



Australia &
New Zealand Dialysis
& Transplant Registry

Chapter 3

Mortality in End Stage Kidney Disease

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Survival

Overall survival for patients who started renal replacement therapy (RRT) in the period 2005-2014 is

shown in figure 3.1 and table 3.1. These data are not censored at transplantation.

Figure 3.1.1

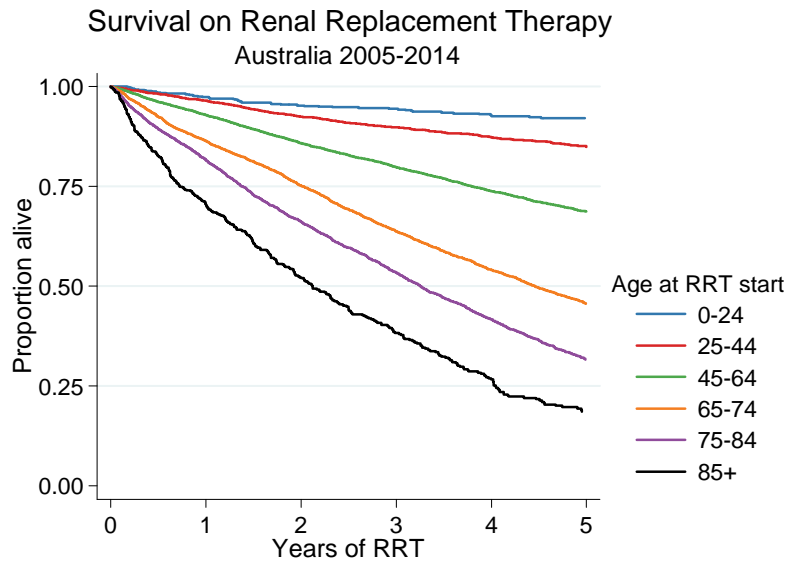
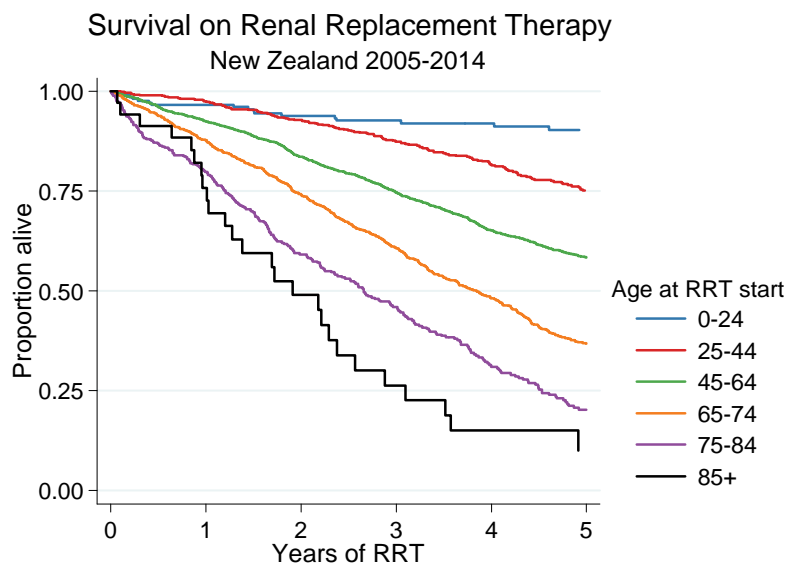


Figure 3.1.2



Survival on dialysis for non-indigenous patients that commenced RRT during 2005-2014 is shown in table 3.2. In this analysis patients were censored at transplantation (that is, events after the date of first

transplantation were not included in analyses). Survival after transplantation and survival of indigenous peoples during dialysis is covered in later chapters.

Table 3.1. Survival (95% CI) among People who Commenced Renal Replacement Therapy 2005-2014

Age at RRT start	Years	Australia	New Zealand
0-24	1	97 (96, 98)	97 (93, 98)
	2	95 (94, 97)	94 (89, 96)
	5	92 (90, 94)	90 (85, 94)
25-44	1	96 (96, 97)	98 (96, 98)
	2	93 (92, 93)	93 (91, 95)
	5	85 (83, 86)	75 (71, 79)
45-64	1	93 (92, 93)	93 (91, 94)
	2	86 (85, 87)	84 (82, 85)
	5	69 (68, 70)	58 (56, 61)
65-74	1	86 (85, 87)	88 (86, 90)
	2	75 (74, 76)	74 (71, 77)
	5	46 (44, 47)	37 (33, 40)
75-84	1	82 (80, 83)	80 (76, 83)
	2	66 (65, 68)	59 (54, 64)
	5	32 (30, 33)	20 (16, 25)
85+	1	71 (67, 74)	76 (57, 87)
	2	52 (48, 56)	49 (31, 65)
	5	19 (15, 23)	10 (2, 26)

Table 3.2. Survival (95% CI) among Non-Indigenous People who Commenced Dialysis 2005-2014

Age at RRT start	Years	Australia	New Zealand
0-24	1	97 (94, 98)	95 (87, 98)
	2	94 (91, 96)	93 (84, 97)
	5	89 (83, 92)	83 (62, 93)
25-44	1	97 (96, 98)	99 (96, 99)
	2	92 (91, 93)	91 (87, 95)
	5	79 (76, 82)	71 (62, 79)
45-64	1	92 (92, 93)	91 (89, 93)
	2	85 (84, 86)	81 (78, 84)
	5	63 (61, 64)	55 (50, 59)
65-74	1	86 (85, 87)	87 (84, 90)
	2	75 (74, 76)	74 (70, 77)
	5	44 (43, 46)	34 (30, 39)
75-84	1	82 (80, 83)	78 (73, 82)
	2	66 (65, 68)	57 (51, 62)
	5	32 (30, 33)	20 (15, 25)
85+	1	71 (67, 74)	73 (54, 86)
	2	52 (48, 57)	48 (29, 65)
	5	19 (15, 23)	10 (2, 25)

Crude (ie unadjusted) death rates for dialysis and transplantation are shown in table 3.3 for various groups. This is a different way of looking at the same question. This table includes all episodes of dialysis and transplantation (i.e. analyses are not censored at first

transplant date), and deaths are attributed to the modality in use at the time of death. For this table, episodes of treatment include all people treated in 2014, regardless of year of first treatment.

Table 3.3. Death Rates per 100 patient-years during Renal Replacement Therapy - 2014

Category	Level	Dialysis rate	95% CI		Transplant rate	95% CI	
Country	Australia	13.1	12.4	13.7	1.9	1.6	2.2
	New Zealand	14.0	12.6	15.5	2.6	1.9	3.6
Age	<25	2.6	1.0	5.3	0.0	0.0	0.6
	25-44	3.9	3.1	5.0	0.6	0.4	1.0
	45-64	9.8	9.0	10.7	1.6	1.3	2.0
	65-84	18.2	17.1	19.2	4.9	4.1	5.9
	85+	29.6	25.0	34.8	10.3	0.3	57.4
Diabetes status	Non-diabetic	10.9	10.2	11.7	1.6	1.3	1.9
	Type 1 diabetes	12.7	9.7	16.4	2.7	1.3	5.1
	Type 2 diabetes	15.9	14.9	16.9	3.4	2.7	4.2
Coronary disease	No	8.8	8.2	9.5	1.4	1.2	1.7
	Yes	18.4	17.4	19.4	4.3	3.5	5.1
Race	Non Indigenous (AUS)	13.8	13.1	14.5	1.9	1.6	2.2
	Non Indigenous (NZ)	16.0	13.8	18.6	2.4	1.6	3.4
	Aboriginal/TSI	10.0	8.4	11.7	4.6	2.2	8.5
	Māori (AUS)	7.2	3.3	13.7	1.8	0.0	10.3
	Māori (NZ)	13.3	10.9	15.9	3.9	1.4	8.5
	Pacific (AUS)	7.7	5.0	11.3	0.0	0.0	4.0
	Pacific (NZ)	11.2	8.8	14.1	4.0	1.1	10.2

Mortality rates are generally higher with older age, diabetes and coronary artery disease. The comparison between indigenous rates (and some other comparisons) will be subject to several confounders.

Comparisons of mortality rates with the general population (stratified by gender) are shown in figures 3.2 and 3.3.

Figure 3.2.1

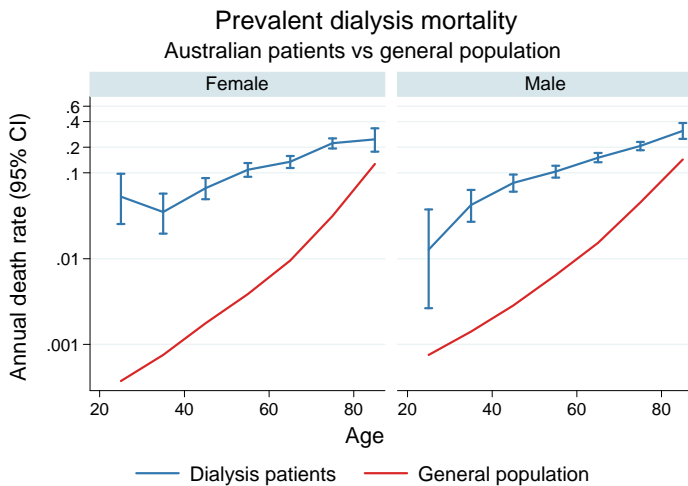


Figure 3.2.2

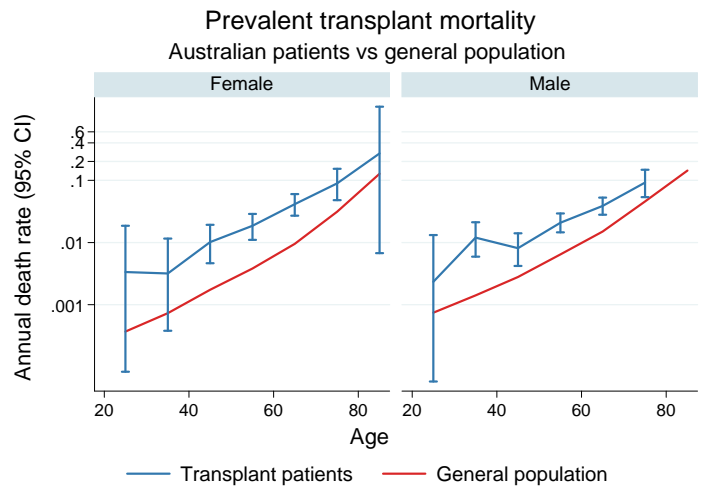


Figure 3.3.1

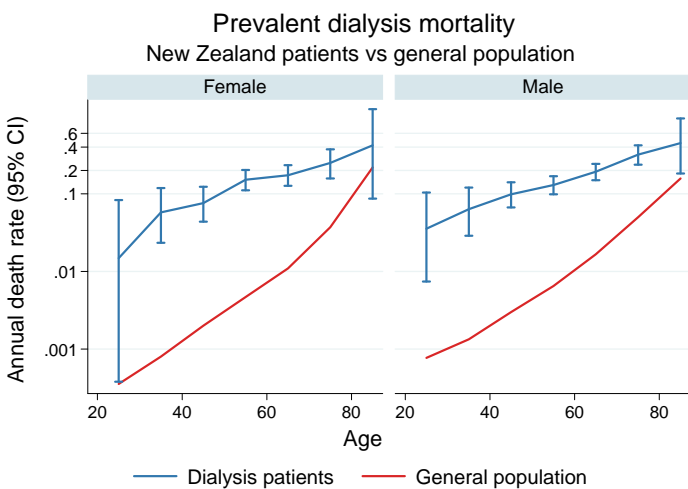
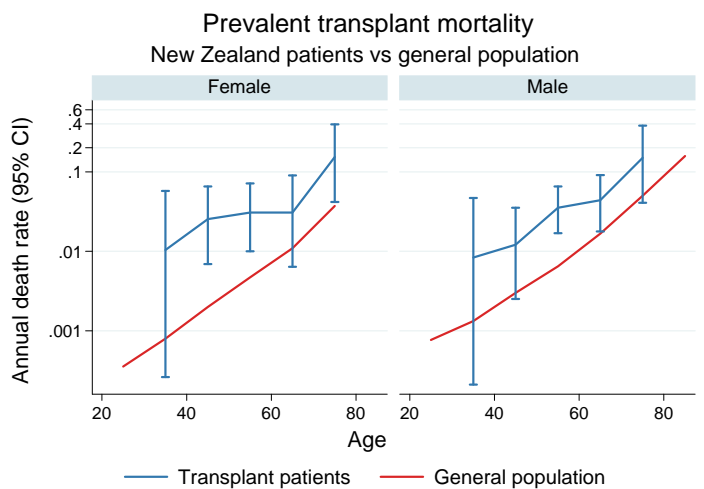


Figure 3.3.2



Another perspective on survival during dialysis is presented in table 3.4. Median survival is the time to which 50% of people can expect to survive. Table 3.5 shows the median survival of people who started dialysis treatment from 1 January 2005, by various categories. These survival data are censored at the time of transplantation, and include those who started dialysis in the period 2005-2014. In addition to the median, the 25th and 75th centiles are included to give

an indication of the range of observed survivals. Some figures are not observed - for example if half of a cohort have not yet died it is not possible to observe a median survival. These occurrences are indicated by * in the tables. The survival times amongst younger people are likely to be strongly affected by the selection bias (fitter people will be progressively transplanted and not be included in the analysis from that point).

Table 3.4. Median Survival on Dialysis by Age 2005-2014

Country	Age at start	Median (25th and 75th centiles), years
Australia	0-24	* (8.1, *)
	25-44	* (5.4, *)
	45-64	6.6 (3.3, *)
	65-74	4.3 (2.0, 7.8)
	75-84	3.3 (1.4, 5.8)
	85+	2.1 (0.7, 4.0)
New Zealand	0-24	* (8.6, *)
	25-44	7.7 (4.2, *)
	45-64	5.5 (2.8, 9.5)
	65-74	3.7 (1.9, 5.9)
	75-84	2.7 (1.2, 4.5)
	85+	1.9 (1.0, 3.1)

Table 3.5. Survival on Dialysis by Age and Comorbidity amongst Older People; Years (median, 25th and 75th centiles) 2005-2014

Age at start	Any vascular disease	Diabetes	Australia	New Zealand
65-69	No	No	6.1 (3.3, *)	5.0 (2.7, 7.1)
65-69	No	Yes	5.1 (3.1, *)	5.0 (3.0, 6.8)
65-69	Yes	No	4.3 (1.7, 7.6)	4.0 (1.9, 5.8)
65-69	Yes	Yes	4.0 (2.0, 7.1)	3.0 (1.6, 4.6)
70-74	No	No	5.4 (2.5, *)	4.4 (1.9, 6.3)
70-74	No	Yes	5.4 (2.7, *)	4.1 (2.2, 6.9)
70-74	Yes	No	3.8 (1.6, 6.9)	3.0 (1.6, 4.7)
70-74	Yes	Yes	3.1 (1.5, 5.5)	3.2 (1.5, 4.9)
75-79	No	No	4.8 (2.1, 7.4)	3.6 (1.7, 6.2)
75-79	No	Yes	4.2 (2.1, 6.5)	4.3 (1.7, 5.8)
75-79	Yes	No	3.1 (1.4, 5.8)	1.9 (0.6, 3.7)
75-79	Yes	Yes	2.9 (1.3, 5.3)	1.9 (0.8, 4.4)
80-84	No	No	3.4 (1.8, 6.1)	2.7 (1.5, 4.4)
80-84	No	Yes	3.1 (1.8, 4.6)	3.8 (1.2, 6.0)
80-84	Yes	No	2.5 (1.1, 4.8)	2.1 (1.2, 4.1)
80-84	Yes	Yes	2.4 (1.0, 4.4)	3.1 (2.0, 4.9)
85+	No	No	3.1 (1.2, 5.5)	2.4 (1.0, 3.6)
85+	No	Yes	2.4 (1.4, 7.9)	0.9 (0.9, 0.9)
85+	Yes	No	2.0 (0.7, 3.9)	1.9 (1.0, 3.1)
85+	Yes	Yes	1.5 (0.4, 3.3)	1.7 (1.2, *)

The evolution of mortality rates over time is shown in figure 3.4. In Australia, there is steady improvement in most groups over time. For New Zealand, the trends are

less clear, in part reflecting the lower precision with smaller numbers.

Figure 3.4.1

**Dialysis mortality rates in Australia
2005-2014**

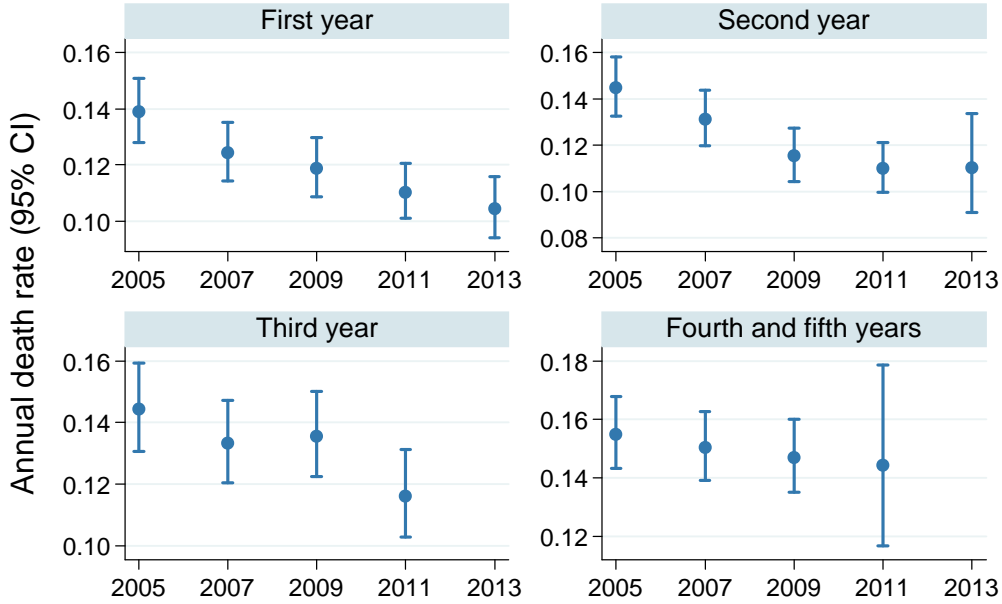
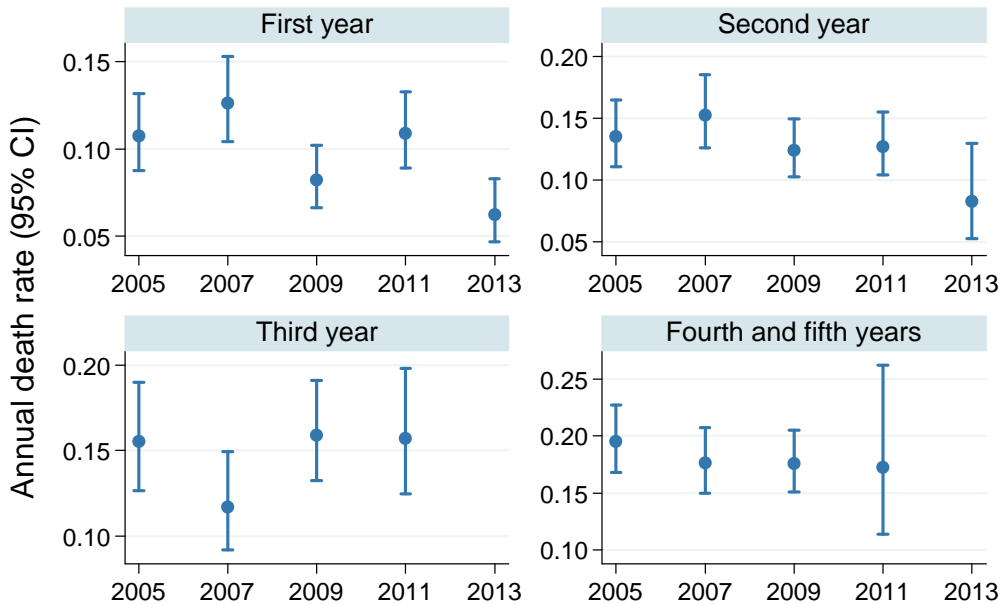


Figure 3.4.2

**Dialysis mortality rates in New Zealand
2005-2014**



Cause of Death

The focus of this section is on deaths reported during 2014. The cause of death reported to ANZDATA is not necessarily the same as that reported on the death certificate. In particular, ANZDATA specifically records a range of reasons for “withdrawal from treatment”. Clearly, the actual cause of death in these instances is

uraemia, however the key issues presented here are the “cause” of the withdrawal; in many cases this is related to an underlying comorbidity (these figures are explored further on pages 3-9 and 3-10).

For the purposes of these analyses, deaths were

Figure 3.5 Cause of death
Deaths occurring during 2014

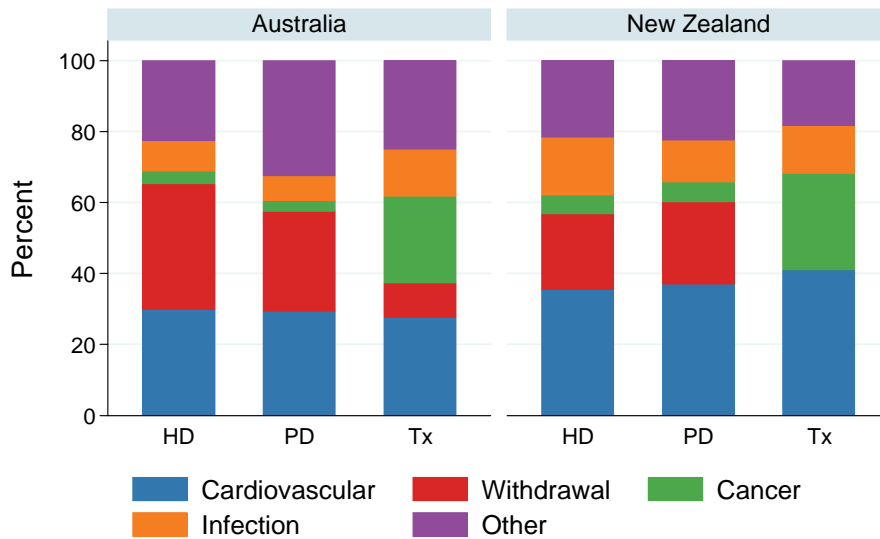
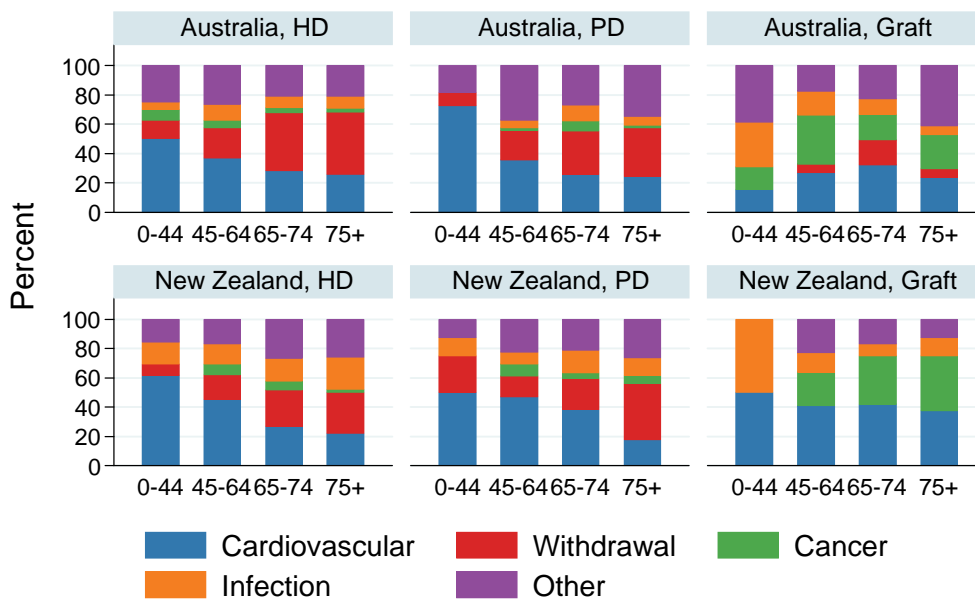


Figure 3.6 Cause of death
Deaths occurring during 2014



attributed to the modality in use at the time of death.

In both Australia and New Zealand, similar trends are seen although there is a larger proportion of deaths coded as “cardiovascular” and smaller proportion coded as “withdrawal” from New Zealand (figure 3.5 and table 3.6). A greater proportion of deaths due to cancer is seen among patients with kidney transplants, whereas among dialysis patients deaths to cardiovascular and infective causes predominate.

The distribution of types of death changes with different age groups. Although one might expect the numbers of deaths reported as treatment withdrawals to increase with age, the proportion of deaths reported as related to withdrawal of dialysis is still substantial in a number of the younger age groups (among dialysis patients) (table 3.6).

Table 3.6. Cause of Death by Modality and Age at Death - 2014

Cause of death	Haemodialysis					Peritoneal Dialysis					Graft				
	0-44	45-64	65-74	75+	Total	0-44	45-64	65-74	75+	Total	0-44	45-64	65-74	75+	Total
Cardiovascular	20	122	97	146	385	8	21	19	28	76	2	20	24	8	54
Withdrawal	5	69	136	247	457	1	12	22	38	73	0	4	13	2	19
Cancer	3	17	12	14	46	0	1	5	2	8	2	25	13	8	48
Infection	2	36	27	46	111	0	3	8	7	18	4	12	8	2	26
Other	10	88	72	121	291	2	22	20	40	84	5	13	17	14	49
Australia	40	332	344	574	1290	11	59	74	115	259	13	74	75	34	196
Cardiovascular	8	43	17	11	79	4	23	20	6	53	1	9	5	3	18
Withdrawal	1	16	16	14	47	2	7	11	13	33	0	0	0	0	0
Cancer	0	7	4	1	12	0	4	2	2	8	0	5	4	3	12
Infection	2	13	10	11	36	1	4	8	4	17	1	3	1	1	6
Other	2	16	17	13	48	1	11	11	9	32	0	5	2	1	8
New Zealand	13	95	64	50	222	8	49	52	34	143	2	22	12	8	44

Withdrawal from renal replacement therapy

During 2014 there were 549 deaths in Australia and 80 in New Zealand attributed to withdrawal from therapy (table 3.7). The vast majority of these were among patients receiving dialysis therapy. “Psychosocial” reasons were the most commonly cited reason for withdrawal in patients receiving all modalities.

However, the coding of these categories is clearly somewhat subjective.

Table 3.8 shows a breakdown of patients who withdrew and died in 2014 by age and duration of RRT.

Table 3.7. Reason for Withdrawal from Renal Replacement Therapy - 2014

Country	Reason for withdrawal	HD	PD	Graft
Australia	Psychosocial	174	34	7
	Refused further treatment	22	3	2
	Suicide	0	0	1
	Cardiovascular co-morbidity	83	11	3
	Cerebrovascular co-morbidity	31	4	1
	Peripheral vascular co-morbidity	40	13	2
	Malignancy	79	6	3
	Dialysis access difficulties	28	2	0
New Zealand	Psychosocial	13	8	0
	Refused further treatment	0	3	0
	Suicide	0	0	0
	Cardiovascular co-morbidity	12	5	0
	Cerebrovascular co-morbidity	7	4	0
	Peripheral vascular co-morbidity	5	8	0
	Malignancy	7	3	0
	Dialysis access difficulties	3	2	0

Table 3.8. Time from Renal Replacement Therapy Start to Death, in Patients who Withdrew and Died in 2014

Time from first RRT (years)	Australia					New Zealand				
	0-44	45-64	65-74	75+	Total	0-44	45-64	65-74	75+	Total
<1 year	4	17	26	36	83	2	1	2	3	8
1-2 years	0	14	16	39	69	1	7	3	6	17
2-5 years	1	15	44	85	145	0	10	10	11	31
5+ years	1	39	85	127	252	0	5	12	7	24
Total	6	85	171	287	549	3	23	27	27	80

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