplants | | | | | | | | | | | |
| All Patients Death Rate | - | - | - | - | 2.1 | 1.3 | 1.5 | 10.4 | 11.7 | 2.5 | |
| No. of Deaths | - | - | - | - | 6 | 4 | 4 | 14 | 3 | 31 | |
| Years of Risk | 2 | 23 | 63 | 125 | 279 | 316 | 274 | 134 | 25 | 1244 | |
| Diabetic Death Rate | - | - | - | - | 3.6 | 6.4 | - | 22.0 | - | 5.6 | |
| No. of Deaths | - | - | - | - | 1 | 2 | - | 3 | - | 6 | |
| Years of Risk | - | - | 1 | 1 | 27 | 31 | 31 | 13 | - | 106 | |
| Non Diabetic Death Rate | - | - | - | - | 2.0 | 0.7 | 1.6 | 9.1 | 11.7 | 2.2 | |
| No. of Deaths | - | - | - | - | 5 | 2 | 4 | 11 | 3 | 25 | |
| Years of Risk | 2 | 23 | 62 | 123 | 251 | 285 | 243 | 121 | 25 | 1138 | |
| Deceased Donor Transplants | | | | | | | | | | | |
| All Patients Death Rate | - | - | - | - | 2.4 | 1.4 | 1.9 | 11.8 | 12.5 | 3.3 | |
| No. of Deaths | - | - | - | - | 4 | 3 | 4 | 13 | 3 | 27 | |
| Years of Risk | - | 5 | 24 | 54 | 163 | 216 | 210 | 110 | 24 | 808 | |
| Diabetic Death Rate | - | - | - | - | 4.1 | 8.6 | - | 22.0 | - | 7.2 | |
| No. of Deaths | - | - | - | - | 1 | 2 | - | 3 | - | 6 | |
| Years of Risk | - | - | 1 | 1 | 24 | 23 | 20 | 13 | - | 83 | |
| Non Diabetic Death Rate | - | - | - | - | 2.2 | 0.5 | 2.1 | 10.4 | 12.5 | 2.9 | |
| No. of Deaths | - | - | - | - | 3 | 1 | 4 | 10 | 3 | 21 | |
| Years of Risk | - | 5 | 23 | 53 | 138 | 192 | 190 | 96 | 24 | 724 | |
| Live Donor Transplants | | | | | | | | | | | |
| All Patients Death Rate | - | - | - | - | 1.7 | 1.0 | - | 4.1 | - | 0.9 | |
| No. of Deaths | - | - | - | - | 2 | 1 | - | 1 | - | 4 | |
| Years of Risk | 2 | 18 | 39 | 70 | 116 | 100 | 63 | 24 | 1 | 436 | |
| Diabetic Death Rate | - | - | - | - | - | - | - | - | - | - | |
| No. of Deaths | - | - | - | - | - | - | - | - | - | - | |
| Years of Risk | - | - | - | - | 3 | 8 | 11 | - | - | 22 | |
| Non Diabetic Death Rate | - | - | - | - | 1.8 | 1.1 | - | 4.1 | - | 1.0 | |
| No. of Deaths | - | - | - | - | 2 | 1 | - | 1 | - | 4 | |
| Years of Risk | 2 | 18 | 39 | 70 | 113 | 92 | 52 | 24 | 1 | 414 | |

DEATHS FROM MALIGNANCY

Figure 3.9

**Deaths from Malignancy 2006
By RRT Modality at Time of Death**

| Australia | Dialysis | Transplant | Total |
|------------------------------------|---------------|------------|------------|
| Adenocarcinoma | | | |
| Breast | 3 (#2) | - | 3 |
| Colon | 3 (#3) | 1 | 4 |
| Kidney | 6 (#6) | 3 | 9 |
| Larynx | 1 | - | 1 |
| Lung | 6 | - | 6 |
| Omentum | - | 1 | 1 |
| Ovary | 1 | 1 | 2 |
| Pancreas | 1 | - | 1 |
| Prostate | 2 (*1) (#1) | - | 2 |
| Salivary gland | 1 | - | 1 |
| Stomach | 2 (#1) | - | 2 |
| Unknown site | 2 | - | 2 |
| Uterus | 1 | - | 1 |
| Leukaemia | 4 (#1) | 1 | 5 |
| Lymphoma | | | |
| Bone marrow | 1 (#1) | 1 | 2 |
| Brain | - | 2 | 2 |
| Groin | 1 (*1) | - | 1 |
| Lymph node (nos) | 1 (#1) | - | 1 |
| Mediastinum | - | 1 | 1 |
| Nasopharynx | - | 1 | 1 |
| Temple | 1 | - | 1 |
| Uterus | 1 (#1) | - | 1 |
| Lymphoproliferative | | | |
| Stomach | - | 1 | 1 |
| Melanoma - Skin | 1 (#1) | 5 | 6 |
| Merkel Cell | - | 3 | 3 |
| Myeloma | 17 (*1) (#16) | 2 | 19 |
| Squamous Cell Carcinoma | | | |
| Lung | 2 | - | 2 |
| Pharynx-Tongue | 1 | - | 1 |
| Oesophagus | - | 1 | 1 |
| Skin | 4 (*1) | 7 | 11 |
| Tonsillar fossa | 1 | - | 1 |
| Transitional Cell Carcinoma | | | |
| Bladder | 3 (#1) | - | 3 |
| Kidney | 1 (#1) | 4 | 5 |
| Urinary tract | 1 (#1) | - | 1 |
| Other | | | |
| Astrocytoma - brain | 1 | - | 1 |
| Carcinoid - ileum | 1 | - | 1 |
| Clear cell - primary unknown | 1 | - | 1 |
| Disseminated - primary unknown | 1 | - | 1 |
| Glioblastoma - brain | - | 1 | 1 |
| Hepatoma - liver | 1 | 1 | 2 |
| Large cell - carina | 1 | - | 1 |
| Large cell - lung | 1 | 1 | 2 |
| Mesothelioma - pleura | 1 | - | 1 |
| Poorly differentiated - lung | - | 1 | 1 |
| Small cell - lung | 1 | 2 | 3 |
| Small cell - parotid | 1 (*1) | - | 1 |
| Unknown - lung | 2 | - | 2 |
| Unknown - pancreas | - | 1 | 1 |
| Unknown - primary unknown | 4 | 2 | 6 |
| Waldenstrom's - disseminated | 1 (#1) | - | 1 |
| Total Deaths | 86 | 44 | 130 |

(38 patients) diagnosed pre dialysis or within one month of commencing

* (Five patients) had previously been transplanted

AUSTRALIA

During 2006 there were 130 deaths directly attributed to malignancies (86 among dialysis dependent and 44 among functioning transplant patients). Deaths were attributed by modality at time of death.

DIALYSIS DEPENDENT

Thirty eight patients had cancer diagnosed before or within one month of starting their first dialysis.

A further nine tumours were identified between one and nine months after the first dialysis. There were 16 patients (never transplanted) who had dialysed for more than five years. Five patients had a previous renal transplant.

The myeloma patients had a median survival of 52.0 months from diagnosis (range 3-96 months).

FUNCTIONING TRANSPLANT

There were 44 deaths in 2006 in this group, the same as in 2005).

Twenty nine died from non-skin cancer: six from adenocarcinoma, five lymphoma, four transitional cell carcinoma, two myeloma, two small cell carcinoma of the lung, one each lymphoproliferative disease, leukaemia and squamous cell carcinoma (oesophagus), glioblastoma (brain), hepatoma (liver), large cell carcinoma (lung), poorly differentiated carcinoma (lung) and three from an unknown type or site.

Fifteen died from skin cancer: seven from squamous cell carcinoma, five from melanoma and three from Merkel Cell.

DEATHS FROM MALIGNANCY

NEW ZEALAND

DIALYSIS DEPENDENT

There were twenty one deaths due to malignancy, nine were diagnosed before or within one month of starting dialysis. Six patients (never transplanted) had dialysed for more than five years. One patient had a previous renal transplant.

Eight were diagnosed with adenocarcinoma, three myeloma, three squamous cell carcinoma, two lymphoma and five other; carcinoid (ileum), glioblastoma (brain), non small cell and small cell (lung) and an unknown primary from an unknown site.

FUNCTIONING TRANSPLANT

There were fifteen deaths: six from squamous cell carcinoma (four skin, one lung and one nasopharynx), four lymphoma (duodenum, tonsil, mesenteric node, unknown site) and one poorly differentiated carcinoma from an unknown site.

Figure 3.10

Deaths from Malignancy 2006 By RRT Modality at Time of Death

| New Zealand | Dialysis | Transplant | Total |
|--|-------------|------------|-----------|
| Adenocarcinoma | | | |
| Breast | 1 (#1) | - | 1 |
| Kidney | 3 (*1) (#1) | - | 3 |
| Lung | 1 | 2 | 3 |
| Oesophagus | - | 1 | 1 |
| Primary Unknown | 1 | - | 1 |
| Prostate | - | 1 | 1 |
| Stomach | 2 | - | 2 |
| Lymphoma | | | |
| Axillary node | 1 (#1) | - | 1 |
| Duodenum | - | 1 | 1 |
| Lymph node (nos) | 1 (#1) | - | 1 |
| Mesenteric node | - | 1 | 1 |
| Primary unknown | - | 1 | 1 |
| Tonsil | - | 1 | 1 |
| Myeloma | 3 (3#) | - | 3 |
| Squamous Cell Carcinoma | | | |
| Lung | 2 | 1 | 2 |
| Nasopharynx | - | 1 | 1 |
| Primary unknown | 1 | - | 1 |
| Skin | - | 4 | 4 |
| Other | | | |
| Carcinoid - ileum | 1 (#1) | - | 1 |
| Glioblastoma - brain | 1 (#1) | - | 1 |
| Non small cell - lung | 1 | - | 1 |
| Poorly differentiated - unknown | - | 1 | 1 |
| Small cell - lung | 1 | - | 1 |
| Unknown - primary unknown | 1 | - | 1 |
| Total Deaths | 21 | 15 | 36 |
| # (Nine patients) diagnosed pre dialysis or within one month of commencing | | | |
| * (One patient) had previously been transplanted | | | |

DEATHS FROM WITHDRAWAL FROM TREATMENT RELATED TO MALIGNANCY

Figure 3.11

Deaths from Withdrawal from Treatment Due to Malignancy 2006 By RRT Modality at Time of Death

| Dialysis Dependent | Australia | New Zealand |
|--|-------------|-------------|
| Adenocarcinoma | | |
| Bladder | 1 (#1) | - |
| Breast | 1 (#1) | - |
| Caecum | - | 1 (#1) |
| Colon | 4 (*1) (#1) | 1 |
| Graft Kidney | 2 (*2) | - |
| Kidney | 6 (*1) (#4) | 2 (*1) (#1) |
| Lung | 2 (#1) | - |
| Ovary | 1 (#1) | - |
| Pancreas | 1 (#1) | - |
| Primary unknown | - | 1 |
| Prostate | 6 (#3) | 1 |
| Rectum | 1 | - |
| Lymphoma | | |
| Lymph nodes | 1 | - |
| Melanoma | | |
| | 3 (#1) | - |
| Myeloma | | |
| | 14 (#13) | 4 (#2) |
| Squamous Cell Carcinoma | | |
| Cervix | 1 (#1) | - |
| Mouth | 2 (#1) | - |
| Lung | 3 | - |
| Skin | 1 (*1) | - |
| Tonsil | 1 (#1) | - |
| Vulva | 1 | 1 (#1) |
| Transitional Cell Carcinoma | | |
| Bladder | 1 (#1) | 1 (#1) |
| Graft Kidney | 1 (*1) | - |
| Kidney | 1 (#1) | 1 (#1) |
| Other | | |
| Large cell - primary unknown | 1 (#1) | - |
| Hepatoma - liver | 1 | - |
| Mesothelioma - pleura | 1 | - |
| Neuroendocrine - axilla | - | 1 |
| Small cell - lung | - | 1 |
| Unknown - lung | 2 | 1 |
| Unknown - pancreas | 1 | - |
| Unknown - primary unknown | 4 (#1) | 2 |
| Total Deaths | 65 | 18 |
| Australia | | |
| # (34) patients diagnosed pre dialysis or within two months of commencing | | |
| * (Six patients) had been previously transplanted | | |
| New Zealand | | |
| # (Seven) patients diagnosed pre dialysis or within two months of commencing | | |
| * (One patient) had been previously transplanted | | |

AUSTRALIA

During 2006 there were 65 deaths among dialysis patients attributed to withdrawal from treatment related to malignancy.

DIALYSIS DEPENDENT

Thirty four of the 65 patients had cancer diagnosed before their first dialysis or within two months of commencing treatment.

Nine further tumours were identified less than twelve months after the first dialysis. There were twelve patients (never transplanted) who had dialysed for more than five years. Six patients had a previous renal transplant.

Four patients dialysed for less than two months and eight patients dialysed between two and six months before treatment was withdrawn.

There were 25 cases with adenocarcinoma, 14 with myeloma, nine with squamous cell carcinoma, three transitional cell carcinomas, three melanomas, one lymphoma and ten other types of malignancies.

The myeloma patients had a median survival from diagnosis of 25.0 months (range <1-95 months).

FUNCTIONING TRANSPLANT

There were no patients in this group in 2006.

NEW ZEALAND

DIALYSIS DEPENDENT

Eighteen patients had withdrawal of treatment related to malignancy in 2006.

Seven of the eighteen patients had cancer diagnosed before their first dialysis. There were six cases of adenocarcinoma, four myeloma, two transitional cell carcinoma, one squamous cell carcinoma and five other types of malignancies.

FUNCTIONING TRANSPLANT

There were no patients in this group in 2006.