

CHAPTER 5

Peritoneal Dialysis

Reporting the incidence, prevalence and survival of peritoneal dialysis patients in Australia and New Zealand; summarising dialysis fluids, laboratory results, rates of transfer to haemodialysis and peritonitis

CONTENTS

Summary and Highlights	3
Incidence, prevalence and usage	4
Peritoneal Dialysis Fluids	10
Patient Survival	13
Time on Peritoneal Dialysis	16
Peritonitis	24
Australian Peritonitis Registry	26
Laboratory Based Data at the time of the Annual Survey	30
Anaemia management	30
Biochemistry	31
References	32

SUMMARY AND HIGHLIGHTS

During the 2022 survey period, 1135 people in Australia and 332 people in New Zealand commenced maintenance peritoneal dialysis (PD). Compared to 2021, the number of patients on PD who received a kidney transplant increased by more than 15% (243, compared to 209 in 2021) but remained lower than pre-COVID-19 pandemic years (328 in 2019). The number of prevalent patients on PD and the proportion of all dialysis patients on PD remained the same in Australia.

In contrast, the number of prevalent patients on PD continues to decline in New Zealand (768 in 2022, compared to 812 in 2021), likely attributed to fewer patients who initiated, or returned to, PD (332, compared to 349 in 2021) and an increased number of patients who withdrew from dialysis or died (148, compared to 117 in 2021). The proportion of all dialysis patients on PD continued to fall in New Zealand over the past five years (30% in 2018 and 24% in 2022).

The most common age groups for patients who commenced PD in 2022 were between 65-74 years in Australia (26%) and between 55-64 years in New Zealand (26%). PD remained the more common dialysis modality for the paediatric group (91% in Australia and 83% in New Zealand). For patients commenced on PD, diabetic kidney disease remained the most common cause of primary kidney disease (33% in Australia and 46% in New Zealand).

The proportion of all PD patients receiving automated PD (APD) remains greater than those receiving continuous ambulatory PD (CAPD) (73% vs. 27% in Australia and 62% vs. 38% in New Zealand). There was marked variation in the use of icodextrin and low GDP solutions between countries and states. The proportions of patients receiving low GDP solutions were low in Australia (19%) and New Zealand (9%).

When considering all people who started peritoneal dialysis within a year of commencing kidney replacement therapy, the survival curves remained unchanged in Australia and New Zealand. The proportion of people surviving at 3 years was 76% in Australia and 65% in New Zealand. Increased age and presence of diabetes mellitus at initiation of kidney replacement therapy were associated with worse survival.

The proportion of patients who stayed on PD at 3-years (censored for kidney transplantation) remained low at 38% in Australia and 32% in New Zealand. Death remained the most common reason for PD discontinuation (25% in Australia and 32% in New Zealand), followed by infection (19% in Australia and 21% in New Zealand). Increased age and presence of diabetes mellitus at initiation of kidney replacement therapy were associated with shorter time on PD.

ANZDATA only reports on Australian episodes of peritoneal dialysis peritonitis, as New Zealand has a separate registry that is not currently linked to ANZDATA. In Australia, the peritonitis rate has been relatively stable (0.30 episodes per patient-year) and is meeting the ISPD international target of 0.4 episodes per patient-year. However, there was significant variation between treating units (0 to 0.69 peritonitis episodes per patient-year).

SUGGESTED CITATION

J Chen, C Davies, E Au, S Bateman, K Hurst, G Irish, D Lee, H McCarthy, S McDonald, W Mulley, M Roberts, T Sun, P Clayton. 46th Report, Chapter 5: Peritoneal dialysis. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2023. Available at: <http://www.anzdata.org.au>

INCIDENCE, PREVALENCE AND USAGE

Table 5.1 shows the percentage of all dialysis patients undergoing peritoneal dialysis (PD) in each state and country over 2018-2022. Table 5.2 shows the same data as a percentage of home dialysis (including community house haemodialysis) patients.

The duration of time spent on PD by prevalent patients is shown in figure 5.1.

Table 5.1
Percentage of all Dialysis Patients on Peritoneal Dialysis

State	2018	2019	2020	2021	2022
Queensland	17%	17%	16%	15%	15%
New South Wales	23%	22%	23%	23%	22%
Australian Capital Territory	9%	12%	15%	12%	12%
Victoria	18%	17%	17%	18%	18%
Tasmania	12%	14%	17%	19%	20%
South Australia	15%	14%	14%	15%	15%
Northern Territory	4%	6%	7%	7%	5%
Western Australia	15%	14%	15%	15%	15%
Australia	18%	17%	17%	18%	17%
New Zealand	30%	29%	28%	26%	24%

Table 5.2
Percentage of all Home Dialysis Patients on Peritoneal Dialysis

State	2018	2019	2020	2021	2022
Queensland	64%	65%	66%	66%	66%
New South Wales	69%	69%	69%	70%	69%
Australian Capital Territory	52%	56%	63%	56%	61%
Victoria	77%	74%	72%	73%	73%
Tasmania	68%	74%	81%	83%	86%
South Australia	80%	77%	83%	83%	83%
Northern Territory	48%	57%	48%	58%	60%
Western Australia	69%	69%	69%	70%	71%
Australia	70%	69%	69%	70%	70%
New Zealand	67%	67%	69%	67%	67%

Figure 5.1.1
Time on Peritoneal Dialysis - Prevalent PD Patients Australia 31 Dec 2022

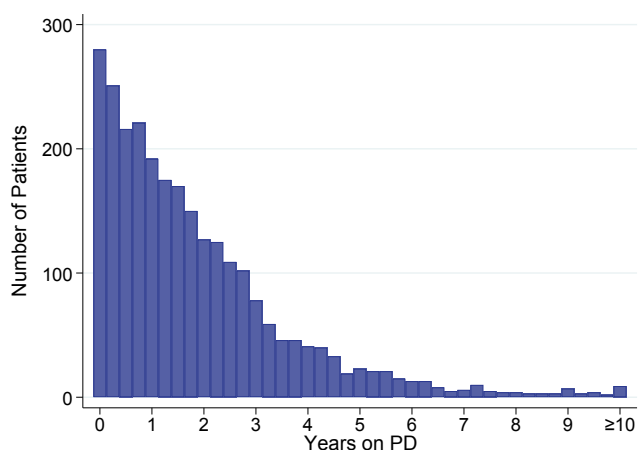
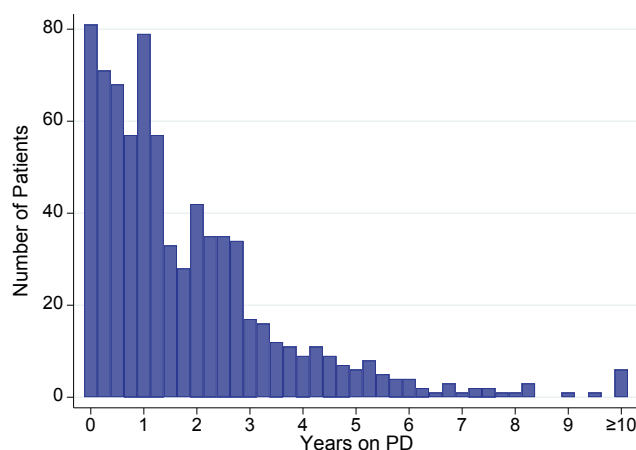


Figure 5.1.2
Time on Peritoneal Dialysis - Prevalent PD Patients New Zealand 31 Dec 2022



[BACK TO CONTENTS](#)

Table 5.3 shows the overall incidence, cessation and annual prevalence of PD in Australia and New Zealand over the last 5 years. Note that dialysis modality changes lasting less than 30 days are not included. Figure 5.2 presents some of these data graphically.

^Please note that in 2020 the ANZDATA registry began to record withdrawal from dialysis as a treatment decision in addition to documenting this as a cause of death. This change is reflected in fewer patients having death documented as cause of dialysis cessation in the table below. The great majority of people who withdraw from dialysis will pass away soon after this decision and therefore the total number of withdrawals and deaths can be compared with the number of deaths in previous years. Following cessation of PD with withdrawal from dialysis in 2021, the median number of days to death was 4, and 90% of patients died within 19 days.

Table 5.3
Incidence, Cessation and Annual Prevalence of Peritoneal Dialysis Patients 2018 - 2022

Country		2018	2019	2020	2021	2022
Australia	All patients who commenced PD					
	First dialysis treatment or returning after kidney recovery	801	768	916	910	836
	Transfer from HD (no prior PD)	245	262	258	222	234
	Transfer from HD (prior PD)	43	33	35	32	35
	Failed Transplant (no prior PD)	22	13	16	16	13
	Failed Transplant (prior PD)	19	12	27	12	17
	Total	1130	1088	1252	1192	1135
	All patients who ceased PD					
	Received kidney transplant	326	328	233	209	243
	Transfer to HD	519	488	542	557	547
	Kidney recovery	10	17	12	23	13
	Withdrawal from dialysis [^]	N/A	N/A	85	95	113
	Deaths	270	288	218	181	233
	Total	1125	1121	1090	1065	1149
	Total patients on PD at 31 December	2432	2397	2552	2679	2657
New Zealand	All patients who commenced PD					
	First dialysis treatment or returning after kidney recovery	231	241	271	249	236
	Transfer from HD (no prior PD)	85	77	79	81	71
	Transfer from HD (prior PD)	21	11	25	11	19
	Failed Transplant (no prior PD)	8	6	4	2	3
	Failed Transplant (prior PD)	7	4	6	6	3
	Total	352	339	385	349	332
	All patients who ceased PD					
	Received kidney transplant	65	72	54	69	69
	Transfer to HD	137	148	151	186	155
	Kidney recovery	7	5	4	8	5
	Withdrawal from dialysis [^]	N/A	N/A	36	27	47
	Deaths	139	156	113	90	101
	Total	348	381	358	380	377
	Total patients on PD at 31 December	866	821	849	812	768

Figure 5.2.1
Incidence, Cessation and Annual Prevalence of Peritoneal Dialysis Patients - Australia 2018-2022

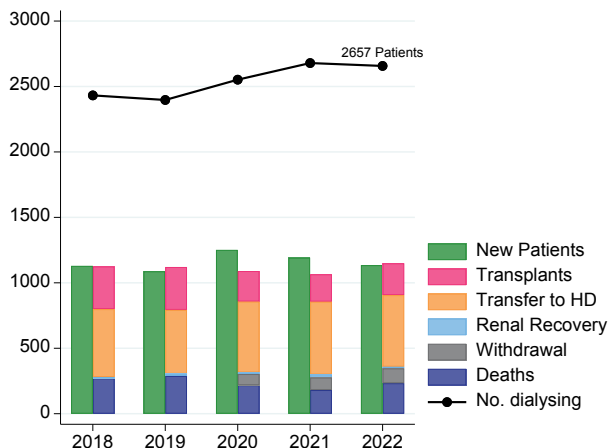


Figure 5.2.2
Incidence, Cessation and Annual Prevalence of Peritoneal Dialysis Patients - New Zealand 2018-2022

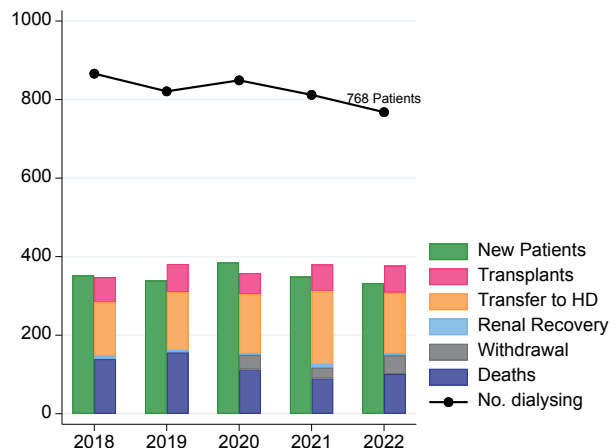


Figure 5.3.1
Age (%) of Incident Peritoneal Dialysis Patients - Australia 2022

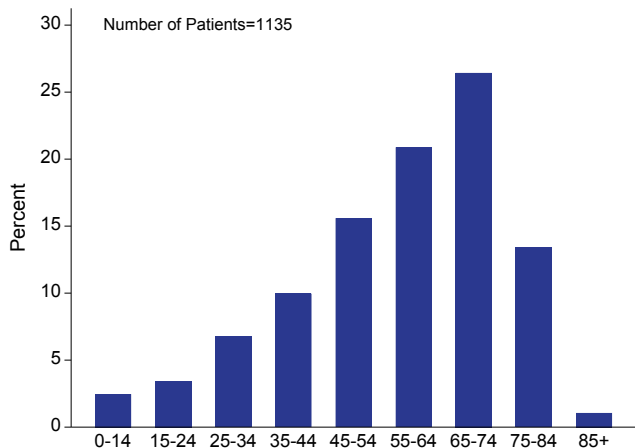


Figure 5.3.2
Age (%) of Incident Peritoneal Dialysis Patients - New Zealand 2022

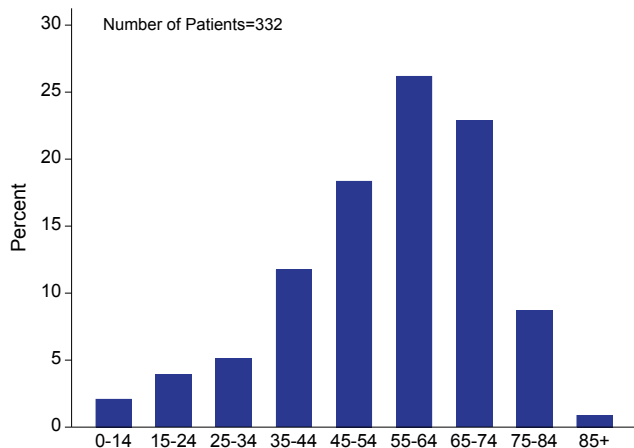


Figure 5.4.1
Age (%) of Prevalent Peritoneal Dialysis Patients - Australia 2022

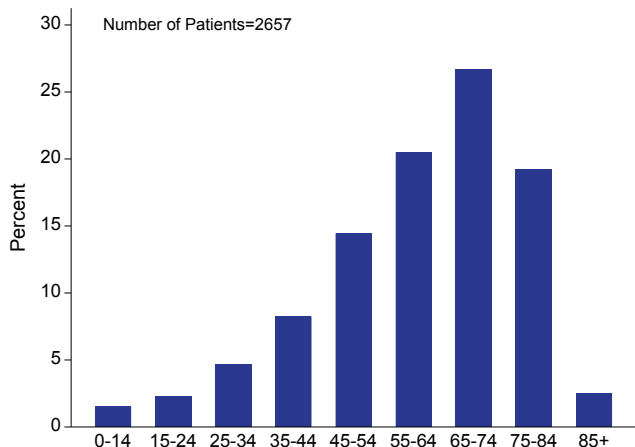


Figure 5.4.2
Age (%) of Prevalent Peritoneal Dialysis Patients - New Zealand 2022

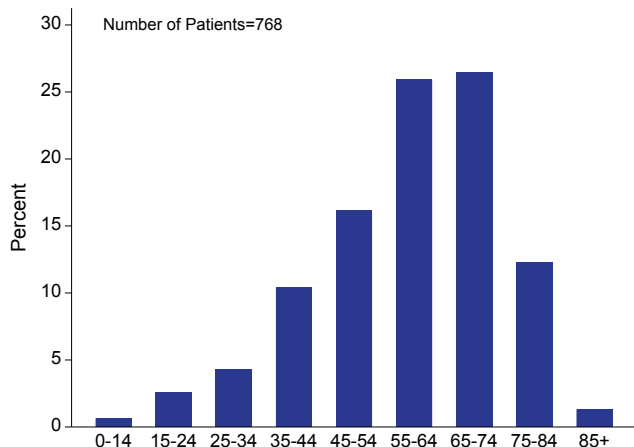


Table 5.4 presents the number and proportion of incident and prevalent peritoneal dialysis patients by age group.

Table 5.4.1
Incident and Prevalent PD patients by Age Group - Australia

Category	Age Group	2018	2019	2020	2021	2022
Incident Patients	0-14	19 (2%)	20 (2%)	21 (2%)	20 (2%)	28 (2%)
	15-24	34 (3%)	25 (2%)	28 (2%)	33 (3%)	39 (3%)
	25-34	65 (6%)	73 (7%)	94 (8%)	86 (7%)	77 (7%)
	35-44	129 (11%)	105 (10%)	116 (9%)	129 (11%)	113 (10%)
	45-54	167 (15%)	198 (18%)	209 (17%)	210 (18%)	177 (16%)
	55-64	235 (21%)	245 (23%)	281 (22%)	245 (21%)	237 (21%)
	65-74	314 (28%)	265 (24%)	307 (25%)	315 (26%)	300 (26%)
	75-84	150 (13%)	145 (13%)	177 (14%)	138 (12%)	152 (13%)
	85+	17 (2%)	12 (1%)	19 (2%)	16 (1%)	12 (1%)
	Total		1130	1088	1252	1192
Prevalent Patients	0-14	23 (1%)	23 (1%)	31 (1%)	37 (1%)	41 (2%)
	15-24	41 (2%)	31 (1%)	35 (1%)	37 (1%)	61 (2%)
	25-34	95 (4%)	103 (4%)	122 (5%)	130 (5%)	123 (5%)
	35-44	205 (8%)	197 (8%)	196 (8%)	220 (8%)	219 (8%)
	45-54	339 (14%)	337 (14%)	357 (14%)	392 (15%)	384 (14%)
	55-64	522 (21%)	525 (22%)	553 (22%)	560 (21%)	544 (20%)
	65-74	653 (27%)	638 (27%)	685 (27%)	712 (27%)	709 (27%)
	75-84	487 (20%)	480 (20%)	505 (20%)	518 (19%)	510 (19%)
	85+	67 (3%)	63 (3%)	68 (3%)	73 (3%)	66 (2%)
	Total		2432	2397	2552	2679

Table 5.4.2
Incident and Prevalent PD patients by Age Group - New Zealand

Category	Age Group	2018	2019	2020	2021	2022
Incident Patients	0-14	7 (2%)	5 (1%)	3 (1%)	3 (1%)	7 (2%)
	15-24	3 (1%)	7 (2%)	14 (4%)	9 (3%)	13 (4%)
	25-34	31 (9%)	29 (9%)	23 (6%)	24 (7%)	17 (5%)
	35-44	30 (9%)	32 (9%)	38 (10%)	41 (12%)	39 (12%)
	45-54	70 (20%)	71 (21%)	72 (19%)	68 (19%)	61 (18%)
	55-64	81 (23%)	94 (28%)	100 (26%)	82 (23%)	87 (26%)
	65-74	93 (26%)	71 (21%)	91 (24%)	83 (24%)	76 (23%)
	75-84	36 (10%)	30 (9%)	42 (11%)	36 (10%)	29 (9%)
	85+	1 (0%)	0 (0%)	2 (1%)	3 (1%)	3 (1%)
	Total		352	339	385	349
Prevalent Patients	0-14	15 (2%)	11 (1%)	7 (1%)	4 (0%)	5 (1%)
	15-24	14 (2%)	16 (2%)	23 (3%)	20 (2%)	20 (3%)
	25-34	46 (5%)	43 (5%)	42 (5%)	41 (5%)	33 (4%)
	35-44	77 (9%)	79 (10%)	87 (10%)	82 (10%)	80 (10%)
	45-54	151 (17%)	145 (18%)	143 (17%)	138 (17%)	124 (16%)
	55-64	204 (24%)	211 (26%)	218 (26%)	199 (25%)	199 (26%)
	65-74	229 (26%)	199 (24%)	209 (25%)	207 (25%)	203 (26%)
	75-84	125 (14%)	113 (14%)	115 (14%)	112 (14%)	94 (12%)
	85+	5 (1%)	4 (0%)	5 (1%)	9 (1%)	10 (1%)
	Total		866	821	849	812

Table 5.5 presents the number and proportion of incident peritoneal dialysis patients by primary kidney disease.

Table 5.5.1
Incident PD Patients by Primary Disease - Australia

Primary Kidney Disease	2018	2019	2020	2021	2022
Diabetic kidney disease	371 (33%)	378 (35%)	420 (34%)	383 (32%)	378 (33%)
Glomerular disease	312 (28%)	279 (26%)	337 (27%)	303 (25%)	286 (25%)
Hypertension / Renal vascular disease	153 (14%)	148 (14%)	134 (11%)	147 (12%)	144 (13%)
Familial / hereditary kidney diseases	95 (8%)	84 (8%)	88 (7%)	114 (10%)	89 (8%)
Tubulointerstitial disease	79 (7%)	89 (8%)	122 (10%)	114 (10%)	100 (9%)
Other systemic diseases affecting the kidney	24 (2%)	25 (2%)	24 (2%)	28 (2%)	23 (2%)
Miscellaneous kidney disorders	90 (8%)	79 (7%)	115 (9%)	100 (8%)	111 (10%)
Not reported	6 (1%)	6 (1%)	12 (1%)	3 (0%)	4 (0%)
Total	1130	1088	1252	1192	1135

Table 5.5.2
Incident PD Patients by Primary Disease - New Zealand

Primary Kidney Disease	2018	2019	2020	2021	2022
Diabetic kidney disease	163 (46%)	156 (46%)	166 (43%)	152 (44%)	152 (46%)
Glomerular disease	83 (24%)	90 (27%)	99 (26%)	101 (29%)	74 (22%)
Hypertension / Renal vascular disease	37 (11%)	33 (10%)	41 (11%)	42 (12%)	33 (10%)
Familial / hereditary kidney diseases	15 (4%)	16 (5%)	24 (6%)	18 (5%)	19 (6%)
Tubulointerstitial disease	22 (6%)	21 (6%)	33 (9%)	17 (5%)	23 (7%)
Other systemic diseases affecting the kidney	7 (2%)	3 (1%)	5 (1%)	5 (1%)	10 (3%)
Miscellaneous kidney disorders	24 (7%)	20 (6%)	16 (4%)	13 (4%)	20 (6%)
Not reported	1 (0%)	0 (0%)	1 (0%)	1 (0%)	1 (0%)
Total	352	339	385	349	332

Figure 5.5 shows the proportion of dialysis patients using PD as their modality by age.

Figure 5.5.1
PD Patients (%) of all Prevalent Dialysis - Australia 2022

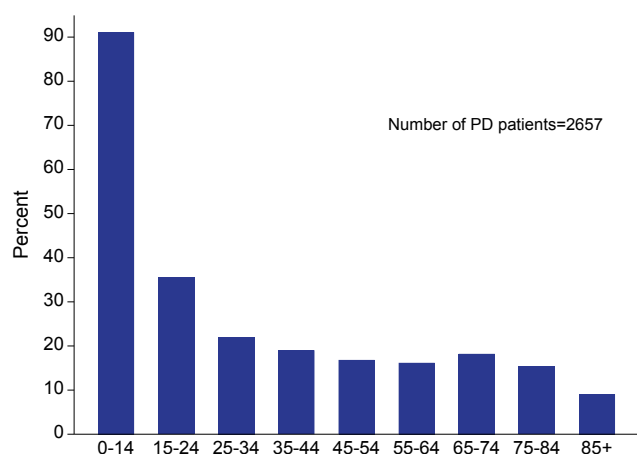


Figure 5.5.2
PD Patients (%) of all Prevalent Dialysis - New Zealand 2022

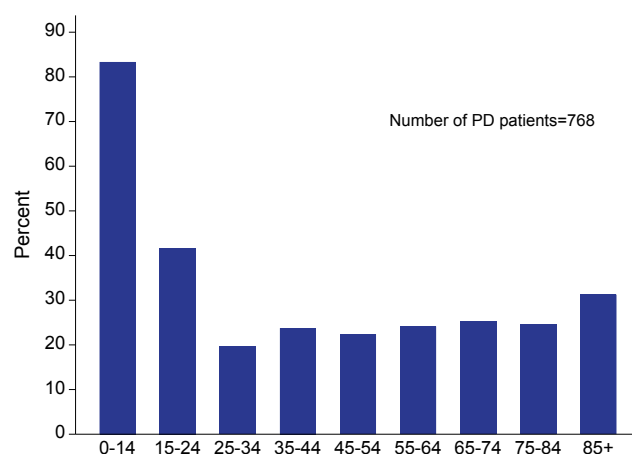


Table 5.6 shows the number of prevalent PD patients, and number per million population, according to PD type. Figure 5.6 shows the trends in PD type use over the last five years.

Population estimates for Australia and New Zealand used for the calculation of prevalence per million population were sourced from the Australian Bureau of Statistics (2022)¹ and Stats NZ (2022)².

Table 5.6.1
Number (per Million) of Prevalent PD Patients, Australia 2018-2022

	2018	2019	2020	2021	2022
Total	2432 (97)	2397 (95)	2552 (99)	2679 (104)	2657 (102)
APD	1671 (67)	1657 (65)	1777 (69)	1869 (73)	1942 (75)
CAPD	761 (30)	740 (29)	775 (30)	810 (32)	715 (28)

Table 5.6.2
Number (per Million) of Prevalent PD Patients, New Zealand 2018-2022

	2018	2019	2020	2021	2022
Total	866 (177)	821 (165)	849 (167)	812 (159)	768 (150)
APD	474 (97)	505 (101)	511 (100)	480 (94)	477 (93)
CAPD	392 (80)	316 (63)	338 (66)	332 (65)	291 (57)

Figure 5.6.1
Prevalent PD Modality - Australia, December 2018 - 2022

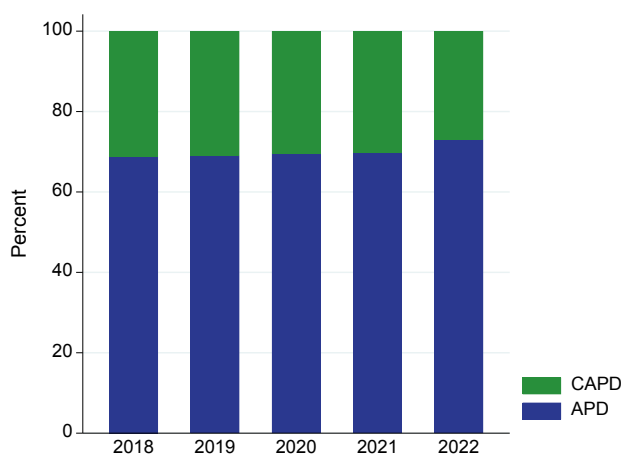
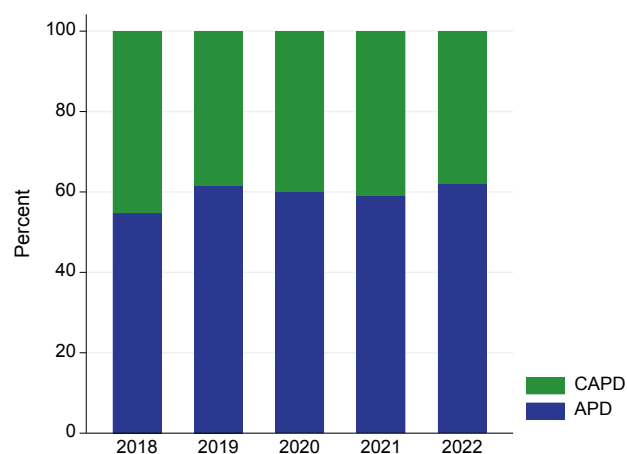


Figure 5.6.2
Prevalent PD Modality - New Zealand, December 2018 - 2022



PERITONEAL DIALYSIS FLUIDS

Table 5.7 shows the use of icodextrin by country and PD type at the end of 2022. Figure 5.7 shows the trends in icodextrin use over the last three years. Finally, figure 5.8 shows icodextrin use by state and PD type at the end of 2022.

Table 5.7
Icodextrin Usage by Modality Type - December 2022

PD Type	Australia				New Zealand				
	No	Yes	Not Reported	Total	No	Yes	Not Reported	Total	
CAPD	n	292	395	28	715	113	178	0	291
	%	41%	55%	4%		39%	61%	0%	
APD	n	912	997	33	1942	115	360	2	477
	%	47%	51%	2%		24%	75%	<1%	
Total	n	1204	1392	61	2657	228	538	2	768
	%	45%	52%	2%		30%	70%	<1%	

Figure 5.7.1
Icodextrin Use by Modality - Prevalent Patients December 2020 - 2022 Australia

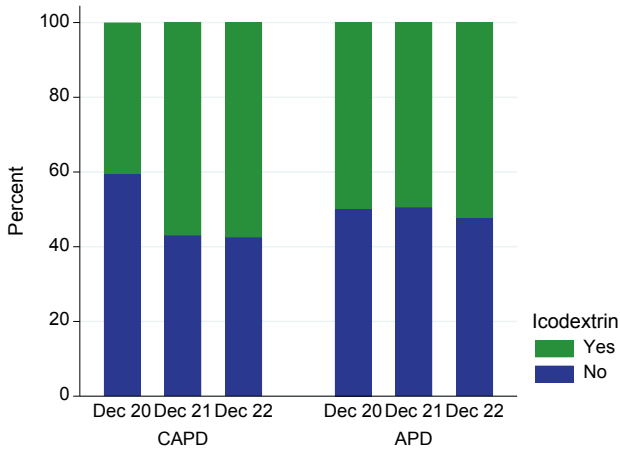


Figure 5.7.2
Icodextrin Use by Modality - Prevalent Patients December 2020 - 2022 New Zealand

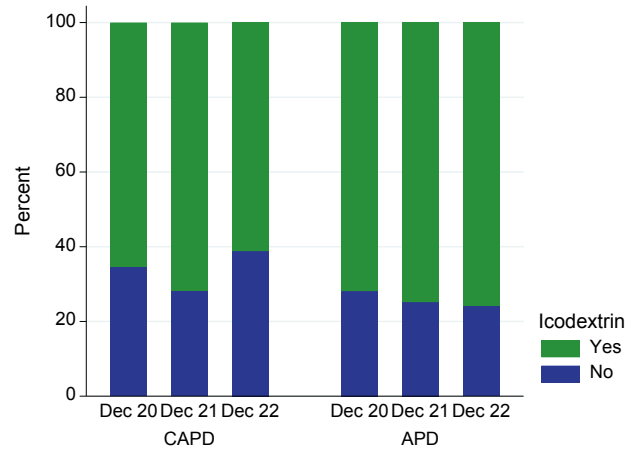


Figure 5.8
Icodextrin Use by State and Country - Prevalent Patients December 2022

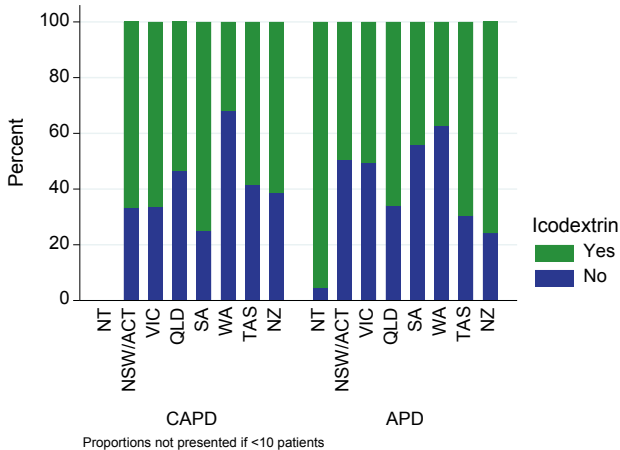


Table 5.8 and figures 5.9 and 5.10 present similar data for low GDP PD solutions.

Table 5.8
Low GDP Usage by Modality Type - December 2022

PD Type	Australia				New Zealand				
	No	Yes	Not Reported	Total	No	Yes	Not Reported	Total	
CAPD	n	460	227	28	715	272	19	0	291
	%	64%	32%	4%		93%	7%	0%	
APD	n	1620	289	33	1942	427	48	2	477
	%	83%	15%	2%		90%	10%	<1%	
Total	n	2080	516	61	2657	699	67	2	768
	%	78%	19%	2%		91%	9%	<1%	

Figure 5.9.1
Low GDP Use by Modality - Prevalent Patients
December 2020 - 2022 Australia

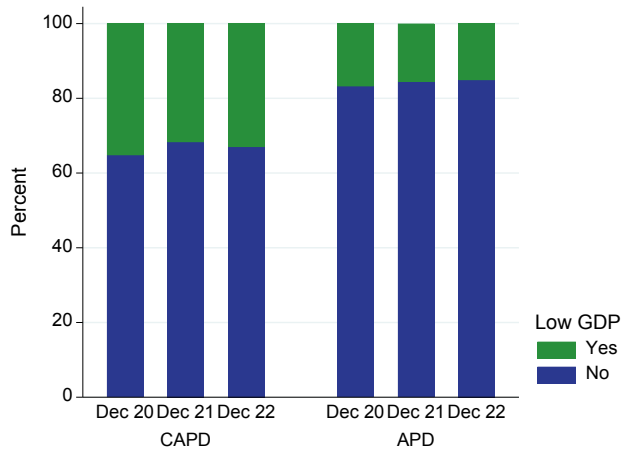


Figure 5.9.2
Low GDP Use by Modality - Prevalent Patients
December 2020 - 2022 New Zealand

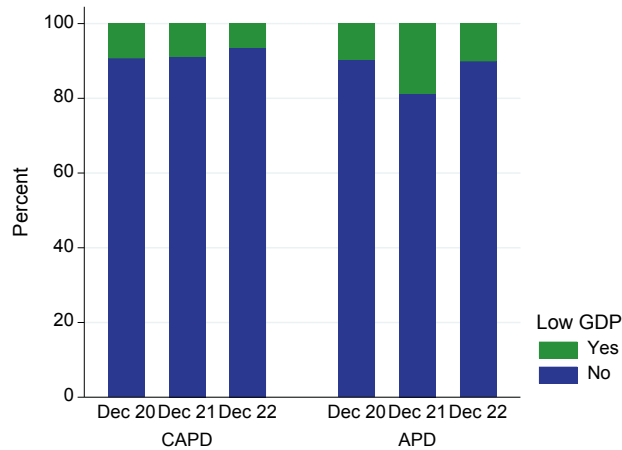


Figure 5.10
Low GDP Use by State and Country - Prevalent Patients December 2022

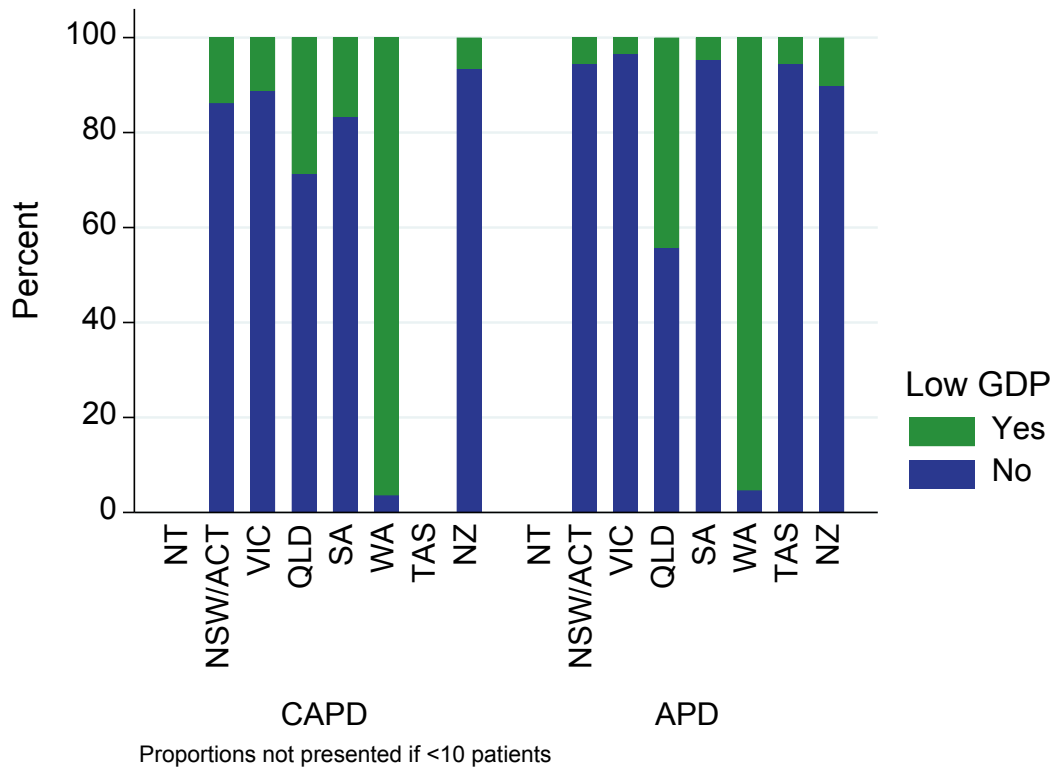


Figure 5.11.1
% Low GDP Use by Hospital - Australia 31 December 2022

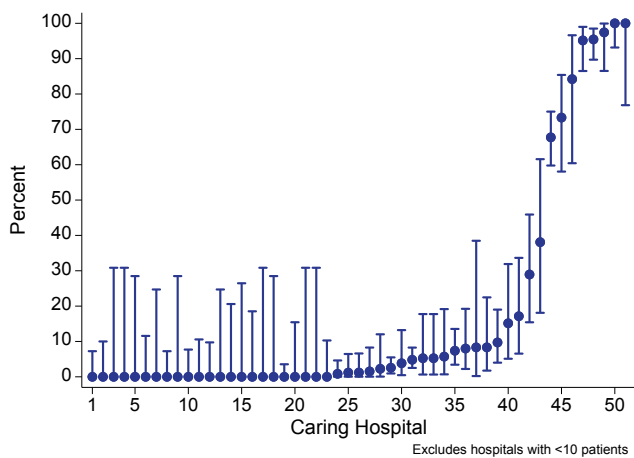
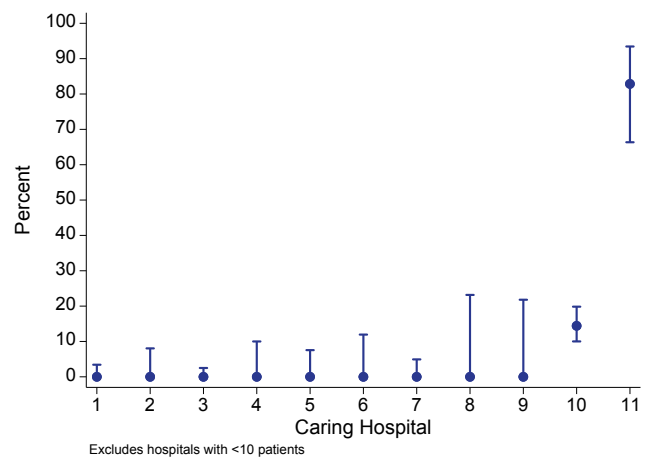


Figure 5.11.2
% Low GDP by Hospital - New Zealand 31 December 2022



PATIENT SURVIVAL

The next section examines PD patient survival. Survival time is presented for those commencing PD for the first time within 365 days of KRT start, from the date of PD start, and censored at transplantation. Patients commencing PD after a transplant are excluded.

Table 5.9 and figure 5.12 show patient survival by era.

Table 5.9
Patient Survival by Era - Peritoneal Dialysis within 365 days of KRT start - Censored for Transplant 2011-2022; % [95% Confidence Interval]

Country	Era	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	2011 - 2013	2685	97 [96, 98]	94 [93, 95]	74 [72, 75]	53 [50, 55]
	2014 - 2016	3069	97 [96, 98]	93 [92, 94]	73 [71, 75]	52 [50, 54]
	2017 - 2019	3036	97 [97, 98]	94 [93, 95]	76 [75, 78]	54 [52, 57]
	2020 - 2022	3283	97 [96, 98]	94 [93, 95]	-	-
New Zealand	2011 - 2013	760	97 [95, 98]	93 [91, 94]	66 [63, 70]	44 [40, 48]
	2014 - 2016	843	96 [95, 97]	93 [91, 94]	68 [64, 71]	41 [38, 45]
	2017 - 2019	929	96 [95, 97]	91 [89, 93]	65 [61, 68]	44 [39, 48]
	2020 - 2022	957	97 [96, 98]	94 [92, 95]	-	-

Figure 5.12.1
Patient Survival by Era Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - Australia

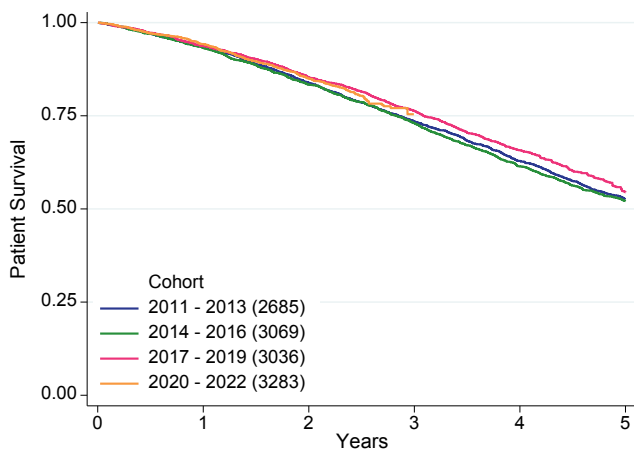


Figure 5.12.2
Patient Survival by Era Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - New Zealand

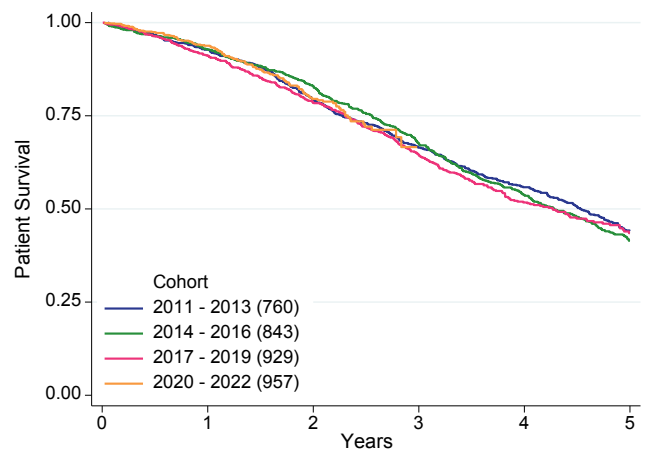


Table 5.10 and figure 5.13 demonstrate the strong association between patient age and survival.

Table 5.10
Patient Survival by Age Group - Peritoneal Dialysis within 365 days of KRT start - Censored for Transplant 2011-2022; % [95% Confidence Interval]

Country	Age Group	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	<40	1841	99 [98, 99]	98 [97, 99]	92 [90, 94]	85 [81, 88]
	40-59	3853	99 [98, 99]	96 [95, 96]	82 [80, 83]	66 [63, 68]
	60-74	4533	96 [96, 97]	93 [92, 93]	72 [70, 73]	50 [48, 52]
	≥75	1846	94 [93, 95]	88 [87, 90]	58 [55, 60]	33 [30, 35]
New Zealand	<40	513	100 [98, 100]	98 [96, 99]	89 [85, 92]	75 [68, 81]
	40-59	1309	98 [97, 98]	95 [94, 96]	74 [71, 77]	50 [46, 54]
	60-74	1323	96 [94, 97]	90 [88, 91]	58 [55, 61]	35 [32, 38]
	≥75	344	93 [89, 95]	87 [83, 90]	46 [40, 52]	19 [14, 24]

Figure 5.13.1
Patient Survival by Age Group Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - Australia

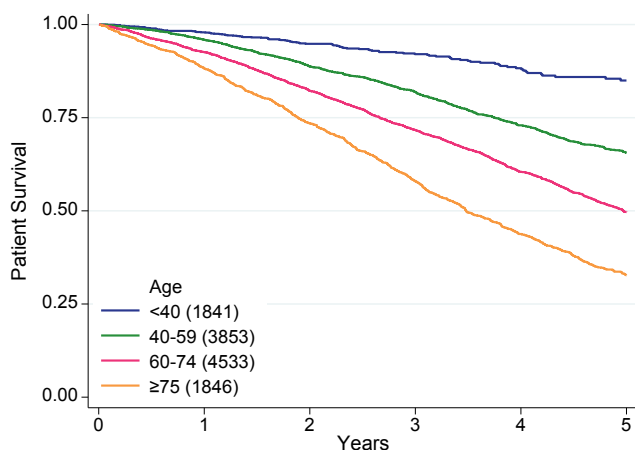


Figure 5.13.2
Patient Survival by Age Group Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - New Zealand

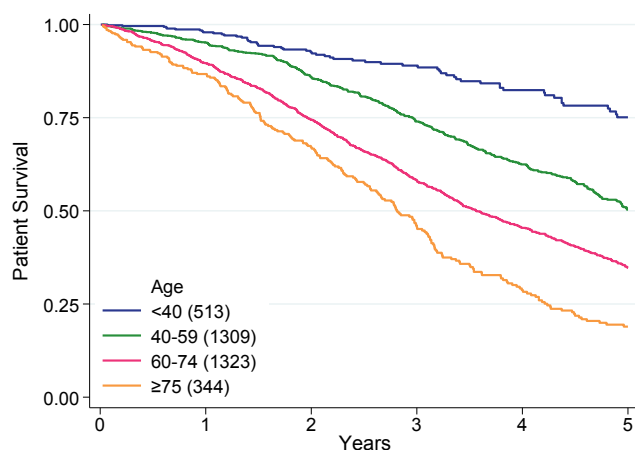


Table 5.11 and figure 5.14 present these data by diabetic status.

Table 5.11
Patient Survival by Diabetic Status - Peritoneal Dialysis within 365 days of KRT start - Censored for Transplant 2011-2022; % [95% Confidence Interval]

Country	Diabetic Status	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	Non-diabetic	6562	98 [97, 98]	95 [95, 96]	81 [80, 82]	63 [61, 65]
	Diabetic	5457	96 [96, 97]	92 [91, 92]	68 [66, 69]	45 [43, 47]
New Zealand	Non-diabetic	1596	97 [96, 98]	94 [92, 95]	74 [71, 76]	52 [48, 56]
	Diabetic	1886	96 [95, 97]	92 [90, 93]	61 [58, 63]	36 [34, 39]

Figure 5.14.1
Patient Survival by Diabetic Status Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - Australia

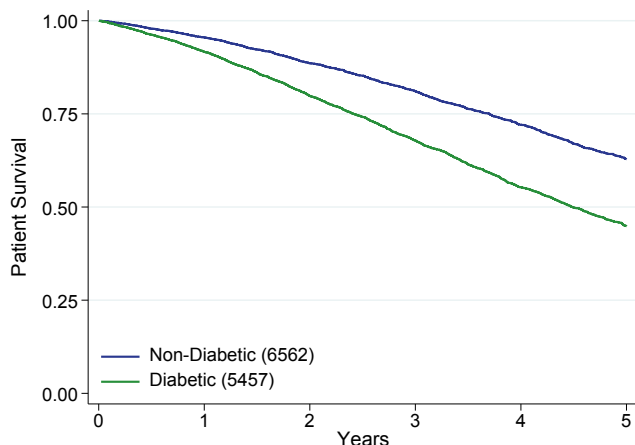
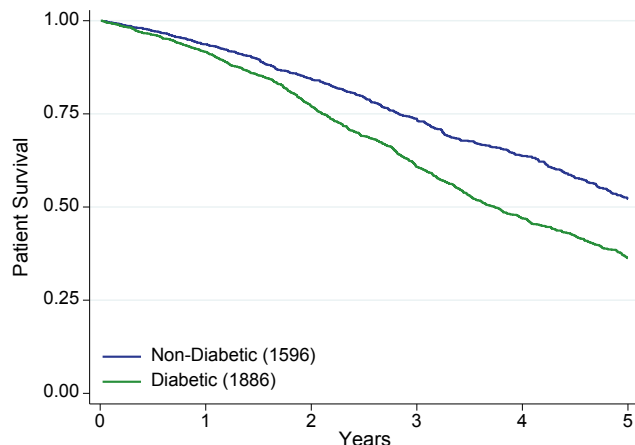


Figure 5.14.2
Patient Survival by Diabetic Status Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - New Zealand



TIME ON PERITONEAL DIALYSIS

This section examines time on peritoneal dialysis (previously known as technique survival), defined as the number of days the patient spent on PD before transferring to HD for at least 30 days, withdrawing from dialysis, or dying (either on PD or within 30 days of transfer to HD). Survival time is calculated from the date of PD start and censored at transplantation. Only patients initiating PD for the first time within 365 days of KRT commencement are included. Patients commencing PD after a transplant are excluded. Survival is shown for the same categories reported for patient survival above.

Table 5.12 and figure 5.15 show time on peritoneal dialysis by era.

Table 5.12
Time on Peritoneal Dialysis by Era - Peritoneal Dialysis within 365 days of KRT start - Censored for Transplant 2011-2022; % [95% Confidence Interval]

Country	Era	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	2011 - 2013	2685	86 [84, 87]	75 [73, 76]	39 [37, 41]	17 [15, 19]
	2014 - 2016	3069	88 [87, 89]	77 [75, 78]	38 [36, 40]	16 [14, 17]
	2017 - 2019	3036	86 [85, 87]	75 [73, 76]	38 [36, 40]	17 [15, 19]
	2020 - 2022	3283	87 [85, 88]	75 [73, 77]	-	-
New Zealand	2011 - 2013	760	87 [84, 89]	79 [76, 81]	40 [37, 44]	18 [15, 21]
	2014 - 2016	843	87 [85, 89]	77 [74, 80]	40 [37, 44]	15 [12, 18]
	2017 - 2019	929	85 [83, 88]	75 [72, 78]	32 [29, 35]	13 [10, 16]
	2020 - 2022	957	85 [82, 87]	76 [73, 79]	-	-

Figure 5.15.1
Time on Peritoneal Dialysis by Era Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - Australia

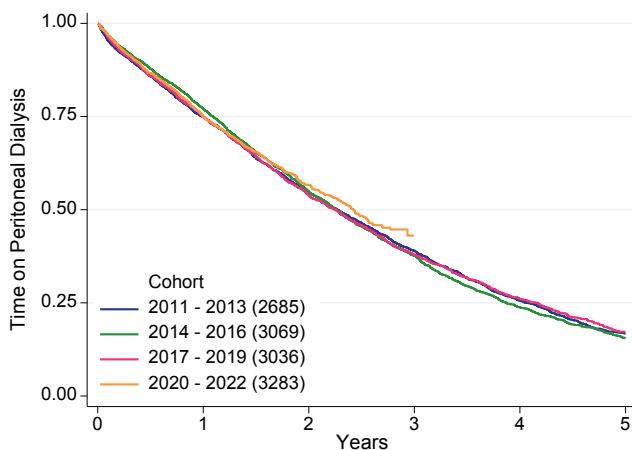


Figure 5.15.2
Time on Peritoneal Dialysis by Era Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - New Zealand

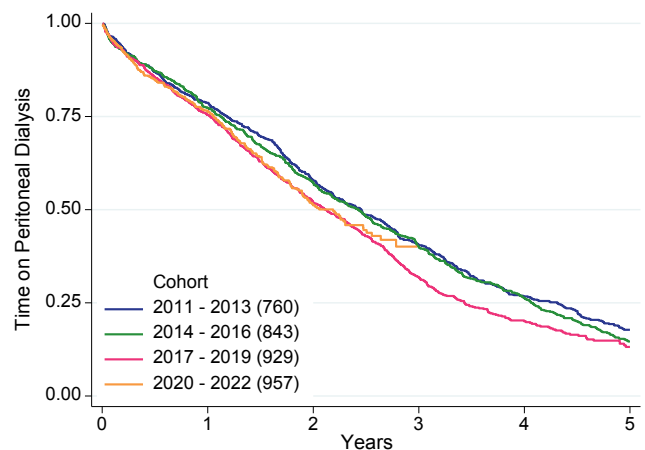


Table 5.13 and figure 5.16 show the association between patient age and time on peritoneal dialysis.

Table 5.13
Time on Peritoneal Dialysis by Age Group - Peritoneal Dialysis within 365 days of KRT start - Censored for Transplant 2011-2022; % [95% Confidence Interval]

Country	Age Group	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	<40	1841	89 [88, 91]	76 [73, 78]	43 [40, 47]	30 [25, 34]
	40-59	3853	88 [87, 89]	78 [76, 79]	41 [39, 43]	18 [16, 20]
	60-74	4533	86 [85, 87]	76 [74, 77]	39 [37, 40]	17 [15, 18]
	≥75	1846	82 [80, 84]	70 [68, 72]	32 [30, 34]	11 [9, 13]
New Zealand	<40	513	89 [86, 91]	80 [76, 83]	45 [39, 51]	22 [16, 29]
	40-59	1309	87 [85, 89]	78 [76, 81]	39 [35, 42]	15 [13, 18]
	60-74	1323	85 [83, 87]	75 [73, 78]	35 [32, 38]	14 [12, 17]
	≥75	344	82 [77, 85]	72 [67, 77]	31 [25, 36]	10 [6, 14]

Figure 5.16.1
Time on Peritoneal Dialysis by Age Group Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - Australia

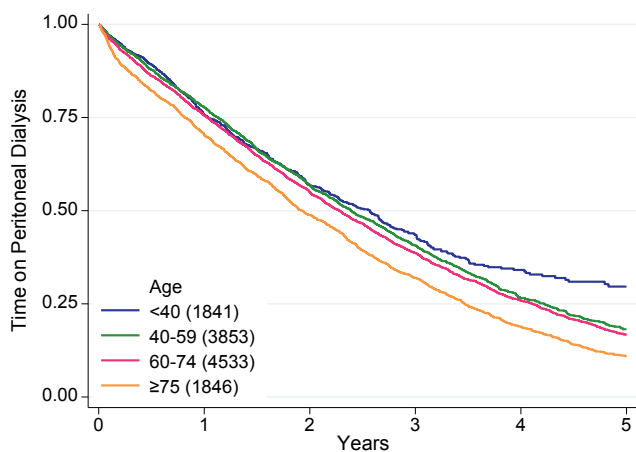


Figure 5.16.2
Time on Peritoneal Dialysis by Age Group Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - New Zealand

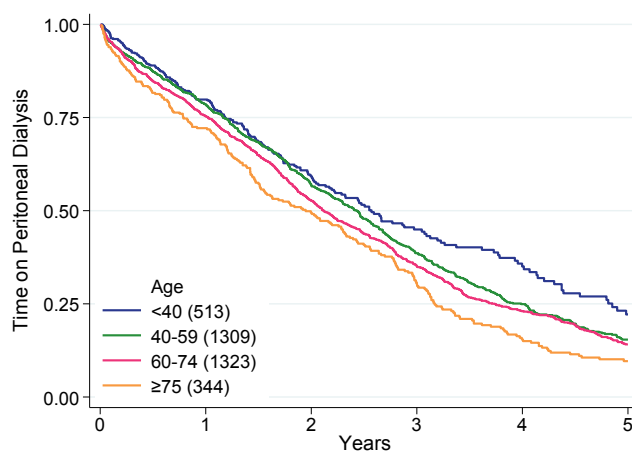


Table 5.14 and figure 5.17 present these data by diabetic status.

Table 5.14
Time on Peritoneal Dialysis by Diabetic Status - Peritoneal Dialysis within 365 days of KRT start - Censored for Transplant 2011-2022; % [95% Confidence Interval]

Country	Diabetic Status	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	Non-diabetic	6562	88 [87, 88]	77 [76, 79]	44 [43, 46]	22 [20, 24]
	Diabetic	5457	85 [84, 86]	73 [72, 74]	33 [31, 34]	12 [11, 13]
New Zealand	Non-diabetic	1596	87 [85, 89]	79 [77, 81]	46 [43, 49]	22 [19, 25]
	Diabetic	1886	85 [83, 87]	75 [73, 77]	31 [28, 33]	10 [9, 12]

Figure 5.17.1
Time on Peritoneal Dialysis by Diabetic Status Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - Australia

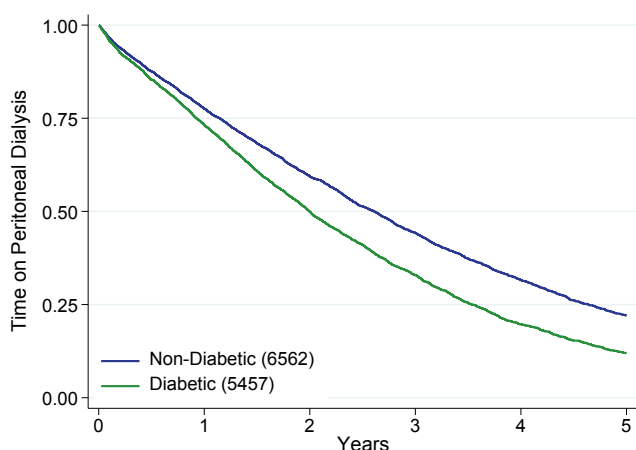


Figure 5.17.2
Time on Peritoneal Dialysis by Diabetic Status Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Transplant - New Zealand

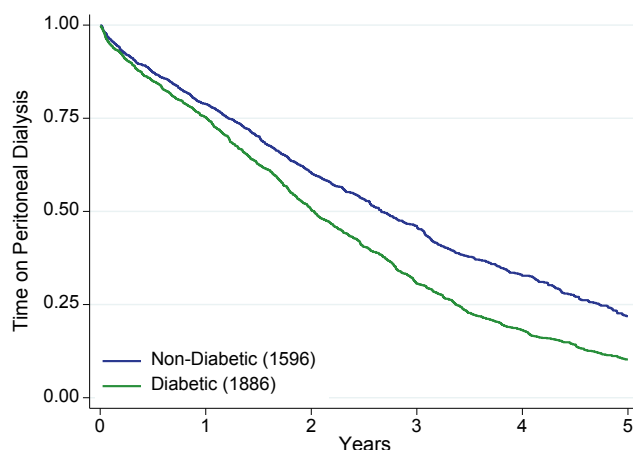


Table 5.15 and figure 5.18 show transfer to haemodialysis (previously known at death-censored technique failure) by era. Survival time is also censored for withdrawal from dialysis and transplantation.

Table 5.15
Transfer to Haemodialysis by Era - Peritoneal Dialysis within 365 days of KRT start - Censored for Death, Withdrawal and Transplant 2011-2022; % [95% Confidence Interval]

Country	Era	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	2011 - 2013	2685	88 [87, 90]	79 [78, 81]	53 [51, 55]	34 [31, 36]
	2014 - 2016	3069	90 [89, 91]	82 [81, 84]	51 [49, 53]	32 [30, 35]
	2017 - 2019	3036	88 [87, 89]	80 [78, 81]	51 [49, 53]	36 [33, 39]
	2020 - 2022	3283	89 [88, 90]	80 [78, 81]	-	-
New Zealand	2011 - 2013	760	90 [88, 92]	84 [82, 87]	62 [57, 65]	43 [38, 48]
	2014 - 2016	843	90 [88, 92]	83 [80, 85]	59 [56, 63]	40 [35, 45]
	2017 - 2019	929	89 [86, 91]	83 [80, 85]	52 [48, 56]	35 [30, 41]
	2020 - 2022	957	88 [85, 90]	81 [78, 84]	-	-

Figure 5.18.1
Transfer to Haemodialysis by Era Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Death, Withdrawal and Transplant - Australia

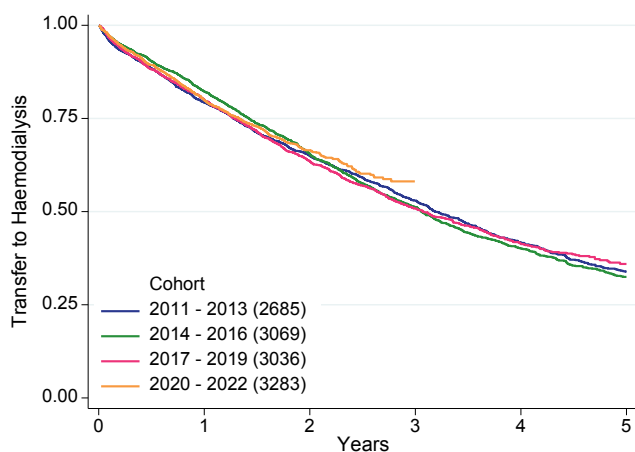


Figure 5.18.2
Transfer to Haemodialysis by Era Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Death, Withdrawal and Transplant - New Zealand

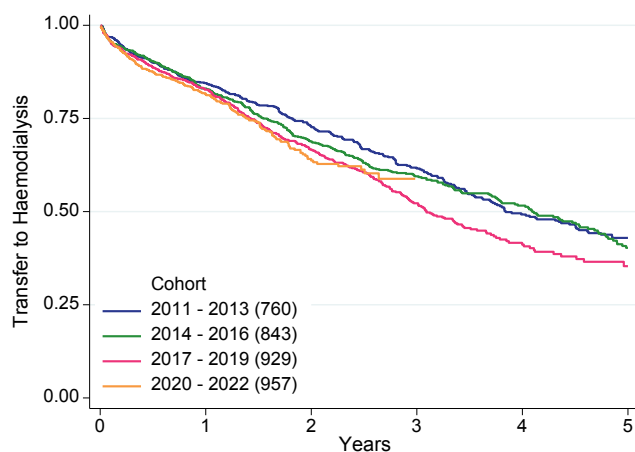


Table 5.16 and figure 5.19 show the association between patient age and transfer to haemodialysis.

Table 5.16
Transfer to Haemodialysis by Age Group - Peritoneal Dialysis within 365 days of KRT start - Censored for Death, Withdrawal and Transplant 2011-2022; % [95% Confidence Interval]

Country	Age Group	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	<40	1841	90 [89, 91]	77 [75, 79]	47 [43, 50]	34 [29, 38]
	40-59	3853	89 [88, 90]	81 [79, 82]	48 [46, 51]	27 [24, 30]
	60-74	4533	89 [89, 90]	81 [80, 83]	54 [52, 56]	37 [35, 39]
	≥75	1846	87 [86, 89]	80 [78, 82]	57 [55, 60]	42 [38, 45]
New Zealand	<40	513	89 [86, 92]	81 [77, 84]	50 [43, 55]	29 [22, 37]
	40-59	1309	89 [88, 91]	82 [80, 84]	54 [50, 57]	33 [29, 38]
	60-74	1323	89 [87, 90]	84 [82, 86]	60 [57, 64]	44 [40, 49]
	≥75	344	88 [84, 91]	84 [80, 88]	68 [62, 74]	59 [50, 66]

Figure 5.19.1
Transfer to Haemodialysis by Age Group Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Death, Withdrawal and Transplant - Australia

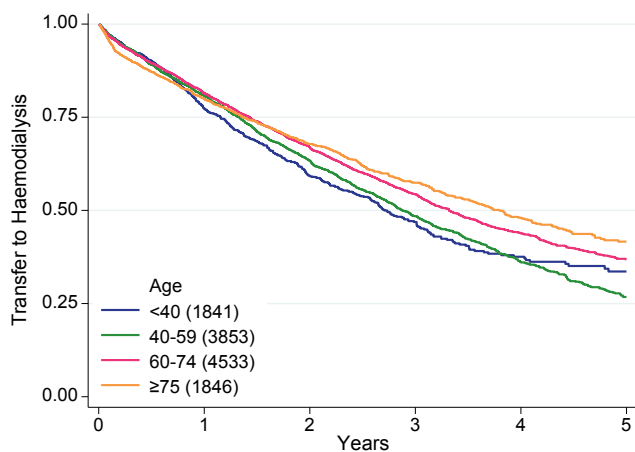


Figure 5.19.2
Transfer to Haemodialysis by Age Group Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022 Censored for Death, Withdrawal and Transplant - New Zealand

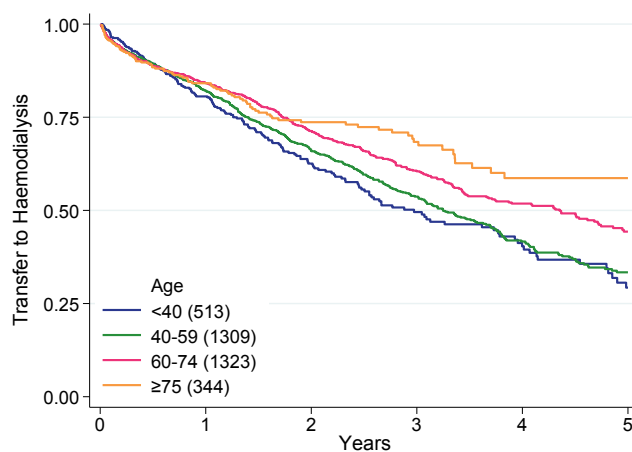


Table 5.17 and figure 5.20 present these data by diabetic status.

Table 5.17
Transfer to Haemodialysis by Diabetic Status - Peritoneal Dialysis within 365 days of KRT start
- Censored for Death, Withdrawal and Transplant 2011-2022; % [95% Confidence Interval]

Country	Diabetic Status	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	Non-diabetic	6562	89 [89, 90]	81 [80, 82]	55 [53, 56]	37 [35, 39]
	Diabetic	5457	89 [88, 89]	80 [78, 81]	49 [47, 51]	31 [29, 33]
New Zealand	Non-diabetic	1596	90 [88, 91]	84 [82, 86]	62 [59, 65]	44 [39, 48]
	Diabetic	1886	89 [87, 90]	82 [80, 84]	53 [50, 56]	35 [32, 39]

Figure 5.20.1
Transfer to Haemodialysis by Diabetic Status Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022
Censored for Death, Withdrawal and Transplant - Australia

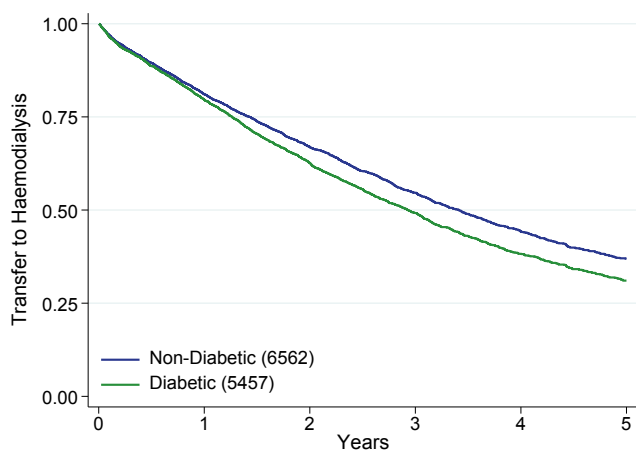
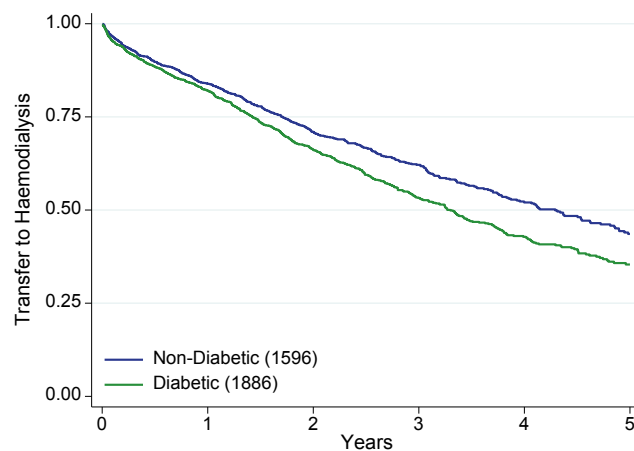


Figure 5.20.2
Transfer to Haemodialysis by Diabetic Status Peritoneal Dialysis within 365 days of KRT start - 2011 - 2022
Censored for Death, Withdrawal and Transplant - New Zealand



The causes of PD discontinuation in 2022 are shown in table 5.18.

Table 5.18
Reason for PD Discontinuation 2022

Category	Cause of PD Discontinuation	Australia	New Zealand
Infection	Recurrent/Persistent Peritonitis	64	27
	Acute Peritonitis	92	25
	Tunnel/Exit Site Infection	14	14
	Diverticulitis	2	1
	Abdominal Abscess	1	0
	Total	173 (19%)	67 (21%)
Inadequate dialysis	Inadequate Solute Clearance	88	30
	Inadequate Fluid Ultrafiltration	38	9
	Excessive Fluid Ultrafiltration	3	0
	Poor Nutrition	1	0
	Total	130 (15%)	39 (12%)
Mechanical	Dialysate Leak	20	5
	Catheter Block	13	6
	Hernia	24	3
	Abdominal Pain	2	1
	Abdominal Surgery	15	3
	Multiple Adhesions	2	0
	Pleural Effusion	13	1
	Other Surgery	6	0
	Hydrothorax	4	1
Scrotal Oedema	1	2	
	Total	100 (11%)	22 (7%)
Social	Geography	0	1
	Patient Preference	32	4
	Unable to Manage Self-Care	41	13
	Total	73 (8%)	18 (6%)
Other	Vascular Access	2	0
	Planned Transfer After Acute PD Start	2	0
	Planned Transfer After Acute HD Start	1	0
	Other (Specify)	45	12
	Total	50 (6%)	12 (4%)
Death	Total	220 (25%)	100 (32%)
Withdrawal from dialysis	Total	105 (12%)	47 (15%)
Not reported	Total	39 (4%)	8 (3%)

Figure 5.21 and table 5.19 show the cumulative incidence of patients returning to PD after transfer to haemodialysis over 2018-2022. These data are censored at transplantation, and death is treated as a competing risk.

Figure 5.21.1
Time to Restarting PD after Transfer to Haemodialysis - Australia 2018-2022

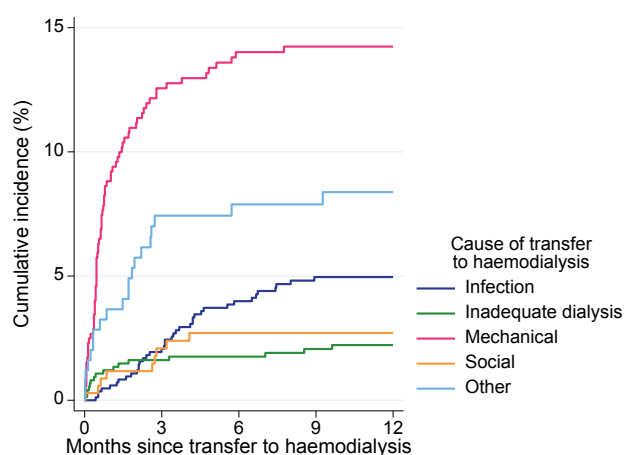


Figure 5.21.2
Time to Restarting PD after Transfer to Haemodialysis - New Zealand 2018-2022

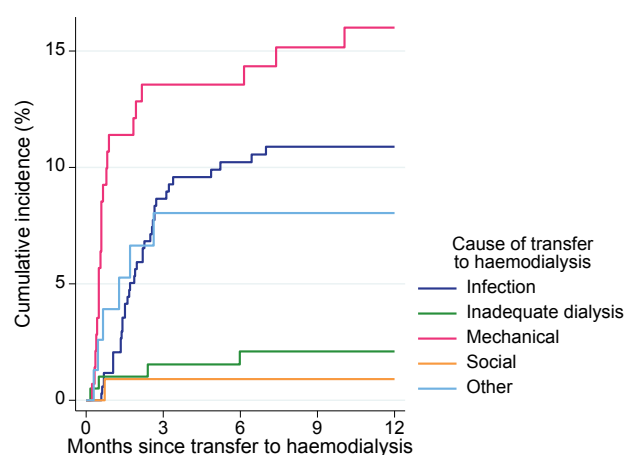


Table 5.19.1
Return to PD [Cumulative Incidence and 95% CI] by Cause of Transfer to Haemodialysis, Australia 2018-2022

Cause of transfer to haemodialysis	3 months	6 months	9 months	12 months
Infection	2.1 [1.3, 3.2]	4.0 [2.8, 5.5]	5.0 [3.6, 6.6]	5.0 [3.6, 6.6]
Inadequate dialysis	1.6 [0.9, 2.7]	1.8 [1.0, 2.9]	2.1 [1.2, 3.3]	2.2 [1.3, 3.5]
Mechanical	12.6 [9.9, 15.6]	14.0 [11.2, 17.2]	14.2 [11.4, 17.4]	14.2 [11.4, 17.4]
Social	2.1 [0.9, 4.1]	2.7 [1.3, 4.9]	2.7 [1.3, 4.9]	2.7 [1.3, 4.9]
Other	7.4 [4.6, 11.2]	7.9 [4.9, 11.7]	7.9 [4.9, 11.7]	8.4 [5.3, 12.3]

Table 5.19.2
Return to PD [Cumulative Incidence and 95% CI] by Cause of Transfer to Haemodialysis, New Zealand 2018-2022

Cause of transfer to haemodialysis	3 months	6 months	9 months	12 months
Infection	8.7 [6.0, 12.0]	10.2 [7.3, 13.8]	10.9 [7.8, 14.5]	10.9 [7.8, 14.5]
Inadequate dialysis	1.5 [0.4, 4.1]	2.1 [0.7, 4.9]	2.1 [0.7, 4.9]	2.1 [0.7, 4.9]
Mechanical	13.6 [8.5, 19.8]	13.6 [8.5, 19.8]	15.2 [9.8, 21.6]	16.0 [10.4, 22.6]
Social	0.9 [0.1, 4.5]	0.9 [0.1, 4.5]	0.9 [0.1, 4.5]	0.9 [0.1, 4.5]
Other	8.0 [3.3, 15.6]	8.0 [3.3, 15.6]	8.0 [3.3, 15.6]	8.0 [3.3, 15.6]

PERITONITIS

Table 5.20 and Figure 5.22 present the peritonitis-free survival over 2018-2022 by age at PD start.

Table 5.20
First PD Treatment to First Episode of Peritonitis By Age at Entry 01-Jan-2018 to 31-Dec-2022
% Survival [95% Confidence Interval]

Survival	Age Groups						All
	00-14	15-34	35-54	55-64	65-74	≥75	
Australia	(n=103)	(n=516)	(n=1457)	(n=1194)	(n=1435)	(n=804)	(n=5509)
3 months	94 [87, 97]	93 [90, 95]	94 [93, 95]	92 [90, 93]	94 [92, 95]	93 [91, 95]	93 [93, 94]
6 months	88 [79, 93]	87 [83, 90]	89 [87, 90]	88 [86, 90]	89 [87, 90]	86 [83, 89]	88 [87, 89]
9 months	82 [72, 89]	84 [80, 87]	84 [81, 86]	84 [81, 86]	83 [81, 85]	82 [78, 84]	83 [82, 84]
1 year	78 [67, 86]	80 [76, 84]	80 [77, 82]	79 [77, 82]	80 [77, 82]	78 [74, 81]	79 [78, 80]
2 years	76 [64, 84]	63 [56, 69]	66 [63, 70]	63 [59, 67]	65 [62, 68]	63 [58, 67]	65 [63, 66]
3 years	63 [35, 82]	60 [53, 67]	53 [48, 58]	51 [46, 56]	49 [45, 54]	56 [50, 61]	53 [50, 55]
New Zealand	(n=25)	(n=150)	(n=492)	(n=401)	(n=392)	(n=171)	(n=1631)
3 months	84 [63, 94]	94 [89, 97]	93 [90, 95]	94 [91, 96]	92 [88, 94]	91 [85, 95]	93 [91, 94]
6 months	71 [49, 85]	89 [82, 93]	89 [86, 92]	89 [85, 92]	86 [82, 89]	85 [79, 90]	88 [86, 89]
9 months	71 [49, 85]	85 [78, 91]	83 [79, 87]	83 [79, 87]	78 [73, 83]	82 [75, 87]	82 [80, 84]
1 year	55 [32, 73]	82 [73, 88]	79 [74, 82]	77 [72, 82]	73 [68, 78]	79 [71, 85]	77 [74, 79]
2 years	20 [4, 45]	73 [61, 82]	60 [53, 65]	57 [50, 63]	61 [54, 67]	63 [52, 73]	60 [56, 63]
3 years	-	60 [41, 74]	51 [43, 58]	43 [34, 52]	52 [43, 60]	39 [23, 54]	48 [43, 52]

Figure 5.22.1
First PD Treatment to First Peritonitis - By Age at First PD
Australia 2018 - 2022

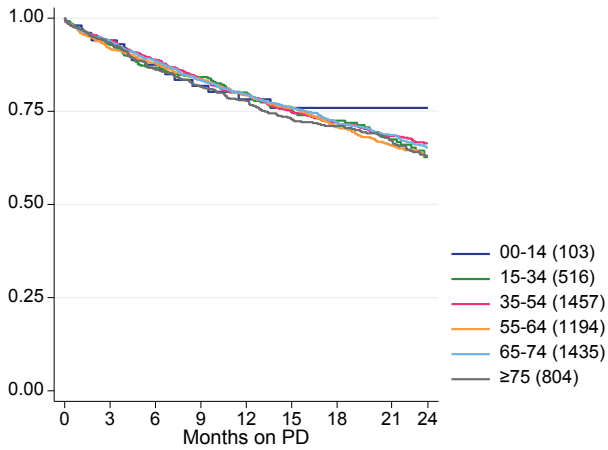
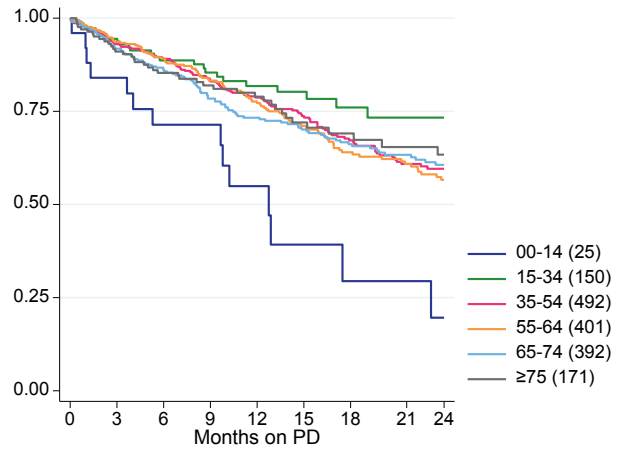


Figure 5.22.2
First PD Treatment to First Peritonitis - By
Age at First PD New Zealand 2018 - 2022



Diabetes is associated with a shorter time to first peritonitis in both countries, but this difference only appears several months into PD treatment (Figure 5.23).

Figure 5.23.1
First PD Treatment to First Peritonitis - By Diabetic
Status at KRT entry Australia 2018 - 2022

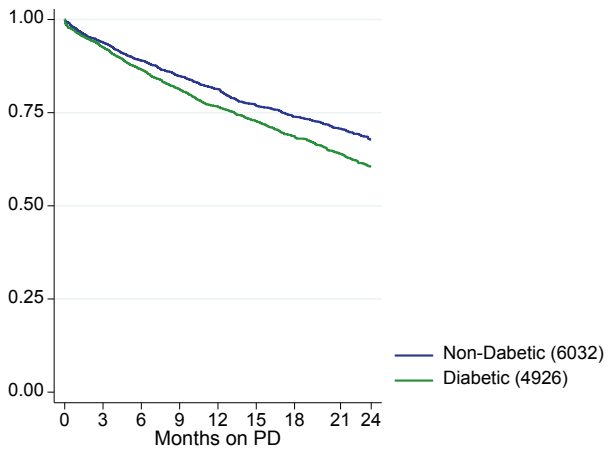
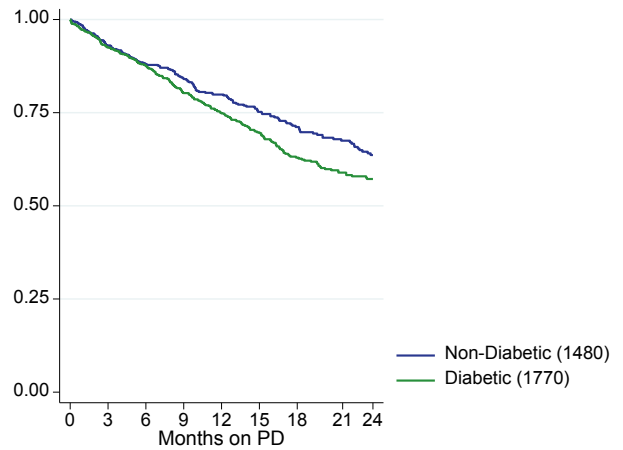


Figure 5.23.2
First PD Treatment to First Peritonitis - By
Diabetic Status at KRT entry New Zealand 2018 - 2022



AUSTRALIAN PERITONITIS REGISTRY

Since October 2003, ANZDATA has collected detailed information on PD peritonitis episodes in Australian patients. A selection of those data are reported here. New Zealand has a separate PD registry which is not currently linked with ANZDATA.

Table 5.21 and Figures 5.24-5.28 report the peritonitis rate, expressed as episodes per patient-year in the table and on the left y axis of the figures and patient-months per episode on the right y axis of the figures, according to different categories.

Table 5.21
Peritonitis Episodes Per Year By State/Territory, Australia 2018-2022

State	2018	2019	2020	2021	2022	2018-2022
QLD	0.41	0.38	0.32	0.29	0.32	0.34
NSW	0.32	0.22	0.31	0.27	0.32	0.29
ACT	0.41	0.60	0.41	0.15	0.20	0.34
VIC	0.26	0.17	0.18	0.18	0.19	0.20
TAS	0.20	0.08	0.11	0.20	0.32	0.20
SA	0.15	0.22	0.21	0.26	0.24	0.22
NT	0.60	0.32	0.49	0.39	0.64	0.48
WA	0.39	0.50	0.39	0.33	0.33	0.39
Australia	0.32	0.27	0.29	0.25	0.29	0.28

Figure 5.24
PD Peritonitis Rate - Australia 2004-2022

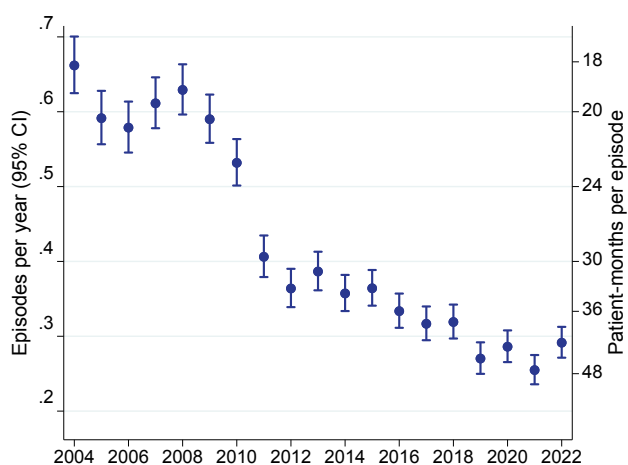


Figure 5.25
PD Peritonitis Rate - By State/Territory, Australia 2018-2022

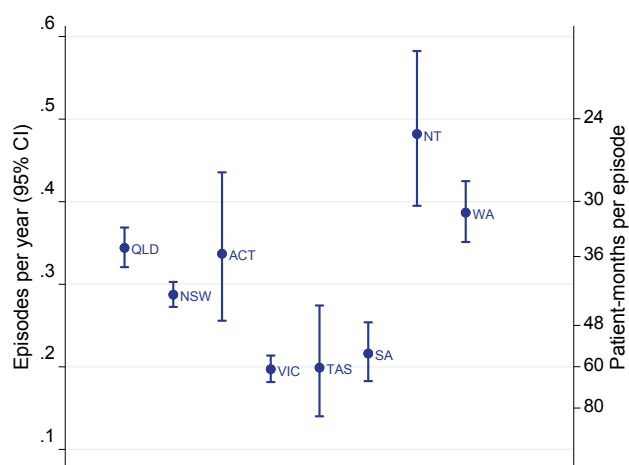


Figure 5.26
PD Peritonitis Rate - By State/Territory, Australia 2013-2022

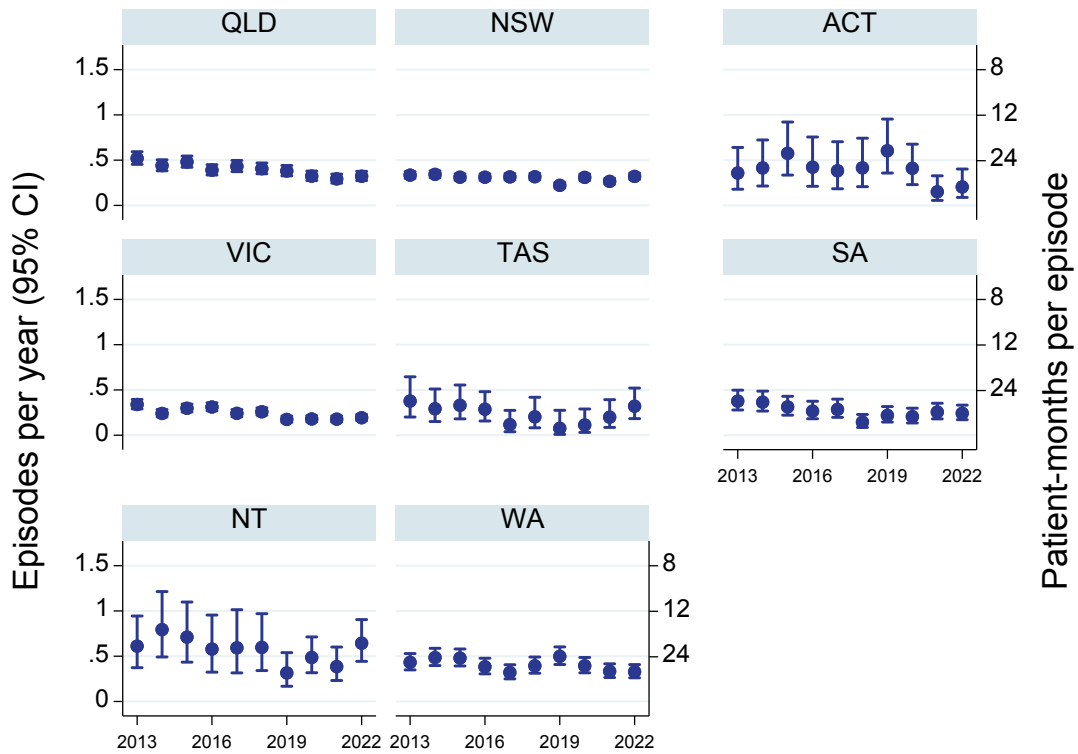


Figure 5.27
PD Peritonitis Rate - By Treating Unit, Australia 2013-2022

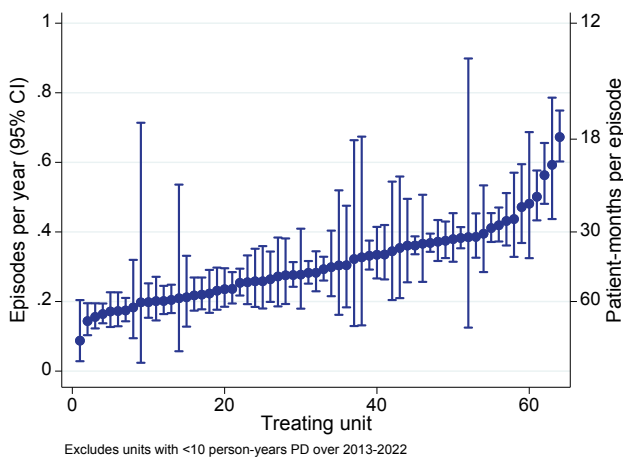
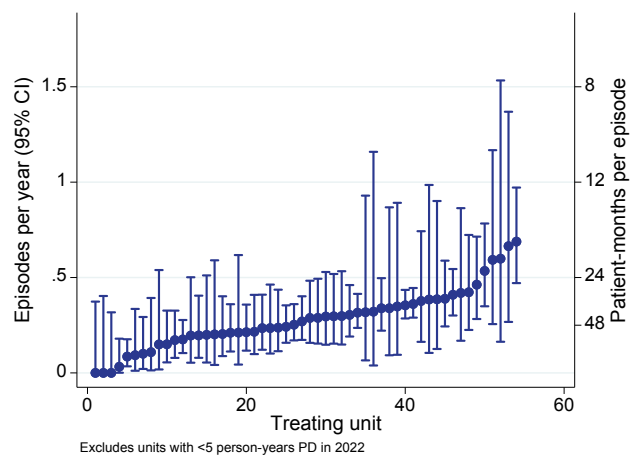


Figure 5.28
PD Peritonitis Rate - By Treating Unit, Australia 2022



The organisms causing peritonitis are presented in Figure 5.29. Figure 5.30 shows these data for 2022 stratified by state/territory.

Figure 5.29
Distribution of Organisms Causing Peritonitis - Australia 2017-2022

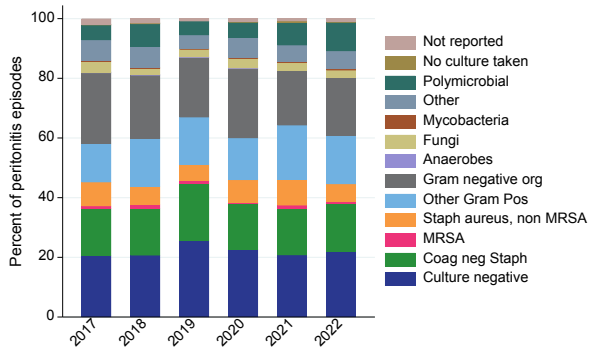
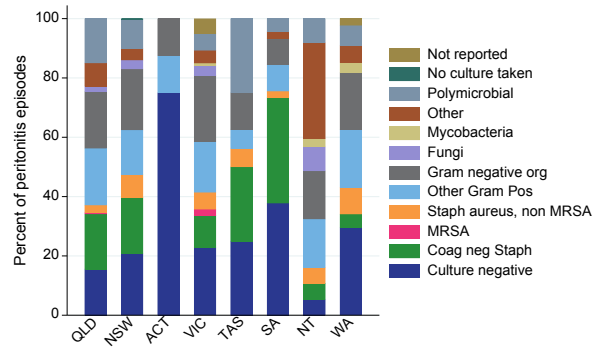


Figure 5.30
Distribution of Organisms Causing Peritonitis - Australia 2022



Initial treatments for peritonitis episodes are shown in Figure 5.31 and 5.32. The medications used in the final regimen are shown in Figures 5.33 and 5.34.

Figure 5.31
Initial Antibiotic Regimen - Gram Positive Cover - Australia 2017-2022

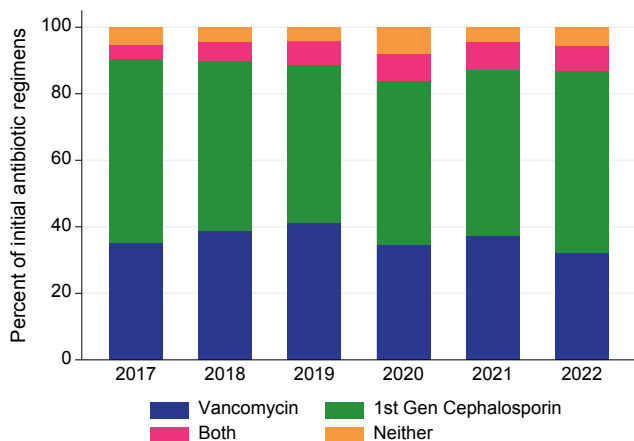


Figure 5.32
Initial Antibiotic Regimen - Gram Negative Cover - Australia 2017-2022

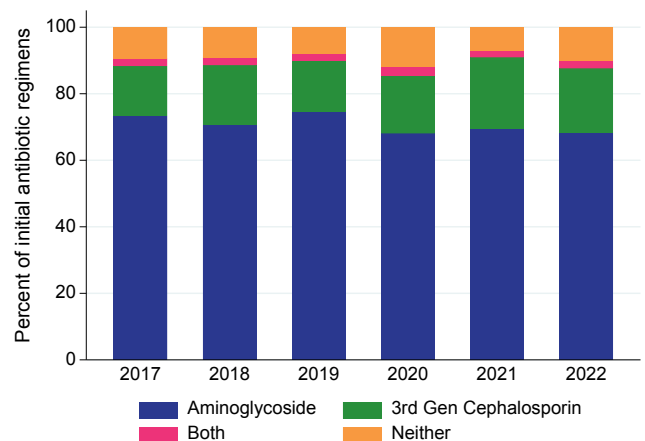


Figure 5.33
Final Antibiotic Regimen - Gram Positive Cover - Australia 2017-2022

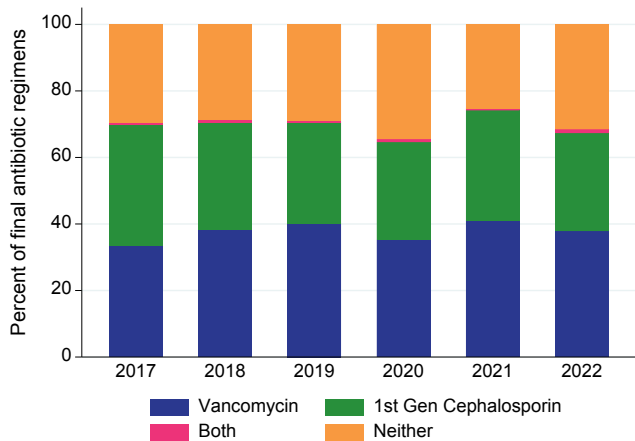
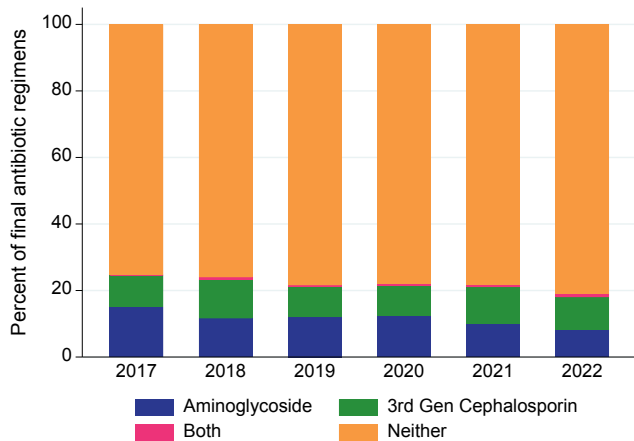
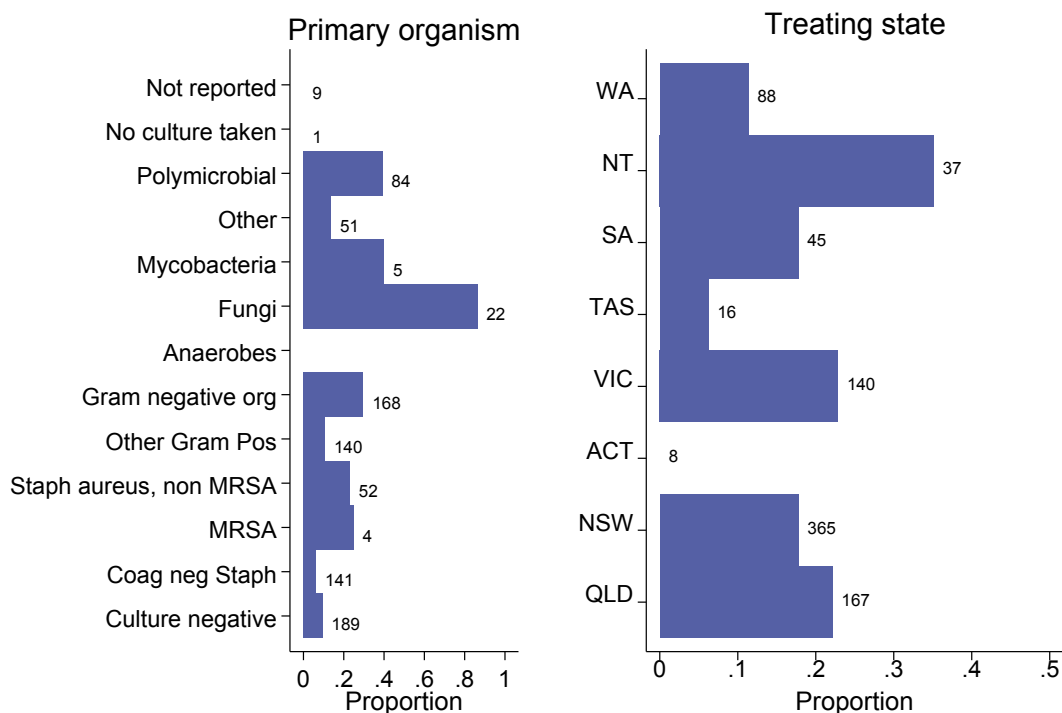


Figure 5.34
Final Antibiotic Regimen - Gram Negative Cover - Australia 2017-2022



The proportion of peritonitis episodes resulting in a permanent transfer to haemodialysis by organism and state/territory is shown in Figure 5.35.

Figure 5.35
Proportion of Episodes Resulting in Permanent HD Transfer - Australia 2022



Values are total number of peritonitis episodes reported in 2022

LABORATORY BASED DATA AT THE TIME OF THE ANNUAL SURVEY

ANAEMIA MANAGEMENT

Figure 5.36 shows the variation in Hb between treating hospitals; median Hb ranged from 98 to 123g/L in Australia and 99-117g/L in New Zealand.

Figure 5.36.1
Haemoglobin in Peritoneal Dialysis Patients - Australia 31 December 2022

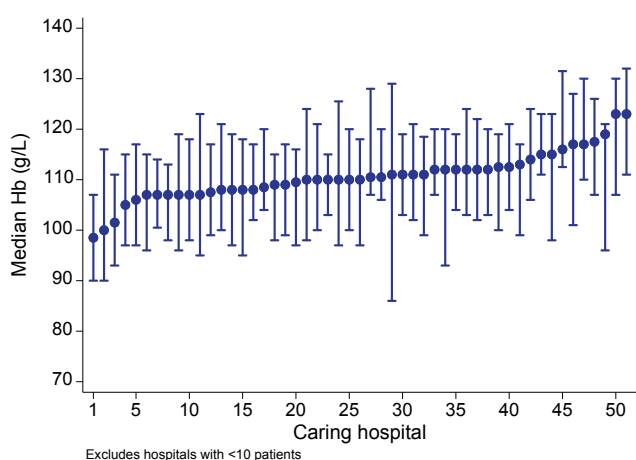


Figure 5.36.2
Haemoglobin in Peritoneal Dialysis Patients - New Zealand 31 December 2022

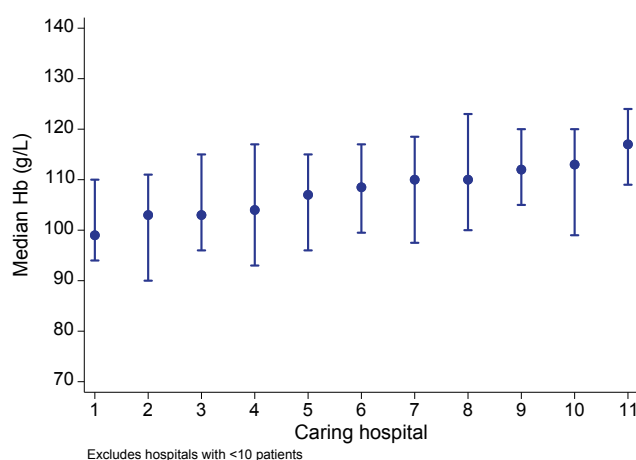


Figure 5.37 shows the proportion of peritoneal dialysis patients prescribed an erythropoiesis-stimulating agent (ESA) whose haemoglobin was between 100-115g/L; the proportion ranged from 0-100% in Australia and 29-59% in New Zealand.

Figure 5.37.1
% Peritoneal Dialysis Patients receiving an ESA with Hb 100-115 g/L - Australia 31 December 2022

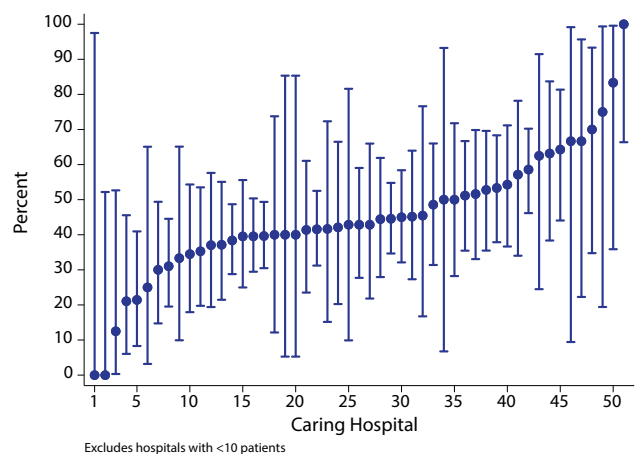
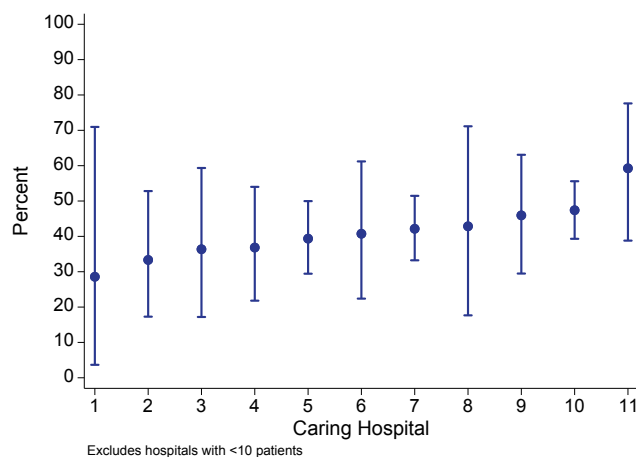


Figure 5.37.2
% Peritoneal Dialysis Patients receiving an ESA with Hb 100-115 g/L - New Zealand 31 December 2022



BIOCHEMISTRY

Figures 5.38 and 5.39 show the proportions of peritoneal dialysis patients with serum calcium between 2.1-2.4mmol/L and phosphate between 0.8-1.6mmol/L respectively at the time of the annual survey. Note that the calcium is not corrected for albumin.

Figure 5.38.1
% PD Patients with Calcium 2.1-2.4 mmol/L - Australia 31 December 2022

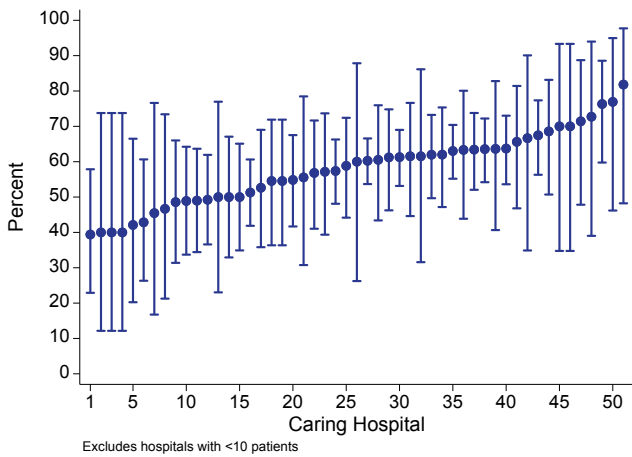


Figure 5.38.2
% PD Patients with Calcium 2.1-2.4 mmol/L - New Zealand 31 December 2022

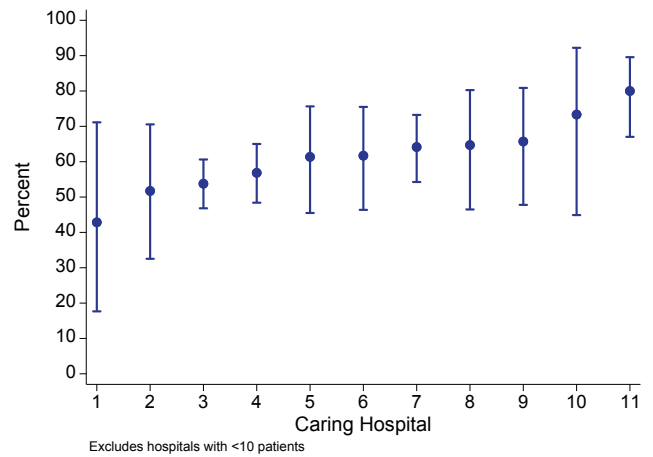


Figure 5.39.1
% PD Patients with Phosphate 0.8-1.6 mmol/L - Australia 31 December 2022

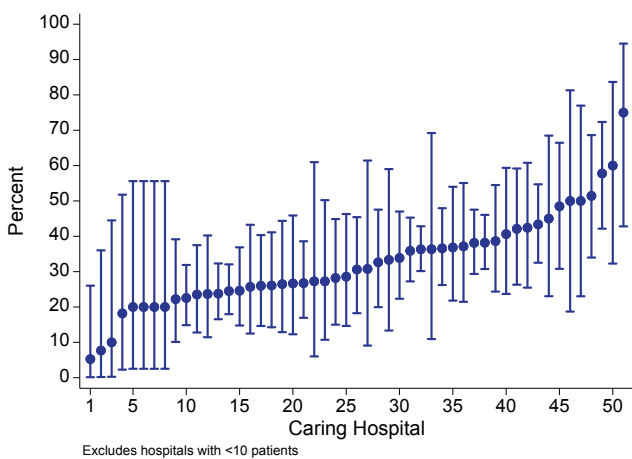
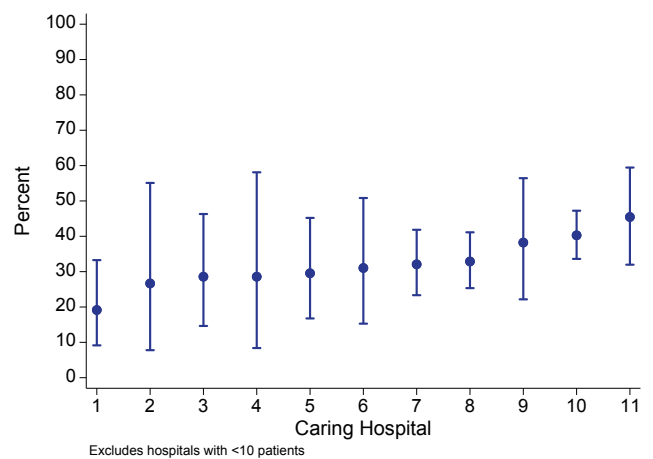
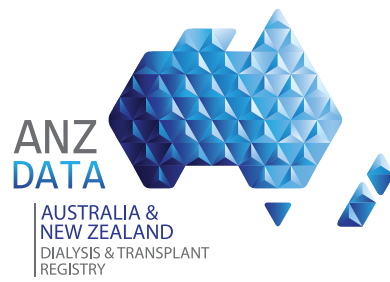


Figure 5.39.2
% PD Patients with Phosphate 0.8-1.6 mmol/L - New Zealand 31 December 2022



REFERENCES

1. Australian Bureau of Statistics, 2022, Quarterly Population Estimates (ERP), by State/Territory, Sex and Age, Jun 2022, viewed 20 Dec 2022, <https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/jun-2022>
2. This work is based on/includes Stats NZ's data which are licensed by Stats NZ for re-use under the Creative Commons Attribution 4.0 International licence. Stats NZ, 2022, Estimated Resident Population by Age and Sex (1991+) (Annual-Jun), NZ Infoshare, viewed 20 Dec 2022, <http://infoshare.stats.govt.nz/>



CHAPTER 5

Peritoneal Dialysis