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# CHAPTER 3

## Mortality in Kidney Failure with Replacement Therapy

Summarising the survival of patients on kidney replacement therapy in Australia and New Zealand and causes of death in this population

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## SUMMARY AND HIGHLIGHTS

People with kidney failure receiving treatment with Kidney Replacement Therapy (KRT) continue to have a higher unadjusted mortality rate compared to the general population. This gap is most evident in younger people receiving KRT (Figures 3.2.1 and 3.2.2). People treated with dialysis have a higher unadjusted mortality compared to the general population (Figure 3.2.1) compared to those treated with a kidney transplant (Figure 3.2.2). Mortality in the first year receiving dialysis remained stable in Australia and New Zealand over the last decade (Figures 3.4.1 and 3.4.2).

The most common single cause of death for those receiving KRT by any treatment modality in both Australia and New Zealand was cardiovascular disease; in some instances, 'other causes' of death was more common, though this was inclusive of multiple causes of death (Table 3.5). The most common cause of death differed for those receiving KRT with dialysis as compared to those receiving KRT with a kidney transplant (Figure 3.5, Table 3.5), and in different age groups (Figure 3.6, Table 3.5).

Withdrawal was a frequent cause of death, most of which were in patients receiving dialysis. The most common cause of withdrawal from dialysis treatment in Australia was for psychosocial reasons, followed by cardiovascular morbidity. In New Zealand, the most common cause of withdrawal from dialysis therapy was cardiovascular comorbidity, followed by psychosocial and peripheral vascular comorbidity (Table 3.6).

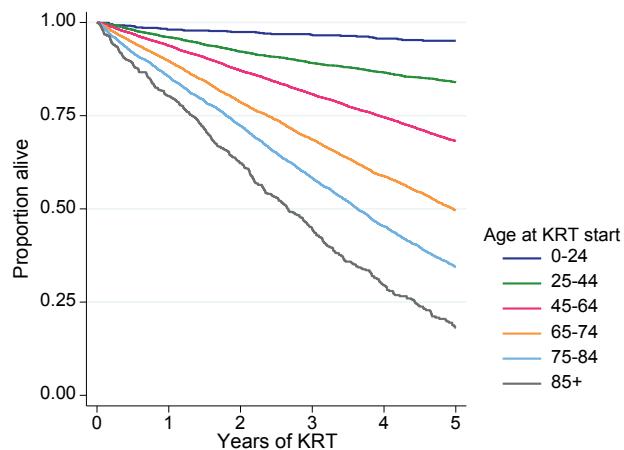
## SUGGESTED CITATION

D Forcey, C Davies, S Bateman, J Chen, P Clayton, F Kholmurodova, D Lee, K Marshall, H McCarthy, S McDonald, W Mulley, K Polkinghorne, K Richards, M Roberts, B Solomon, G Irish. 48th Report, Chapter 3: Mortality in Kidney Failure with Replacement Therapy. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2025. Available at: <http://www.anzdata.org.au>

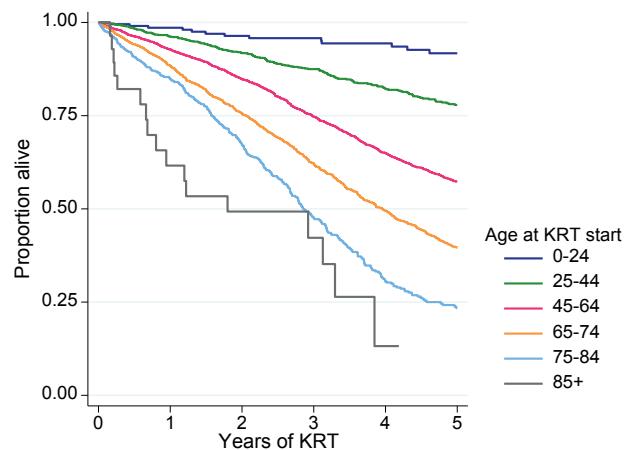
# SURVIVAL

Overall survival for patients who started kidney replacement therapy (KRT) in the period 2015-2024 is shown in Figure 3.1 using the Kaplan-Meier method to calculate survival curves. Table 3.1 shows the survival at 1, 2 and 5 years for incident kidney replacement therapy patients by age group of the same period. These data are not censored at transplantation.

**Figure 3.1.1**  
**Survival on Kidney Replacement Therapy - Australia 2015-2024**



**Figure 3.1.2**  
**Survival on Kidney Replacement Therapy - New Zealand 2015-2024**



**Table 3.1**  
**Survival [95% CI] Among People Who Commenced Kidney Replacement Therapy 2015-2024**

Age at KRT start	Years	Australia	New Zealand
0-24	1	98 [97, 99]	99 [96, 100]
	2	97 [96, 98]	96 [93, 98]
	5	95 [93, 96]	92 [86, 95]
25-44	1	96 [95, 97]	96 [95, 97]
	2	92 [91, 93]	92 [90, 93]
	5	84 [83, 85]	78 [75, 81]
45-64	1	94 [93, 94]	93 [92, 94]
	2	87 [86, 88]	85 [83, 86]
	5	68 [67, 69]	57 [55, 59]
65-74	1	90 [89, 90]	88 [87, 90]
	2	79 [78, 80]	76 [73, 78]
	5	50 [48, 51]	40 [37, 43]
75-84	1	85 [84, 86]	85 [82, 87]
	2	72 [71, 74]	67 [63, 71]
	5	34 [33, 36]	23 [19, 28]
85+	1	80 [77, 83]	62 [40, 77]
	2	62 [58, 66]	49 [29, 67]
	5	18 [14, 22]	-

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# DEATH RATES

Unadjusted death rates for dialysis and transplantation during 2024 are shown in Table 3.2 for various groups. 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 2024, regardless of year of first treatment.

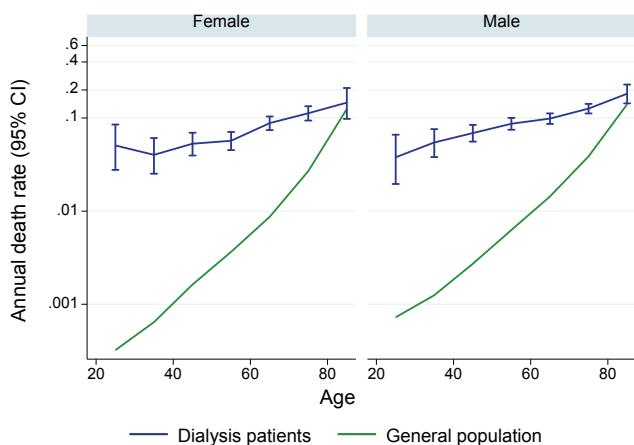
Comparisons of mortality rates with the general population (stratified by gender) are shown in Figures 3.2 and 3.3. Transplant survival is described in more detail in the Kidney Transplantation chapter of the Report.

Population and death estimates for Australia and New Zealand used for the calculation of mortality rates in this chapter were sourced from the Australian Bureau of Statistics (2024)<sup>1,2</sup> and Stats NZ (2024)<sup>3,4</sup>.

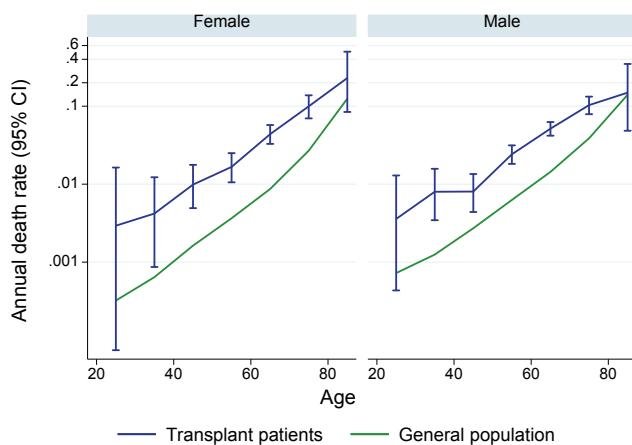
**Table 3.2**  
**Death Rates [95% CI] per 100 patient-years during Kidney Replacement Therapy - 2024**

Category	Level	Dialysis	Transplant
Country	<b>Australia</b>	8.8 [8.3, 9.2]	2.8 [2.5, 3.1]
	<b>New Zealand</b>	10.2 [9.2, 11.4]	3.0 [2.4, 3.8]
Age	<b>&lt;25</b>	2.2 [0.8, 4.8]	0.8 [0.2, 1.8]
	<b>25-44</b>	4.4 [3.6, 5.4]	0.6 [0.4, 1.0]
	<b>45-64</b>	7.5 [6.9, 8.2]	1.7 [1.4, 2.0]
	<b>65-84</b>	11.2 [10.5, 11.9]	6.0 [5.3, 6.8]
	<b>85+</b>	16.4 [13.4, 19.8]	22.8 [12.8, 37.6]
	<b>Non-diabetic</b>	6.4 [5.9, 7.0]	2.1 [1.8, 2.4]
Diabetes status	<b>Type 1 diabetes</b>	11.4 [9.2, 13.9]	4.4 [3.2, 5.9]
	<b>Type 2 diabetes</b>	11.2 [10.5, 11.9]	4.3 [3.7, 5.0]
Coronary disease	<b>No</b>	6.6 [6.1, 7.1]	2.0 [1.7, 2.2]
	<b>Yes</b>	12.8 [12.0, 13.6]	5.9 [5.1, 6.7]

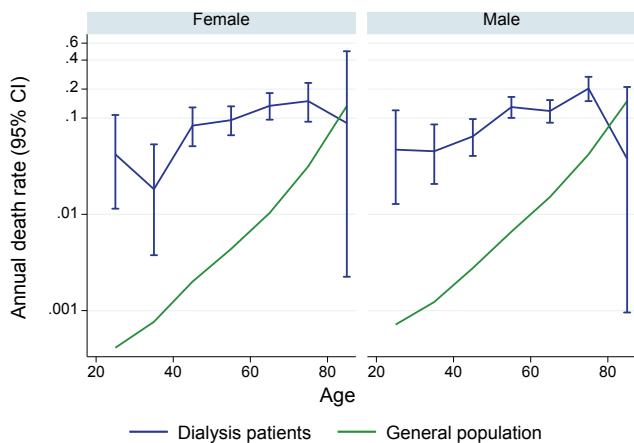
**Figure 3.2.1**  
**Prevalent Dialysis Mortality 2024 -  
 Australian Patients vs General Population**



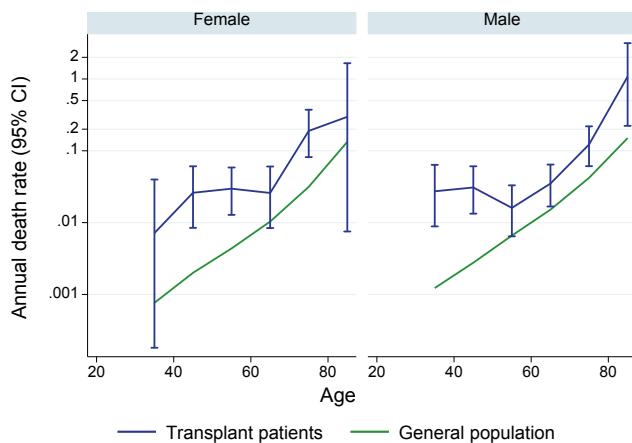
**Figure 3.2.2**  
**Prevalent Transplant Mortality 2024 -  
 Australian Patients vs General Population**



**Figure 3.3.1**  
**Prevalent Dialysis Mortality 2024 -  
 New Zealand Patients vs General Population**

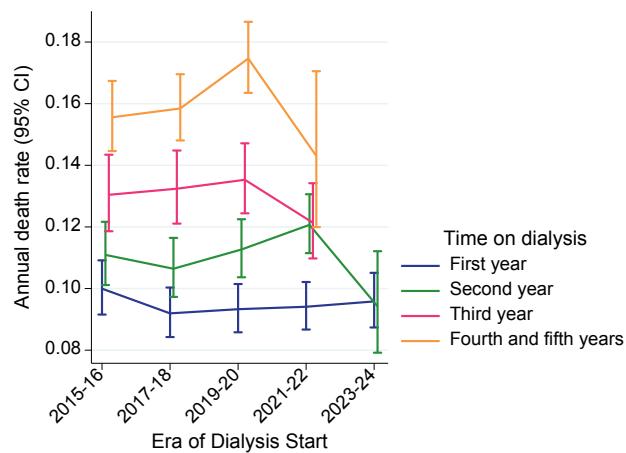


**Figure 3.3.2**  
**Prevalent Transplant Mortality 2024 -  
 New Zealand Patients vs General Population**

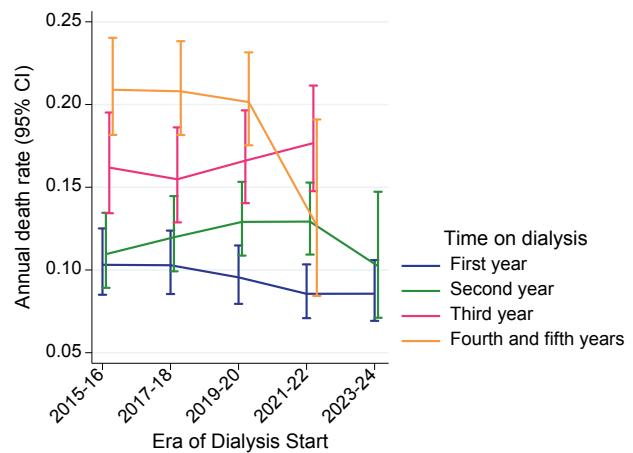


The evolution of dialysis mortality rates over time is shown in Figure 3.4.

**Figure 3.4.1**  
**Dialysis Mortality Rates in Australia - 2015-2024**



**Figure 3.4.2**  
**Dialysis Mortality Rates in New Zealand - 2015-2024**



## MEDIAN SURVIVAL

Another perspective on survival during dialysis is presented in Table 3.3. Median survival is the time to which 50% of people can expect to survive. Median survival is not presented for transplant recipients as it is not possible to estimate due to the low mortality rates. Table 3.4 shows the median survival of older people who started dialysis treatment, by various categories. These survival data are censored at the time of transplantation, and include those who started dialysis in the period 2015-2024. 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 3.3**  
**Median Survival on Dialysis by Age**  
**2015-2024**

Country	Age at start	Median (25th and 75th centiles), years
Australia	0-24	* (7.4, *)
	25-44	8.8 (5.1, *)
	45-64	6.3 (3.3, *)
	65-74	4.6 (2.3, 7.5)
	75-84	3.6 (1.8, 6.0)
	85+	2.7 (1.3, 4.4)
New Zealand	0-24	* (7.7, *)
	25-44	7.6 (4.3, *)
	45-64	4.9 (2.7, 8.2)
	65-74	3.7 (2.0, 6.4)
	75-84	2.8 (1.6, 4.5)
	85+	1.8 (0.7, 3.8)

**Table 3.4**  
**Survival on Dialysis by Age and Comorbidity Amongst**  
**Older People; Years (Median, 25th and 75th centiles)**  
**2015-2024**

	Age at Start	Any Vascular Disease	Diabetes	Australia	New Zealand
65-69	No	No	5.9 (3.4, 8.6)	5.6 (2.8, 7.3)	
	No	Yes	5.1 (2.7, 8.6)	4.6 (2.4, 6.9)	
	Yes	No	4.4 (1.9, 7.1)	3.4 (1.7, 6.8)	
	Yes	Yes	4.0 (2.0, 6.6)	3.3 (1.7, 5.2)	
70-74	No	No	5.7 (3.2, 8.6)	3.7 (2.0, 6.2)	
	No	Yes	4.9 (2.7, 8.0)	4.3 (2.7, 6.8)	
	Yes	No	4.3 (2.1, 7.2)	2.9 (1.5, 5.9)	
	Yes	Yes	3.6 (1.8, 6.1)	3.1 (1.5, 5.5)	
75-79	No	No	4.6 (2.6, 7.6)	3.2 (2.0, 4.4)	
	No	Yes	4.5 (2.3, 7.2)	3.7 (2.7, 5.9)	
	Yes	No	3.5 (1.7, 6.9)	2.6 (1.1, 4.3)	
	Yes	Yes	3.1 (1.5, 5.2)	2.8 (1.5, 3.9)	
80-84	No	No	3.8 (1.9, 6.4)	3.4 (1.7, 5.3)	
	No	Yes	3.8 (2.0, 5.7)	2.4 (1.4, *)	
	Yes	No	3.2 (1.5, 5.7)	2.3 (1.5, 3.2)	
	Yes	Yes	3.0 (1.5, 4.7)	1.9 (1.2, 5.6)	
85+	No	No	2.7 (1.7, 4.5)	1.8 (0.2, *)	
	No	Yes	3.2 (1.8, 4.7)	0.7 (0.7, *)	
	Yes	No	2.5 (0.9, 4.1)	1.2 (0.7, 3.1)	
	Yes	Yes	2.6 (1.4, 4.5)	3.8 (0.3, 3.8)	

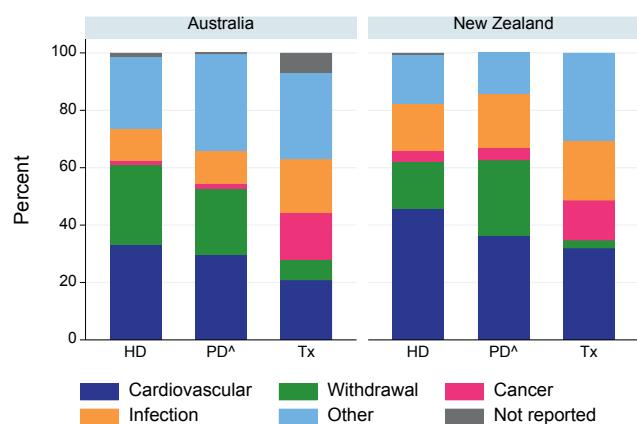
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# CAUSE OF DEATH

The focus of this section is on deaths reported during 2024. The cause of death reported to ANZDATA is not necessarily the same as that reported on the death certificate<sup>5</sup>. ANZDATA specifically records a range of reasons for “withdrawal from treatment”. The cause of death in these instances is a person’s underlying kidney failure, however, these data help to understand the reasons why individuals choose to cease kidney replacement therapy. This often relates to an underlying comorbidity and is further explored in Table 3.6.

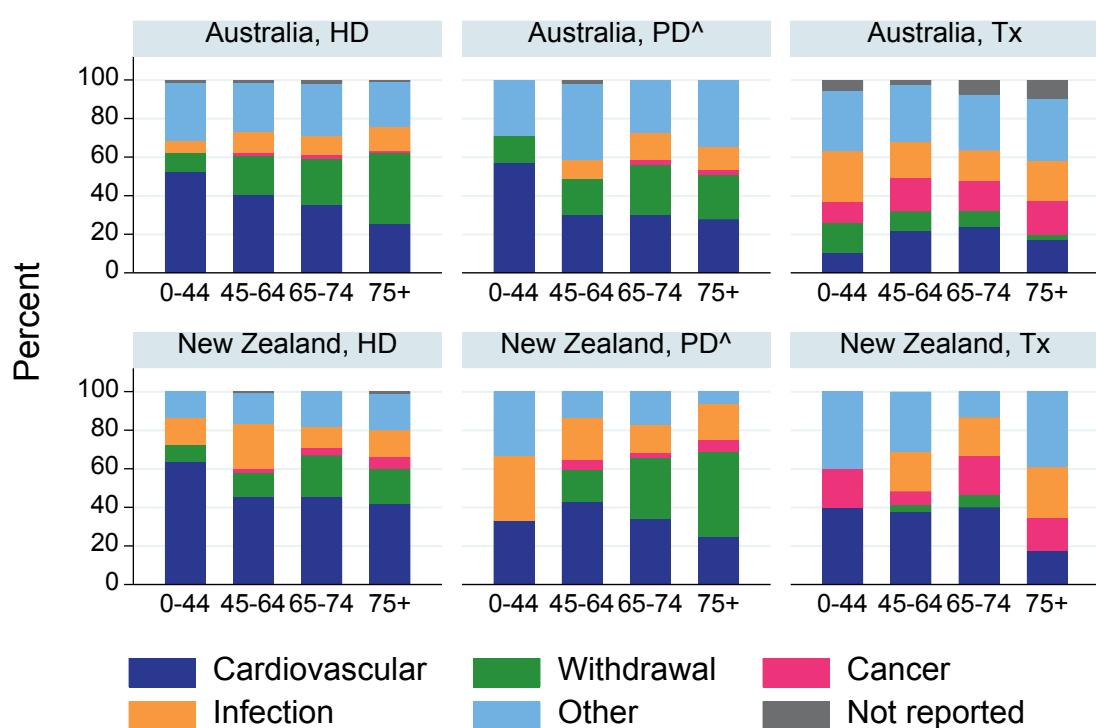
For the purposes of these analyses, deaths were attributed to the modality in use at the time of death (Figure 3.5). Figure 3.6 and Table 3.5 show the relationship between cause of death and age at death.

**Figure 3.5**  
**Cause of Death by Modality - Deaths Occurring During 2024**



<sup>^</sup>Includes Hybrid Dialysis

**Figure 3.6**  
**Cause of Death by Modality and Age at Death - Deaths Occurring During 2024**



<sup>^</sup>Includes Hybrid Dialysis

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Table 3.5

## Cause of Death by Modality and Age at Death - Deaths Occurring During 2024

Country	Cause of Death	Haemodialysis				Peritoneal Dialysis <sup>^</sup>				Transplant						
		0-44	45-54	65-74	75+	Total	0-44	45-54	65-74	75+	Total	0-44	45-54	65-74	75+	Total
Australia	Cardiovascular	49	208	183	226	666	4	16	22	37	79	2	20	38	20	80
	Withdrawal	9	106	125	325	565	1	10	19	31	61	3	9	13	3	28
	Cancer	0	6	10	8	24	0	0	2	3	5	2	16	25	20	63
	Infection	6	57	50	113	226	0	5	10	16	31	5	17	25	24	71
	Other	28	131	142	205	506	2	21	20	46	89	6	27	46	37	116
	Not reported	1	6	9	8	24	0	1	0	0	1	1	2	12	11	26
New Zealand	Total	93	514	519	885	2011	7	53	73	133	266	19	91	159	115	384
	Cardiovascular	14	64	55	40	173	1	16	12	4	33	2	11	6	4	23
	Withdrawal	2	17	26	17	62	0	6	11	7	24	0	1	1	0	2
	Cancer	0	3	5	6	14	0	2	1	1	4	1	2	3	4	10
	Infection	3	33	13	13	62	1	8	5	3	17	0	6	3	6	15
	Other	3	22	22	18	65	1	5	6	1	13	2	9	2	9	22
	Not reported	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0
	Total	22	140	121	95	378	3	37	35	16	91	5	29	15	23	72

<sup>^</sup>Includes Hybrid Dialysis

# WITHDRAWAL FROM KIDNEY REPLACEMENT THERAPY

During 2024 there were 654 deaths in Australia and 88 in New Zealand attributed to withdrawal from kidney replacement therapy (Table 3.6). The vast majority of these were among patients receiving dialysis therapy. "Psychosocial" reasons were the most cited reasons for withdrawal. However, the coding of these categories is clearly somewhat subjective. Table 3.7 shows a breakdown of patients who withdrew and died in 2024 by age and duration of KRT.

**Table 3.6**  
**Reason for Withdrawal from Kidney Replacement Therapy - 2024**

Country	Reason for withdrawal	HD	PD <sup>^</sup>	Tx
Australia	Psychosocial	190	26	7
	Declined further treatment	15	2	4
	Cardiovascular comorbidity	165	11	1
	Cerebrovascular comorbidity	53	8	1
	Peripheral vascular comorbidity	39	7	2
	Malignancy	80	6	13
	Dialysis access difficulties	23	1	0
New Zealand	Psychosocial	11	7	1
	Declined further treatment	2	0	0
	Cardiovascular comorbidity	26	5	0
	Cerebrovascular comorbidity	2	3	0
	Peripheral vascular comorbidity	11	7	0
	Malignancy	8	1	1
	Dialysis access difficulties	2	1	0

<sup>^</sup>Includes Hybrid Dialysis

**Table 3.6**  
**Reason for Withdrawal from Kidney Replacement Therapy - 2024**

Time from first KRT (years)	Australia					New Zealand				
	0-44	45-54	65-74	75+	Total	0-44	45-54	65-74	75+	Total
<1 year	1	19	16	36	72	0	3	5	3	11
1-2 years	0	18	17	29	64	0	5	5	4	14
2-5 years	5	35	50	112	202	2	8	13	11	34
5+ years	7	53	74	182	316	0	8	15	6	29
<b>Total</b>	<b>13</b>	<b>125</b>	<b>157</b>	<b>359</b>	<b>654</b>	<b>2</b>	<b>24</b>	<b>38</b>	<b>24</b>	<b>88</b>

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