

# Chapter 3

## Mortality in End Stage Kidney Disease



2016  
ANZDATA Registry  
39th Annual Report

*Data to 31-Dec-2015*

## Survival

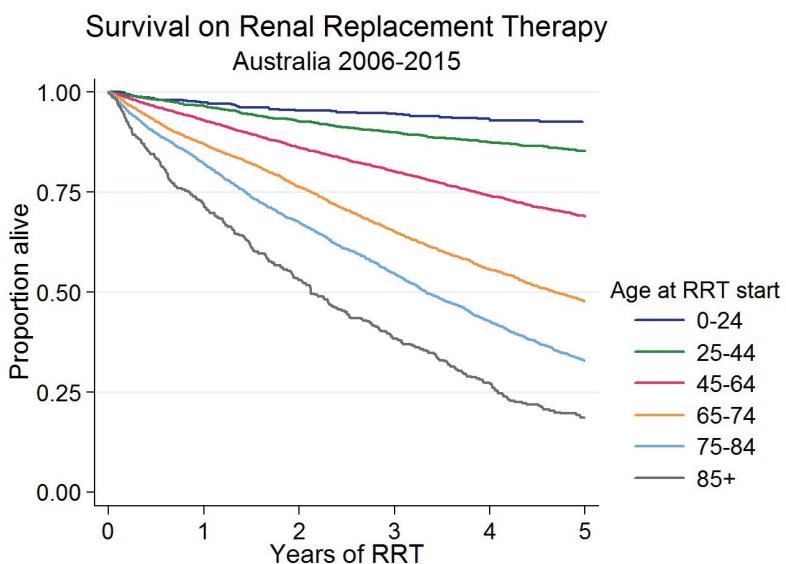
Overall survival for patients who started renal replacement therapy (RRT) in the period 2006-2015 is shown in figure 3.1 and table 3.1. This data is not censored at transplantation.

Survival on dialysis for non-indigenous patients that commenced RRT during 2006-2015 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.

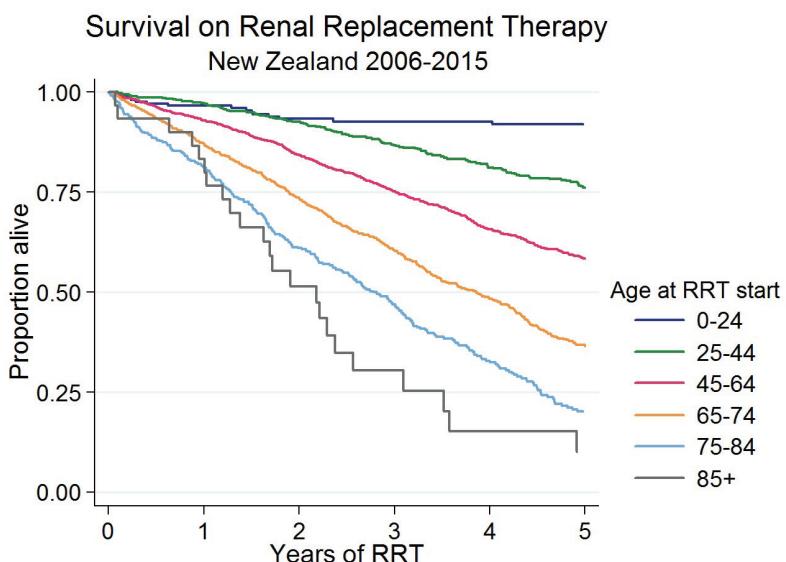
Crude (i.e. unadjusted) death rates for dialysis and transplantation are shown in table 3.3 for various groups. This is a different way of looking at the same question. This table includes all episodes of dialysis and transplantation (i.e. analyses are not censored at first transplant date), and deaths are attributed to the modality in use at the time of death. For this table, episodes of treatment include all people treated in 2015, regardless of year of first treatment.

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 3.1.1**



**Figure 3.1.2**



**Table 3.1. Survival (95% CI) among People who Commenced Renal Replacement Therapy 2006-2015**

Age at RRT start	Years	Australia	New Zealand
0-24	1	97 (96, 98)	97 (93, 98)
	2	96 (94, 97)	93 (89, 96)
	5	93 (90, 94)	92 (87, 95)
25-44	1	97 (96, 97)	97 (96, 98)
	2	93 (92, 94)	93 (90, 94)
	5	85 (84, 87)	76 (72, 80)
45-64	1	93 (92, 94)	93 (92, 94)
	2	86 (85, 87)	84 (83, 86)
	5	69 (68, 70)	58 (56, 61)
65-74	1	87 (86, 88)	87 (85, 89)
	2	76 (75, 78)	74 (71, 76)
	5	48 (46, 49)	37 (33, 40)
75-84	1	82 (81, 83)	81 (77, 85)
	2	68 (66, 69)	61 (56, 66)
	5	33 (31, 35)	20 (16, 25)
85+	1	72 (68, 75)	83 (64, 93)
	2	53 (49, 57)	51 (32, 68)
	5	19 (15, 23)	10 (2, 27)

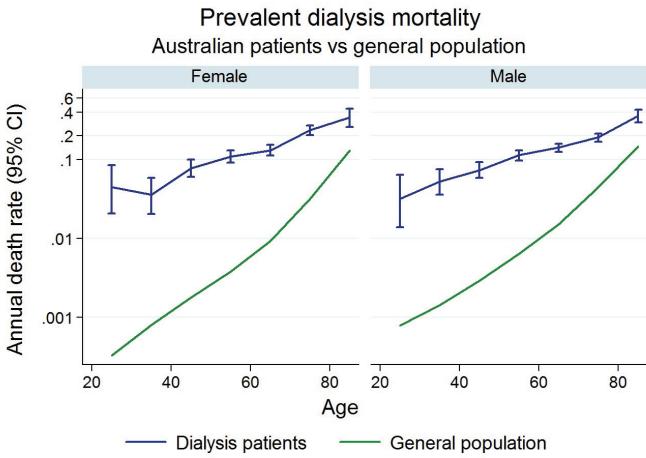
**Table 3.2. Survival (95% CI) among Non-Indigenous People who Commenced Dialysis 2006-2015**

Age at RRT start	Years	Australia	New Zealand
0-24	1	97 (95, 98)	94 (87, 98)
	2	95 (92, 97)	93 (84, 97)
	5	89 (83, 93)	90 (78, 95)
25-44	1	97 (96, 98)	98 (96, 99)
	2	92 (91, 94)	92 (87, 95)
	5	79 (76, 81)	72 (63, 80)
45-64	1	93 (92, 93)	92 (90, 94)
	2	85 (84, 86)	82 (79, 85)
	5	63 (61, 64)	54 (49, 59)
65-74	1	87 (86, 88)	87 (84, 90)
	2	76 (75, 77)	74 (70, 78)
	5	46 (44, 48)	36 (31, 41)
75-84	1	82 (81, 83)	80 (75, 84)
	2	68 (66, 69)	60 (54, 65)
	5	33 (31, 35)	19 (14, 25)
85+	1	72 (68, 76)	81 (61, 92)
	2	53 (49, 57)	49 (29, 67)
	5	19 (15, 23)	9 (2, 25)

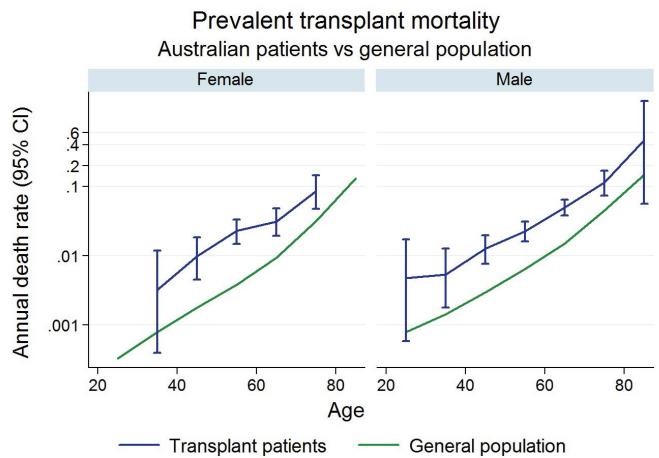
**Table 3.3. Death Rates per 100 patient-years during Renal Replacement Therapy - 2015**

Category	Level	Dialysis rate	95% CI	Transplant rate	95% CI
<b>Country</b>	Australia	13.3	12.7	14.0	2.2
	New Zealand	15.0	13.6	16.5	2.5
<b>Age</b>	<25	2.2	0.8	4.7	0.7
	25-44	4.9	3.9	6.0	0.4
	45-64	10.3	9.5	11.2	1.8
	65-84	17.8	16.8	18.9	5.4
	85+	35.1	30.1	40.7	27.4
					5.6
<b>Diabetes status</b>	Non-diabetic	11.0	10.3	11.8	2.0
	Type 1 diabetes	18.5	15.0	22.5	4.4
	Type 2 diabetes	16.3	15.3	17.3	3.6
<b>Coronary disease</b>	No	10.4	9.8	11.1	2.0
	Yes	20.1	18.9	21.4	4.6
<b>Race</b>	Non Indigenous (AUS)	13.9	13.2	14.6	2.2
	Non Indigenous (NZ)	14.8	12.6	17.2	2.0
	Aboriginal/TSI	10.7	9.1	12.4	3.1
	Māori (AUS)	13.5	8.0	21.4	3.4
	Māori (NZ)	18.9	16.1	22.0	5.6
	Pacific (AUS)	8.1	5.5	11.5	0.8
	Pacific (NZ)	10.5	8.3	13.2	3.5
					1.0
					9.0

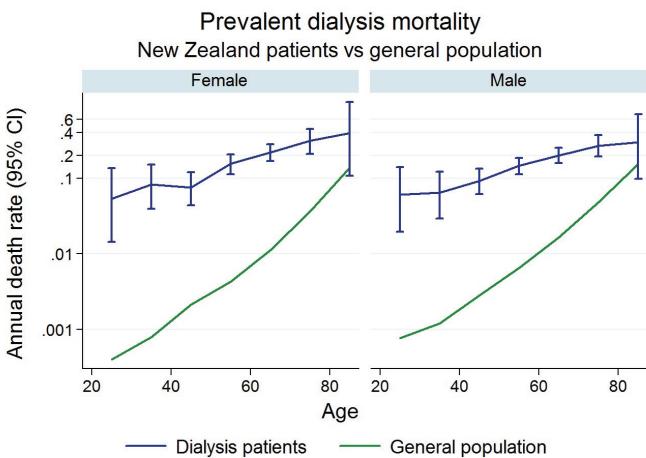
**Figure 3.2.1**



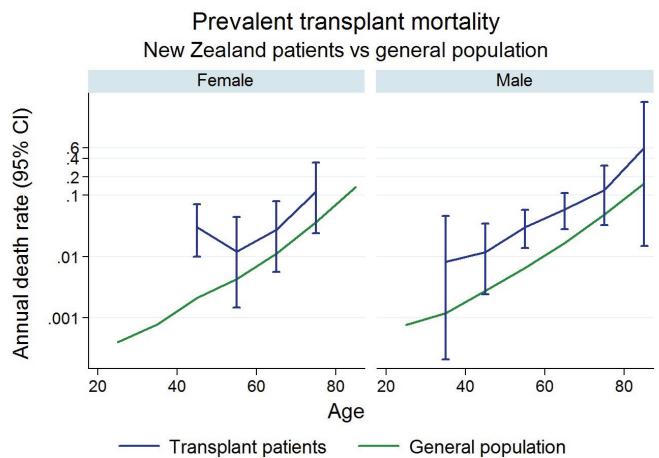
**Figure 3.2.2**



**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 2006, by various categories. This survival data is censored at the time of transplantation, and include those who started dialysis in the period 2006-2015. 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 2006-2015**

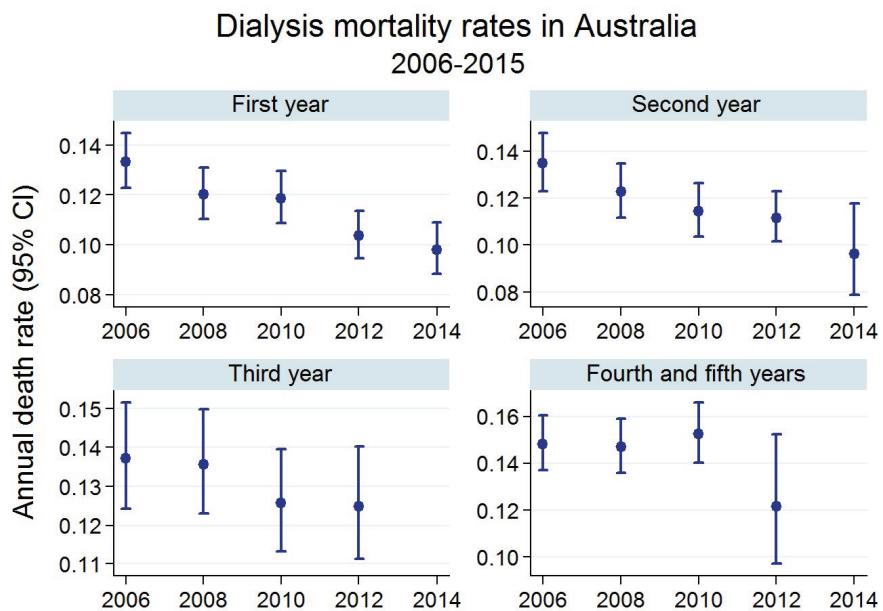
Country	Age at start	Median (25th and 75th centiles), years
Australia	0-24	* (8.1, *)
	25-44	* (5.4, *)
	45-64	6.6 (3.3, *)
	65-74	4.5 (2.1, 7.8)
	75-84	3.3 (1.4, 6.0)
	85+	2.1 (0.9, 4.1)
New Zealand	0-24	* (*, *)
	25-44	8.0 (4.2, *)
	45-64	5.5 (2.8, 9.0)
	65-74	3.7 (1.9, 5.9)
	75-84	2.8 (1.3, 4.5)
	85+	2.2 (1.2, 3.5)

**Table 3.5 Survival on Dialysis by Age and Comorbidity amongst Older People  
Years (median, 25th and 75th centiles) 2006-2015**

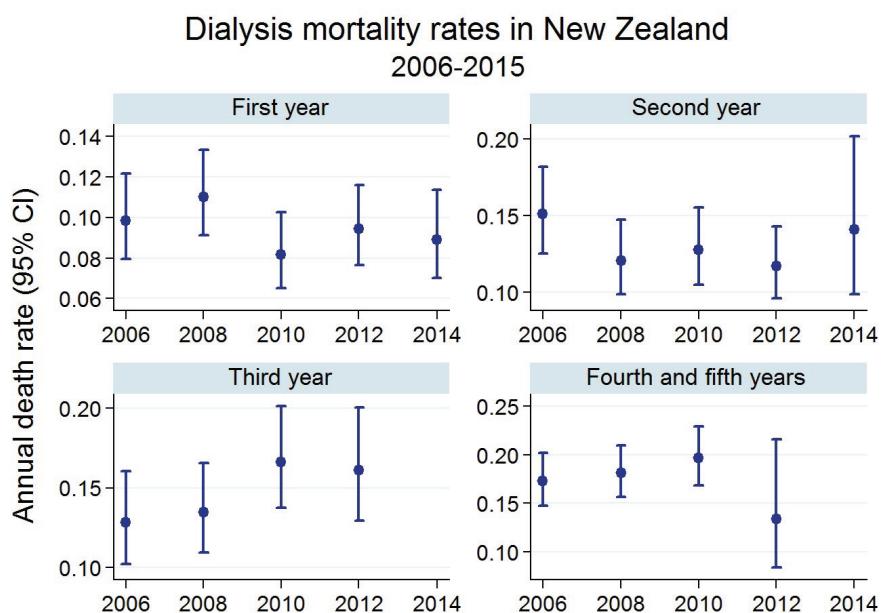
Age at start	Any vascular disease	Diabetes	Australia	New Zealand
65-69	No	No	6.7 (3.1, 9.4)	5.0 (3.0, 7.3)
65-69	No	Yes	6.0 (3.4, 9.4)	4.4 (2.6, 6.9)
65-69	Yes	No	4.5 (1.8, 8.8)	4.4 (1.8, 6.0)
65-69	Yes	Yes	4.3 (2.0, 7.3)	2.8 (1.5, 4.6)
70-74	No	No	5.7 (2.7, 9.3)	4.4 (2.3, 9.1)
70-74	No	Yes	5.5 (2.7, 9.0)	3.9 (2.0, 5.9)
70-74	Yes	No	3.8 (1.7, 7.1)	3.1 (1.6, 4.6)
70-74	Yes	Yes	3.3 (1.5, 5.6)	3.0 (1.7, 4.9)
75-79	No	No	5.3 (2.5, 8.1)	4.1 (1.7, 5.3)
75-79	No	Yes	4.2 (2.1, 7.2)	3.9 (2.2, 4.8)
75-79	Yes	No	3.5 (1.5, 6.1)	2.2 (1.1, 3.8)
75-79	Yes	Yes	3.2 (1.3, 5.6)	2.6 (1.1, 4.2)
80-84	No	No	3.6 (1.8, 6.1)	2.7 (1.6, 4.9)
80-84	No	Yes	2.9 (1.5, 5.2)	5.2 (1.2, 6.0)
80-84	Yes	No	2.9 (1.2, 5.1)	2.1 (1.2, 4.2)
80-84	Yes	Yes	2.6 (1.1, 4.5)	3.1 (1.4, 3.9)
85+	No	No	3.2 (1.3, 5.3)	2.6 (2.4, 3.6)
85+	No	Yes	2.8 (1.4, 5.1)	1.0 (0.9, 1.6)
85+	Yes	No	2.1 (0.7, 3.8)	1.9 (1.0, 2.3)
85+	Yes	Yes	1.8 (0.5, 3.6)	5.2 (1.7, 5.2)

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**



**Figure 3.4.2**



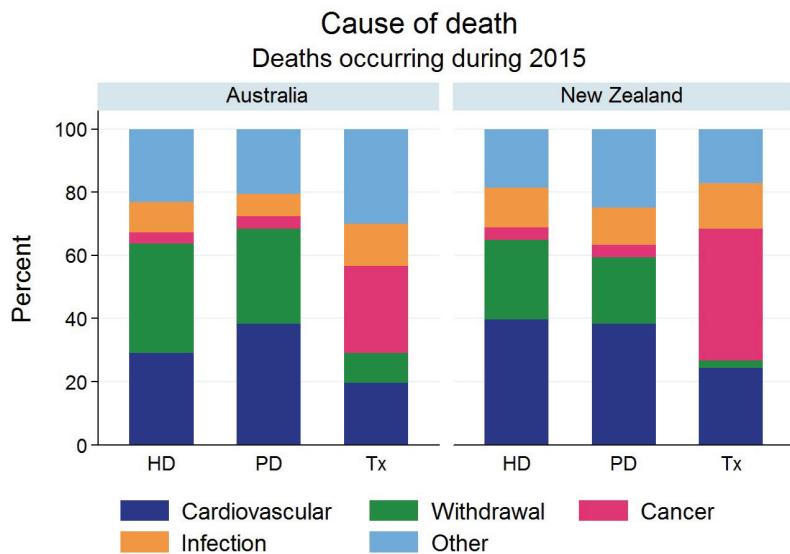
## Cause of Death

The focus of this section is on deaths reported during 2015. 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).

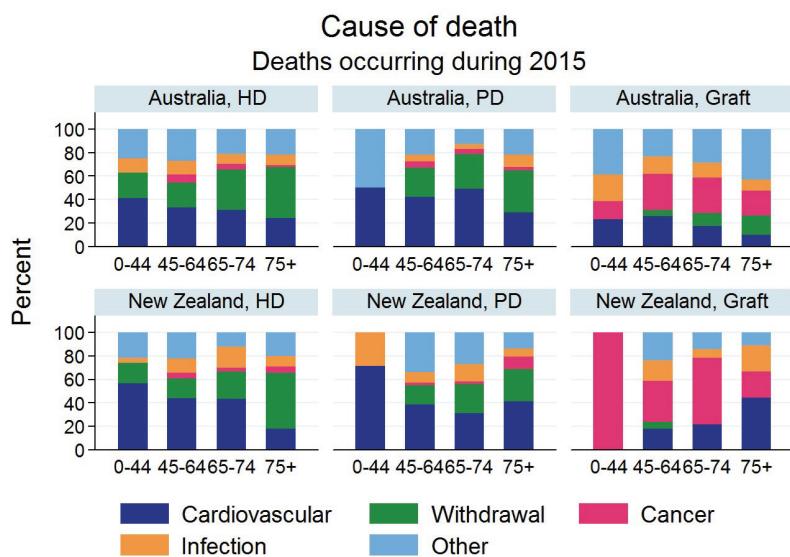
For the purposes of these analyses, deaths were attributed to the modality in use at the time of death.

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

**Figure 3.5**



**Figure 3.6**



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

**Table 3.6. Cause of Death by Modality and Age at Death - 2015**

Country	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
Australia	Cardiovascular	23	115	109	146	393	5	31	35	37	108	3	23	14	4	44
	Withdrawal	12	77	121	259	469	0	18	21	46	85	0	5	9	7	21
	Cancer	0	23	16	9	48	0	4	3	4	11	2	27	24	9	62
	Infection	7	42	29	54	132	0	4	3	13	20	3	13	10	4	30
	Other	14	94	75	130	313	5	16	9	28	58	5	21	23	18	67
Total		56	351	350	598	1355	10	73	71	128	282	13	89	80	42	224
New Zealand	Cardiovascular	13	47	39	10	109	5	17	15	12	49	0	3	3	4	10
	Withdrawal	4	18	21	26	69	0	7	12	8	27	0	1	0	0	1
	Cancer	0	5	3	3	11	0	1	1	3	5	1	6	8	2	17
	Infection	1	13	16	5	35	2	4	7	2	15	0	3	1	2	6
	Other	5	24	11	11	51	0	15	13	4	32	0	4	2	1	7
Total		23	107	90	55	275	7	44	48	29	128	1	17	14	9	41

### Withdrawal from renal replacement therapy

During 2015 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 reasons 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 2015 by age and duration of RRT.

**Table 3.7. Reason for Withdrawal from Renal Replacement Therapy - 2015**

Country	Reason for withdrawal	HD	PD	Graft
Australia	Withdrawal-Psycho Social Reasons	156	41	7
	Patient Refused Treatment (Specify)	16	4	3
	Withdrawal-Cardiovascular Comorbid Conditions	111	10	5
	Withdrawal-Cerebrovascular Comorbid Conditions	44	5	3
	Withdrawal-Peripheral Vascular Comorbid Conditions	31	10	0
	Withdrawal-Malignancy	86	10	3
	Withdrawal-Dialysis Access Difficulties	25	5	0
New Zealand	Withdrawal-Psycho Social Reasons	25	10	0
	Patient Refused Treatment (Specify)	1	1	0
	Withdrawal-Cardiovascular Comorbid Conditions	22	8	0
	Withdrawal-Cerebrovascular Comorbid Conditions	4	3	0
	Withdrawal-Peripheral Vascular Comorbid Conditions	10	4	0
	Withdrawal-Malignancy	6	1	1
	Withdrawal-Dialysis Access Difficulties	1	0	0

**Table 3.8. Time from Renal Replacement Therapy Start to Death, in Patients who Withdraw and Died in 2015**

Australia					New Zealand					
Time from first RRT (years)	0-44	45-64	65-74	75+	Total	0-44	45-64	65-74	75+	Total
<1 year	5	13	16	31	65	2	3	5	3	13
1-2 years	3	15	18	30	66	1	3	6	2	12
2-5 years	1	29	36	104	170	1	8	8	12	29
5+ years	3	43	81	147	274	0	12	14	17	43
<b>Total</b>	<b>12</b>	<b>100</b>	<b>151</b>	<b>312</b>	<b>575</b>	<b>4</b>	<b>26</b>	<b>33</b>	<b>34</b>	<b>97</b>

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