



CHAPTER 5 - PERITONEAL DIALYSIS

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

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Summary and Highlights

During the 2021 survey period, 1175 people in Australia and 335 people in New Zealand commenced maintenance peritoneal dialysis (PD). Similar to 2020, the number of patients on PD receiving a kidney transplant remained low in Australia during the COVID-19 pandemic (210, compared to 233 in 2020 and 328 in 2019), resulting in an increase in the number of prevalent PD patients to 2667 in 2021 in Australia. Despite the decreased number of incident patients on PD in Australia compared to 2020, the proportion of all dialysis patients on PD remained stable at 18%. In contrast, the number of prevalent PD patients declined to 810 in New Zealand, likely attributed to an increased number of patients transferring to haemodialysis (182, compared to 151 in 2020). The proportion of all dialysis patients on PD continued to fall in New Zealand over the past five years (31% in 2017 and 26% in 2021).

A quarter of patients who commenced PD in 2021 were between the age of 65-75 years, the most common age group in Australia and New Zealand, followed by over 20% between age of 55-64 years. PD remained the more common dialysis modality for the paediatric group (84% in Australia and 67% in New Zealand). For patients on PD, diabetic kidney disease remained the most common cause of primary kidney disease (32% in Australia and 39% in New Zealand).

The proportion of all PD patients receiving low GDP solutions continued to decline in Australia (19%, compared to 21% in 2020). There was marked variation in the use of icodextrin and low GDP solutions between countries and states, in particular Western Australia was the only state with 100% use of low GDP solutions.

When considering all people who started peritoneal dialysis within a year of commencing kidney replacement therapy, the survival curves showed improved survival in patients who commenced PD between 2019-2021 in Australia. The cause is unclear but may be related to the increased number of prevalent patients as a result of a decline in kidney transplant during the COVID-19 pandemic. The survival curves remained unchanged in New Zealand. The proportion of people surviving at 3 years was 75% 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.

Due to the change of nomenclature suggested by the International Society of Peritoneal Dialysis (ISPD), the term 'technique survival' has been changed to 'time on PD', and 'death-censored technique failure' has been changed to 'transfer to haemodialysis' in this 2022 annual report. The proportion of patients staying on PD at 3-years (censored for kidney transplantation) remained low at 37% in Australia and 36% in New Zealand. Death remained the most common reason for PD discontinuation (30% in Australia and 38% in New Zealand), followed by infection (19% in Australia and 20% in New Zealand) and inadequate dialysis (18% in Australia and 14% 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 peritoneal dialysis episodes of peritonitis, as New Zealand has a separate registry that is not currently linked to ANZDATA. In Australia, the peritonitis rate has been stable (0.29 episodes per patient-year) and is meeting the ISPD international target (0.4 episodes per patient-year). However, there was significant variation between treating units (0 to 0.64 peritonitis episodes per patient-year).

Suggested Citation

ANZDATA Registry. 45th Report, Chapter 5: Peritoneal dialysis. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2022. 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 2017-2021. 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	2017	2018	2019	2020	2021
Queensland	18%	18%	17%	16%	16%
New South Wales	24%	23%	22%	23%	23%
Australian Capital Territory	9%	9%	12%	15%	12%
Victoria	19%	18%	17%	17%	17%
Tasmania	19%	12%	14%	17%	19%
South Australia	14%	15%	14%	14%	15%
Northern Territory	3%	4%	6%	7%	7%
Western Australia	15%	15%	14%	15%	14%
Australia	18%	18%	17%	17%	18%
New Zealand	31%	30%	29%	28%	26%

Table 5.2 Percentage of all Home Dialysis Patients on Peritoneal Dialysis

State	2017	2018	2019	2020	2021
Queensland	65%	64%	65%	66%	66%
New South Wales	70%	69%	69%	69%	70%
Australian Capital Territory	55%	52%	56%	63%	57%
Victoria	76%	77%	74%	72%	72%
Tasmania	79%	68%	74%	81%	83%
South Australia	81%	80%	77%	83%	83%
Northern Territory	38%	48%	57%	48%	57%
Western Australia	69%	69%	69%	69%	70%
Australia	70%	70%	69%	69%	70%
New Zealand	66%	67%	67%	69%	67%

Figure 5.1.1 - Time on Peritoneal Dialysis - Prevalent PD Patients Australia 31 Dec 2021

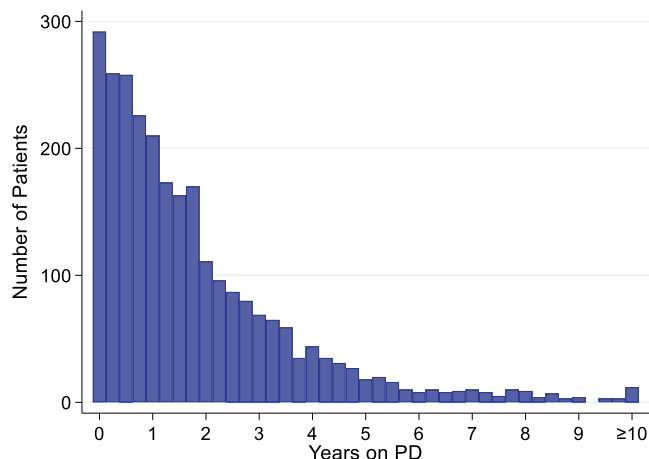


Figure 5.1.2 - Time on Peritoneal Dialysis - Prevalent PD Patients New Zealand 31 Dec 2021

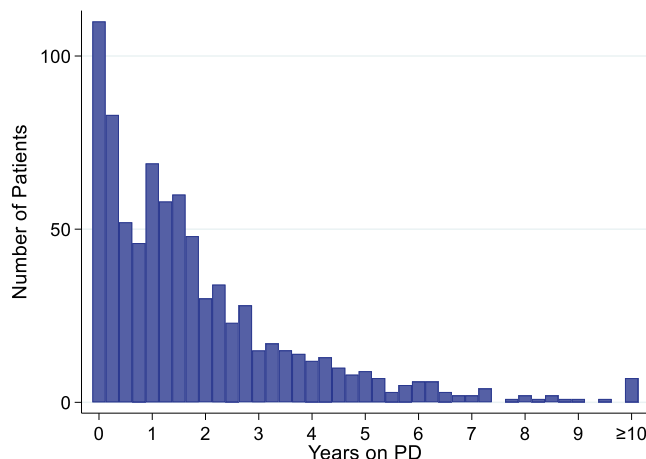


Table 5.3 shows the overall incidence, cessation and annual prevalence of PD in Australia and New Zealand over the last 5 years. Note that dialysis modality changes lasting less than 30 days are not included. Figure 5.2 presents some of these data graphically.

^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 2020, the median days to death was 8, and 90% of patients died within 47 days.

Table 5.3 Incidence, Cessation and Annual Prevalence of Peritoneal Dialysis Patients 2017 - 2021

Country		2017	2018	2019	2020	2021
Australia	All patients who commenced PD					
	First dialysis treatment or returning after kidney recovery	820	802	764	905	898
	Transfer from HD (no prior PD)	252	245	262	257	219
	Transfer from HD (prior PD)	44	43	33	34	32
	Failed Transplant (no prior PD)	22	22	13	15	16
	Failed Transplant (prior PD)	21	19	12	27	10
	Total	1159	1131	1084	1238	1175
	All patients who ceased PD					
	Received kidney transplant	321	326	328	233	210
	Transfer to HD	546	519	488	539	554
	Kidney recovery	17	10	17	12	21
	Withdrawal from dialysis [^]	-	-	-	84	94
	Deaths	302	269	288	217	172
	Total	1186	1124	1121	1085	1051
Total patients on PD at 31 December	2425	2432	2394	2539	2667	
New Zealand	All patients who commenced PD					
	First dialysis treatment or returning after kidney recovery	226	231	241	271	243
	Transfer from HD (no prior PD)	96	85	77	79	74
	Transfer from HD (prior PD)	18	21	11	24	10
	Failed Transplant (no prior PD)	1	8	6	4	2
	Failed Transplant (prior PD)	1	7	4	6	6
	Total	342	352	339	384	335
	All patients who ceased PD					
	Received kidney transplant	67	65	72	54	69
	Transfer to HD	110	137	147	151	182
	Kidney recovery	5	6	4	4	6
	Withdrawal from dialysis [^]	-	-	-	36	27
	Deaths	126	139	156	111	89
	Total	308	347	379	356	373
Total patients on PD at 31 December	864	867	824	854	810	

Figure 5.2.1 - Incidence, Cessation and Annual Prevalence of Peritoneal Dialysis Patients - Australia 2017-2021

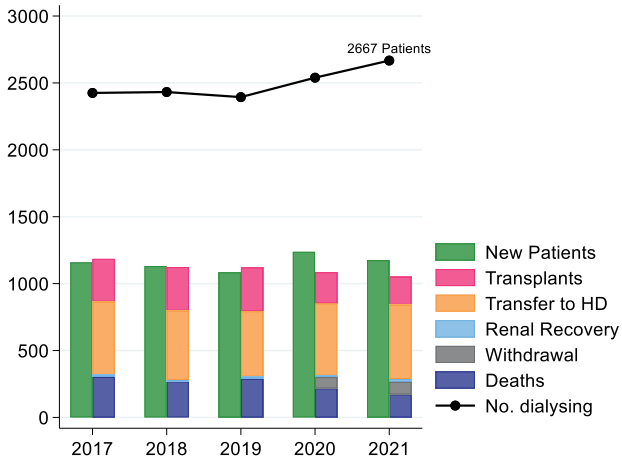
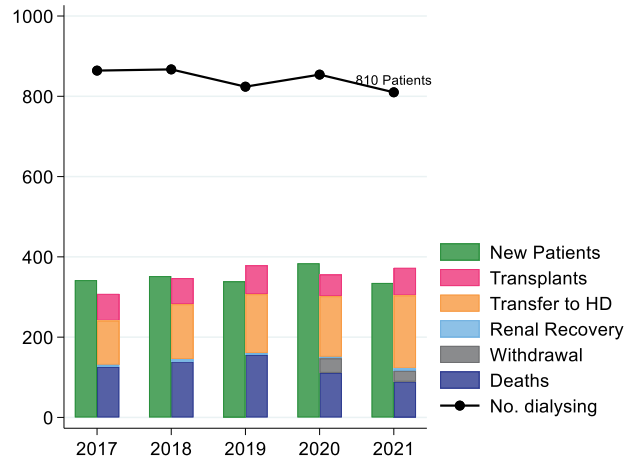


Figure 5.2.2 - Incidence, Cessation and Annual Prevalence of Peritoneal Dialysis Patients - New Zealand 2017-2021



The age distributions of incident and prevalent PD patients are shown in figures 5.3 and 5.4 respectively.

Figure 5.3.1 - Age (%) of Incident Peritoneal Dialysis Patients - Australia 2021

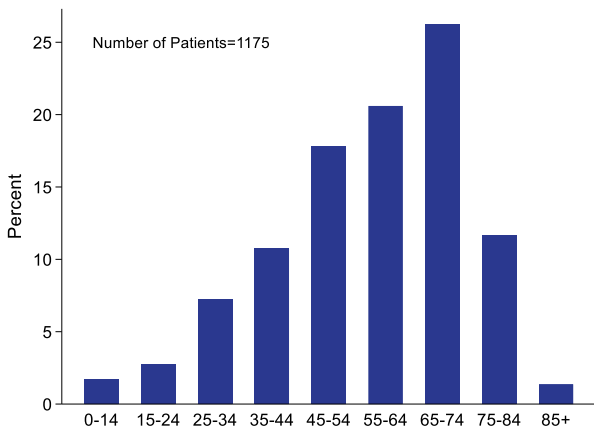


Figure 5.3.2 - Age (%) of Incident Peritoneal Dialysis Patients - New Zealand 2021

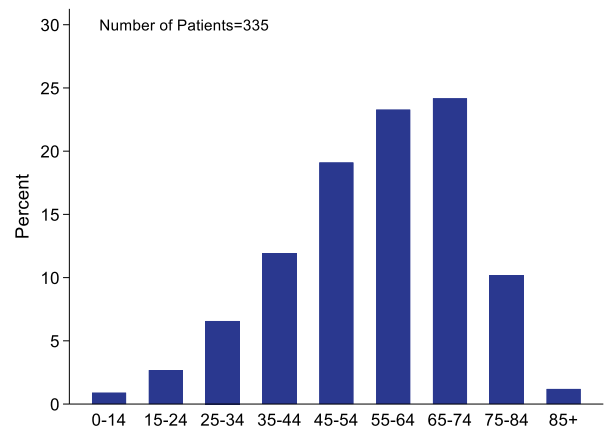


Figure 5.4.1 - Age (%) of Prevalent Peritoneal Dialysis Patients - Australia 2021

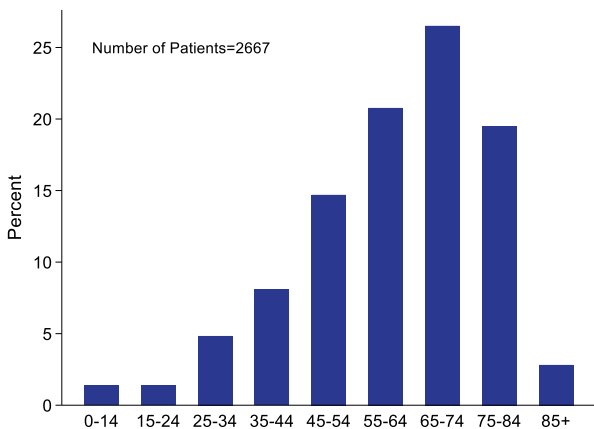


Figure 5.4.2 - Age (%) of Prevalent Peritoneal Dialysis Patients - New Zealand 2021

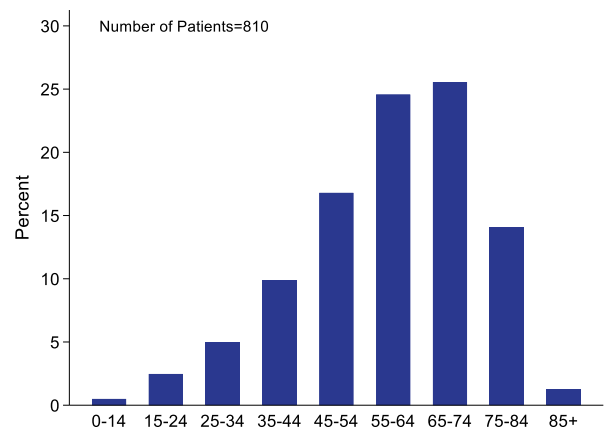


Table 5.4 presents the number and proportion of incident and prevalent peritoneal dialysis patients by age group.

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

Category	Age group	2017	2018	2019	2020	2021
Incident Patients	0-14	29 (3%)	19 (2%)	19 (2%)	22 (2%)	20 (2%)
	15-24	31 (3%)	34 (3%)	25 (2%)	28 (2%)	32 (3%)
	25-34	73 (6%)	66 (6%)	74 (7%)	94 (8%)	85 (7%)
	35-44	126 (11%)	129 (11%)	104 (10%)	116 (9%)	126 (11%)
	45-54	195 (17%)	168 (15%)	198 (18%)	205 (17%)	209 (18%)
	55-64	266 (23%)	233 (21%)	246 (23%)	276 (22%)	242 (21%)
	65-74	276 (24%)	315 (28%)	264 (24%)	304 (25%)	308 (26%)
	75-84	150 (13%)	150 (13%)	142 (13%)	175 (14%)	137 (12%)
	85+	13 (1%)	17 (2%)	12 (1%)	18 (1%)	16 (1%)
	Total	1159	1131	1084	1238	1175
Prevalent Patients	0-14	32 (1%)	23 (1%)	22 (1%)	31 (1%)	37 (1%)
	15-24	42 (2%)	41 (2%)	31 (1%)	35 (1%)	37 (1%)
	25-34	108 (4%)	96 (4%)	105 (4%)	123 (5%)	129 (5%)
	35-44	202 (8%)	205 (8%)	196 (8%)	195 (8%)	216 (8%)
	45-54	353 (15%)	340 (14%)	338 (14%)	355 (14%)	392 (15%)
	55-64	524 (22%)	520 (21%)	524 (22%)	547 (22%)	554 (21%)
	65-74	625 (26%)	653 (27%)	638 (27%)	683 (27%)	707 (27%)
	75-84	470 (19%)	487 (20%)	477 (20%)	503 (20%)	520 (19%)
	85+	69 (3%)	67 (3%)	63 (3%)	67 (3%)	75 (3%)
	Total	2425	2432	2394	2539	2667

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

Category	Age group	2017	2018	2019	2020	2021
Incident Patients	0-14	7 (2%)	7 (2%)	5 (1%)	3 (1%)	3 (1%)
	15-24	9 (3%)	3 (1%)	7 (2%)	14 (4%)	9 (3%)
	25-34	25 (7%)	31 (9%)	29 (9%)	23 (6%)	22 (7%)
	35-44	31 (9%)	30 (9%)	32 (9%)	38 (10%)	40 (12%)
	45-54	63 (18%)	70 (20%)	71 (21%)	72 (19%)	64 (19%)
	55-64	81 (24%)	81 (23%)	94 (28%)	99 (26%)	78 (23%)
	65-74	97 (28%)	93 (26%)	71 (21%)	91 (24%)	81 (24%)
	75-84	29 (8%)	36 (10%)	30 (9%)	42 (11%)	34 (10%)
	85+	0 (0%)	1 (0%)	0 (0%)	2 (1%)	4 (1%)
	Total	342	352	339	384	335
Prevalent Patients	0-14	13 (2%)	15 (2%)	11 (1%)	7 (1%)	4 (0%)
	15-24	19 (2%)	14 (2%)	16 (2%)	23 (3%)	20 (2%)
	25-34	48 (6%)	46 (5%)	43 (5%)	42 (5%)	40 (5%)
	35-44	85 (10%)	77 (9%)	79 (10%)	87 (10%)	80 (10%)
	45-54	142 (16%)	151 (17%)	145 (18%)	143 (17%)	136 (17%)
	55-64	207 (24%)	204 (24%)	212 (26%)	218 (26%)	199 (25%)
	65-74	233 (27%)	230 (27%)	200 (24%)	210 (25%)	207 (26%)
	75-84	111 (13%)	125 (14%)	114 (14%)	119 (14%)	114 (14%)
	85+	6 (1%)	5 (1%)	4 (0%)	5 (1%)	10 (1%)
	Total	864	867	824	854	810

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	2017	2018	2019	2020	2021
Diabetic Kidney Disease	403 (35%)	368 (33%)	376 (35%)	405 (33%)	371 (32%)
Glomerular Disease	258 (22%)	300 (27%)	260 (24%)	305 (25%)	279 (24%)
Hypertension	144 (12%)	146 (13%)	139 (13%)	127 (10%)	133 (11%)
Polycystic Disease	81 (7%)	74 (7%)	62 (6%)	67 (5%)	83 (7%)
Reflux Nephropathy	47 (4%)	25 (2%)	28 (3%)	34 (3%)	40 (3%)
Other	135 (12%)	150 (13%)	158 (15%)	200 (16%)	190 (16%)
Uncertain	77 (7%)	53 (5%)	47 (4%)	75 (6%)	70 (6%)
Not reported	14 (1%)	15 (1%)	14 (1%)	25 (2%)	9 (1%)
Total	1159	1131	1084	1238	1175

Table 5.5.2 Incident PD Patients by Primary Disease - New Zealand

Primary Kidney Disease	2017	2018	2019	2020	2021
Diabetic Kidney Disease	165 (48%)	162 (46%)	154 (45%)	163 (42%)	130 (39%)
Glomerular Disease	74 (22%)	81 (23%)	87 (26%)	94 (24%)	87 (26%)
Hypertension	34 (10%)	37 (11%)	33 (10%)	39 (10%)	39 (12%)
Polycystic Disease	13 (4%)	13 (4%)	10 (3%)	19 (5%)	12 (4%)
Reflux Nephropathy	4 (1%)	7 (2%)	8 (2%)	12 (3%)	5 (1%)
Other	36 (11%)	33 (9%)	34 (10%)	44 (11%)	42 (13%)
Uncertain	13 (4%)	17 (5%)	13 (4%)	12 (3%)	6 (2%)
Not reported	3 (1%)	2 (1%)	0 (0%)	1 (0%)	14 (4%)
Total	342	352	339	384	335

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 2021

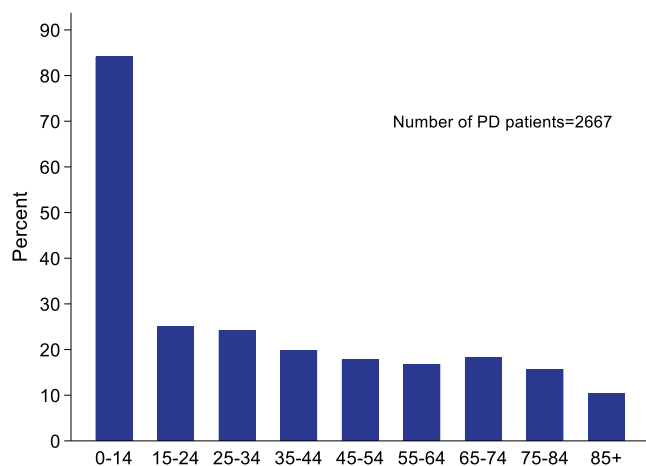


Figure 5.5.2 - PD Patients (%) of all Prevalent Dialysis - New Zealand 2021

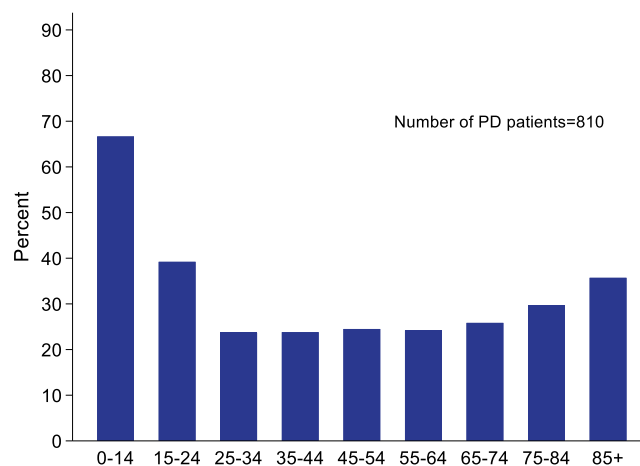


Table 5.6 shows the number of prevalent PD patients, and number per million population, according to PD type.

Population estimates for Australia and New Zealand used for the calculation of prevalence per million population were sourced from the Australian Bureau of Statistics (2021)¹ and Stats NZ (2021)².

Table 5.6.1 Number (per Million) of Prevalent PD Patients, Australia 2017-2021

	2017	2018	2019	2020	2021
Total	2425 (99)	2432 (97)	2394 (94)	2539 (99)	2667 (104)
APD	1636 (66)	1671 (67)	1654 (65)	1764 (69)	1835 (71)
CAPD	789 (32)	761 (30)	740 (29)	775 (30)	832 (32)

Table 5.6.2 Number (per Million) of Prevalent PD Patients, New Zealand 2017-2021

	2017	2018	2019	2020	2021
Total	864 (179)	867 (177)	824 (165)	854 (168)	810 (157)
APD	453 (94)	475 (97)	505 (101)	515 (101)	473 (91)
CAPD	411 (85)	392 (80)	319 (64)	339 (67)	337 (65)

Peritoneal Dialysis Fluids

Table 5.7 shows the use of icodextrin by country and PD type at the end of 2021. Figure 5.6 shows the trends in icodextrin use over the last three years. Finally, figure 5.7 shows icodextrin use by state and PD type at the end of 2021.

Table 5.7 Icodextrin Usage by Modality Type - December 2021

PD Type	Australia					New Zealand			
	No	Yes	Not Reported	Total		No	Yes	Not Reported	Total
CAPD	n	309	416	107	832	70	186	81	337
	%	37%	50%	13%		21%	55%	24%	
APD	n	879	867	89	1835	108	312	53	473
	%	48%	47%	5%		23%	66%	11%	
Total	n	1188	1283	196	2667	178	498	134	810
	%	45%	48%	7%		22%	61%	17%	

Figure 5.6.1 - Icodextrin Use by Modality - Prevalent Patients December 2019 - 2021 Australia

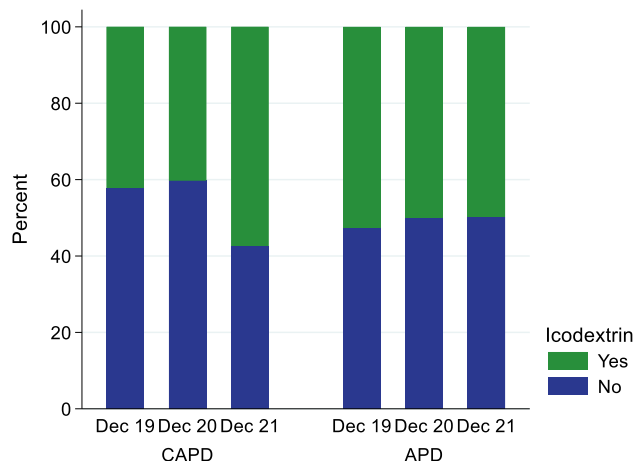


Figure 5.6.2 - Icodextrin Use by Modality - Prevalent Patients December 2019 - 2021 New Zealand

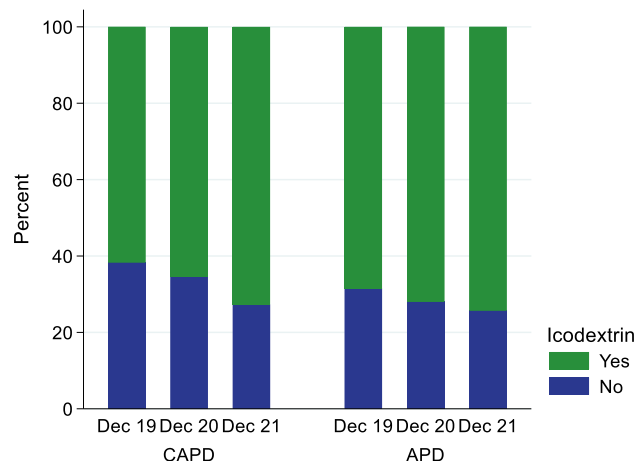


Figure 5.7 - Icodextrin Use by State and Country - Prevalent Patients December 2021

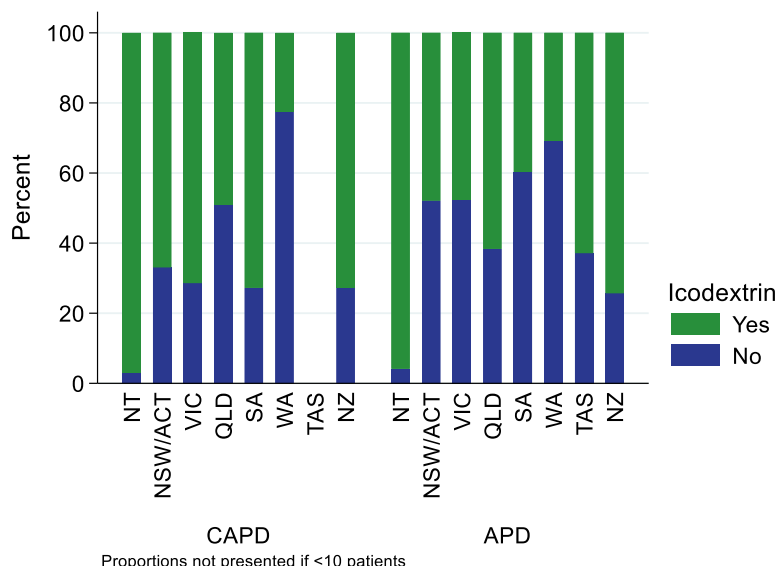


Table 5.8 and figures 5.8 and 5.9 present similar data for low GDP PD solutions.

Table 5.8 Low GDP Usage by Modality Type - December 2021

PD Type	Australia				New Zealand				
	n	No	Yes	Not Reported	Total	No	Yes	Not Reported	Total
CAPD	n	491	234	107	832	233	23	81	337
	%	59%	28%	13%		69%	7%	24%	
APD	n	1471	273	91	1835	341	79	53	473
	%	80%	15%	5%		72%	17%	11%	
Total	n	1962	507	198	2667	574	102	134	810
	%	74%	19%	7%		71%	13%	17%	

Figure 5.8.1 - Low GDP Use by Modality - Prevalent Patients December 2019 - 2021 Australia

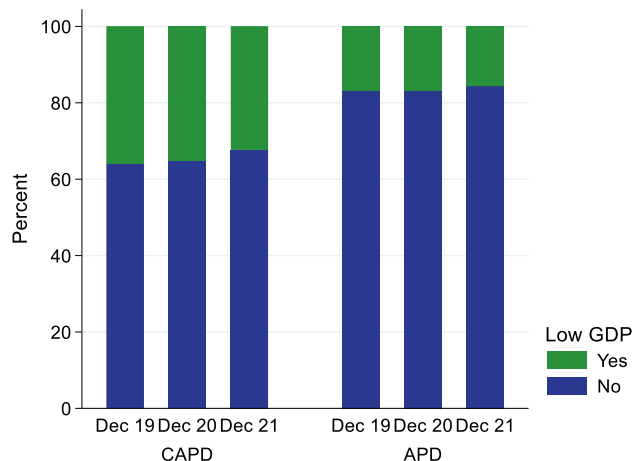


Figure 5.8.2 - Low GDP Use by Modality - Prevalent Patients December 2019 - 2021 New Zealand

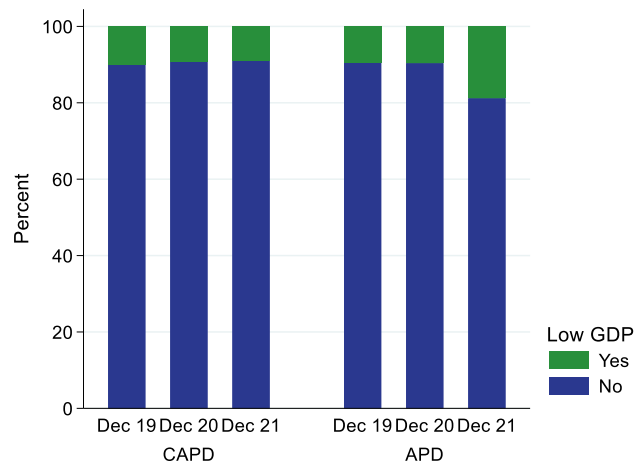
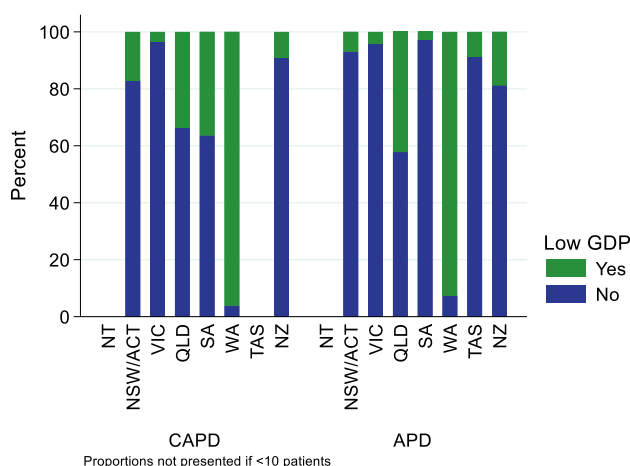


Figure 5.9 - Low GDP Use by State and Country - Prevalent Patients December 2021



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 5.10 show patient survival by era.

Table 5.9 Patient Survival by Era - Peritoneal Dialysis within 365 days of KRT start - Censored for Transplant 2010-2021; % [95% Confidence Interval]

Country	Era	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	2010 - 2012	2460	97[96,97]	93[92,94]	72[70,74]	51[49,53]
	2013 - 2015	2975	97[96,98]	93[92,94]	73[71,75]	53[51,55]
	2016 - 2018	3078	97[96,97]	93[92,94]	75[73,76]	55[52,58]
	2019 - 2021	3203	98[97,98]	94[93,95]	-	-
New Zealand	2010 - 2012	752	97[96,98]	93[90,94]	65[61,69]	40[36,44]
	2013 - 2015	815	97[95,98]	92[90,94]	68[65,71]	46[42,50]
	2016 - 2018	925	96[94,97]	92[90,93]	65[62,68]	41[37,46]
	2019 - 2021	953	97[96,98]	93[91,95]	-	-

Figure 5.10.1 - Patient Survival by Era Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - Australia

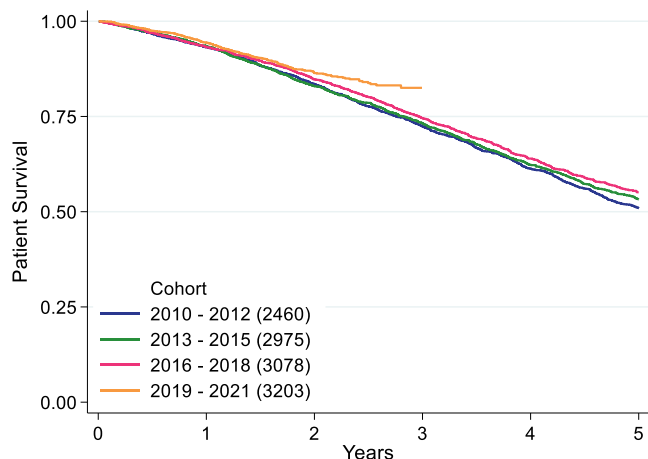


Figure 5.10.2 - Patient Survival by Era Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - New Zealand

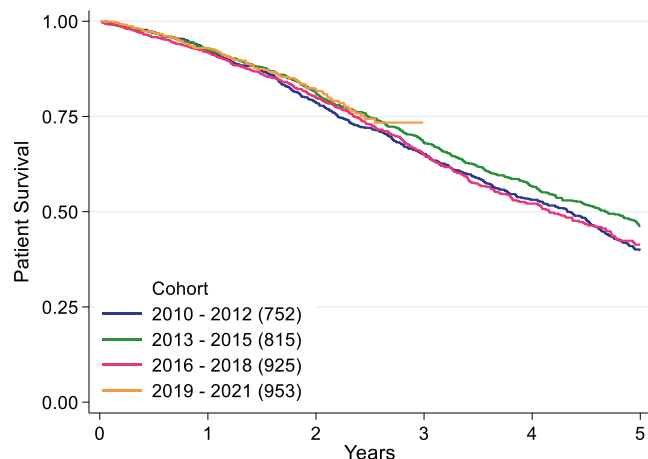


Table 5.10 and figure 5.11 demonstrate the strong association between patient age and survival.

Table 5.10 Patient Survival by Age Group - Peritoneal Dialysis within 365 days of KRT start - Censored for Transplant 2010-2021; % [95% Confidence Interval]

Country	Age Group	Number of Patients	Survival			
			6 months	1 year	3 year	5 year
Australia	<40	1774	99[98,99]	98[97,98]	92[90,94]	85[81,88]
	40-59	3773	99[98,99]	96[95,96]	82[80,83]	65[62,67]
	60-74	4374	96[96,97]	92[92,93]	71[70,73]	50[48,52]
	≥75	1795	95[93,96]	88[86,89]	58[55,60]	33[30,35]
New Zealand	<40	486	100[98,100]	98[96,99]	90[86,93]	77[70,82]
	40-59	1281	98[97,99]	95[94,96]	74[70,76]	51[47,55]
	60-74	1333	96[94,97]	89[87,91]	59[56,62]	35[31,38]
	≥75	345	93[89,95]	87[83,90]	48[42,53]	18[13,23]

Figure 5.11.1 - Patient Survival by Age Group Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - Australia

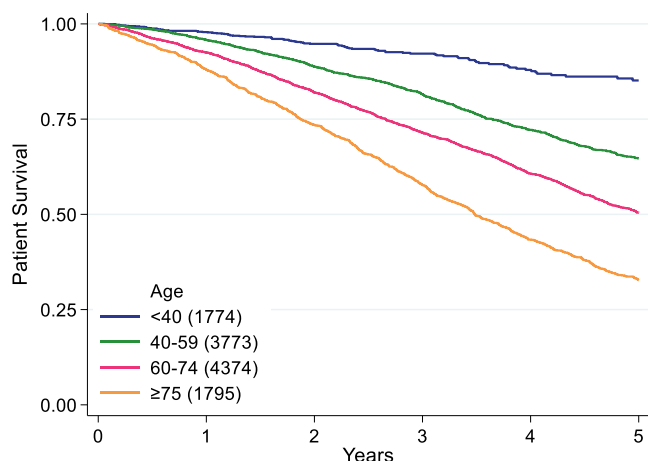


Figure 5.11.2 - Patient Survival by Age Group Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - New Zealand

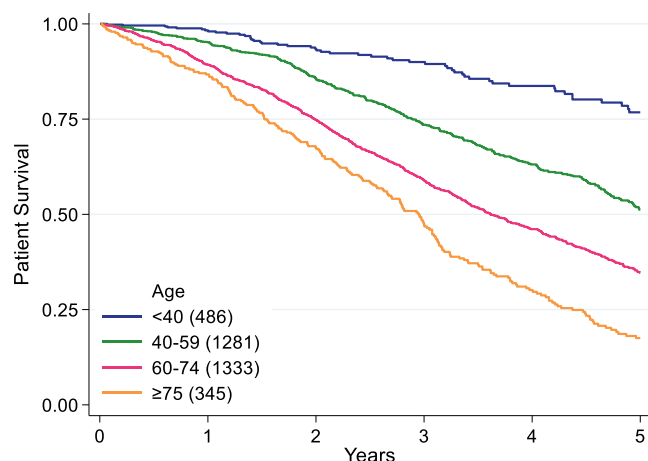


Table 5.11 and figure 5.12 present these data by diabetic status.

Table 5.11 Patient Survival by Diabetic Status - Peritoneal Dialysis within 365 days of KRT start - Censored for Transplant 2010-2021; % [95% Confidence Interval]

Country	Diabetic Status	Number of Patients	Survival			
			6 months	1 year	3 year	5 year
Australia	Non-diabetic	6374	98[97,98]	95[95,96]	81[79,82]	63[61,65]
	Diabetic	5294	96[96,97]	92[91,92]	68[66,69]	45[44,47]
New Zealand	Non-diabetic	1580	97[96,98]	93[92,95]	74[71,76]	52[48,55]
	Diabetic	1850	96[95,97]	92[90,93]	61[59,64]	36[34,39]

Figure 5.12.1 - Patient Survival by Diabetic Status Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - Australia

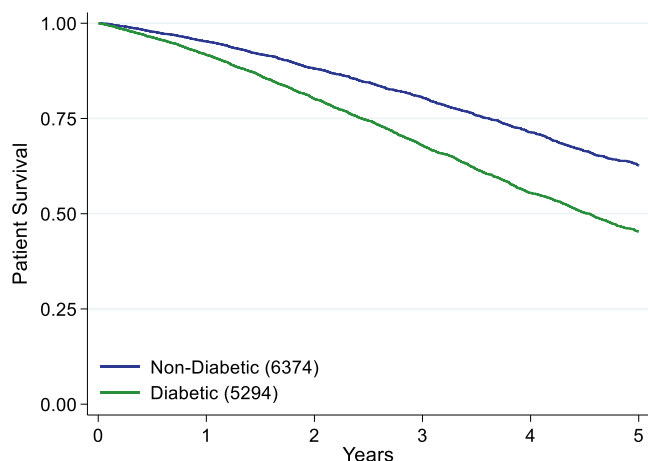
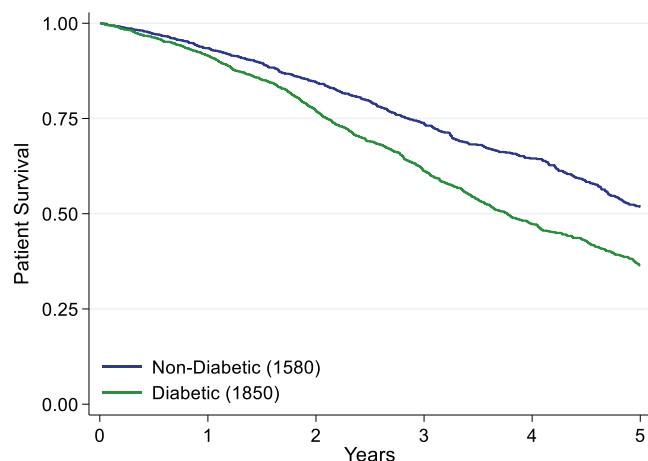


Figure 5.12.2 - Patient Survival by Diabetic Status Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - New Zealand



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 5.13 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 2010-2021; % [95% Confidence Interval]

Country	Era	Number of Patients	Survival			
			6 months	1 year	3 year	5 year
Australia	2010 - 2012	2460	84[83,86]	73[71,75]	38[35,40]	16[14,18]
	2013 - 2015	2975	88[87,89]	78[76,79]	39[37,41]	17[15,18]
	2016 - 2018	3078	86[84,87]	74[73,76]	37[35,39]	17[15,19]
	2019 - 2021	3203	87[86,88]	76[74,77]	-	-
New Zealand	2010 - 2012	752	89[86,91]	80[77,83]	41[37,45]	16[13,19]
	2013 - 2015	815	87[85,89]	77[74,79]	40[37,44]	18[15,22]
	2016 - 2018	925	87[85,89]	78[75,81]	36[32,39]	13[10,16]
	2019 - 2021	953	85[83,88]	76[72,79]	-	-

Figure 5.13.1 – Time on Peritoneal Dialysis by Era - Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - Australia

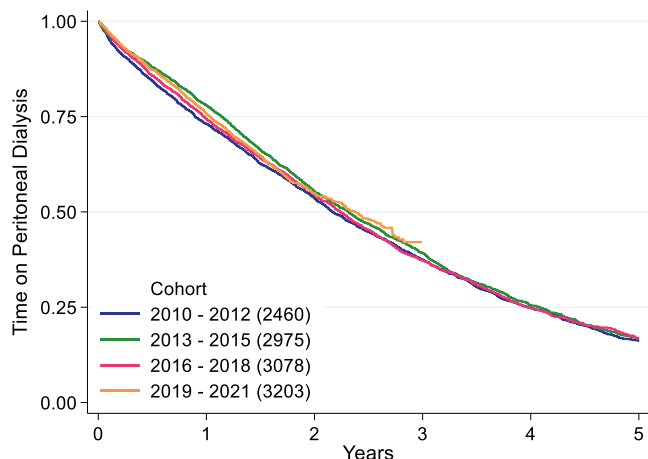


Figure 5.13.2 – Time on Peritoneal Dialysis by Era - Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - New Zealand

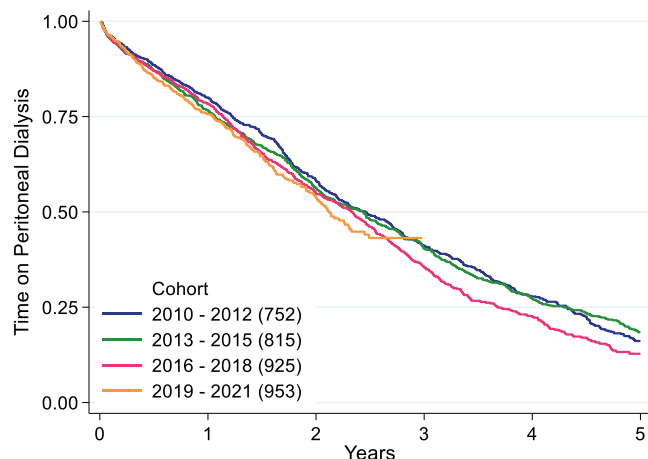


Table 5.13 and figure 5.14 show the association between patient age and time on peritoneal dialysis.

Table 5.13 Time on Peritoneal Dialysis by Age Group - Peritoneal Dialysis within 365 days of KRT start - Censored for Transplant 2010-2021; % [95% Confidence Interval]

Country	Age Group	Number of Patients	Survival			
			6 months	1 year	3 year	5 year
Australia	<40	1774	89[88,91]	76[74,78]	43[40,47]	26[21,31]
	40-59	3773	88[86,89]	77[76,79]	40[38,42]	18[16,20]
	60-74	4374	86[85,87]	75[74,77]	39[37,41]	17[16,19]
	≥75	1795	82[80,84]	70[68,72]	32[30,34]	12[10,14]
New Zealand	<40	486	90[86,92]	80[76,83]	46[40,52]	23[16,30]
	40-59	1281	88[86,90]	80[77,82]	40[37,44]	16[13,19]
	60-74	1333	86[84,88]	76[74,79]	37[34,40]	15[13,18]
	≥75	345	82[77,86]	72[67,77]	31[26,37]	8[5,13]

Figure 5.14.1 – Time on Peritoneal Dialysis by Age Group - Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - Australia

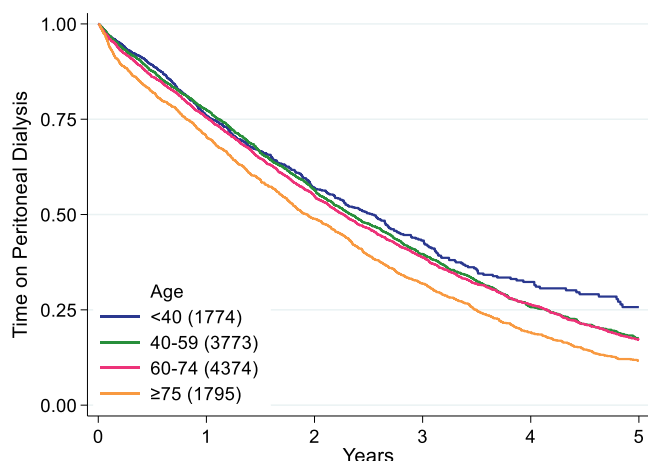


Figure 5.14.2 – Time on Peritoneal Dialysis by Age Group - Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - New Zealand

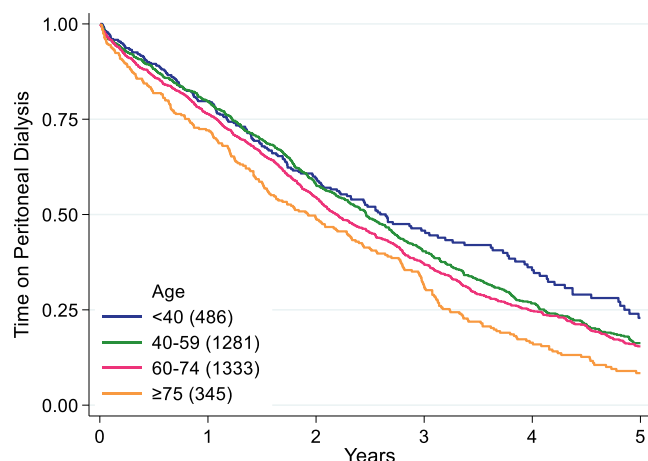


Table 5.14 and figure 5.15 present these data by diabetic status.

Table 5.14 Time on Peritoneal Dialysis by Diabetic Status - Peritoneal Dialysis within 365 days of KRT start - Censored for Transplant 2010-2021; % [95% Confidence Interval]

Country	Diabetic Status	Number of Patients	Survival			
			6 months	1 year	3 year	5 year
Australia	Non-diabetic	6374	87[87,88]	77[76,78]	44[42,46]	22[21,24]
	Diabetic	5294	85[84,86]	73[72,74]	33[31,34]	12[11,13]
New Zealand	Non-diabetic	1580	88[86,89]	79[77,81]	47[44,50]	23[20,26]
	Diabetic	1850	86[84,88]	76[74,78]	32[30,35]	11[9,13]

Figure 5.15.1 – Time on Peritoneal Dialysis by Diabetic Status - Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - Australia

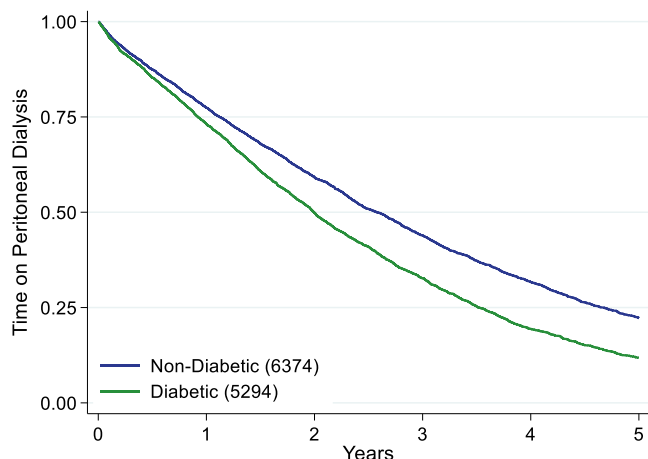


Figure 5.15.2 – Time on Peritoneal Dialysis by Diabetic Status - Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Transplant - New Zealand

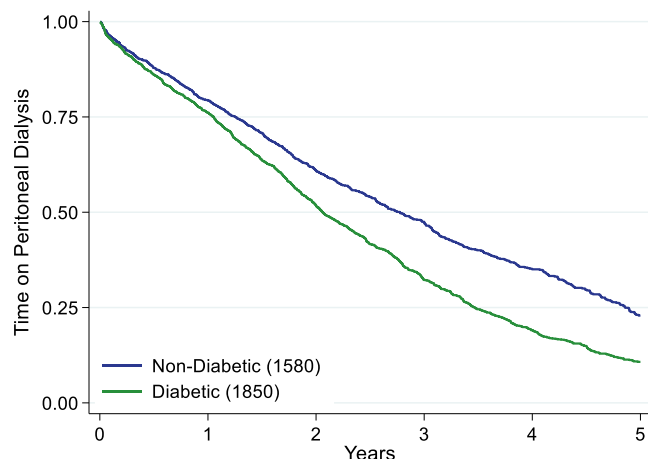


Table 5.15 and figure 5.16 show transfer to haemodialysis (previously known at death-censored technique failure) by era. Survival time is also censored for withdrawal from dialysis and transplantation.

Table 5.15 Transfer to Haemodialysis by Era - Peritoneal Dialysis within 365 days of KRT start - Censored for Death, Withdrawal and Transplant 2010-2021; % [95% Confidence Interval]

Country	Era	Number of Patients	Survival			
			6 months	1 year	3 year	5 year
Australia	2010 - 2012	2460	87[86,89]	78[76,80]	52[49,54]	33[31,36]
	2013 - 2015	2975	90[89,91]	83[82,84]	53[51,56]	34[31,36]
	2016 - 2018	3078	88[87,89]	79[78,81]	50[48,52]	34[31,37]
	2019 - 2021	3203	90[88,91]	81[79,82]	-	-
New Zealand	2010 - 2012	752	91[89,93]	86[84,89]	64[60,68]	44[38,49]
	2013 - 2015	815	90[88,92]	83[80,85]	60[56,64]	44[39,48]
	2016 - 2018	925	90[88,92]	85[82,87]	56[52,60]	35[29,41]
	2019 - 2021	953	88[86,90]	82[79,85]	-	-

Figure 5.16.1 - Transfer to Haemodialysis by Era - Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Death, Withdrawal and Transplant - Australia

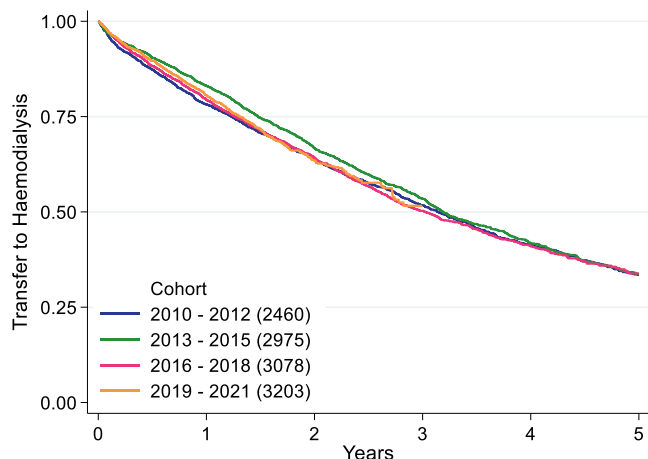


Figure 5.16.2 - Transfer to Haemodialysis by Era - Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Death, Withdrawal and Transplant - New Zealand

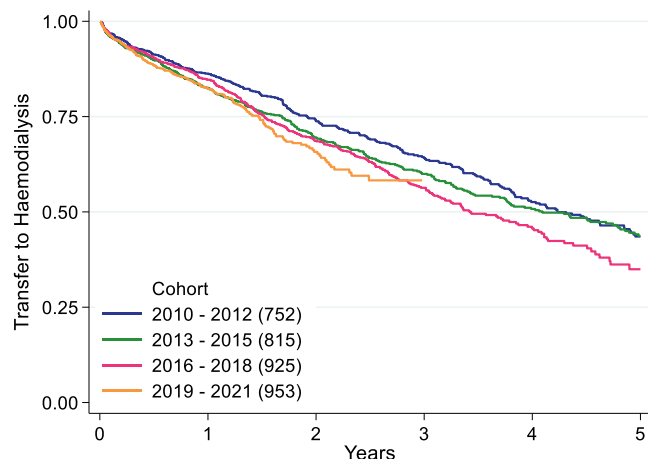


Table 5.16 and figure 5.17 show the association between patient age and transfer to haemodialysis.

Table 5.16 Transfer to Haemodialysis by Age Group - Peritoneal Dialysis within 365 days of KRT start - Censored for Death, Withdrawal and Transplant 2010-2021; % [95% Confidence Interval]

Country	Age Group	Number of Patients	Survival			
			6 months	1 year	3 year	5 year
Australia	<40	1774	90[89,92]	77[75,80]	46[43,50]	29[24,34]
	40-59	3773	89[88,90]	81[79,82]	48[45,50]	26[24,29]
	60-74	4374	89[88,90]	81[80,83]	54[52,56]	37[34,39]
	≥75	1795	87[85,89]	80[78,82]	57[55,60]	42[38,46]
New Zealand	<40	486	90[87,92]	81[76,84]	51[44,57]	30[22,38]
	40-59	1281	90[88,92]	83[81,85]	56[53,60]	34[30,39]
	60-74	1333	90[88,92]	86[83,87]	62[59,66]	47[42,51]
	≥75	345	88[84,92]	84[80,88]	68[61,74]	58[50,66]

Figure 5.17.1 - Transfer to Haemodialysis by Age Group - Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Death, Withdrawal and Transplant - Australia

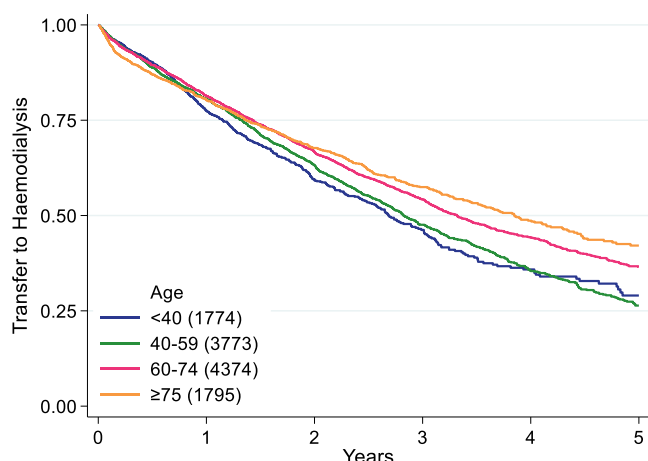


Figure 5.17.2 - Transfer to Haemodialysis by Age Group - Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Death, Withdrawal and Transplant - New Zealand

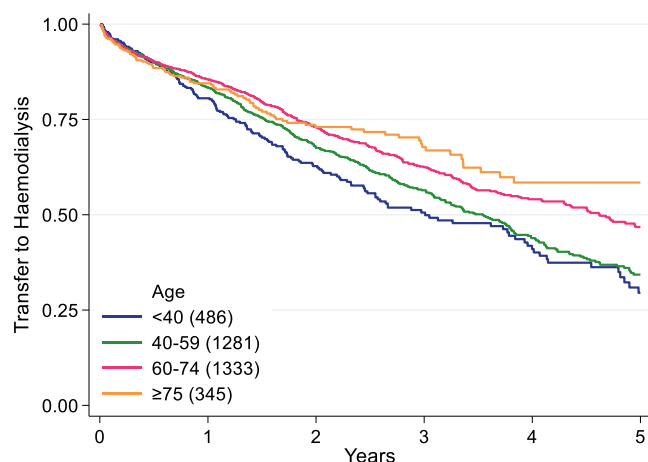


Table 5.17 and figure 5.18 present these data by diabetic status.

Table 5.17 Transfer to Haemodialysis by Diabetic Status - Peritoneal Dialysis within 365 days of KRT start - Censored for Death, Withdrawal and Transplant 2010-2021; % [95% Confidence Interval]

Country	Diabetic Status	Number of Patients	Survival			
			6 months	1 year	3 year	5 year
Australia	Non-diabetic	6374	89[89,90]	81[80,82]	54[53,56]	37[35,39]
	Diabetic	5294	89[88,89]	80[78,81]	49[47,50]	30[28,32]
New Zealand	Non-diabetic	1580	90[89,92]	85[83,86]	64[61,67]	45[41,50]
	Diabetic	1850	90[88,91]	83[81,85]	55[52,58]	36[32,40]

Figure 5.18.1 - Transfer to Haemodialysis by Diabetic Status Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Death, Withdrawal and Transplant - Australia

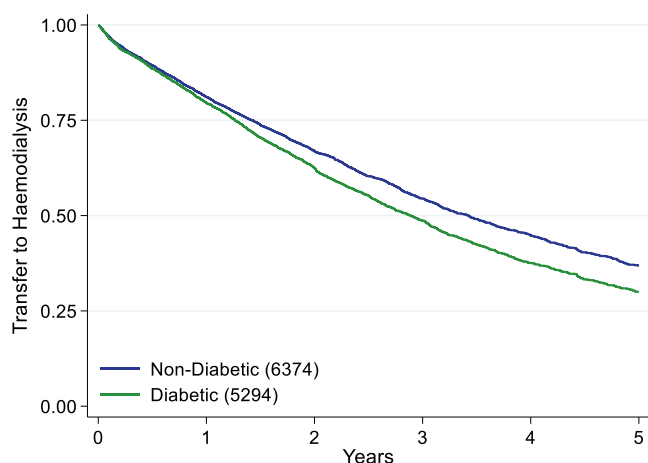
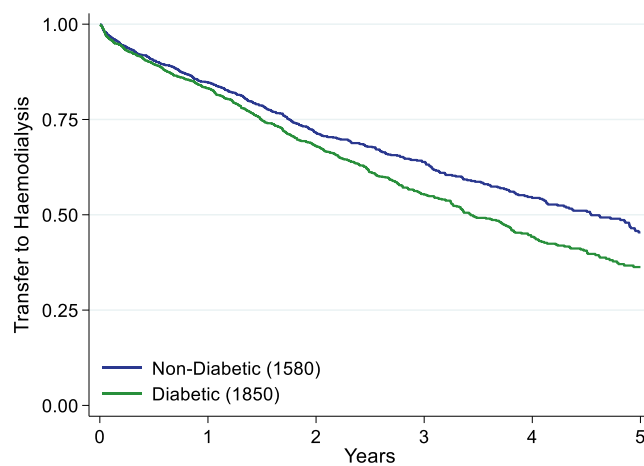


Figure 5.18.2 - Transfer to Haemodialysis by Diabetic Status Peritoneal Dialysis within 365 days of KRT start - 2010-2021 Censored for Death, Withdrawal and Transplant - New Zealand



The causes of PD discontinuation in 2021 are shown in table 5.18.

Table 5.18 Reason for PD Discontinuation 2021

Category	Cause of PD Discontinuation	Australia	New Zealand
Infection	Recurrent/Persistent Peritonitis	59	30
	Acute Peritonitis	82	14
	Tunnel/Exit Site Infection	18	14
	Diverticulitis	0	1
	Abdominal Abscess	3	3
	Total	162 (19%)	62 (20%)
Inadequate dialysis	Inadequate Solute Clearance	112	29
	Inadequate Fluid Ultrafiltration	41	13
	Poor Nutrition	1	0
	Total	154 (18%)	42 (14%)
Mechanical	Dialysate Leak	19	11
	Catheter Block	13	4
	Haemoperitoneum	2	0
	Hernia	26	7
	Abdominal Pain	4	0
	Abdominal Surgery	15	4
	Multiple Adhesions	2	0
	Pleural Effusion	3	1
	Other Surgery	10	5
	Hydrothorax	1	0
	Scrotal Oedema	5	0
Total	100 (12%)	32 (11%)	
Social	Patient Preference	30	11
	Unable to Manage Self-Care	48	19
	Total	78 (9%)	30 (10%)
Other	Cardiovascular	3	1
	Vascular Access	1	0
	Planned Transfer After Acute PD Start	2	0
	Planned Transfer After Acute HD Start	1	1
	Other (Specify)	41	15
	Total	48 (6%)	17 (6%)
Death	Total	162 (19%)	88 (29%)
Withdrawal from dialysis	Total	91 (11%)	27 (9%)
Not reported	Total	62 (7%)	6 (2%)

Figure 5.19 and table 5.19 show the cumulative incidence of patients returning to PD after transfer to haemodialysis over 2017-2021. These data are censored at transplantation, and death is treated as a competing risk.

Figure 5.19.1 - Time to Restarting PD after Transfer to Haemodialysis - Australia 2017-2021

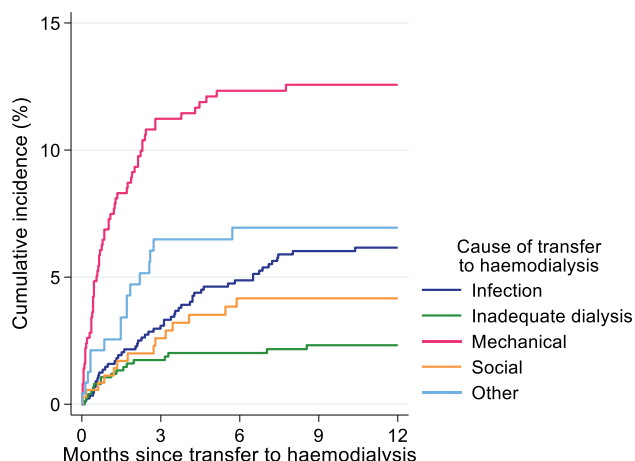


Figure 5.19.2 - Time to Restarting PD after Transfer to Haemodialysis - New Zealand 2017-2021

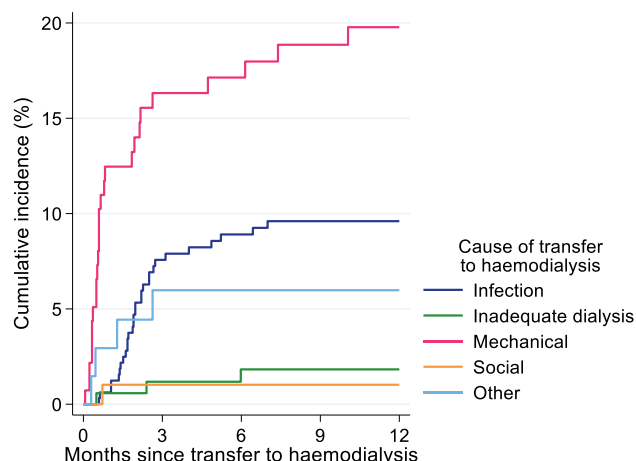


Table 5.19.1 Return to PD (Cumulative Incidence and 95% CI) by Cause of Transfer to Haemodialysis, Australia 2017-2021

Cause of transfer to haemodialysis	3 months	6 months	9 months	12 months
Infection	3.1 (2.1, 4.4)	4.9 (3.6, 6.5)	6.0 (4.6, 7.8)	6.2 (4.7, 7.9)
Inadequate dialysis	1.7 (1.0, 2.9)	2.0 (1.2, 3.2)	2.3 (1.4, 3.6)	2.3 (1.4, 3.6)
Mechanical	11.2 (8.6, 14.2)	12.3 (9.6, 15.4)	12.6 (9.8, 15.7)	12.6 (9.8, 15.7)
Social	2.6 (1.3, 4.7)	4.2 (2.4, 6.7)	4.2 (2.4, 6.7)	4.2 (2.4, 6.7)
Other	6.5 (3.8, 10.2)	6.9 (4.1, 10.7)	6.9 (4.1, 10.7)	6.9 (4.1, 10.7)

Table 5.19.2 Return to PD (Cumulative Incidence and 95% CI) by Cause of Transfer to Haemodialysis, New Zealand 2017-2021

Cause of transfer to haemodialysis	3 months	6 months	9 months	12 months
Infection	7.6 (5.0, 10.8)	8.9 (6.1, 12.4)	9.6 (6.7, 13.2)	9.6 (6.7, 13.2)
Inadequate dialysis	1.2 (0.2, 3.9)	1.8 (0.5, 4.9)	1.8 (0.5, 4.9)	1.8 (0.5, 4.9)
Mechanical	16.3 (10.7, 23.1)	17.1 (11.3, 24.0)	18.9 (12.7, 26.0)	19.8 (13.4, 27.0)
Social	1.0 (0.1, 5.0)	1.0 (0.1, 5.0)	1.0 (0.1, 5.0)	1.0 (0.1, 5.0)
Other	6.0 (1.9, 13.4)	6.0 (1.9, 13.4)	6.0 (1.9, 13.4)	6.0 (1.9, 13.4)

Peritonitis

Table 5.20 and figure 5.20 present the peritonitis-free survival over 2017-2021 by age at PD start.

Table 5.20 First PD Treatment to First Episode of Peritonitis By Age at Entry 01-Jan-2017 to 31-Dec-2021 % Survival [95% Confidence Interval]

Survival	Age Groups						All
	00-14	15-34	35-54	55-64	65-74	≥75	
Australia	(n=103)	(n=504)	(n=1472)	(n=1208)	(n=1405)	(n=790)	(n=5482)
3 months	91 [83,95]	92 [89,94]	94 [92,95]	92 [90,94]	94 [93,95]	94 [92,95]	93 [92,94]
6 months	84 [75,90]	86 [82,89]	89 [87,91]	88 [85,89]	89 [87,90]	88 [85,90]	88 [87,89]
9 months	79 [68,86]	83 [79,86]	83 [81,85]	83 [81,85]	83 [81,85]	82 [79,85]	83 [82,84]
1 year	75 [63,84]	80 [75,84]	79 [77,82]	78 [76,81]	80 [77,82]	80 [76,83]	79 [78,80]
2 years	69 [55,79]	62 [54,69]	67 [63,70]	62 [59,66]	66 [62,69]	64 [59,68]	65 [63,66]
3 years	69 [55,79]	61 [53,67]	55 [50,60]	48 [43,53]	53 [48,57]	56 [51,61]	53 [51,56]
New Zealand	(n=25)	(n=152)	(n=485)	(n=393)	(n=412)	(n=166)	(n=1633)
3 months	92 [72,98]	93 [88,96]	92 [89,94]	90 [86,92]	90 [87,93]	89 [83,93]	91 [89,92]
6 months	84 [62,94]	88 [82,93]	89 [85,91]	85 [80,88]	84 [80,88]	84 [77,89]	86 [84,88]
9 months	84 [62,94]	84 [77,90]	81 [77,85]	79 [74,83]	77 [72,81]	83 [76,89]	80 [78,82]
1 year	70 [47,84]	79 [70,85]	76 [71,80]	72 [67,77]	70 [65,75]	77 [68,84]	74 [71,76]
2 years	41 [17,63]	68 [56,78]	56 [50,62]	56 [49,62]	56 [49,62]	62 [51,71]	57 [54,61]
3 years	-	53 [36,67]	50 [42,57]	47 [38,55]	50 [42,58]	43 [28,56]	48 [44,52]

Figure 5.20.1 - First PD Treatment to First Peritonitis - By Age at First PD Australia 2017-2021

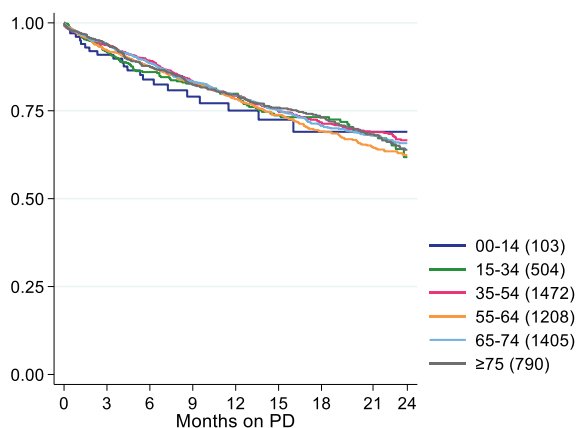
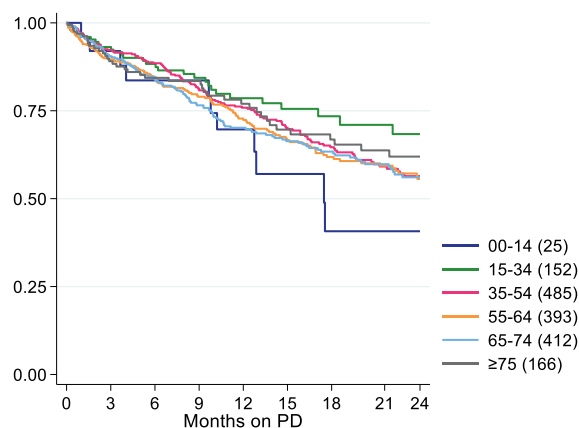


Figure 5.20.2 - First PD Treatment to First Peritonitis - By Age at First PD New Zealand 2017-2021



Diabetes is associated with a shorter time to first peritonitis in both countries, but this difference only appears several months into PD treatment (figure 5.21).

Figure 5.21.1 - First PD Treatment to First Peritonitis - By Diabetic Status at KRT entry Australia 2017-2021

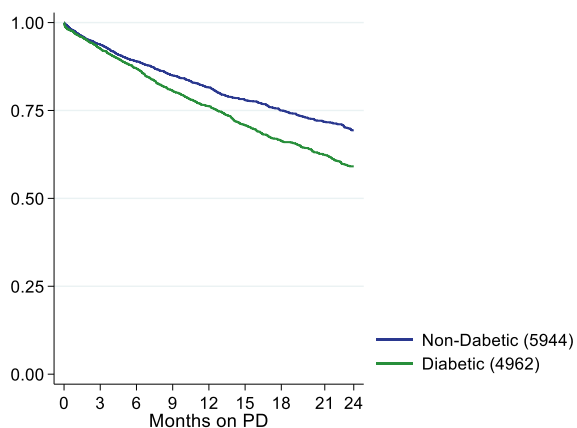
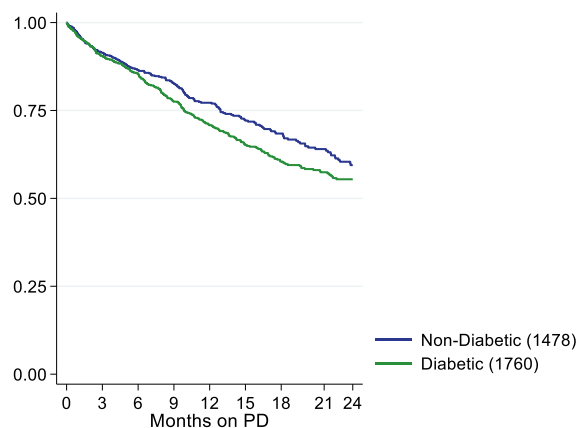


Figure 5.21.2 - First PD Treatment to First Peritonitis - By Diabetic Status at KRT entry New Zealand 2017-2021



Australian Peritonitis Registry

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

Table 5.21 and Figures 5.22-5.26 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 PD Peritonitis Episodes Per Year By State/Territory, Australia 2017-2021

State	2017	2018	2019	2020	2021	2017-2021
QLD	0.43	0.41	0.38	0.33	0.31	0.37
NSW	0.31	0.32	0.22	0.31	0.27	0.29
ACT	0.38	0.41	0.60	0.41	0.15	0.38
VIC	0.24	0.26	0.18	0.18	0.16	0.20
TAS	0.12	0.20	0.08	0.11	0.20	0.15
SA	0.29	0.15	0.22	0.21	0.27	0.23
NT	0.59	0.60	0.32	0.49	0.41	0.46
WA	0.32	0.39	0.50	0.40	0.34	0.39
Australia	0.32	0.32	0.27	0.29	0.26	0.29

Figure 5.22 - PD Peritonitis Rate - Australia 2004-2021

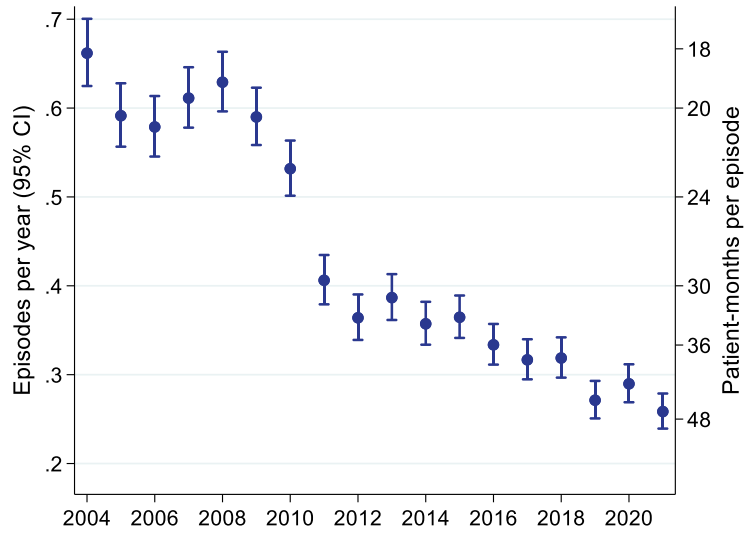


Figure 5.23 - PD Peritonitis Rate - By State/Territory, Australia 2017-2021

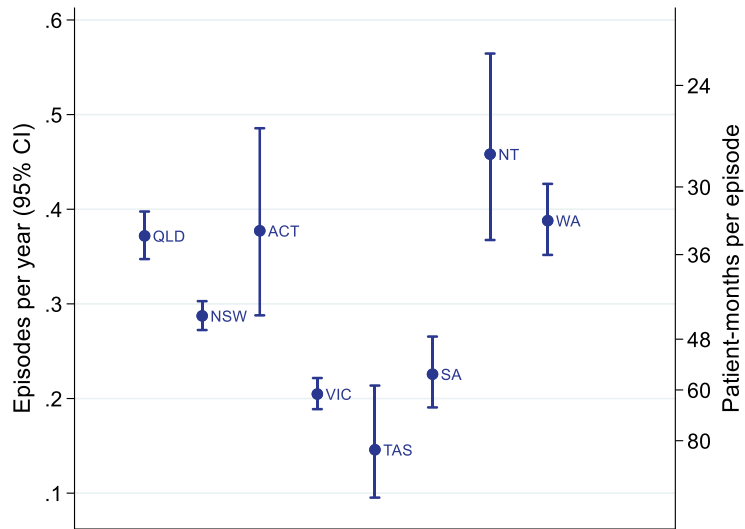


Figure 5.24 - PD Peritonitis Rate - By State/Territory, Australia 2012-2021

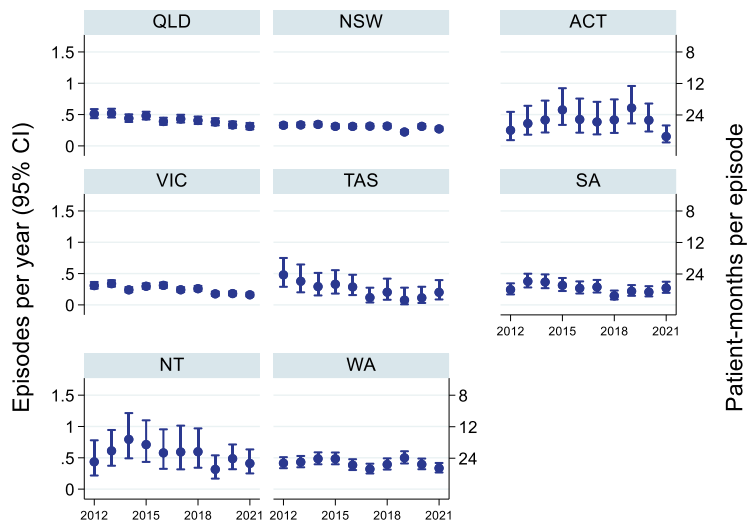


Figure 5.25 - PD Peritonitis Rate - By Treating Unit, Australia 2012-2021

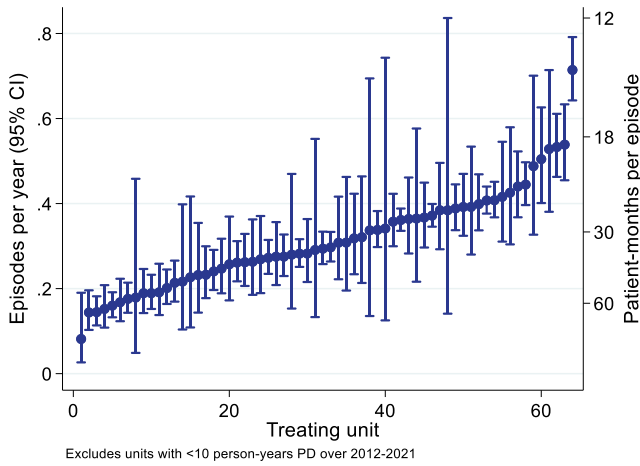
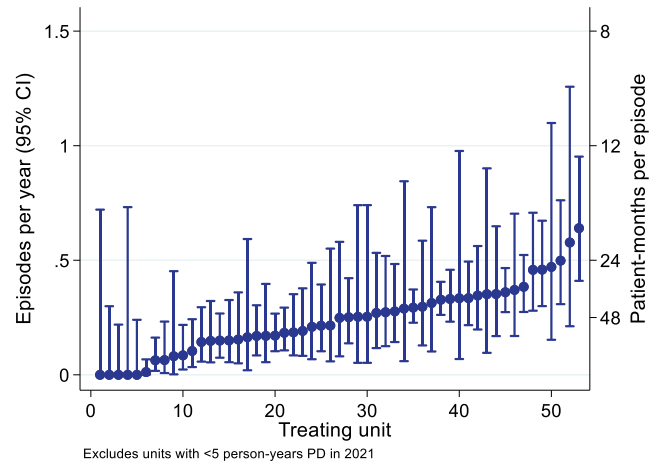


Figure 5.26 - PD Peritonitis Rate - By Treating Unit, Australia 2021



The organisms causing peritonitis are presented in figure 5.27. Figure 5.28 shows these data for 2021 stratified by state/territory.

Figure 5.27 - Distribution of Organisms Causing Peritonitis - Australia 2016-2021

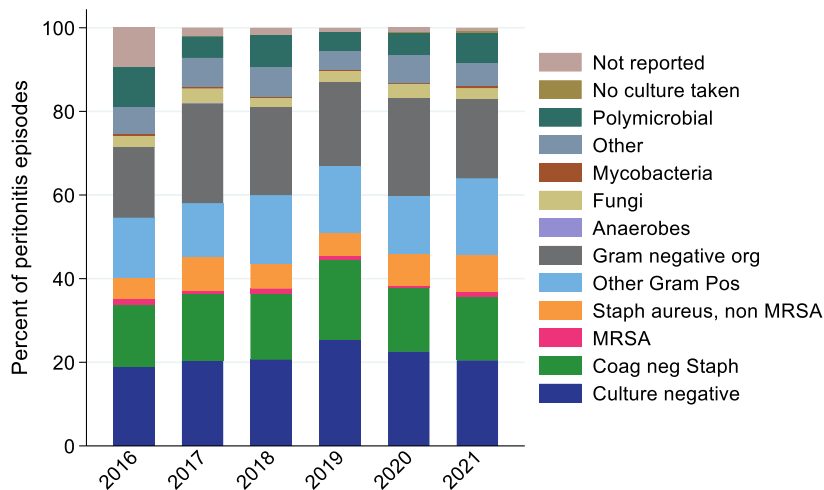
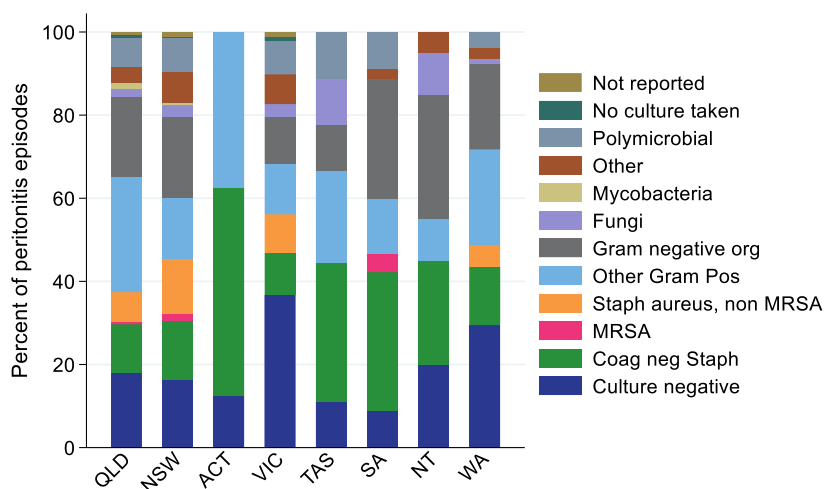


Figure 5.28 - Distribution of Organisms Causing Peritonitis - Australia 2021



Initial treatments for peritonitis episodes is shown in (figure 5.29). The medications used in the final regimen are shown in figure 5.30.

Figure 5.29 - Initial Antibiotic Regimen - Australia 2016-2021

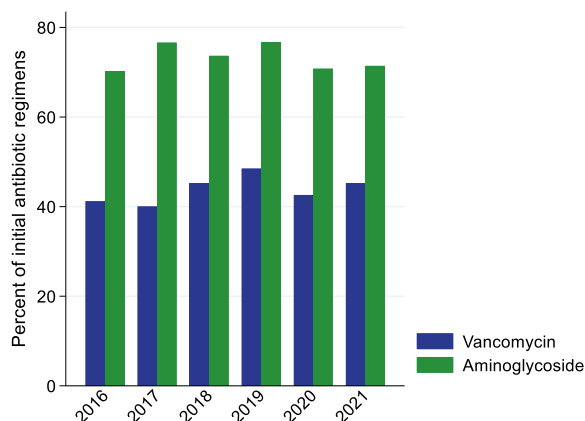
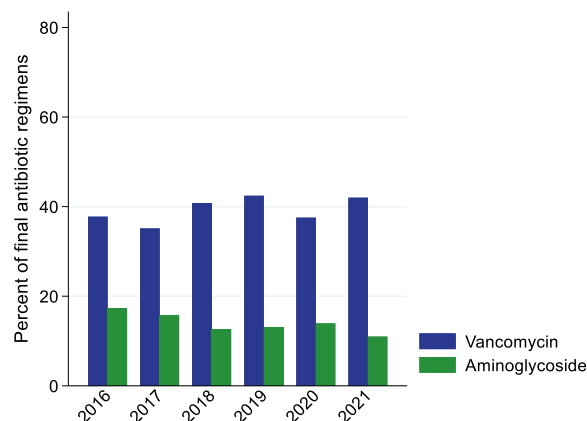
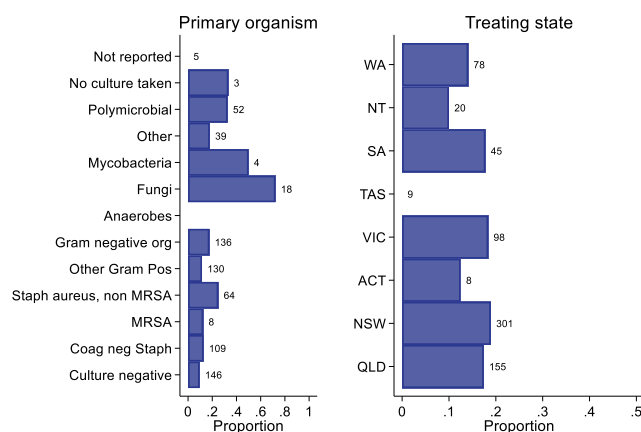


Figure 5.30 - Final Antibiotic Regimen - Australia 2016-2021



The proportion of peritonitis episodes resulting in a permanent transfer to haemodialysis by organism and state/territory is shown in (figure 5.31).

Figure 5.31 - Proportion of Episodes Resulting in Permanent HD Transfer - Australia 2021



Values are total number of peritonitis episodes reported in 2021

Laboratory Values

Anaemia

Figure 5.32 shows the distribution of Hb in PD patients over the last 3 years.

Figure 5.32 - Haemoglobin - Peritoneal Dialysis - December 2019-2021

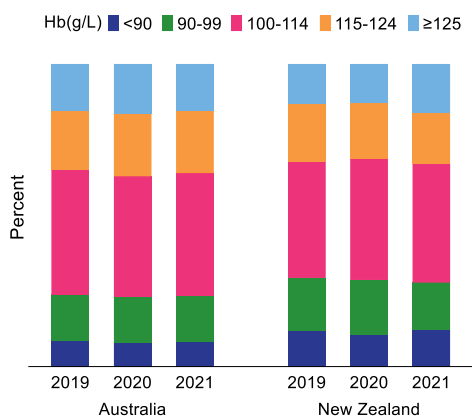


Figure 5.33 shows the variation in Hb between treating hospitals; median Hb ranged from 103 to 127g/L in Australia and 103-117g/L in New Zealand.

Figure 5.33.1 - Haemoglobin in Peritoneal Dialysis Patients - Australia 31 December 2021

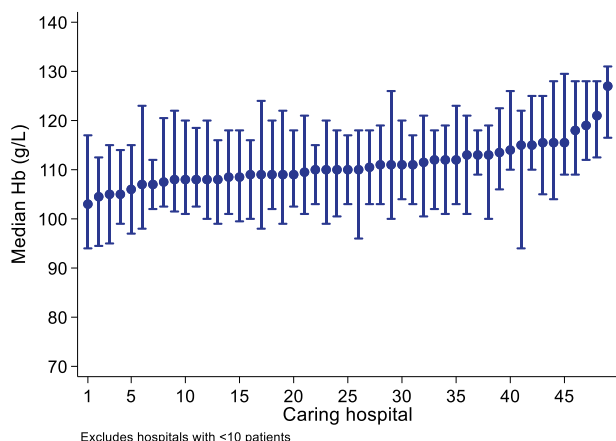


Figure 5.33.2 - Haemoglobin in Peritoneal Dialysis Patients - New Zealand 31 December 2021

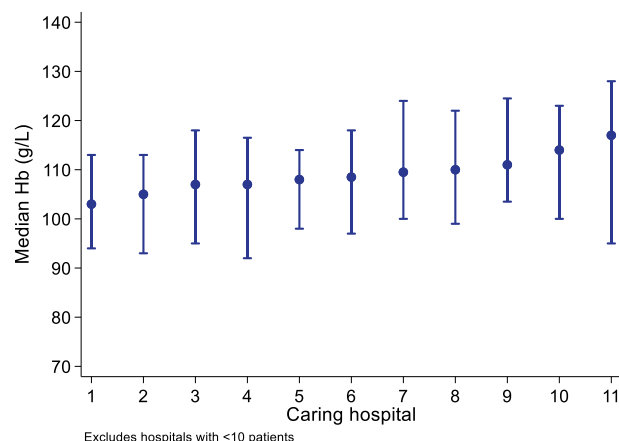


Figure 5.34 shows the proportion of peritoneal dialysis patients prescribed an erythropoiesis-stimulating agent whose haemoglobin was between 100-115g/L; the proportion ranged from 0-83% in Australia and 13-53% in New Zealand.

Figure 5.34.1 - % Peritoneal Dialysis Patients receiving an ESA with Hb 100-115 g/L - Australia 31 December 2021

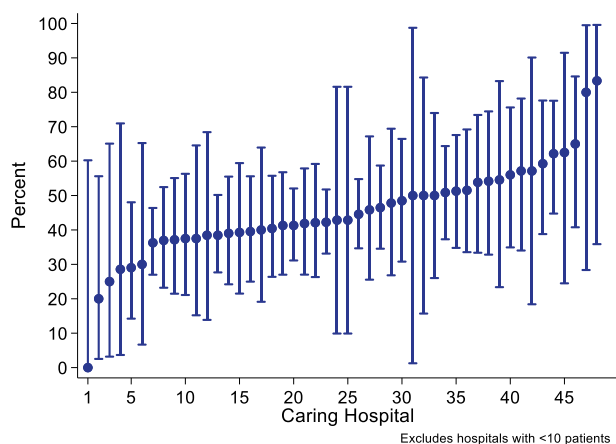
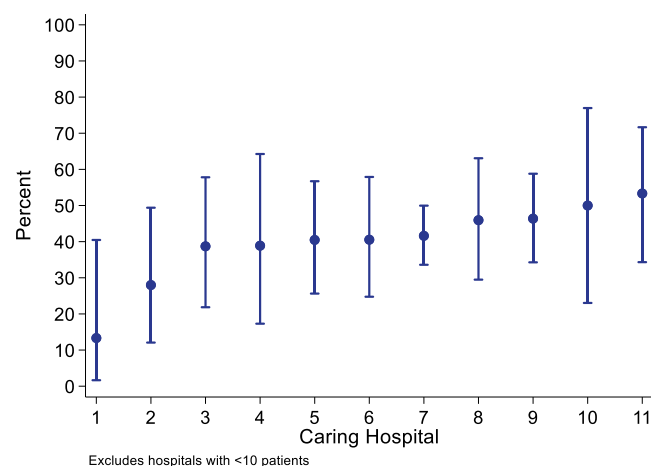


Figure 5.34.2 - % Peritoneal Dialysis Patients receiving an ESA with Hb 100-115 g/L - New Zealand 31 December 2021



Biochemistry

Figures 5.35-5.38 present the distributions of calcium and phosphate for patients treated with peritoneal dialysis.

Figure 5.35 - Serum Calcium - Peritoneal Dialysis - December 2019-2021

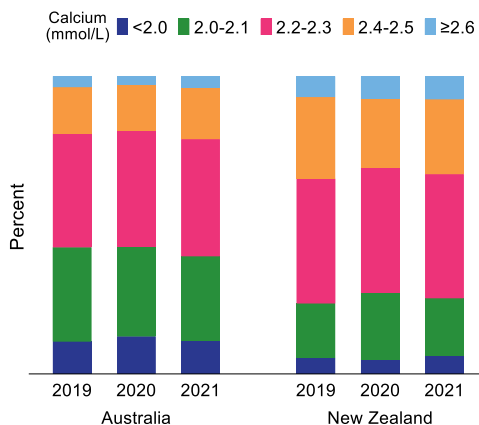


Figure 5.36.1 - % PD Patients with Calcium 2.1-2.4 mmol/L - Australia 31 December 2021

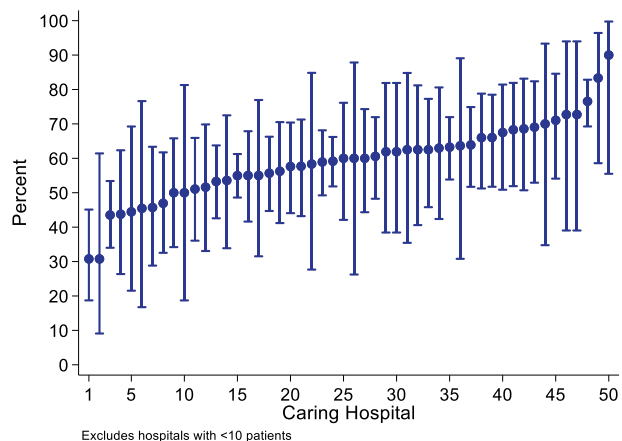


Figure 5.36.2 - % PD Patients with Calcium 2.1-2.4 mmol/L - New Zealand 31 December 2021

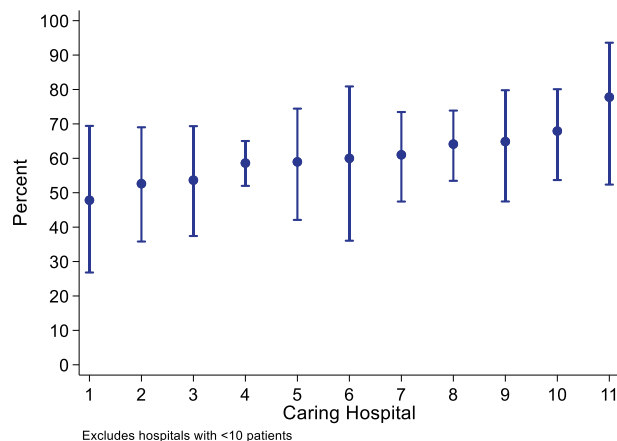


Figure 5.37 - Serum Phosphate - Peritoneal Dialysis - December 2019-2021

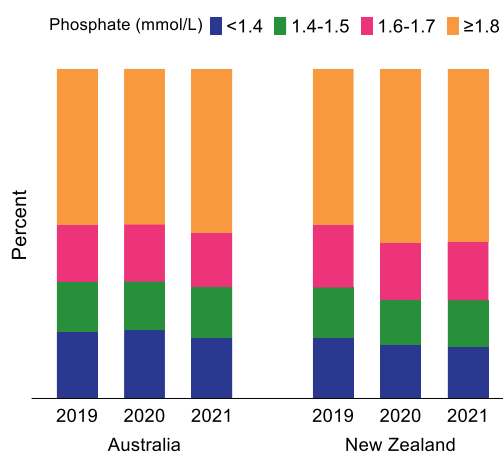


Figure 5.38.1 - % PD Patients with Phosphate 0.8-1.6 mmol/L - Australia 31 December 2021

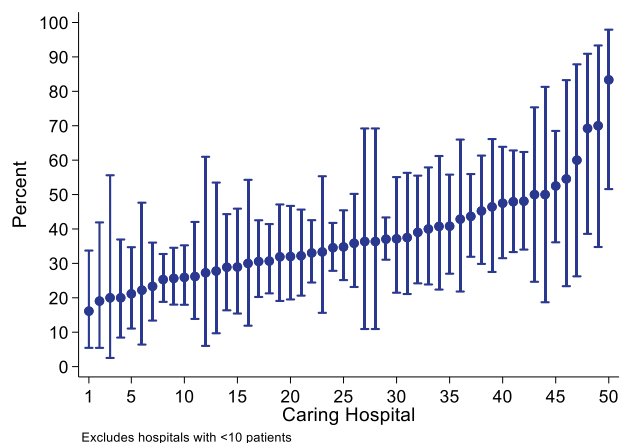
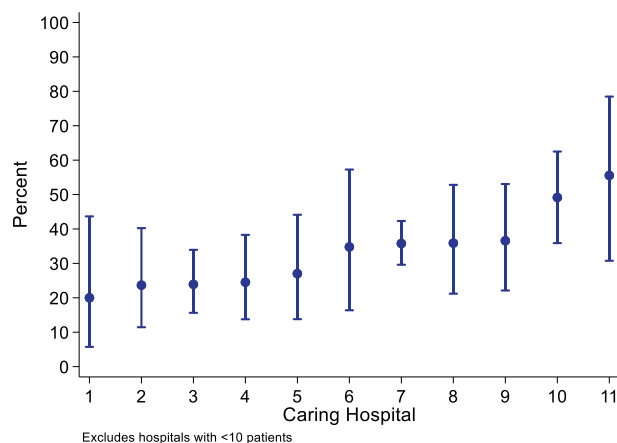


Figure 5.38.2 - % PD Patients with Phosphate 0.8-1.6 mmol/L - New Zealand 31 December 2021



References

¹ Australian Bureau of Statistics, 2021, Quarterly Population Estimates (ERP), by State/Territory, Sex and Age, Jun 2021, viewed 22 Dec 2021, <https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/jun-2021>

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, 2021, Estimated Resident Population by Age and Sex (1991+) (Annual-Jun), NZ Infoshare, viewed 5 Jan 2022, <http://infoshare.stats.govt.nz/>