

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

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SUMMARY AND HIGHLIGHTS

During the 2023 survey period, 1221 people in Australia and 306 people in New Zealand commenced maintenance peritoneal dialysis (PD). The number of incident and prevalent patients on PD and the proportion of all dialysis patients on PD remained stable in Australia. Compared to 2022, the number of incident patients dropped by 10% in New Zealand (336 people in 2022). As a result, the number of prevalent patients on PD continues to decline in New Zealand (746 in 2022, compared to 769 in 2021). The proportion of all dialysis patients on PD continued to fall in New Zealand over the past five years (29% in 2019 and 23% in 2023). The number of patients on PD who received a kidney transplant has returned close to the pre-COVID-19 pandemic years in Australia (301 vs. 328 in 2019) but decreased back to COVID-19 pandemic years in New Zealand (55 vs. 69 in 2022 vs. 54 in 2020).

The most common age groups for patients who commenced PD in 2022 were between 65-74 years in Australia (25%) and between 55-64 years in New Zealand (26%). PD remained the more common dialysis modality for the paediatric group (82% in Australia and 78% in New Zealand). For patients commenced on PD, diabetic kidney disease remained the most common cause of primary kidney disease (31% in Australia and 45% in New Zealand). The proportion of incident patients on peritoneal dialysis in New Zealand with glomerular disease as the primary kidney disease reduced over the past five years (19% in 2023 vs. 27% in 2019).

The proportion of all PD patients receiving automated PD (APD) remains greater than those receiving continuous ambulatory PD (CAPD) (72% vs. 28% in Australia and 65% vs. 35% in New Zealand). Prevalent patients on hybrid dialysis (concurrent treatment with PD and haemodialysis) were reported for the first time in ANZDATA using the end-of-year survey. There was marked centre variation in the use of icodextrin and low GDP solutions. Compared to 2022, the proportions of patients receiving low GDP solutions remained the same in Australia (19%) but decreased in New Zealand (6% vs. 9% in 2022).

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 66% 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 39% in Australia and 33% in New Zealand. Death remained one of the most common reasons for PD discontinuation (23% in Australia and 27% in New Zealand). Although, infection was the third most common reason in Australia (17%) after death and inadequate dialysis (21%), infection had overtaken death as the most common reason for PD discontinuation in New Zealand (29%). The proportion of patients transferred to haemodialysis at 1 year remained the same in Australia but increased in New Zealand (21% for 2021-2023 vs. 18% for 2018-2020 vs. 16% 2015-2017). 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 (0.28 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 (0.0 to 0.8 peritonitis episodes per patient-year). PD peritonitis rates remained high in the Northern Territory (0.75 episodes per patient-year). The proportions of culture negative PD peritonitis were high in ACT (38%) and WA (40%) despite the ISPD recommendation of <15% of PD peritonitis being culture negative.

Date of PD catheter insertion is a new variable collected in 2023 aiming to assess the pattern of acute start PD. In both Australia and New Zealand, 16% of patients started PD within 14 days after PD catheter insertion with 4% of patients in Australia and 3% of patients in New Zealand starting PD within 3 days after PD catheter insertion.

SUGGESTED CITATION

J Chen, C Davies, E Au, S Bateman, P Clayton, K Hurst, F Kholmurodova, D Lee, H McCarthy, S McDonald, W Mulley, M Roberts, B Solomon, T Sun, G Irish. 47th Report, Chapter 5: Peritoneal dialysis. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2024. 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 2019-2023. 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	2019	2020	2021	2022	2023
Queensland	17%	16%	15%	15%	16%
New South Wales	22%	23%	23%	22%	21%
Australian Capital Territory	12%	15%	12%	12%	12%
Victoria	17%	17%	18%	18%	17%
Tasmania	14%	17%	19%	20%	20%
South Australia	14%	14%	15%	15%	16%
Northern Territory	6%	7%	7%	5%	5%
Western Australia	14%	15%	14%	15%	15%
Australia	17%	17%	18%	17%	17%
New Zealand	29%	29%	26%	25%	23%

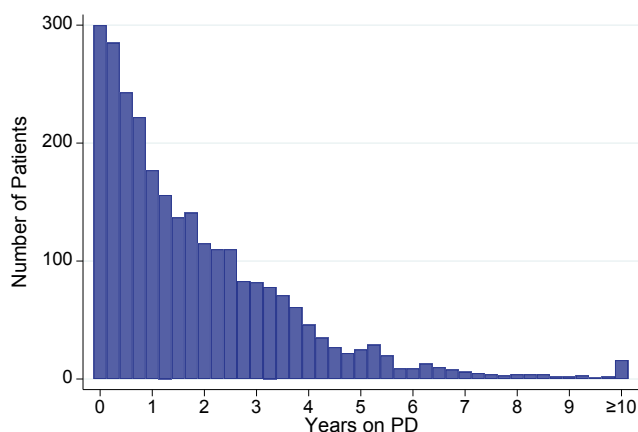
[^]Includes Hybrid Dialysis

Table 5.2
Percentage of all Home Dialysis* Patients on Peritoneal Dialysis[^]

State	2019	2020	2021	2022	2023
Queensland	65%	66%	66%	66%	69%
New South Wales	69%	69%	70%	69%	70%
Australian Capital Territory	56%	63%	56%	63%	66%
Victoria	74%	72%	73%	73%	74%
Tasmania	74%	81%	83%	85%	89%
South Australia	77%	83%	83%	83%	84%
Northern Territory	57%	48%	58%	61%	52%
Western Australia	69%	69%	70%	70%	71%
Australia	69%	69%	70%	70%	71%
New Zealand	67%	69%	67%	66%	66%

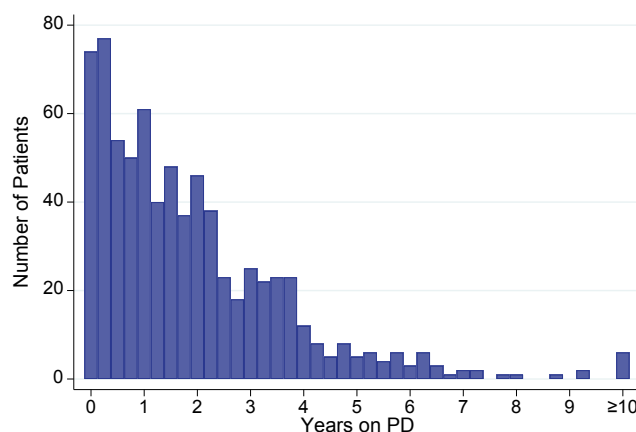
*Includes Community House Haemodialysis [^]Includes Hybrid Dialysis

Figure 5.1.1
Time on Peritoneal Dialysis[^] - Prevalent PD Patients Australia 31 Dec 2023



[^]Includes Hybrid Dialysis

Figure 5.1.2
Time on Peritoneal Dialysis[^] - Prevalent PD Patients New Zealand 31 Dec 2023



[^]Includes Hybrid Dialysis

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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 2022, the median number of days to death was 4, and 90% of patients died within 20 days.

Table 5.3
Incidence, Cessation and Annual Prevalence of Peritoneal Dialysis^a Patients 2019 - 2023

Country		2019	2020	2021	2022	2023
Australia	All patients who commenced PD					
	First dialysis treatment or returning after kidney recovery	767	919	912	838	883
	Transfer from HD (no prior PD)	263	258	222	233	266
	Transfer from HD (prior PD)	33	35	32	35	45
	Failed Transplant (no prior PD)	13	16	16	13	8
	Failed Transplant (prior PD)	12	27	12	17	19
	Total	1088	1255	1194	1136	1221
	All patients who ceased PD					
	Received kidney transplant	328	233	209	243	301
	Transfer to HD	489	542	558	551	565
	Kidney recovery	17	12	23	16	20
	Withdrawal from dialysis*	-	85	94	115	95
	Deaths	288	218	182	239	207
	Total	1122	1090	1066	1164	1188
Total patients on PD at 31 December	2394	2551	2680	2645	2674	
New Zealand	All patients who commenced PD					
	First dialysis treatment or returning after kidney recovery	241	271	249	239	214
	Transfer from HD (no prior PD)	77	79	81	72	79
	Transfer from HD (prior PD)	11	25	11	19	9
	Failed Transplant (no prior PD)	6	4	2	3	2
	Failed Transplant (prior PD)	4	6	6	3	2
	Total	339	385	349	336	306
	All patients who ceased PD					
	Received kidney transplant	72	54	69	69	55
	Transfer to HD	148	151	185	152	149
	Kidney recovery	5	4	8	5	5
	Withdrawal from dialysis*	-	36	27	46	41
	Deaths	156	113	90	107	78
	Total	381	358	379	379	328
Total patients on PD at 31 December	821	849	812	769	746	

^aIncludes Hybrid Dialysis

Figure 5.2.1
Incidence, Cessation and Annual Prevalence of Peritoneal Dialysis[^] Patients - Australia 2019-2023

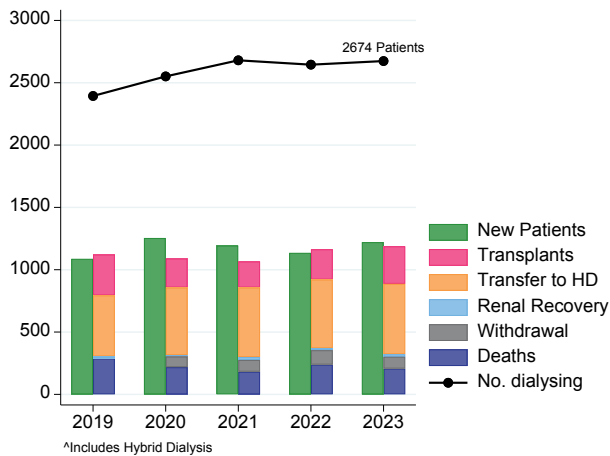
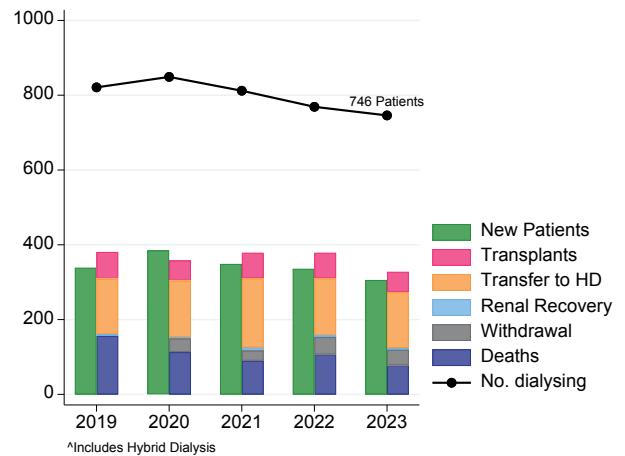


Figure 5.2.2
Incidence, Cessation and Annual Prevalence of Peritoneal Dialysis[^] Patients - New Zealand 2019-2023



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 2023

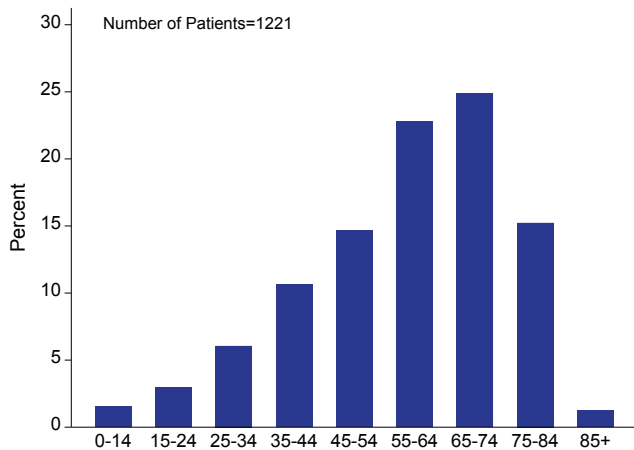


Figure 5.3.2
Age (%) of Incident Peritoneal Dialysis Patients - New Zealand 2023

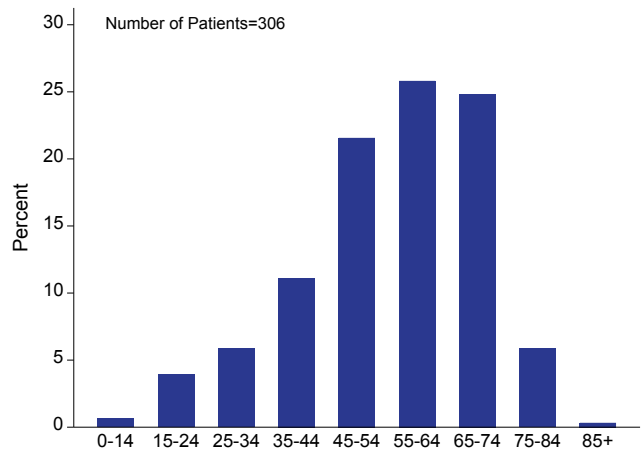


Figure 5.4.1
Age (%) of Prevalent Peritoneal Dialysis[^] Patients - Australia 2023

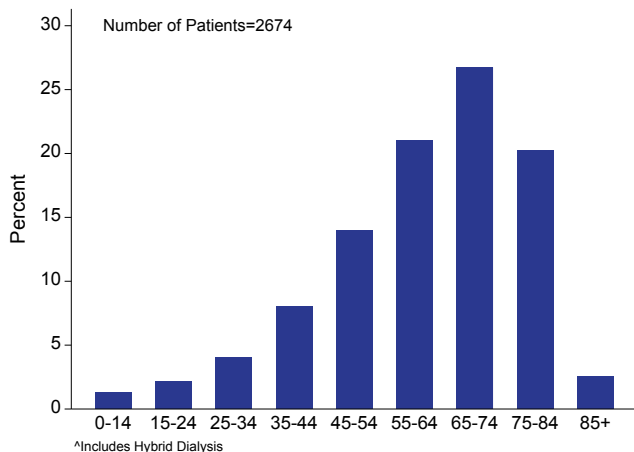
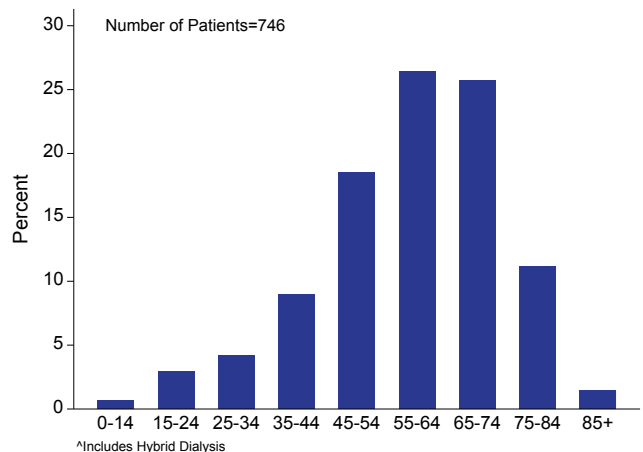


Figure 5.4.2
Age (%) of Prevalent Peritoneal Dialysis[^] Patients - New Zealand 2023



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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^a patients by Age Group - Australia

Category	Age group	2019	2020	2021	2022	2023
Incident Patients	0-14	20 (2%)	21 (2%)	20 (2%)	28 (2%)	19 (2%)
	15-24	25 (2%)	28 (2%)	32 (3%)	39 (3%)	36 (3%)
	25-34	73 (7%)	94 (7%)	86 (7%)	75 (7%)	74 (6%)
	35-44	105 (10%)	117 (9%)	128 (11%)	113 (10%)	130 (11%)
	45-54	198 (18%)	209 (17%)	212 (18%)	178 (16%)	179 (15%)
	55-64	245 (23%)	282 (22%)	245 (21%)	236 (21%)	278 (23%)
	65-74	265 (24%)	307 (24%)	316 (26%)	302 (27%)	304 (25%)
	75-84	145 (13%)	178 (14%)	139 (12%)	153 (13%)	186 (15%)
	85+	12 (1%)	19 (2%)	16 (1%)	12 (1%)	15 (1%)
	Total	1088	1255	1194	1136	1221
Prevalent Patients	0-14	23 (1%)	31 (1%)	37 (1%)	41 (2%)	34 (1%)
	15-24	31 (1%)	35 (1%)	37 (1%)	60 (2%)	57 (2%)
	25-34	103 (4%)	122 (5%)	130 (5%)	121 (5%)	108 (4%)
	35-44	197 (8%)	196 (8%)	219 (8%)	218 (8%)	215 (8%)
	45-54	337 (14%)	357 (14%)	393 (15%)	384 (15%)	373 (14%)
	55-64	525 (22%)	554 (22%)	561 (21%)	542 (20%)	563 (21%)
	65-74	635 (27%)	682 (27%)	710 (26%)	706 (27%)	715 (27%)
	75-84	480 (20%)	506 (20%)	521 (19%)	508 (19%)	541 (20%)
	85+	63 (3%)	68 (3%)	72 (3%)	65 (2%)	68 (3%)
	Total	2394	2551	2680	2645	2674

^aIncludes Hybrid Dialysis

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

Category	Age group	2019	2020	2021	2022	2023
Incident Patients	0-14	5 (1%)	3 (1%)	3 (1%)	7 (2%)	2 (1%)
	15-24	7 (2%)	14 (4%)	9 (3%)	13 (4%)	12 (4%)
	25-34	29 (9%)	23 (6%)	24 (7%)	19 (6%)	18 (6%)
	35-44	32 (9%)	38 (10%)	41 (12%)	39 (12%)	34 (11%)
	45-54	71 (21%)	72 (19%)	68 (19%)	61 (18%)	66 (22%)
	55-64	94 (28%)	100 (26%)	82 (23%)	87 (26%)	79 (26%)
	65-74	71 (21%)	91 (24%)	83 (24%)	78 (23%)	76 (25%)
	75-84	30 (9%)	42 (11%)	36 (10%)	29 (9%)	18 (6%)
	85+	0 (0%)	2 (1%)	3 (1%)	3 (1%)	1 (0%)
	Total	339	385	349	336	306
Prevalent Patients	0-14	11 (1%)	7 (1%)	4 (0%)	5 (1%)	5 (1%)
	15-24	16 (2%)	23 (3%)	20 (2%)	20 (3%)	22 (3%)
	25-34	43 (5%)	42 (5%)	41 (5%)	35 (5%)	31 (4%)
	35-44	79 (10%)	87 (10%)	82 (10%)	81 (11%)	67 (9%)
	45-54	145 (18%)	143 (17%)	138 (17%)	124 (16%)	138 (18%)
	55-64	211 (26%)	218 (26%)	199 (25%)	199 (26%)	197 (26%)
	65-74	199 (24%)	209 (25%)	207 (25%)	205 (27%)	192 (26%)
	75-84	113 (14%)	115 (14%)	112 (14%)	93 (12%)	83 (11%)
	85+	4 (0%)	5 (1%)	9 (1%)	7 (1%)	11 (1%)
	Total	821	849	812	769	746

^aIncludes Hybrid Dialysis

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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	2019	2020	2021	2022	2023
Diabetic kidney disease	379 (35%)	425 (34%)	385 (32%)	380 (33%)	376 (31%)
Glomerular disease	281 (26%)	337 (27%)	305 (26%)	285 (25%)	308 (25%)
Hypertension / Renal vascular disease	147 (14%)	134 (11%)	147 (12%)	142 (13%)	159 (13%)
Familial / hereditary kidney diseases	85 (8%)	88 (7%)	115 (10%)	89 (8%)	112 (9%)
Tubulointerstitial disease	89 (8%)	122 (10%)	112 (9%)	101 (9%)	98 (8%)
Other systemic diseases affecting the kidney	25 (2%)	24 (2%)	28 (2%)	23 (2%)	26 (2%)
Miscellaneous kidney disorders	77 (7%)	113 (9%)	100 (8%)	112 (10%)	140 (11%)
Not reported	5 (0%)	12 (1%)	2 (0%)	4 (0%)	2 (0%)
Total	1088	1255	1194	1136	1221

Table 5.5.2
Incident PD Patients by Primary Disease - New Zealand

Primary Kidney Disease	2019	2020	2021	2022	2023
Diabetic kidney disease	156 (46%)	166 (43%)	152 (44%)	155 (46%)	139 (45%)
Glomerular disease	90 (27%)	100 (26%)	101 (29%)	75 (22%)	59 (19%)
Hypertension / Renal vascular disease	33 (10%)	41 (11%)	43 (12%)	34 (10%)	33 (11%)
Familial / hereditary kidney diseases	16 (5%)	23 (6%)	18 (5%)	19 (6%)	23 (8%)
Tubulointerstitial disease	21 (6%)	33 (9%)	17 (5%)	23 (7%)	17 (6%)
Other systemic diseases affecting the kidney	3 (1%)	5 (1%)	4 (1%)	10 (3%)	11 (4%)
Miscellaneous kidney disorders	20 (6%)	16 (4%)	13 (4%)	20 (6%)	24 (8%)
Not reported	0 (0%)	1 (0%)	1 (0%)	0 (0%)	0 (0%)
Total	339	385	349	336	306

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 2023

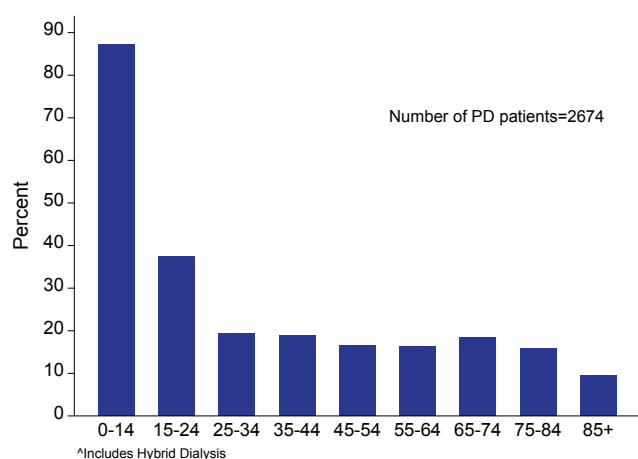
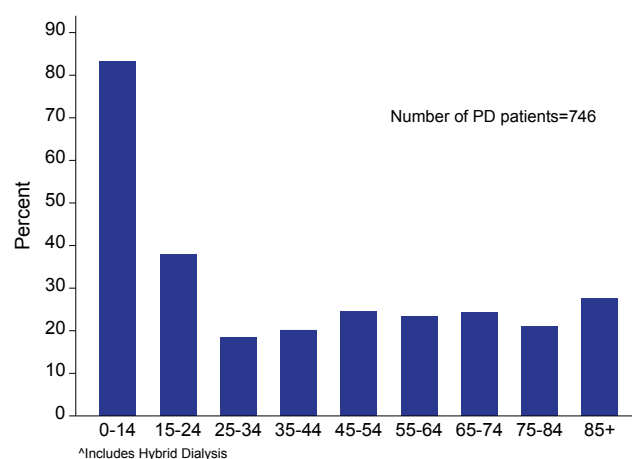


Figure 5.5.2
PD* Patients (%) of all Prevalent Dialysis - New Zealand 2023



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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. Hybrid dialysis has been collected as a modality of dialysis since 2023. Hybrid dialysis is defined as combined concurrent peritoneal dialysis and haemodialysis therapy. As this is a newly collected variable, there may have been under-reporting in the number of hybrid therapy patients.

Population estimates for Australia and New Zealand used for the calculation of prevalence per million population were sourced from the Australian Bureau of Statistics (2023)¹ and Stats NZ (2023)².

Table 5.6.1
Number (per Million) of Prevalent PD Patients, Australia 2019-2023

	2019	2020	2021	2022	2023
Total	2394 (94)	2551 (99)	2680 (104)	2645 (102)	2674 (100)
APD	1656 (65)	1777 (69)	1873 (73)	1929 (74)	1900 (71)
APD Hybrid	-	-	-	-	17 (1)
CAPD	738 (29)	774 (30)	807 (31)	716 (28)	753 (28)
CAPD Hybrid	-	-	-	-	4 (0)

Hybrid Dialysis was only collected from 2023 onwards as a modality of treatment.

Table 5.6.2
Number (per Million) of Prevalent PD Patients, New Zealand 2019-2023

	2019	2020	2021	2022	2023
Total	821 (165)	849 (167)	812 (159)	769 (150)	746 (142)
APD	505 (101)	511 (100)	480 (94)	484 (95)	483 (92)
APD Hybrid	-	-	-	-	3 (1)
CAPD	316 (63)	338 (66)	332 (65)	285 (56)	258 (49)
CAPD Hybrid	-	-	-	-	2 (0)

Hybrid Dialysis was only collected from 2023 onwards as a modality of treatment.

Figure 5.6.1
Prevalent PD[^] Modality - Australia, December 2019 - 2023

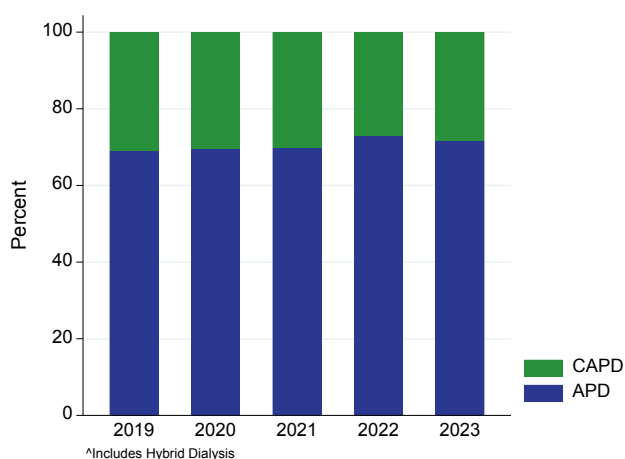
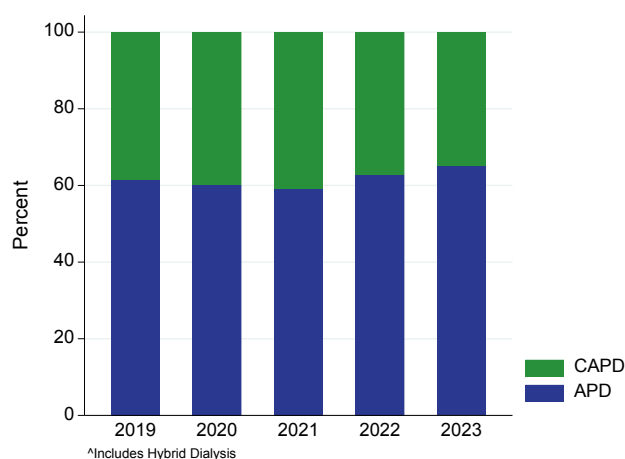


Figure 5.6.2
Prevalent PD[^] Modality - New Zealand, December 2019 - 2023



Collection of the first peritoneal catheter insertion date commenced in 2023. Table 5.7 shows the days from PD catheter insertion to first PD start. Urgent start PD is defined as 0-3 days and early start PD as 4-14 days.

Figure 5.7
Days from First PD Catheter Insertion to First PD Start

Country	Days	2023
Australia	0-3 (Urgent start)	50 (4%)
	4-14 (Early start)	133 (12%)
	>14	925 (80%)
	Not Reported	43 (4%)
	Total	1151
New Zealand	0-3 (Urgent start)	10 (3%)
	4-14 (Early start)	37 (13%)
	>14	244 (83%)
	Not Reported	2 (1%)
	Total	293

PERITONEAL DIALYSIS FLUIDS

Table 5.8 shows the use of icodextrin by country and PD type at the end of 2023. 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 2023.

Table 5.8
Icodextrin Usage by Modality Type - December 2023

PD Type	Australia				New Zealand				
	No	Yes	Not Reported	Total	No	Yes	Not Reported	Total	
CAPD	n	287	433	37	757	93	159	8	260
	%	38%	57%	5%		36%	61%	3%	
APD	n	874	984	59	1917	115	356	15	486
	%	46%	51%	3%		24%	73%	3%	
Total	n	1161	1417	96	2674	208	515	23	746
	%	43%	53%	4%		28%	69%	3%	

^aIncludes Hybrid Dialysis

Figure 5.7.1
Icodextrin Use by PD Modality^a - Prevalent Patients December 2021 - 2023 Australia

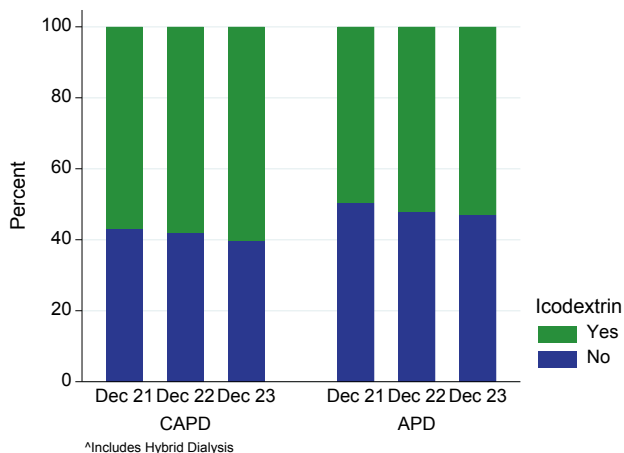


Figure 5.7.2
Icodextrin Use by PD Modality^a - Prevalent Patients December 2021 - 2023 New Zealand

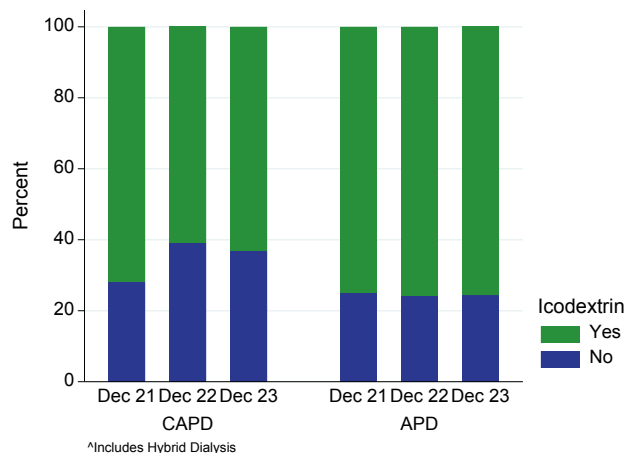


Figure 5.8
Icodextrin Use by State and Country - Prevalent PD[^] Patients December 2023

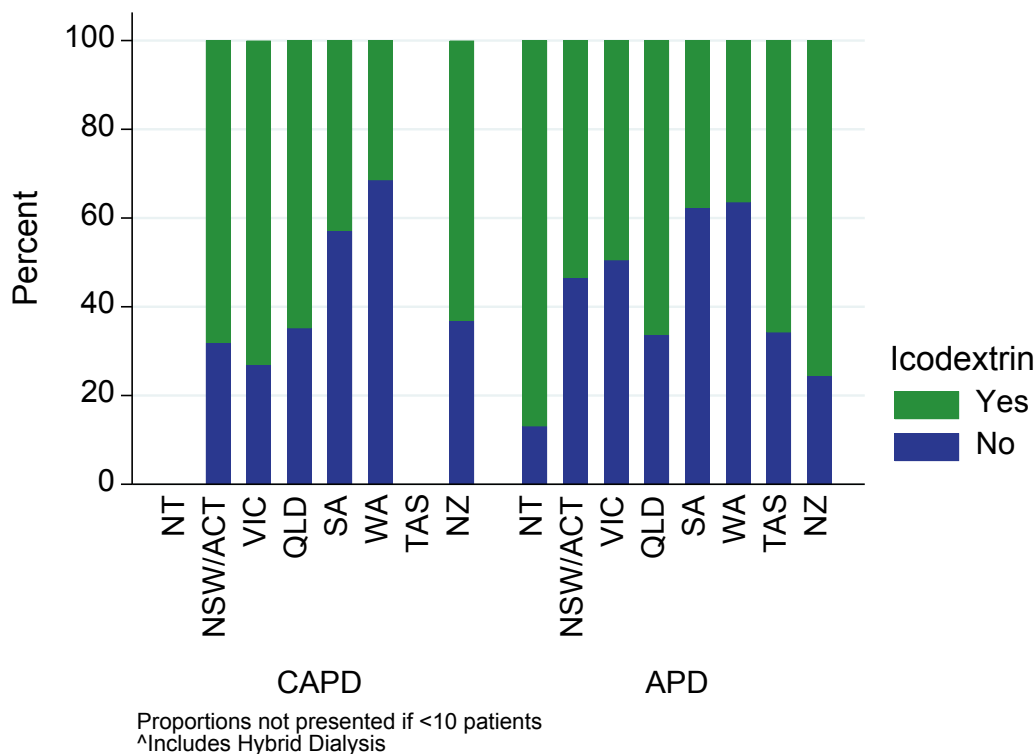


Table 5.9 and Figures 5.9 and 5.10 present similar data for low Glucose degradation products (GDP) PD solutions.

Table 5.9
Low GDP Usage by Modality Type - December 2023

PD Type	Australia				New Zealand				
	No	Yes	Not Reported	Total	No	Yes	Not Reported	Total	
CAPD	n	483	237	37	757	247	5	8	260
	%	64%	31%	5%		95%	2%	3%	
APD	n	1572	284	61	1917	433	37	16	486
	%	82%	15%	3%		89%	8%	3%	
Total	n	2055	521	98	2674	680	42	24	746
	%	77%	19%	4%		91%	6%	3%	

[^]Includes Hybrid Dialysis

Figure 5.9.1
Low GDP Use by PD Modality[^] - Prevalent Patients December 2021 - 2023 Australia

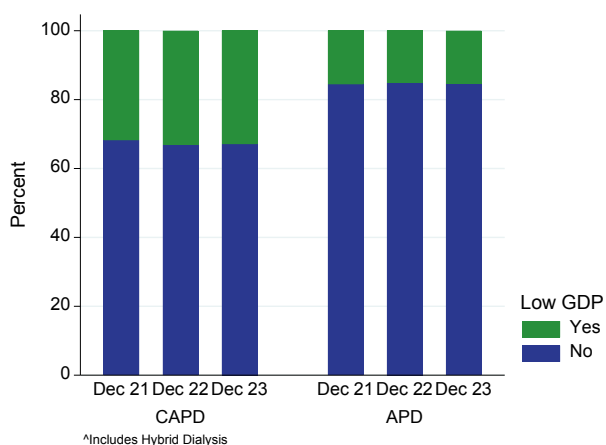
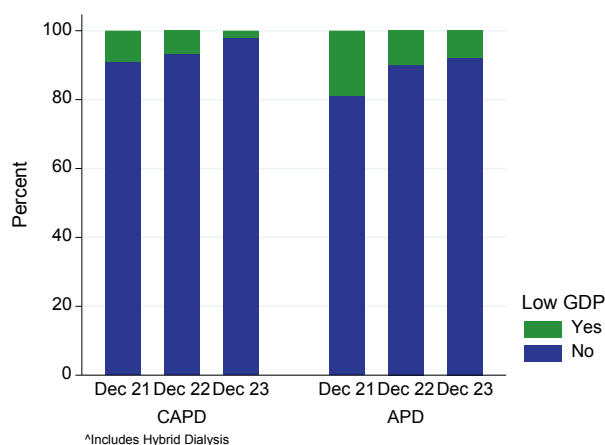


Figure 5.9.2
Low GDP Use by PD Modality[^] - Prevalent Patients December 2021 - 2023 New Zealand



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Figure 5.10
Low GDP Use by State and Country - Prevalent PD[^] Patients December 2023

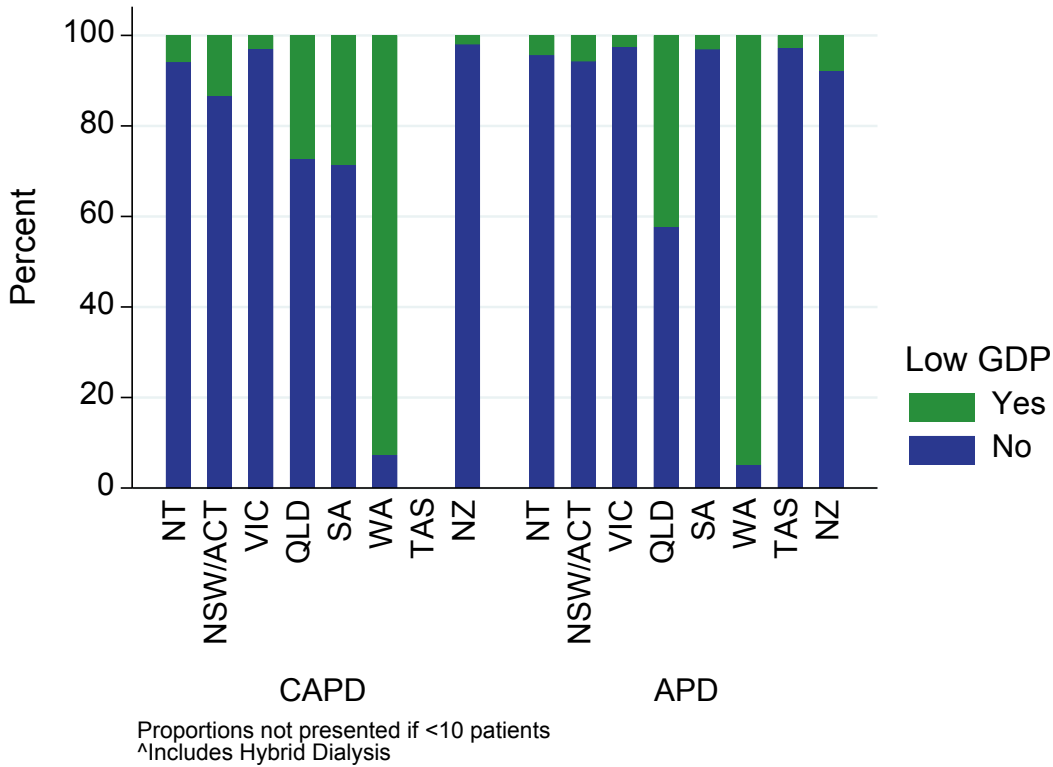
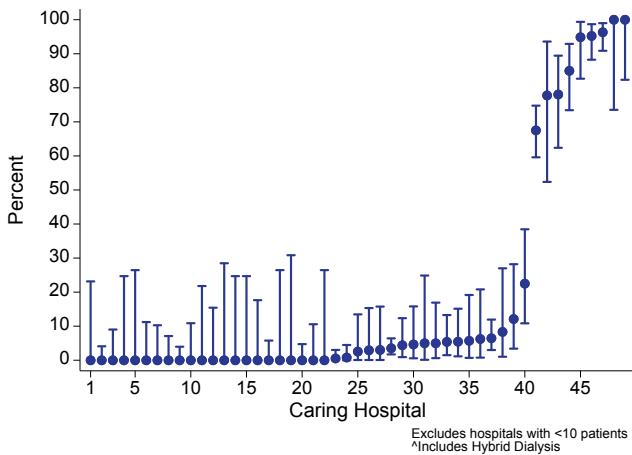


Figure 5.11 shows the proportion of peritoneal dialysis patients using a low GDP solution by hospital.

Figure 5.11.1
% Low GDP Use[^] by Hospital - Australia 31 December 2023



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 5.10 and Figure 5.12 show patient survival by era.

Table 5.10
PD^ Patient Survival by Era - 2012-2023; % [95% Confidence Interval]

Country	Era	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	2012 - 2014	2933	97 [97, 98]	94 [93, 95]	74 [72, 76]	53 [51, 56]
	2015 - 2017	3055	97 [96, 97]	93 [92, 94]	73 [71, 75]	52 [50, 55]
	2018 - 2020	3140	97 [97, 98]	94 [93, 95]	76 [75, 78]	54 [51, 57]
	2021 - 2023	3271	97 [96, 98]	94 [93, 95]	-	-
New Zealand	2012 - 2014	777	97 [95, 98]	93 [91, 94]	68 [65, 72]	46 [42, 50]
	2015 - 2017	906	96 [95, 97]	92 [90, 93]	65 [62, 69]	42 [38, 45]
	2018 - 2020	956	97 [95, 98]	93 [91, 94]	66 [62, 69]	44 [39, 48]
	2021 - 2023	904	97 [96, 98]	92 [90, 94]	-	-

Peritoneal Dialysis within 365 days of KRT start
Censored for Transplant
^Includes Hybrid Dialysis

Figure 5.12.1
PD^ Patient Survival by Era - Australia 2012 - 2023

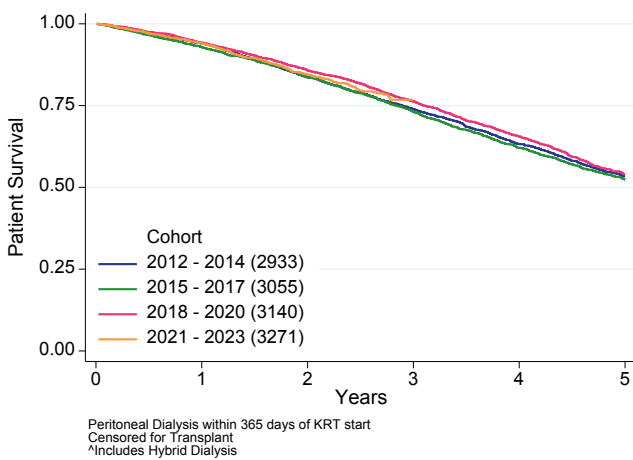


Figure 5.12.2
PD^ Patient Survival by Era - New Zealand 2012 - 2023

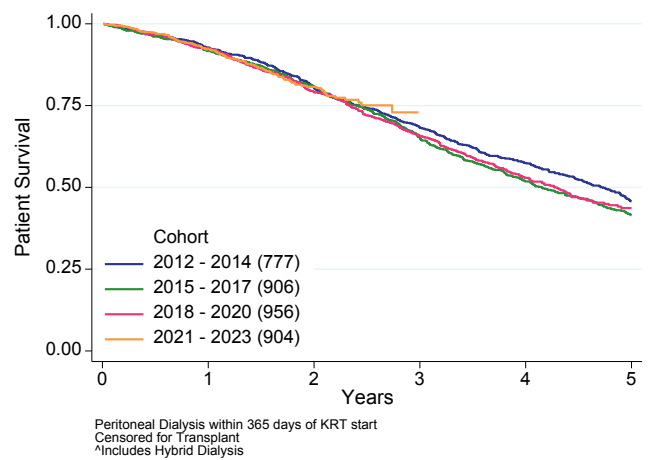


Table 5.11 and Figure 5.13 demonstrate the strong association between patient age and survival.

Table 5.11
PD[^] Patient Survival by Age Group - 2012-2023; % [95% Confidence Interval]

Country	Age Group	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	<40	1871	99 [98, 99]	98 [97, 99]	92 [90, 93]	85 [82, 88]
	40-59	3935	99 [98, 99]	96 [95, 97]	82 [80, 83]	67 [65, 69]
	60-74	4700	96 [96, 97]	93 [92, 93]	72 [71, 74]	49 [47, 51]
	≥75	1893	94 [93, 95]	88 [86, 89]	57 [55, 59]	32 [30, 35]
New Zealand	<40	529	100 [98, 100]	98 [96, 99]	89 [85, 92]	77 [70, 82]
	40-59	1337	98 [97, 98]	95 [94, 96]	73 [70, 76]	51 [47, 54]
	60-74	1334	96 [94, 97]	89 [88, 91]	59 [56, 62]	36 [32, 39]
	≥75	343	92 [88, 94]	85 [80, 88]	46 [40, 52]	20 [15, 25]

Peritoneal Dialysis within 365 days of KRT start

Censored for Transplant

[^]Includes Hybrid Dialysis

Figure 5.13.1
PD[^] Patient Survival by Age Group - Australia 2012 - 2023

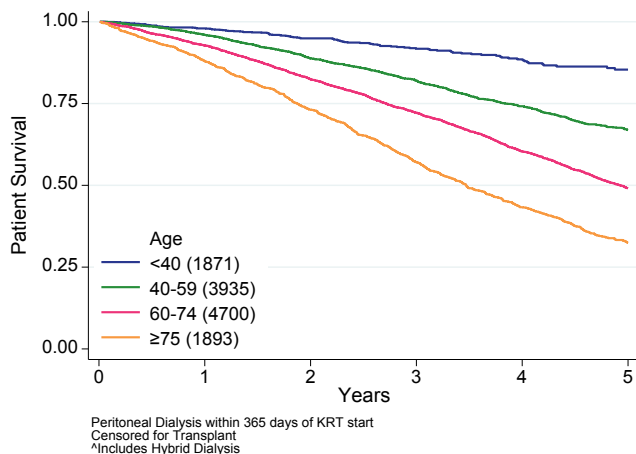


Figure 5.13.2
PD[^] Patient Survival by Age Group - New Zealand 2012 - 2023

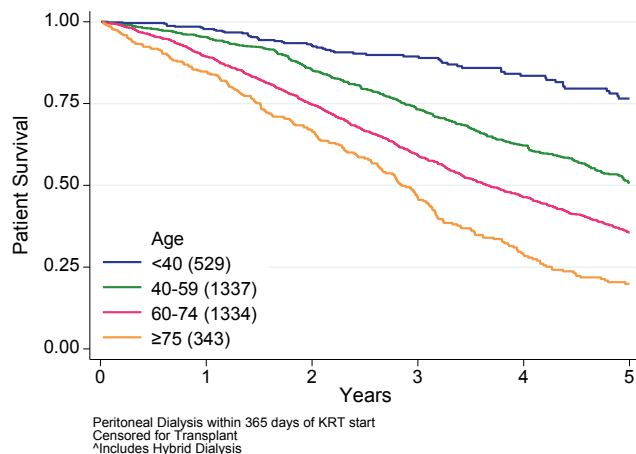


Table 5.12 and Figure 5.14 present these data by diabetic status.

Table 5.12
PD^ Patient Survival by Diabetic Status - 2012-2023; % [95% Confidence Interval]

Country	Diabetic Status	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	Non-diabetic	6714	98 [97, 98]	96 [95, 96]	81 [80, 83]	63 [62, 65]
	Diabetic	5628	96 [96, 97]	92 [91, 92]	68 [66, 69]	45 [43, 46]
New Zealand	Non-diabetic	1601	97 [96, 98]	94 [92, 95]	75 [72, 77]	54 [50, 57]
	Diabetic	1936	96 [95, 97]	91 [90, 92]	61 [58, 63]	37 [34, 40]

Peritoneal Dialysis within 365 days of KRT start

Censored for Transplant

^Includes Hybrid Dialysis

Figure 5.14.1
PD^ Patient Survival by Diabetic Status - Australia 2012 - 2023

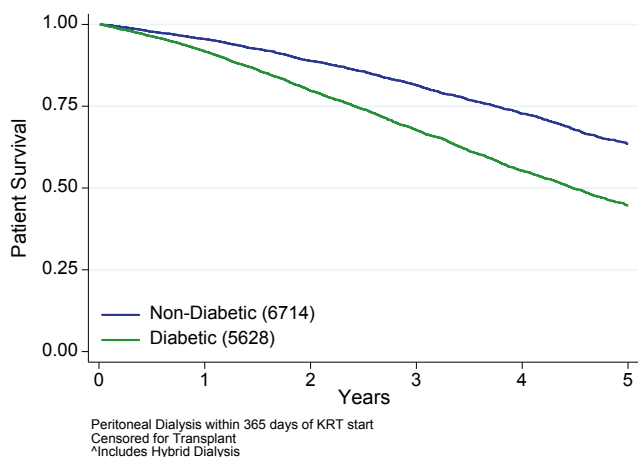
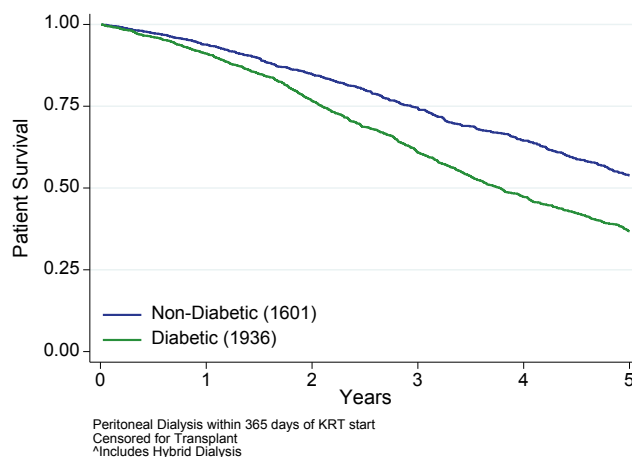


Figure 5.14.2
PD^ Patient Survival by Diabetic Status - New Zealand 2012 - 2023



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 5.13 and Figure 5.15 show time on peritoneal dialysis by era.

Table 5.13
Time on Peritoneal Dialysis[^] by Era - 2012-2023; % [95% Confidence Interval]

Country	Era	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	2012 - 2014	2933	87 [86, 88]	76 [74, 78]	39 [37, 41]	16 [14, 18]
	2015 - 2017	3055	86 [85, 88]	76 [75, 78]	38 [36, 40]	16 [15, 18]
	2018 - 2020	3140	86 [85, 87]	74 [73, 76]	39 [37, 40]	18 [16, 21]
	2021 - 2023	3271	87 [86, 88]	75 [74, 77]	-	-
New Zealand	2012 - 2014	777	87 [84, 89]	78 [75, 81]	41 [37, 44]	19 [16, 22]
	2015 - 2017	906	87 [85, 89]	77 [74, 80]	37 [34, 41]	14 [11, 16]
	2018 - 2020	956	85 [83, 87]	76 [73, 78]	33 [30, 36]	14 [10, 17]
	2021 - 2023	904	83 [81, 86]	73 [70, 76]	-	-

Peritoneal Dialysis within 365 days of KRT start

Censored for Transplant

[^]Includes Hybrid Dialysis

Figure 5.15.1
Time on Peritoneal Dialysis[^] by Era - Australia 2012 - 2023

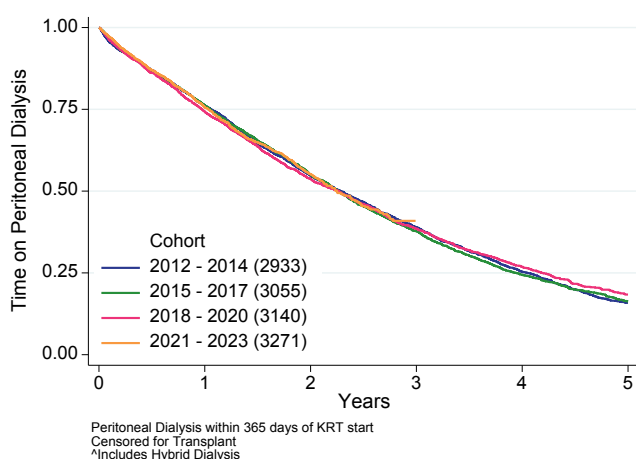
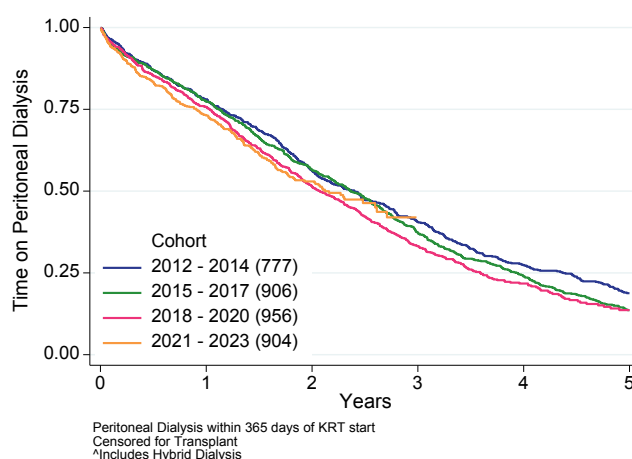


Figure 5.15.2
Time on Peritoneal Dialysis[^] by Era - New Zealand 2012 - 2023



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Table 5.14 and Figure 5.16 show the association between patient age and time on peritoneal dialysis.

Table 5.14
Time on Peritoneal Dialysis^a by Age Group - 2012-2023; % [95% Confidence Interval]

Country	Age Group	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	<40	1871	89 [87, 90]	76 [74, 78]	43 [40, 46]	28 [24, 33]
	40-59	3935	88 [87, 89]	78 [76, 79]	41 [39, 43]	19 [17, 21]
	60-74	4700	86 [85, 87]	75 [74, 77]	39 [37, 40]	16 [15, 18]
	≥75	1893	82 [81, 84]	71 [68, 73]	32 [30, 34]	11 [10, 13]
New Zealand	<40	529	89 [86, 91]	79 [75, 82]	44 [38, 50]	20 [14, 27]
	40-59	1337	87 [85, 89]	78 [76, 81]	38 [35, 41]	16 [13, 19]
	60-74	1334	84 [82, 86]	74 [72, 77]	35 [32, 38]	15 [12, 17]
	≥75	343	80 [75, 84]	70 [65, 75]	29 [24, 35]	10 [6, 14]

Peritoneal Dialysis within 365 days of KRT start

Censored for Transplant

^aIncludes Hybrid Dialysis

Figure 5.16.1
Time on Peritoneal Dialysis^a by Age Group - Australia 2012 - 2023

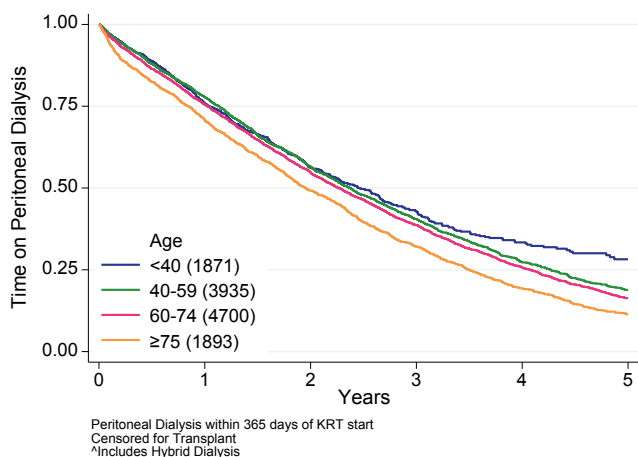


Figure 5.16.2
Time on Peritoneal Dialysis^a by Age Group - New Zealand 2012 - 2023

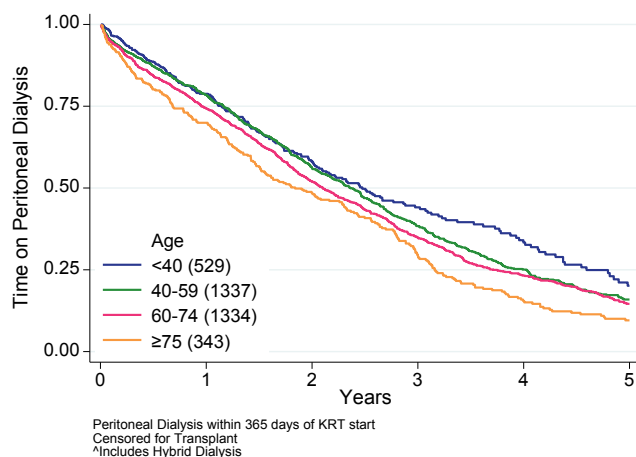


Table 5.15 and Figure 5.17 present these data by diabetic status.

Table 5.15
Time on Peritoneal Dialysis[^] by Diabetic Status - 2012-2023; % [95% Confidence Interval]

Country	Diabetic Status	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	Non-diabetic	6714	88 [87, 88]	78 [77, 79]	45 [43, 46]	22 [21, 24]
	Diabetic	5628	85 [85, 86]	73 [72, 74]	32 [31, 34]	12 [11, 13]
New Zealand	Non-diabetic	1601	87 [85, 89]	78 [76, 80]	46 [43, 49]	22 [19, 25]
	Diabetic	1936	85 [83, 86]	74 [72, 76]	30 [28, 32]	11 [9, 13]

Peritoneal Dialysis within 365 days of KRT start
Censored for Transplant
[^]Includes Hybrid Dialysis

Figure 5.17.1
Time on Peritoneal Dialysis[^] by Diabetic Status - Australia 2012 - 2023

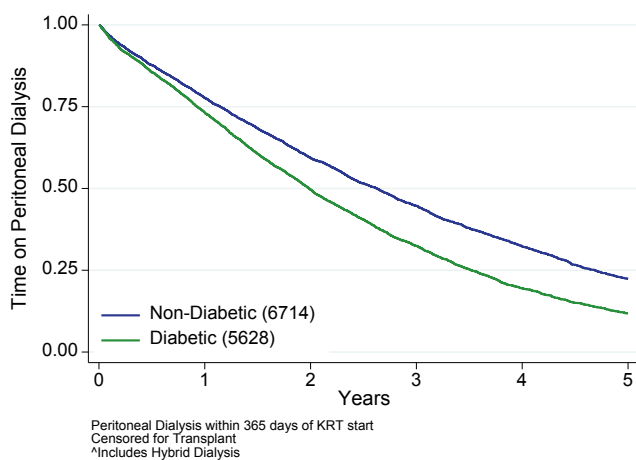


Figure 5.17.2
Time on Peritoneal Dialysis[^] by Diabetic Status - New Zealand 2012 - 2023

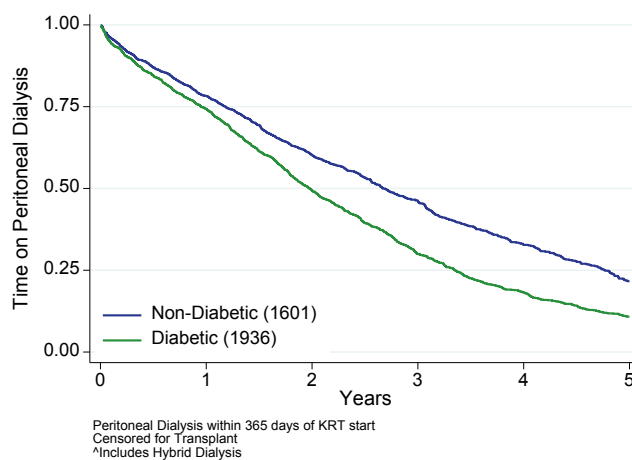


Table 5.16 and Figure 5.18 show transfer to haemodialysis (previously known at death-censored technique failure) by era. Survival time is also censored for withdrawal from dialysis and transplantation.

Table 5.16
Transfer to Haemodialysis by Age Group - 2012-2023; % [95% Confidence Interval]

Country	Era	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	2012 - 2014	2933	89 [88, 90]	81 [79, 82]	53 [51, 55]	33 [31, 36]
	2015 - 2017	3055	89 [88, 91]	82 [80, 83]	51 [49, 53]	34 [31, 36]
	2018 - 2020	3140	88 [87, 89]	79 [77, 80]	51 [49, 53]	36 [33, 39]
	2021 - 2023	3271	90 [88, 91]	80 [79, 82]	-	-
New Zealand	2012 - 2014	777	90 [88, 92]	84 [81, 86]	60 [56, 64]	44 [39, 48]
	2015 - 2017	906	90 [88, 92]	84 [81, 86]	58 [54, 61]	38 [34, 43]
	2018 - 2020	956	88 [86, 90]	82 [79, 84]	53 [49, 57]	35 [29, 41]
	2021 - 2023	904	86 [84, 89]	79 [76, 82]	-	-

Peritoneal Dialysis within 365 days of KRT start

Censored for Transplant

*Includes Hybrid Dialysis

Figure 5.18.1
Transfer to Haemodialysis by Era - Australia 2012 - 2023

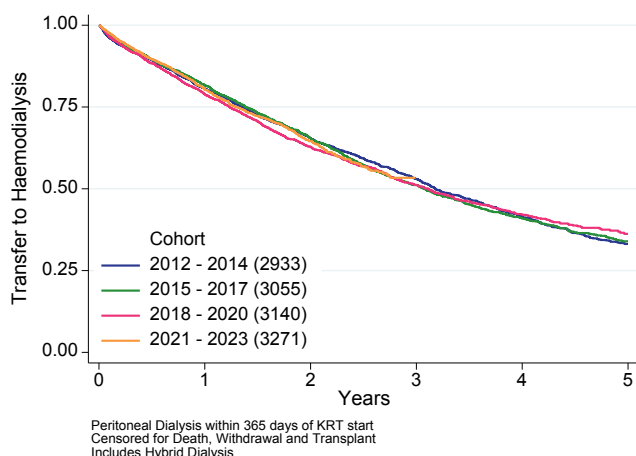


Figure 5.18.2
Transfer to Haemodialysis by Era - New Zealand 2012 - 2023

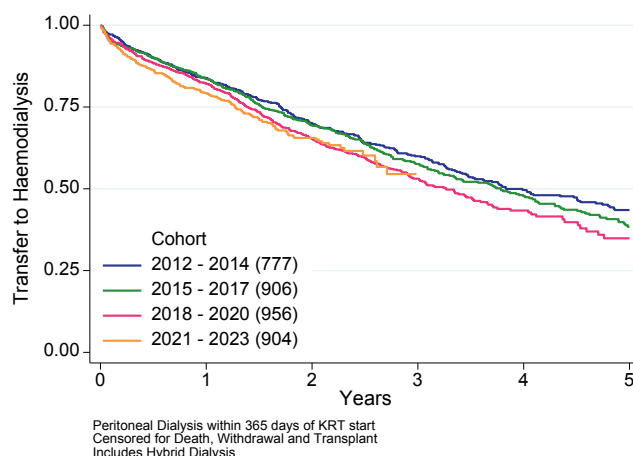


Table 5.17 and Figure 5.19 show the association between patient age and transfer to haemodialysis.

Table 5.16
Transfer to Haemodialysis by Era - 2012-2023; % [95% Confidence Interval]

Country	Age Group	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	<40	1871	90 [88, 91]	77 [75, 79]	46 [43, 50]	32 [28, 37]
	40-59	3935	89 [88, 90]	81 [79, 82]	48 [46, 50]	27 [25, 30]
	60-74	4700	90 [89, 90]	81 [80, 82]	54 [52, 56]	37 [34, 39]
	≥75	1893	88 [86, 89]	80 [78, 82]	58 [55, 60]	43 [39, 46]
New Zealand	<40	529	89 [86, 91]	80 [76, 83]	49 [43, 54]	26 [19, 34]
	40-59	1337	89 [87, 91]	82 [80, 84]	54 [50, 57]	34 [30, 39]
	60-74	1334	88 [86, 90]	83 [81, 85]	59 [55, 62]	44 [39, 48]
	≥75	343	88 [84, 91]	83 [78, 87]	67 [60, 73]	55 [46, 64]

Peritoneal Dialysis within 365 days of KRT start

Censored for Transplant

*Includes Hybrid Dialysis

Figure 5.19.1
Transfer to Haemodialysis by Age Group - Australia 2012 - 2023

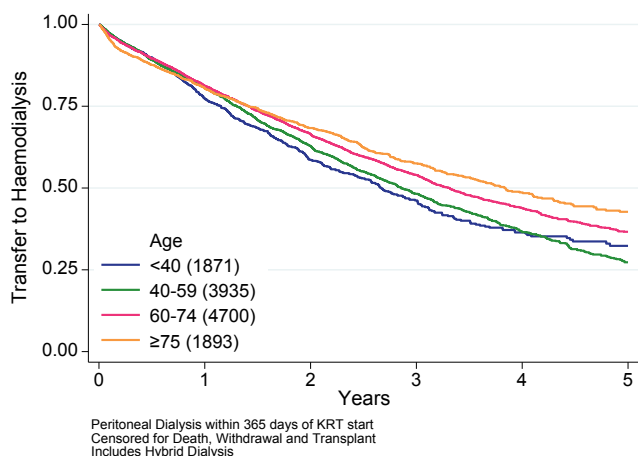


Figure 5.19.2
Transfer to Haemodialysis by Age Group - New Zealand 2012 - 2023

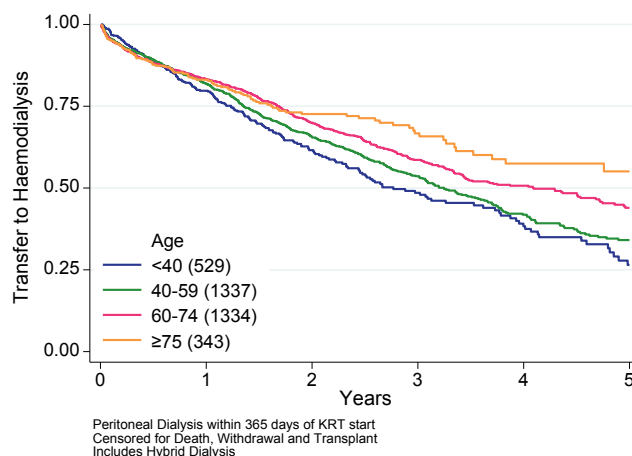


Table 5.18 and Figure 5.20 present these data by diabetic status.

Table 5.18
Transfer to Haemodialysis by Diabetic Status - 2012-2023; % [95% Confidence Interval]

Country	Diabetic Status	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	Non-diabetic	6714	90 [89, 90]	81 [80, 82]	55 [53, 56]	37 [35, 39]
	Diabetic	5628	89 [88, 89]	80 [78, 81]	48 [47, 50]	31 [29, 33]
New Zealand	Non-diabetic	1601	89 [88, 91]	83 [81, 85]	62 [59, 65]	43 [38, 47]
	Diabetic	1936	88 [87, 90]	81 [79, 83]	52 [49, 55]	36 [32, 39]

Peritoneal Dialysis within 365 days of KRT start

Censored for Transplant

*Includes Hybrid Dialysis

Figure 5.20.1
Transfer to Haemodialysis by Diabetic Status - Australia 2012 - 2023

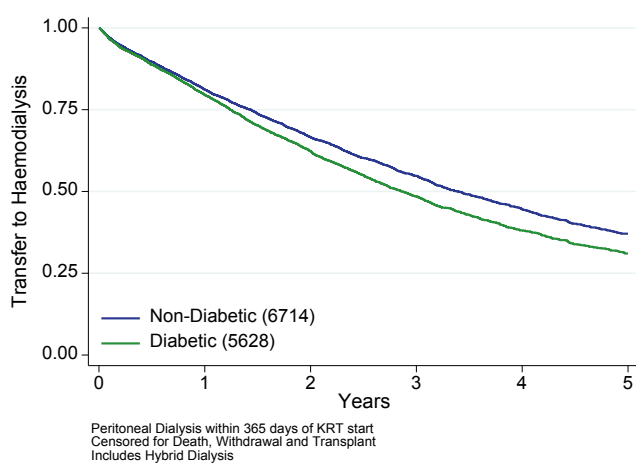
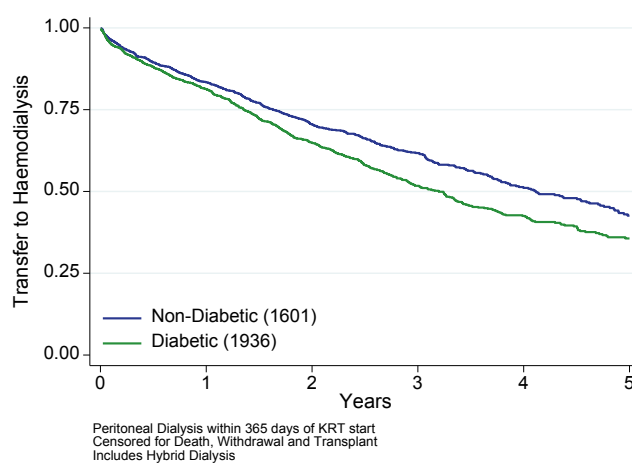


Figure 5.20.2
Transfer to Haemodialysis by Diabetic Status - New Zealand 2012 - 2023



The causes of PD discontinuation in 2023 are shown in Table 5.19.

Table 5.19
Reason for PD^a Discontinuation 2023

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%)

^aIncludes Hybrid Dialysis

Figure 5.21 and Table 5.20 show the cumulative incidence of patients returning to PD after transfer to haemodialysis over 2019-2023. 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 2019-2023

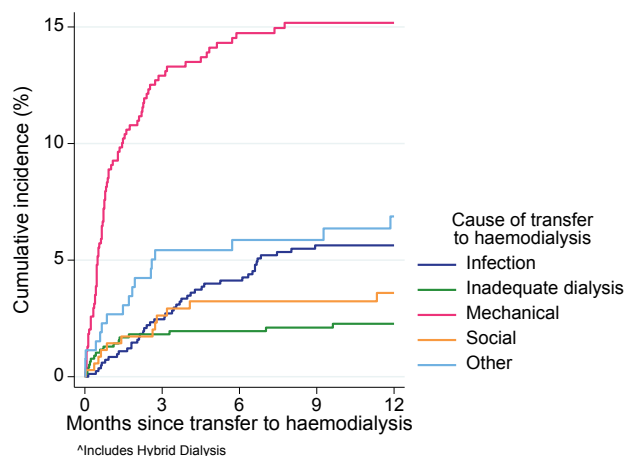


Figure 5.21.2
Time to Restarting PD[^] after Transfer to Haemodialysis - New Zealand 2019-2023

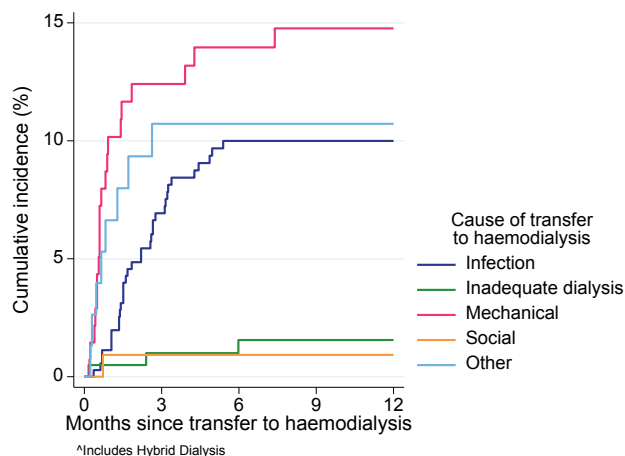


Table 5.20.1
Return to PD[^] (Cumulative Incidence and [95% CI]) by Cause of Transfer to Haemodialysis, Australia 2019-2023

Cause of transfer to haemodialysis	3 months	6 months	9 months	12 months
Infection	2.5 [1.6, 3.7]	4.1 [2.9, 5.7]	5.6 [4.2, 7.4]	5.6 [4.2, 7.4]
Inadequate dialysis	1.8 [1.0, 3.0]	2.0 [1.1, 3.1]	2.1 [1.3, 3.3]	2.3 [1.4, 3.5]
Mechanical	12.9 [10.2, 15.9]	14.7 [11.9, 17.9]	15.2 [12.3, 18.4]	15.2 [12.3, 18.4]
Social	2.6 [1.3, 4.7]	3.2 [1.7, 5.5]	3.2 [1.7, 5.5]	3.6 [2.0, 6.0]
Other	5.4 [3.1, 8.7]	5.9 [3.4, 9.2]	5.9 [3.4, 9.2]	6.9 [4.2, 10.5]

[^]Includes Hybrid Dialysis

Table 5.20.2
Return to PD[^] (Cumulative Incidence and [95% CI]) by Cause of Transfer to Haemodialysis, New Zealand 2019-2023

Cause of transfer to haemodialysis	3 months	6 months	9 months	12 months
Infection	6.9 [4.6, 9.9]	10.0 [7.1, 13.5]	10.0 [7.1, 13.5]	10.0 [7.1, 13.5]
Inadequate dialysis	1.0 [0.2, 3.3]	1.6 [0.4, 4.2]	1.6 [0.4, 4.2]	1.6 [0.4, 4.2]
Mechanical	12.4 [7.6, 18.5]	14.0 [8.8, 20.3]	14.8 [9.4, 21.3]	14.8 [9.4, 21.3]
Social	0.9 [0.1, 4.6]	0.9 [0.1, 4.6]	0.9 [0.1, 4.6]	0.9 [0.1, 4.6]
Other	10.7 [5.0, 18.9]	10.7 [5.0, 18.9]	10.7 [5.0, 18.9]	10.7 [5.0, 18.9]

[^]Includes Hybrid Dialysis

PERITONITIS

Table 5.21 and Figure 5.22 present the peritonitis-free survival over 2019-2023 by age at PD start.

Table 5.21
First PD Treatment to First Episode of Peritonitis By Age at Entry 01-Jan-2019 to 31-Dec-2023
% Survival [95% Confidence Interval]

Survival	Age Groups						All
	00-14	15-34	35-54	55-64	65-74	≥75	
Australia	(n=103)	(n=519)	(n=1478)	(n=1234)	(n=1431)	(n=838)	(n=5603)
3 months	89 [81, 94]	93 [90, 95]	94 [93, 95]	92 [90, 93]	94 [93, 95]	94 [92, 95]	94 [93, 94]
6 months	83 [74, 89]	88 [85, 91]	89 [87, 90]	87 [85, 89]	89 [88, 91]	87 [84, 89]	88 [87, 89]
9 months	78 [68, 85]	85 [81, 88]	84 [82, 86]	83 [80, 85]	84 [82, 86]	82 [79, 85]	83 [82, 85]
1 year	73 [62, 81]	79 [75, 83]	80 [77, 82]	79 [76, 81]	80 [77, 82]	79 [75, 82]	79 [78, 80]
2 years	69 [56, 79]	61 [55, 67]	67 [64, 70]	61 [57, 65]	65 [62, 69]	65 [60, 69]	64 [63, 66]
3 years	42 [17, 65]	56 [48, 63]	53 [48, 58]	50 [45, 55]	50 [46, 55]	53 [47, 59]	52 [50, 54]
New Zealand	(n=20)	(n=149)	(n=500)	(n=405)	(n=379)	(n=154)	(n=1607)
3 months	79 [54, 92]	98 [94, 99]	93 [91, 95]	93 [90, 95]	92 [89, 95]	94 [88, 97]	93 [92, 94]
6 months	68 [42, 84]	95 [89, 97]	90 [86, 92]	88 [84, 91]	84 [80, 88]	86 [79, 91]	88 [86, 89]
9 months	68 [42, 84]	91 [84, 95]	84 [80, 88]	83 [78, 87]	77 [72, 82]	83 [75, 88]	83 [80, 85]
1 year	51 [24, 73]	88 [81, 93]	80 [76, 84]	77 [72, 81]	74 [69, 79]	79 [70, 85]	78 [76, 80]
2 years	10 [1, 36]	70 [57, 80]	65 [59, 71]	57 [50, 63]	56 [49, 62]	60 [48, 69]	60 [57, 63]
3 years	-	51 [32, 66]	51 [43, 59]	43 [35, 51]	39 [31, 47]	41 [26, 56]	44 [40, 49]

Figure 5.22.1
First PD Treatment to First Peritonitis -
By Age at First PD Australia 2019 - 2023

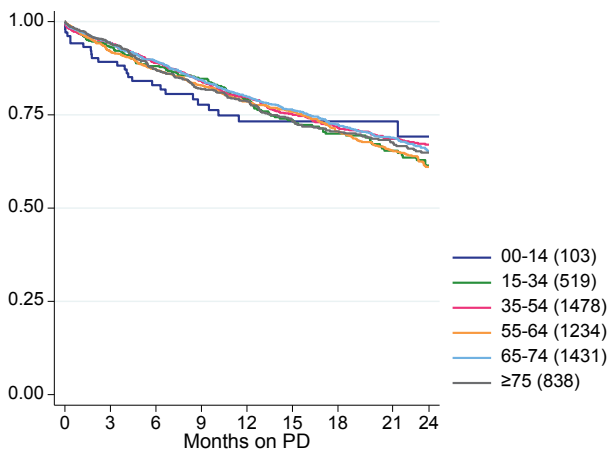
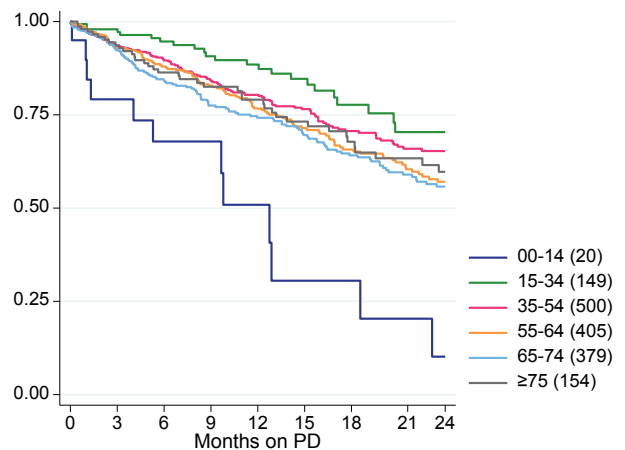


Figure 5.22.2
First PD Treatment to First Peritonitis -
By Age at First PD New Zealand 2019 - 2023



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 2019 - 2023

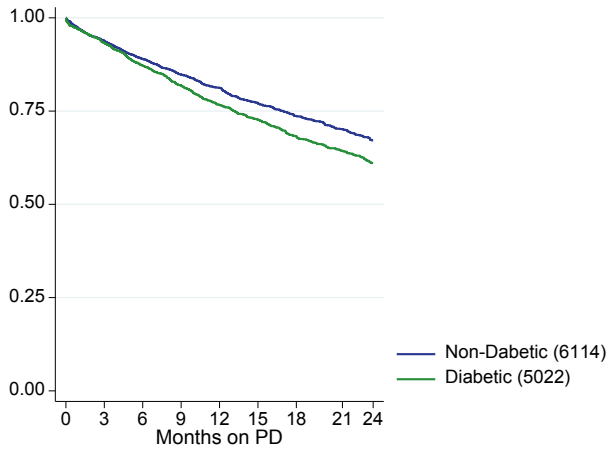
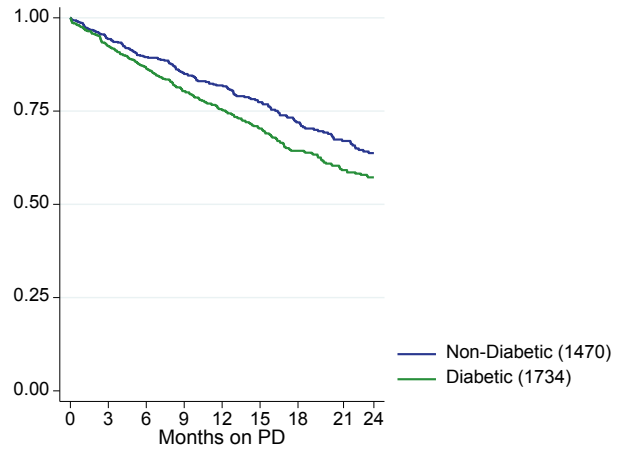


Figure 5.23.2
First PD Treatment to First Peritonitis - By Diabetic Status at KRT entry New Zealand 2019 - 2023



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 5.22 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 5.22
PD^a Peritonitis Episodes Per Year By State/Territory, Australia 2019-2023

State	2019	2020	2021	2022	2023	2019-2023
QLD	0.38	0.32	0.29	0.32	0.32	0.33
NSW	0.22	0.31	0.27	0.32	0.29	0.28
ACT	0.60	0.41	0.15	0.20	0.28	0.31
VIC	0.17	0.18	0.18	0.19	0.19	0.18
TAS	0.08	0.11	0.20	0.32	0.30	0.22
SA	0.22	0.21	0.26	0.24	0.17	0.22
NT	0.32	0.49	0.39	0.64	0.75	0.51
WA	0.50	0.40	0.34	0.33	0.40	0.39
Australia	0.27	0.29	0.26	0.29	0.28	0.28

^aIncludes Hybrid Dialysis

Figure 5.24
PD^a Peritonitis Rate - Australia 2004-2023

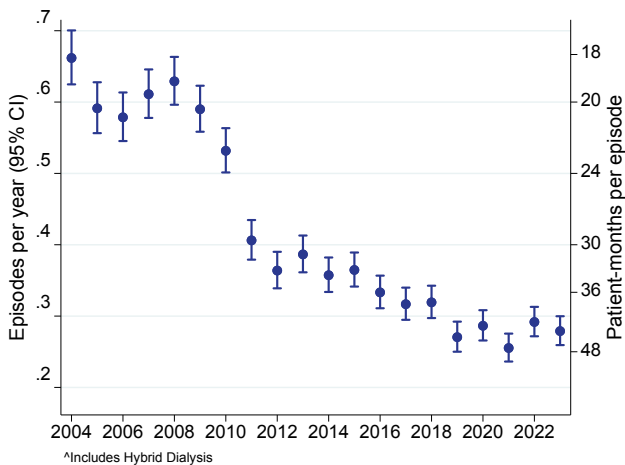
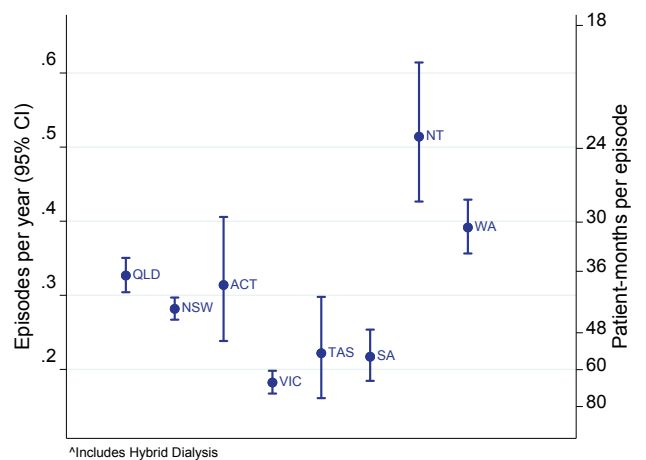


Figure 5.25
PD^a Peritonitis Rate - By State/Territory, Australia 2019-2023



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Figure 5.26
PD[^] Peritonitis Rate - By State/Territory, Australia 2014-2023

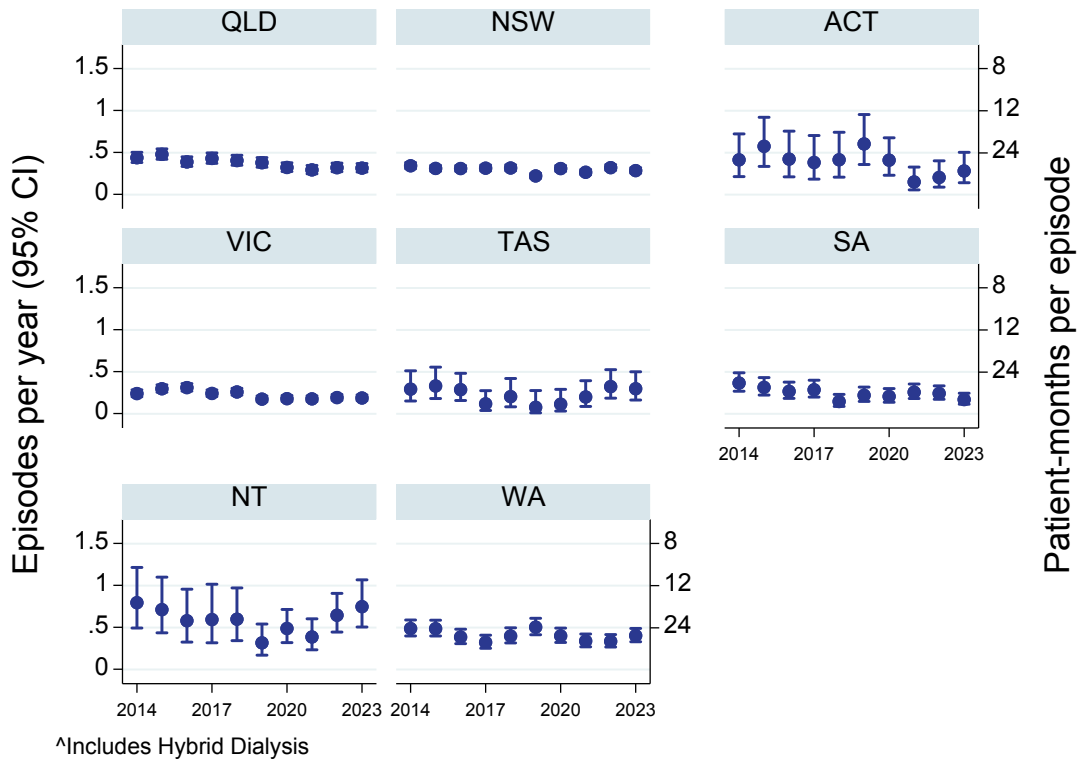


Figure 5.27
PD[^] Peritonitis Rate - By Treating Unit, Australia 2014-2023

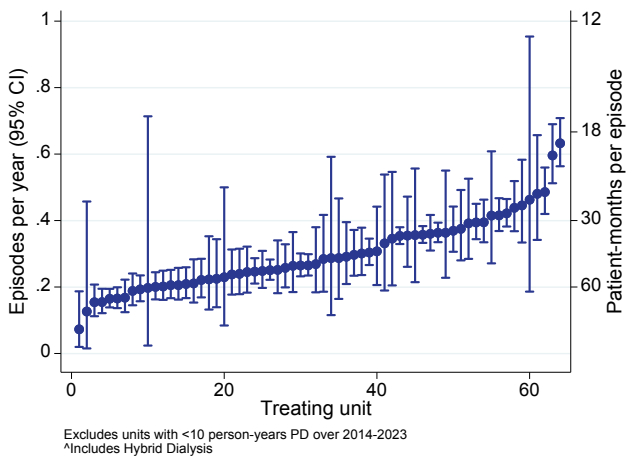
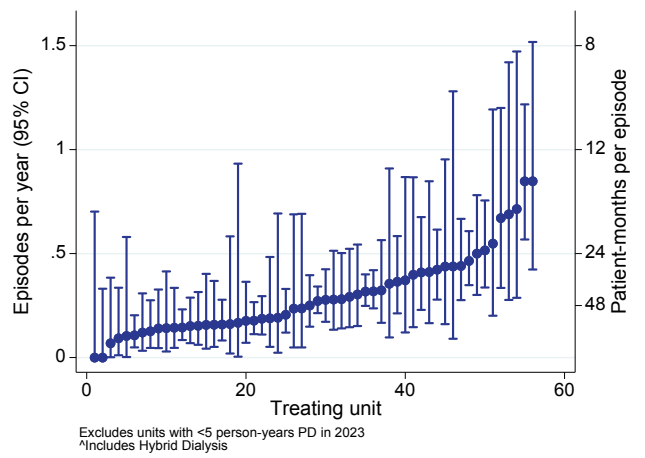
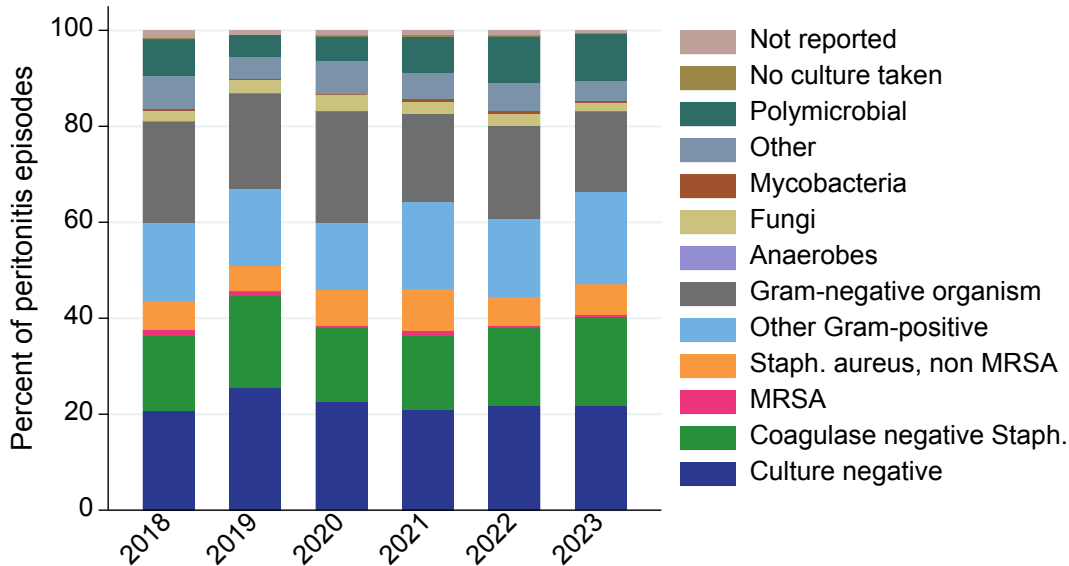


Figure 5.28
PD[^] Peritonitis Rate - By Treating Unit, Australia 2023



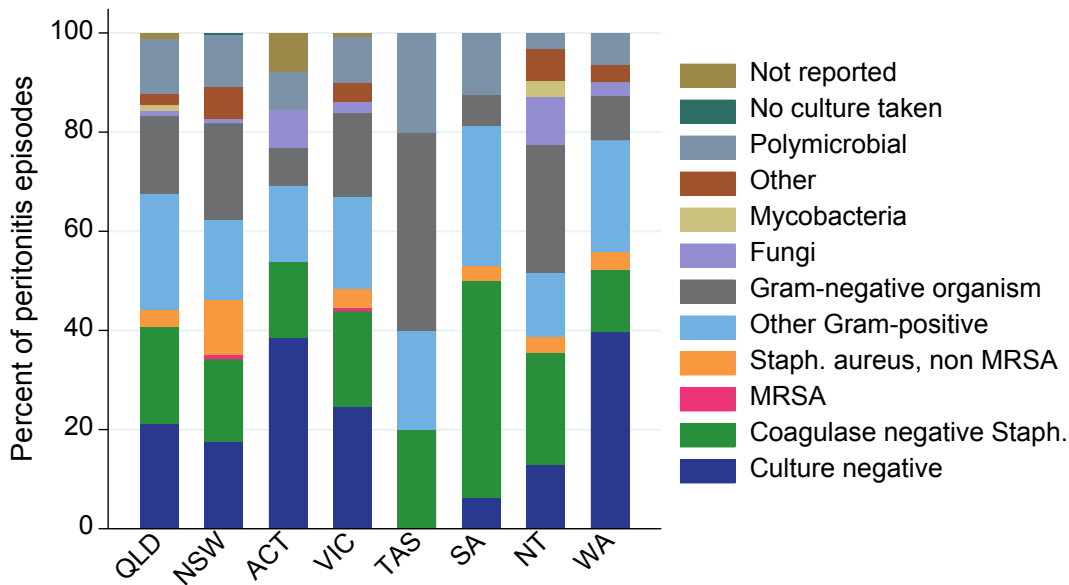
The organisms causing peritonitis are presented in Figure 5.29. Figure 5.30 shows these data for 2023 stratified by state/territory.

Figure 5.29
Distribution of Organisms Causing PD[^] Peritonitis - Australia 2018-2023



[^]Includes Hybrid Dialysis; Staph: Staphylococcus
MRSA: Methicillin-resistant Staphylococcus aureus

Figure 5.30
Distribution of Organisms Causing PD[^] Peritonitis - Australia 2023



[^]Includes Hybrid Dialysis; Staph: Staphylococcus
MRSA: Methicillin-resistant Staphylococcus aureus

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 2018-2023

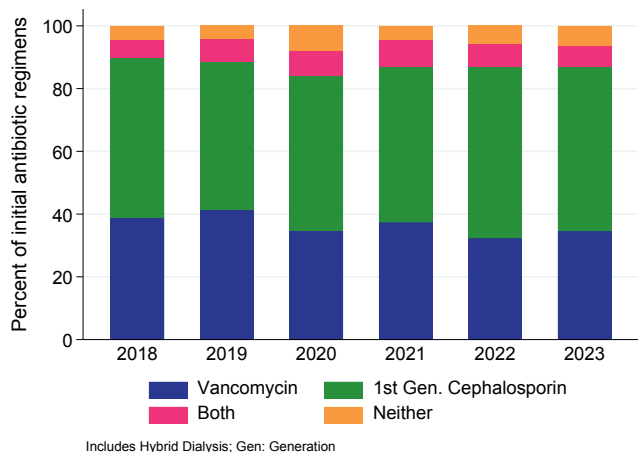


Figure 5.32
Initial Antibiotic Regimen - Gram Negative Cover - Australia 2018-2023

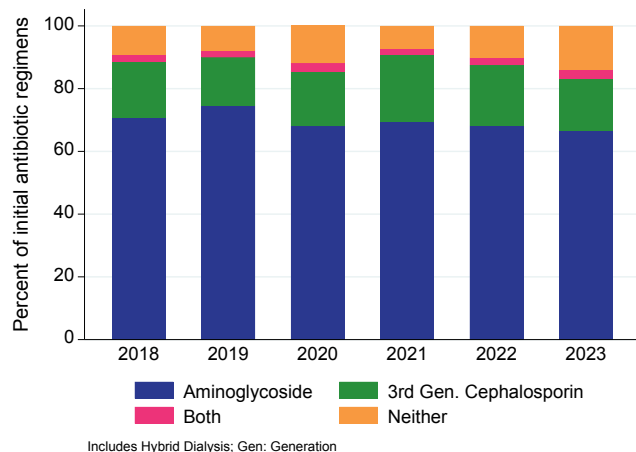


Figure 5.33
Final Antibiotic Regimen - Gram Positive Cover - Australia 2018-2023

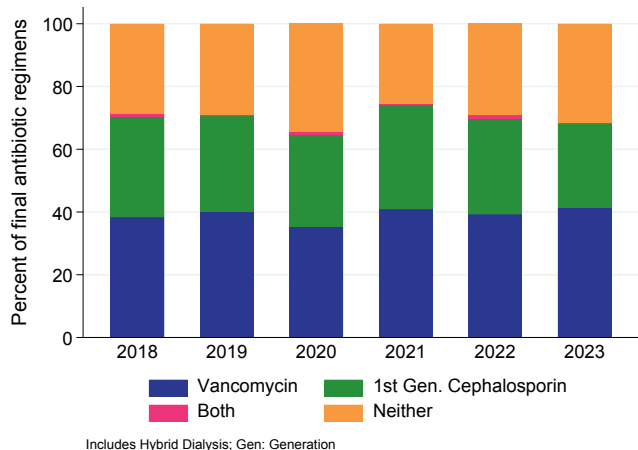
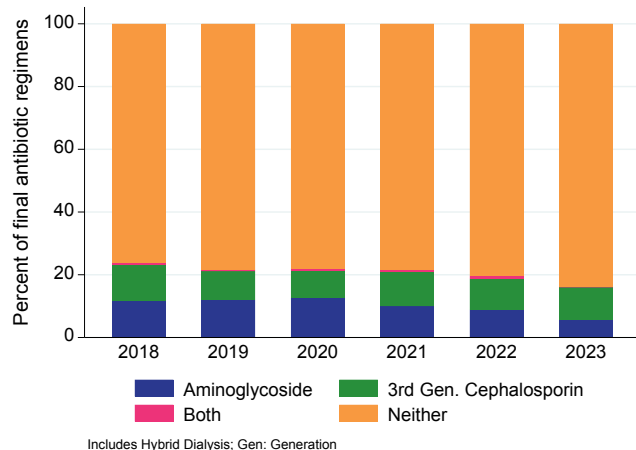
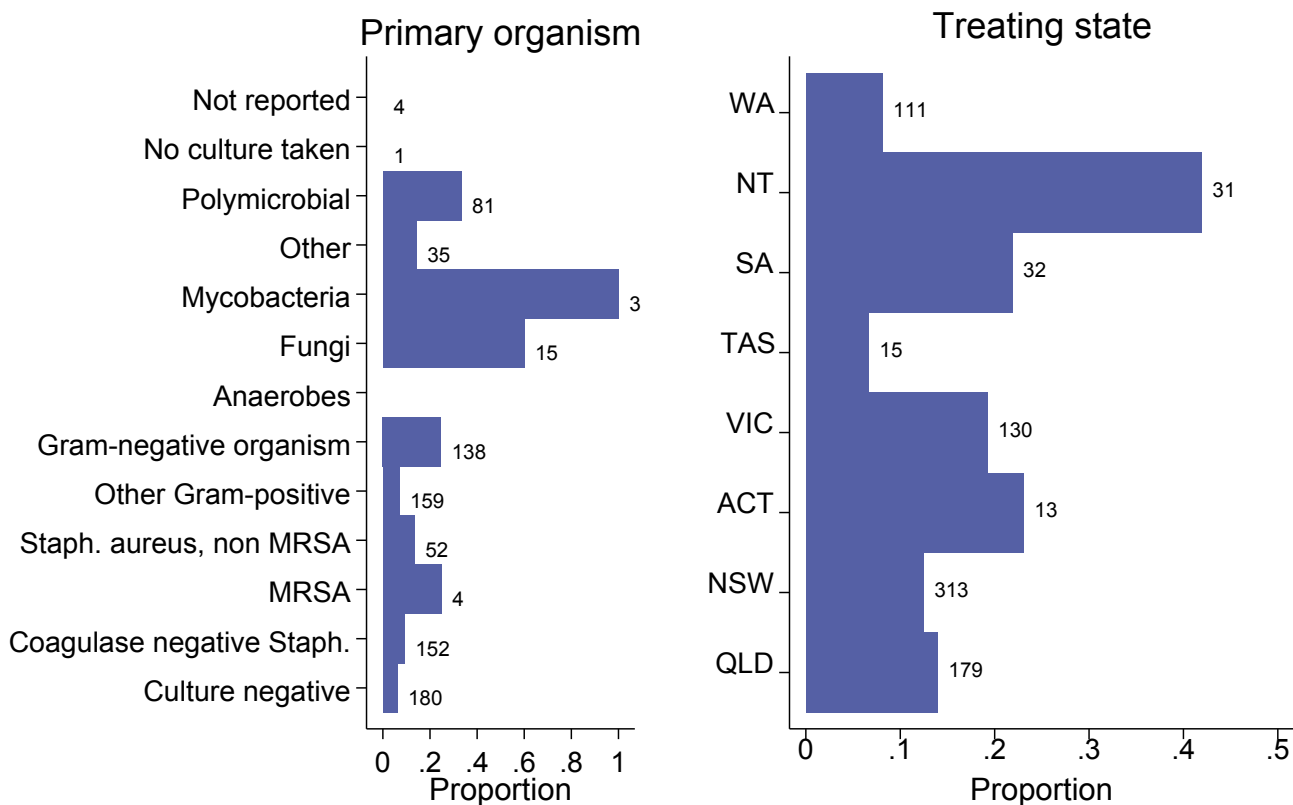


Figure 5.34
Final Antibiotic Regimen - Gram Negative Cover - Australia 2018-2023



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 2023



Values are total number of peritonitis episodes reported in 2023
 Includes Hybrid Dialysis; Staph: Staphylococcus
 MRSA: Methicillin-resistant Staphylococcus aureus

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 103 to 120g/L in Australia and 101-119g/L in New Zealand.

Figure 5.36.1
Haemoglobin in Peritoneal Dialysis[^] Patients - Australia 31 December 2023

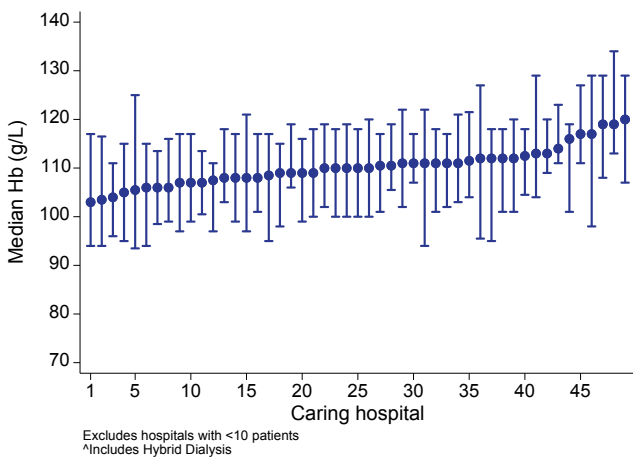


Figure 5.36.2
Haemoglobin in Peritoneal Dialysis[^] Patients - New Zealand 31 December 2023

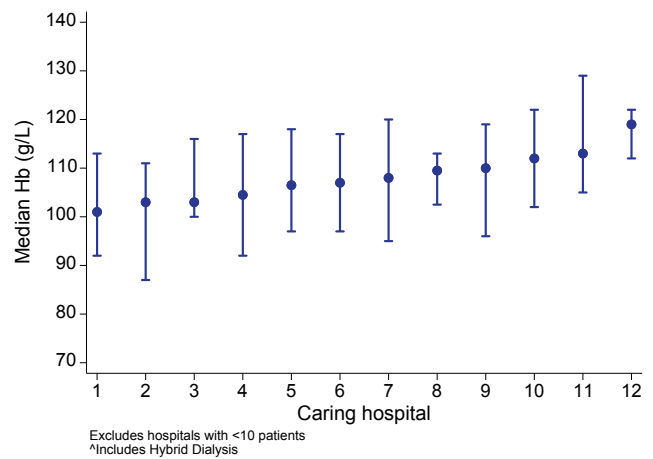


Figure 5.37 shows the proportion of peritoneal dialysis patients prescribed an erythropoiesis-stimulating agent (ESA) whose haemoglobin was between 100-115g/L; the proportion ranged from 14-100% in Australia and 29-68% in New Zealand.

Figure 5.37.1
% Peritoneal Dialysis[^] Patients receiving an ESA with Hb 100-115 g/L - Australia 31 December 2023

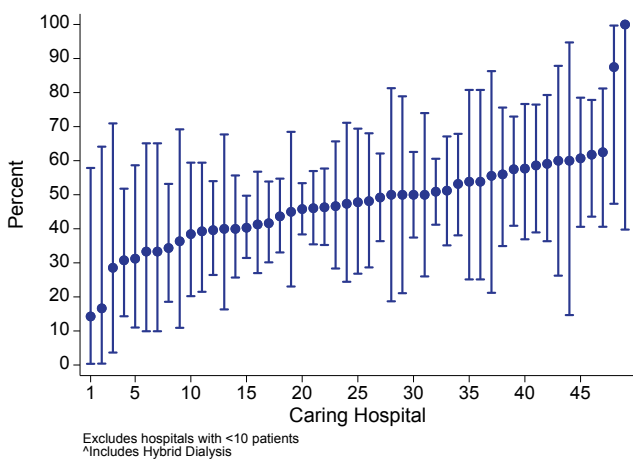
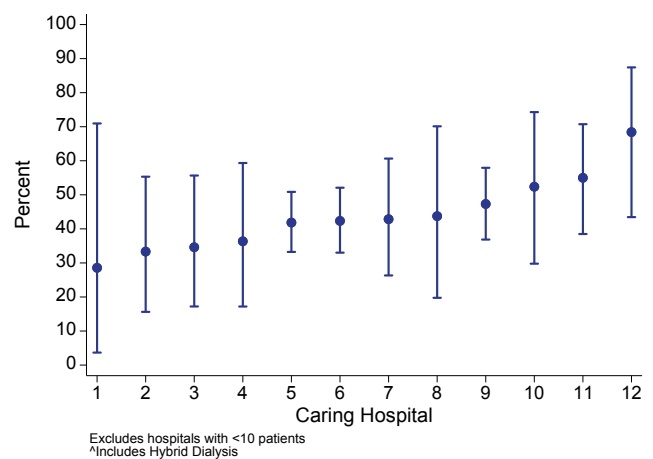


Figure 5.37.2
% Peritoneal Dialysis[^] Patients receiving an ESA with Hb 100-115 g/L - New Zealand 31 December 2023



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 2023

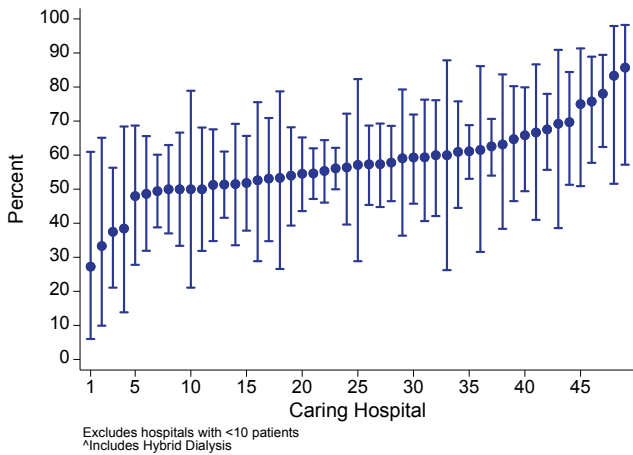


Figure 5.38.2
% PD[^] Patients with Calcium 2.1-2.4 mmol/L - New Zealand 31 December 2023

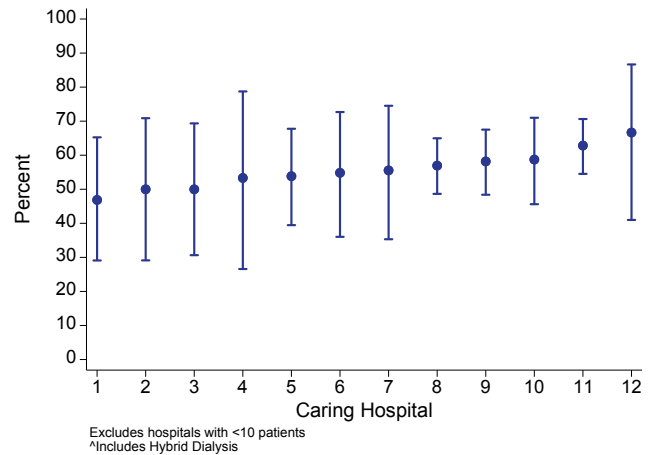


Figure 5.39.1
% PD[^] Patients with Phosphate 0.8-1.6 mmol/L - Australia 31 December 2023

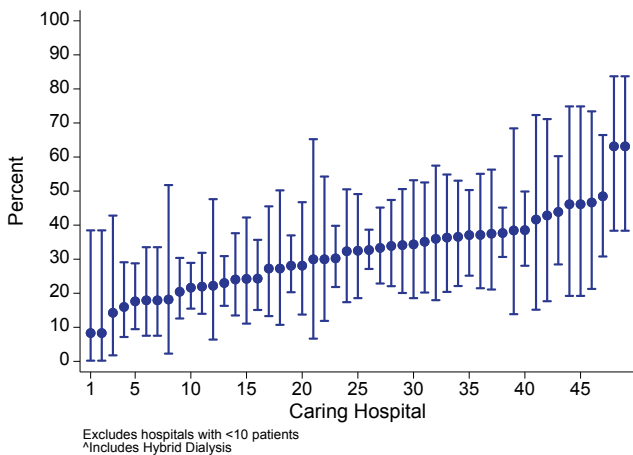
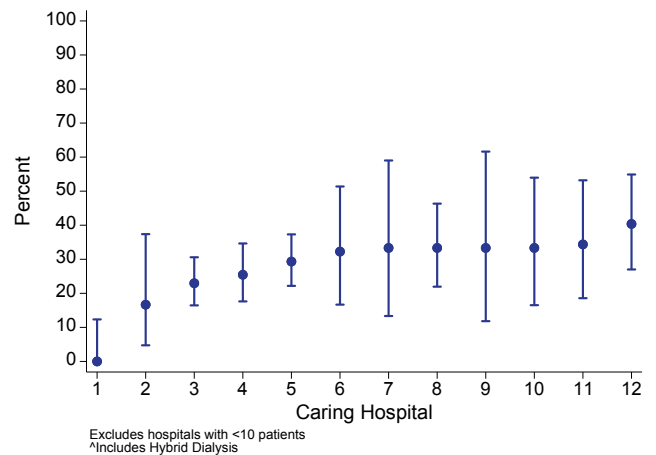
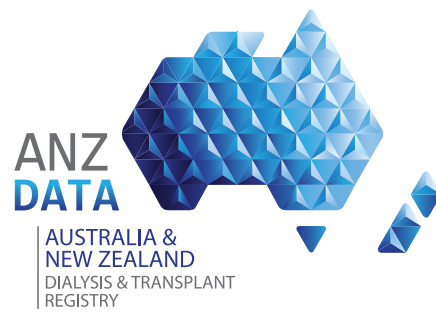


Figure 5.39.2
% PD[^] Patients with Phosphate 0.8-1.6 mmol/L - New Zealand 31 December 2023



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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, 2023, Estimated Resident Population by Age and Sex (1991+) (Annual-Jun), NZ Infoshare, viewed 14 Dec 2023, <http://infoshare.stats.govt.nz/>



CHAPTER 5

Peritoneal Dialysis