CHAPTER 13

Chronic Peritoneal Dialysis Practices

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SECTION 13.1: PD PRACTICES

13.1 : Mode of PD (Tables 13.1.1 to 13.1.4)

In 2007, there were a total of 1801 patients on peritoneal dialysis (PD), of which 92% were on CAPD and 8% on automated PD (APD). Compared with 2 years ago, the percentage of APD penetration has doubled but the number is still small. This could be explained by the fact that APD is largely only available for government pensioners or paediatric patients who receive funding from the National Kidney Foundation and the PD industry. Daytime ambulatory PD (DAPD) is still prescribed in up to 6% of patients to minimize fluid absorption during overnight dwell. This PD regime is utilised mainly as an alternative to Icodextrin use or APD which would be more costly.

Most patients were on the Baxter disconnect system (92%) and the majority (90%) do 4 exchanges per day. Five percent of patients required 5 exchanges per day but this figure may not truly reflect the dwell volumes required for PD adequacy as some patients may be converted to haemodialysis rather than increase the number of daily exchanges. Most patients (88%) used a fill volume of 2L but up to 10% were using larger fill volumes.

Table 13.1.1: Chronic Peritoneal Dialysis Regimes, 1998-2007

PD regime	1998		1999		2000		2001		2002	
	No.	%	No.	%	No.	%	No.	%	No.	%
Standard CAPD	492	93	577	96	633	97	755	98	837	97
DAPD	32	6	16	3	16	2	17	2	24	3
Automated PD/ CCPD	6	1	6	1	5	1	2	0	3	0
TOTAL	530	100	599	100	654	100	774	100	864	100

PD regime	2003		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%
Standard CAPD	1153	97	1211	96	1297	93	1393	90	1542	86
DAPD	33	3	39	3	45	3	67	4	115	6
Automated PD/ CCPD	5	0	12	1	50	4	88	6	144	8
TOTAL	1191	100	1262	100	1392	100	1548	100	1801	100

Table 13.1.2: CAPD Connectology, 1998-2007

CAPD Connectology	1998		1999		2000		2001		2002	
	No.	%	No.	%	No.	%	No.	%	No.	%
UVXD	10	2	3	1	0	0	0	0	0	0
Baxter disconnect	511	95	347	58	235	39	436	57	719	87
B Braun disconnect	18	3	248	41	370	61	324	43	93	11
Fresenius disconnect	0	0	0	0	0	0	0	0	11	1
Others	0	0	0	0	0	0	0	0	0	0
TOTAL	539	100	598	100	605	100	760	100	823	100

CAPD Connectology	2003		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%
UVXD	0	0	0	0	0	0	0	0	0	0
Baxter disconnect	1038	87	1142	88	1260	90	1425	92	1674	93
B Braun disconnect	7	1	14	1	1	0	0	0	1	0
Fresenius disconnect	154	13	145	11	111	8	119	8	116	6
Others	1	0	0	0	25	2	6	0	2	0
TOTAL	1200	100	1301	100	1397	100	1550	100	1793	100

Table 13.1.3: CAPD Number of Exchanges per day, 1998-2007

No. of Exchanges/ day	1998		1999		2000		2001		2002	
	No.	%	No.	%	No.	%	No.	%	No.	%
2	2	0	0	0	2	0	1	0	0	0
3	4	1	4	1	1	0	5	1	11	1
4	508	96	579	97	624	96	735	95	834	96
5	16	3	13	2	23	4	31	4	28	3
TOTAL	530	100	596	100	650	100	772	100	873	100

No. of Exchanges/ day	2003		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%
2	4	0	6	0	3	0	4	0	2	0
3	14	1	12	1	25	2	55	4	40	2
4	1136	96	1225	95	1280	94	1359	91	1566	90
5	32	3	52	4	48	4	76	5	123	7
TOTAL	1186	100	1295	100	1356	100	1494	100	1731	100

Table 13.1.4: CAPD Volume per Exchange, 1998– 2007

Volume per Exchange (L)	1998		1999		2000		2001		2002	
	No.	%	No.	%	No.	%	No.	%	No.	%
<1.5	25	5	19	3	25	4	32	4	37	4
1.5-1.9	0	0	0	0	0	0	0	0	0	0
2.0	496	95	557	96	595	95	711	95	793	94
>2.0	0	0	2	0	5	1	9	1	14	2
TOTAL	521	100	578	100	625	100	752	100	844	100

Volume per Exchange (L)	2003		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%
<1.5	41	4	42	3	55	4	50	3	46	3
1.5-1.9	0	0	0	0	0	0	0	0	0	0
2.0	1088	94	1154	92	1195	89	1315	88	1508	88
>2.0	31	3	60	5	92	7	135	9	167	10
TOTAL	1160	100	1256	100	1342	100	1500	100	1721	100

SECTION 13.2: ACHIEVEMENT OF SOLUTE CLEARANCE AND PERITONEAL TRANSPORT

The median delivered weekly Kt/V remained at 2.1 since year 2003, with 83% of patients achieving K/DOQI recommendation in 2006 of a Kt/V of ≥ 1.7 per week. Comparison between PD centres according to the percentage of patients in each centre achieveing this target Kt/V has shown a 1.5-fold variation between the highest- and lowest-performing centres (93% vs 69%). Half of the centres were

Table 13.2.1: Distribution of delivered KT/V, CAPD patients 2003-2007

Year	No. of Subjects	Mean	SD	Median	LQ	UQ	% patients ≥ 1.7 per week
2003	789	3.7	19.9	2.1	1.8	2.5	83
2004	1068	2.8	9.9	2.1	1.8	2.5	85
2005	1124	3.3	13.7	2.1	1.8	2.5	84
2006	1290	2.4	3.6	2.1	1.8	2.4	84
2007	1435	2.2	0.7	2.1	1.8	2.4	83

Figure 13.2.1: Cumulative distribution of delivered KT/V, CAPD patients 2003-2007

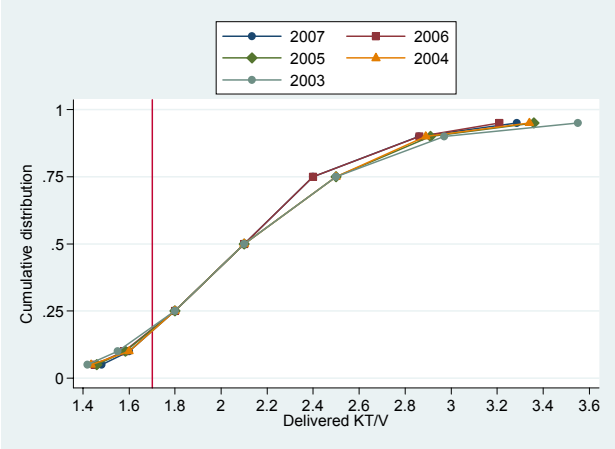


Figure 13.2.2: Variation in proportion of patients with KT/V ≥1.7 per week among CAPD centres 2007

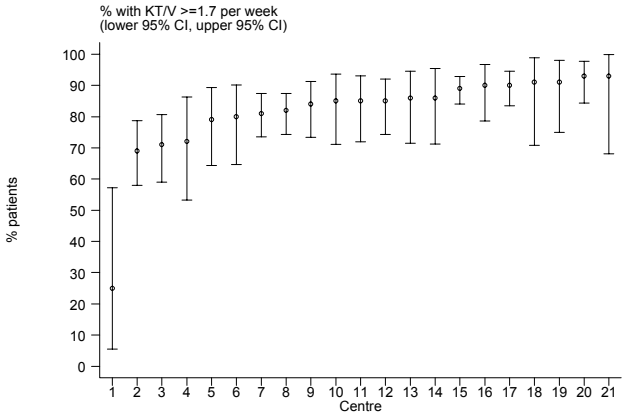


Table 13.2.2: Variation in proportion of patients with KT/V ≥ 1.7 per week among CAPD centres 2007

Year	No. of centres	Min	5th Centile	LQ	Median	UQ	95th Centile	Max
2003	14	0	0	75	82.5	88	91	91
2004	17	75	75	79	85	88	100	100
2005	18	56	56	75	85	90	97	97
2006	21	66	67	77	83	92	100	100
2007	21	25	69	80	85	90	93	93

Among incident PD patients low average transport status was commonest (42%) followed by high average transport status (38%). Over time a proportion of patients will develop changes in their peritoneal membrane characteristics such that there was high PET status in 15% vs 9% in prevalent as compared to incident PD patients (Tables 13.2.3 and 13.2.4). There is no apparent association between comorbidities such as cardiovascular disease and diabetes with PET status.

Table 13.2.3: Peritoneal transport status by PET D/P creatinine at 4 hours, new PD patients 2003-2007

Year	2003		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%
Low	10	6	67	15	69	12	105	12	106	10
Low average	85	51	187	41	246	41	359	42	429	42
High average	62	37	176	38	223	37	315	37	392	38
High	11	7	29	6	62	10	75	9	95	9
TOTAL	168	100	459	100	600	100	854	100	1022	100

Table 13.2.4: Peritoneal transport status by PET D/P creatinine at 4 hours, prevalent PD patients 2003-2007

Year	2003		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%
Low	10	3	39	9	44	13	23	8	19	10
Low average	174	44	180	42	130	39	106	38	65	34
High average	171	43	168	39	118	35	106	38	78	41
High	39	10	41	10	42	13	41	15	28	15
TOTAL	394	100	428	100	334	100	276	100	190	100

Table 13.2.5: Association among PET and comorbidity, 2003 – 2007

Co morbidity	Low		Low Average		High Average		High	
	No.	%	No.	%	No.	%	No.	%
No CVD	306	12.3	1030	41.2	219	8.8	942	37.7
CVD	51	8.4	276	45.5	53	8.7	226	37.3
No DM	239	13	777	42.4	153	8.4	663	36.2
DM	118	9.3	529	41.6	119	9.4	505	39.7

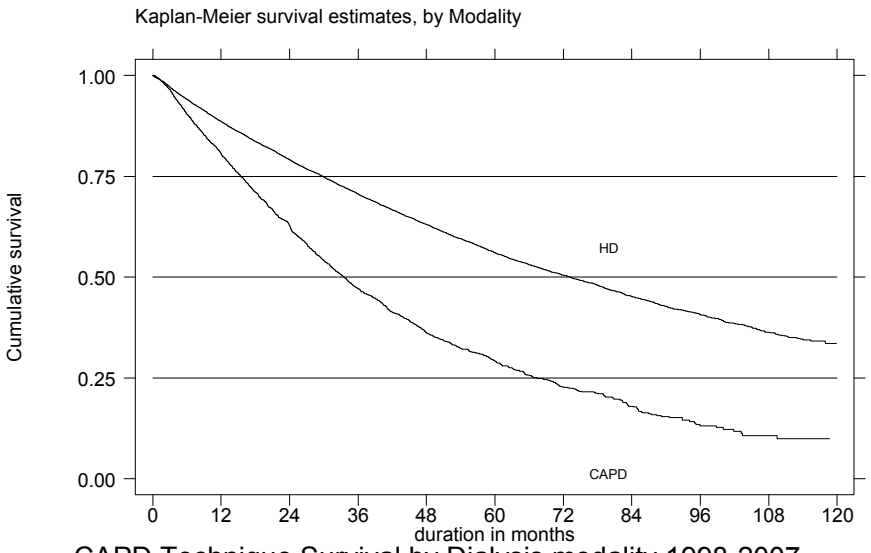
SECTION 13.3: TECHNIQUE SURVIVAL ON PD

CAPD fared worse compared with haemodialysis in terms of technique survival. The Kaplan-Meir cumulative survival curves diverge as early as 6 months. One-, three-and five-year technique survival for CAPD was 81%,41% and 29% respectively as compared to 89%,71% and 56% for HD. Median technique survival time was less than 36 months. Overall these trends in technique survival are unchanged by year of entry (Tables and figures 13.3.1 and 13.3.2). The best technique survival rate was seen in the age group 25-34 years while the oldest age group (>65 years) consistently had the worst technique survival (Table and figure 13.3.3). There was no gender difference (Table and figure 13.3.4). Diabetics have a poorer technique survival than non-diabetics (Table and figure 13.3.5). After 36 months there was a clear separation in survival curves according to solute clearance. As expected, those with Kt/V >2.0 fared the best as compared to those with Kt/V < 1.7 (Table and figure 13.3.6).

Table 13.3.1: Unadjusted technique survival by Dialysis modality, 1998-2007

Year Interval (month)	CAPD			HD			All dialysis		
	No.	% Survival	SE	No.	% Survival	SE	No.	% Survival	SE
6	2865	90	1	19841	94	0	22706	94	0
12	2289	81	1	16940	89	0	19229	88	0
24	1456	63	1	12328	79	0	13784	77	0
36	910	47	1	8947	71	0	9857	68	0
48	565	36	1	6322	63	0	6887	60	0
60	332	29	1	4343	56	0	4675	53	0
72	178	23	1	2885	50	0	3063	47	0
84	91	18	1	1785	45	1	1875	42	1
96	36	13	1	1008	41	1	1043	37	1
108	16	11	1	419	36	1	434	33	1
120	-	-	-	-	-	-	-	-	-

Figure 13.3.1: Unadjusted technique survival by Dialysis modality, 1998-2007



CAPD Technique Survival by Dialysis modality 1998-2007

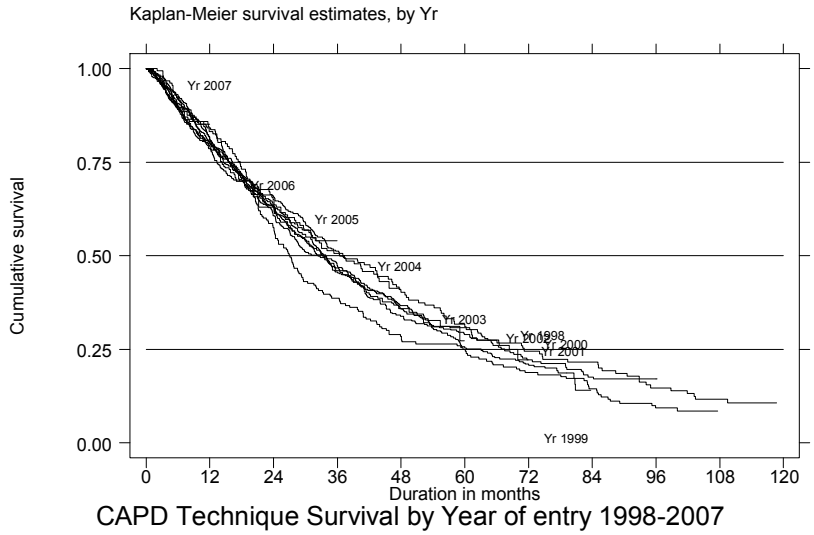
Table 13.3.2: Unadjusted technique survival by year of entry, 1998-2007

Year Interval (month)	1998			1999			2000			2001		
	No	% Survival	SE	No	% Survival	SE	No	% Survival	SE	No	% Survival	SE
6	144	92	2	189	90	2	206	91	2	303	90	2
12	128	83	3	175	84	3	185	81	3	266	80	2
24	96	65	4	117	58	3	138	63	3	198	61	3
36	75	51	4	78	39	3	101	46	3	151	47	3
48	59	40	4	57	29	3	78	36	3	107	34	3
60	45	32	4	50	25	3	67	31	3	78	25	2
72	34	25	4	37	19	3	47	22	3	63	21	2
84	30	22	3	27	15	3	36	18	3	-	-	-
96	20	15	3	17	9	2	-	-	-	-	-	-
108	16	12	3	-	-	-	-	-	-	-	-	-
120	-	-	-	-	-	-	-	-	-	-	-	-

Year Interval (month)	2002			2003			2004			2005		
	No	% Survival	SE	No	% Survival	SE	No	% Survival	SE	No	% Survival	SE
6	342	92	1	369	89	2	302	89	2	322	89	2
12	293	80	2	332	80	2	266	79	2	280	79	2
24	228	64	3	254	63	2	213	66	3	219	63	3
36	165	47	3	183	46	2	163	51	3	-	-	-
48	126	37	3	142	36	2	-	-	-	-	-	-
60	96	29	2	-	-	-	-	-	-	-	-	-
72	-	-	-	-	-	-	-	-	-	-	-	-

Year Interval (month)	2006			2007		
	No	% Survival	SE	No	% Survival	SE
6	427	93	1	269	90	1
12	370	81	2	3	-	-
24	-	-	-	-	-	-

Figure 13.3.2: Unadjusted technique survival by year of entry, 1998-2007



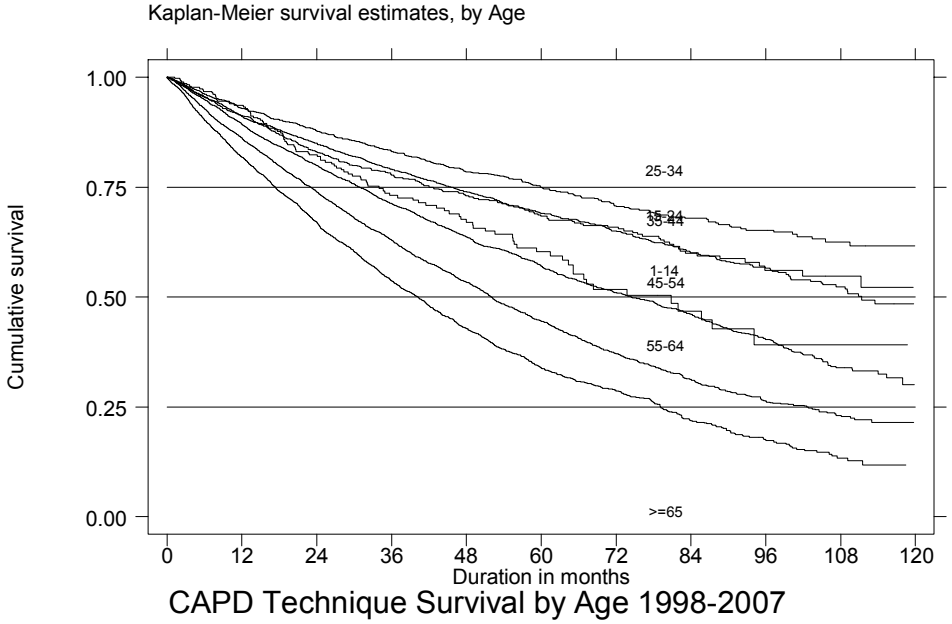
CAPD Technique Survival by Year of entry 1998-2007

Table 13.3.3: Unadjusted technique survival by age, 1998-2007

Age group (years) Interval (month)	<=14			15-24			25-34			35-44		
	No	% Survival	SE	No	% Survival	SE	No	% Survival	SE	No	% Survival	SE
6	314	97	1	1021	96	1	1761	96	0	3062	96	0
12	280	94	1	877	91	1	1537	93	1	2651	91	0
24	204	82	2	630	83	1	1170	88	1	2052	85	1
36	141	73	3	481	78	1	924	83	1	1598	79	1
48	104	67	3	350	73	2	723	79	1	1214	74	1
60	71	60	4	249	68	2	537	75	1	916	69	1
72	40	52	4	175	66	2	374	71	1	654	65	1
84	26	47	5	109	60	2	270	68	2	423	60	1
96	11	39	6	62	56	3	169	65	2	243	57	1
108	6	39	6	26	55	3	77	63	2	113	52	1
120	-	-	-	-	-	-	-	-	-	-	-	-

Age group (years) Interval (month)	45-54			55-64			>=65		
	No	% Survival	SE	No	% Survival	SE	No	% Survival	SE
6	5767	95	0	6198	93	0	4584	90	0
12	4936	89	0	5207	86	0	3743	82	1
24	3593	80	1	3686	74	1	2454	67	1
36	2635	71	1	2522	63	1	1561	54	1
48	1861	64	1	1696	53	1	941	43	1
60	1309	57	1	1061	44	1	534	34	1
72	865	51	1	640	37	1	318	29	1
84	543	46	1	365	31	1	147	22	1
96	300	40	1	195	26	1	70	17	1
108	113	34	1	77	23	1	28	13	1
120	-	-	-	-	-	-	-	-	-

Figure 13.3.3: Unadjusted technique survival by age, 1998-2007

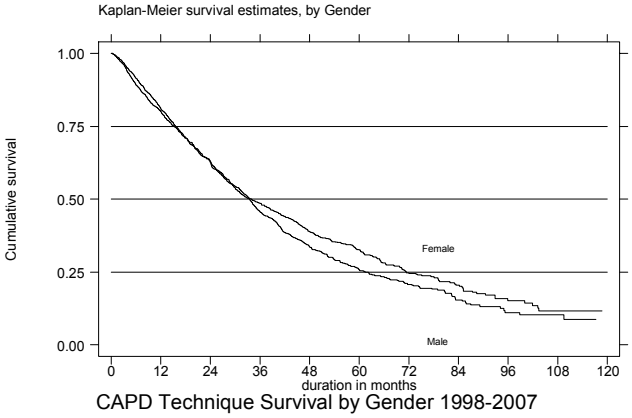


CAPD Technique Survival by Age 1998-2007

Table 13.3.4: Unadjusted technique survival by Gender, 1998-2007

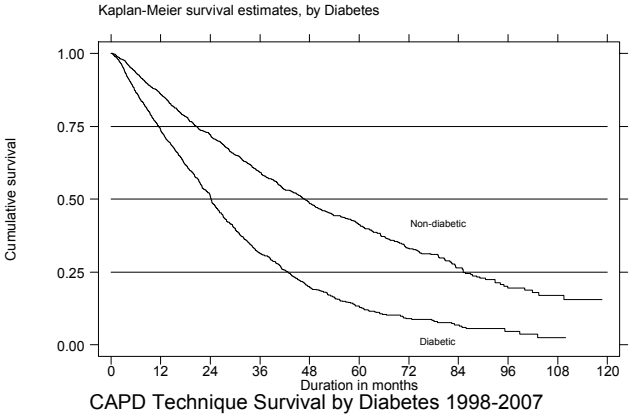
Gender Interval (months)	Male			Female		
	No	% survival	SE	No	% survival	SE
6	1448	91	1	1417	89	1
12	1138	81	1	1152	80	1
24	723	63	1	735	63	1
36	441	46	1	471	49	1
48	269	34	1	297	39	1
60	150	26	1	184	33	2
72	80	21	2	99	25	2
84	39	15	2	53	21	2
96	16	11	2	21	15	2
108	9	10	2	8	12	2
120	-	-	-	-	-	-

Figure 13.3.4: Unadjusted technique survival by Gender, 1998-2007



CAPD Technique Survival by Gender 1998-2007

Figure 13.3.5: Unadjusted technique survival by Diabetes status, 1998-2007



CAPD Technique Survival by Diabetes 1998-2007

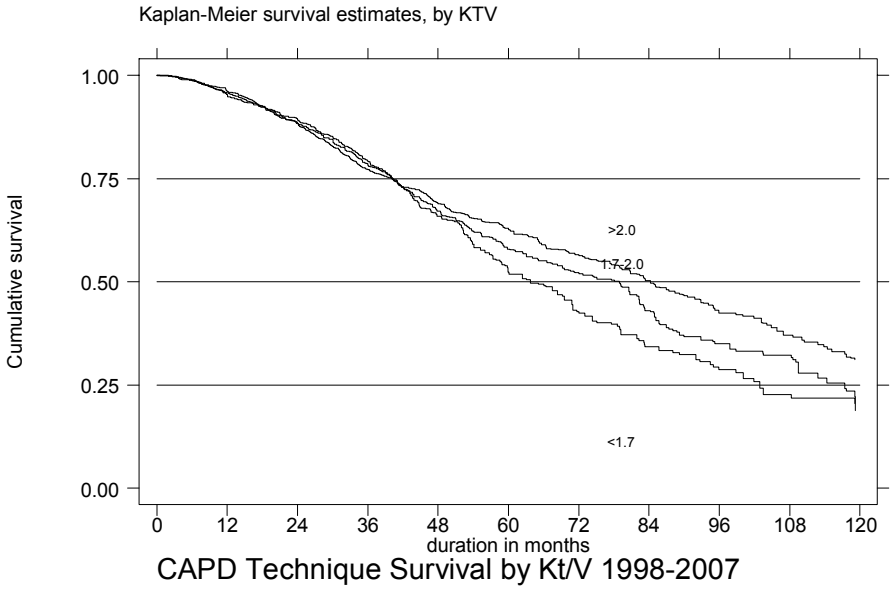
Table 13.3.5: Unadjusted technique survival by Diabetes status, 1998-2007

Diabetes status Interval (month)	Non-Diabetic			Diabetic		
	No	% survival	SE	No	% survival	SE
6	1639	93	1	1226	87	1
12	1378	86	1	911	74	1
24	945	72	1	511	51	1
36	658	59	1	253	31	1
48	438	48	1	128	20	1
60	270	41	2	63	13	1
72	147	33	2	32	9	1
84	74	26	2	18	7	1
96	31	20	2	6	5	1
108	15	17	2	2	2	1
120	-	-	-	-	-	-

Table 13.3.6: Unadjusted technique survival by Kt/V, 1998-2007

KT/V	<1.7			1.7-2.0			>2.0		
Interval (months)	No.	% Survival	SE	No.	% Survival	SE	No.	% Survival	SE
6	898	99	0	1381	99	0	3217	99	0
12	823	95	1	1301	96	1	2964	96	0
24	709	89	1	1065	88	1	2392	88	1
36	556	79	1	857	79	1	1773	77	1
48	391	66	2	625	67	1	1289	69	1
60	232	52	2	392	58	2	883	63	1
72	117	43	2	260	52	2	595	57	1
84	72	34	3	144	43	2	391	50	1
96	45	28	3	80	35	2	245	42	1
108	31	23	3	61	32	2	166	37	2
120	16	20	3	33	19	3	94	31	2

Figure 13.3.6 Unadjusted technique survival by Kt/V, 1998 -2007



Increasing age, diabetes, peritonitis episodes, cardiovascular disease, low serum albumin, low BMI, abnormal lipid profile, serum Hb less than 10g/dL and assisted PD were associated with an increased risk for change of modality. The commonest reason for PD drop-out was peritonitis (40%), followed by membrane failure (18%) and patient preference(16%).

Table 13.3.7: Adjusted hazard ratio for change of modality, 1998-2007

Factors	N	Hazard Ratio	95% CI		p value
Age (years):					
Age 1-14 (ref)	257	1.00			
Age 15-24	311	1.85	(1.37	2.48)	0.000
Age 25-34	286	1.96	(1.42	2.70)	0.000
Age 35-44	437	2.21	(1.62	3.01)	0.000
Age 45-54	737	2.55	(1.85	3.50)	0.000
Age 55-64	767	2.94	(2.17	4.00)	0.000
Age >=65	482	4.09	(2.96	5.66)	0.000
Peritonitis					
No (ref)	3,049	1.00			
Yes	228	2.28	(1.96	2.65)	0.000
Diabetes Mellitus					
Non-diabetic (ref)	1,810	1.00			
Diabetic	1,467	1.55	(1.34	1.78)	0.000
Gender					
Male (ref)	1,639	1.00			
Female	1,638	0.92	(0.82	1.04)	0.175
Year start dialysis:					
Year 1998-1999 (ref)	325	1.00			
Year 2000-2001	516	1.10	(0.94	1.30)	0.239
Year 2002-2003	756	1.16	(0.99	1.36)	0.073
Year 2004-2007	1,680	1.05	(0.89	1.25)	0.549
Cardiovascular Disease:					
No CVD (ref)	2,520	1.00			
CVD	757	1.31	(1.16	1.48)	0.000
BMI:					
<18.5	530	1.31	(1.11	1.54)	0.001
18.5-<25 (ref)	1,775	1.00			
>=25	972	0.83	(0.74	0.94)	0.002
Serum Albumin:					
<30	866	1.81	(1.58	2.09)	0.000
30-<35	1,124	1.31	(1.15	1.49)	0.000
35-<45 (ref)	964	1.00			
>=45	323	1.10	(0.87	1.40)	0.418
Serum Cholesterol:					
<3.2	63	1.77	(1.22	2.55)	0.002
3.2-<5.2 (ref)	1,557	1.00			
>=5.2	1,657	1.13	(1.01	1.25)	0.026
Diastolic BP:					
<70	373	1.17	(0.99	1.40)	0.073
70-<80	1,018	0.93	(0.82	1.05)	0.226
80-<90 (ref)	1,375	1.00			
90-<100	428	1.40	(1.19	1.64)	0.000
>=100	83	1.88	(1.38	2.57)	0.000
Hemoglobin:					
<8	218	2.04	(1.63	2.57)	0.000
8-<9	456	1.63	(1.35	1.98)	0.000
9-<10	848	1.35	(1.15	1.60)	0.000
10-<11	910	1.01	(0.86	1.19)	0.898
11-<12 (ref)	537	1.00			
>=12	308	0.96	(0.77	1.20)	0.749

Table 13.3.7: Adjusted hazard ratio for change of modality, 1998-2007 (cont'd)

Factors	N	Hazard Ratio	95% CI	95% CI	p value
Serum Calcium:					
<2.2	1,118	1.14	(1.01	1.29)	0.038
2.2-<2.6 (ref)	2,030	1.00			
>=2.6	129	1.81	(1.43	2.28)	0.000
Calcium Phosphate product:					
<3.5	1,750	1.17	(0.99	1.39)	0.070
3.5-<4.5 (ref)	984	1.00			
4.5-<5.5	413	0.91	(0.72	1.15)	0.415
>=5.5	130	0.72	(0.45	1.14)	0.156
Serum Phosphate:					
<1.6 (ref)	1,903	1.00			
1.6-<2.0	888	0.83	(0.69	1.00)	0.044
2.0-<2.2	233	1.04	(0.76	1.42)	0.802
2.2-<2.4	115	1.16	(0.78	1.72)	0.472
2.4-<2.6	70	1.45	(0.87	2.41)	0.157
>=2.6	68	1.59	(0.87	2.94)	0.135
KT/V					
<=1.7 (ref)	2,176	1.00			
>1.7	1,101	0.97	(0.79	1.17)	0.722
Assisted PD					
Self-care (ref)	1,934	1.00			
Assisted	1,277	1.33	(1.18	1.50)	0.000

Table 13.3.8: Reasons for change of dialysis modality to HD, 1998-2007

Cause	No.	Percentage
Peritonitis	302	40
Catheter related infection	24	3
Membrane failure	135	18
Technical problem	60	8
Patient preference	120	16
Others	71	9
Unknown	38	5
Total	750	100

SECTION 13.4: Patient Survival on PD

Increasing age ,diabetes, cardiovascular disease, low BMI, low serum albumin, diastolic BP<70 or >90 mmHg, haemoglobin <10 g/dL, hypercalcaemia, peritonitis episodes and assisted PD are associated with an increased mortality risk (Table 13.4.1).

Table 13.4.1: Adjusted Hazard Ratio for patient mortality

Factors	N	Hazard Ratio	95% CI		p value
Age (years):					
Age 1-14 (ref)	257	1.00			
Age 15-24	311	2.09	(1. 03	3.36)	0.002
Age 25-34	286	1.88	(1.11	3.17)	0.018
Age 35-44	437	2.92	(1.82	4.69)	0.000
Age 45-54	737	4.64	(2.89	7.44)	0.000
Age 55-64	767	5.42	(3.42	8.57)	0.000
Age >=65	482	7.73	(4.81	12.43)	0.000
Diabetes Mellitus					
Non-diabetic (ref)	1,810	1.00			
Diabetic	1,467	1.95	(1.62	2.34)	0.000
Gender					
Male (ref)	1,639	1.00			
Female	1,638	0.89	(0.77	1.03)	0.118
Year start dialysis:					
Year 1998-1999 (ref)	325	1.00			
Year 2000-2001	516	0.92	(0.75	1.13)	0.427
Year 2002-2003	756	1.05	(0.86	1.29)	0.613
Year 2004-2007	1,680	0.92	(0.74	1.13)	0.417
Cardiovascular Disease:					
No CVD (ref)	2,520	1.00			
CVD	757	1.51	(1.31	1.75)	0.000
BMI:					
<18.5	530	1.43	(1.15	1.78)	0.001
18.5-<25 (ref)	1,775	1.00			
>=25	972	0.76	(0.66	0.89)	0.000
Serum Albumin:					
<30	866	2.04	(1.71	2.45)	0.000
30-<35	1,124	1.34	(1.13	1.60)	0.001
35-<45 (ref)	964	1.00			
>=45	323	1.06	(0.77	1.48)	0.711
Diastolic BP:					
<70	373	1.27	(1.03	1.56)	0.025
70-<80	1,018	0.92	(0.79	1.08)	0.321
80-<90 (ref)	1,375	1.00			
90-<100	428	1.30	(1.03	1.65)	0.028
>=100	83	2.24	(1.46	3.44)	0.000
Hemoglobin:					
<8	218	2.02	(1.49	2.74)	0.000
8-<9	456	1.64	(1.28	2.09)	0.000
9-<10	848	1.49	(1.21	1.82)	0.000
10-<11	910	0.99	(0.81	1.22)	0.989
11-<12 (ref)	537	1.00			
>=12	308	0.99	(0.76	1.31)	0.991
Serum Calcium:					
<2.2	1,118	1.03	(0.87	1.21)	0.742
2.2-<2.6 (ref)	2,030	1.00			
>=2.6	129	1.96	(1.47	2.61)	0.000

Table 13.4.1: Adjusted Hazard Ratio for patient mortality—(cont'd)

Factors	N	Hazard Ratio	95% CI	95% CI	p value
Calcium Phosphate product:					
<3.5	1,750	1.11	(0.89	1.39)	0.359
3.5-<4.5 (ref)	984	1.00			
4.5-<5.5	413	1.06	(0.78	1.45)	0.704
>=5.5	130	1.06	(0.57	1.98)	0.856
Serum Phosphate:					
<1.6 (ref)	1,903	1.00			
1.6-<2.0	888	0.78	(0.61	0.99)	0.041
2.0-<2.2	233	1.13	(0.75	1.71)	0.548
2.2-<2.4	115	1.31	(0.76	2.26)	0.324
2.4-<2.6	70	1.11	(0.55	2.26)	0.764
>=2.6	68	0.75	(0.27	2.08)	0.582
KT/V					
<=1.7	2,176	1.00			
>1.7 (ref)	1,101	1.06	(0.81	1.38)	0.680
Peritonitis episode					
No (ref)	2,979				
Yes	298	0.72	(0.58	0.88)	0.002
Assisted PD					
No (ref)	1,934	1.00			
Yes	1,277	1.58	(1.36	1.84)	0.000

SECTION 13.5: PD PERITONITIS

The median peritonitis rate has improved to 40.9 patient-months per episode (pt-month/epi) as shown in Table 13.5.1. There was a wide inter-centre variation with the highest and lowest peritonitis rates of 12 and 106.7 patient-months per episode. Gram-positive organisms accounted for 27% of peritonitis episodes while 32% were due to gram negative organisms. The commonest organism for gram positive peritonitis was staphylococcus coagulase negative (12%), followed by *Staphylococcus aureus* (8%). Meanwhile, for the gram negative peritonitis *E.coli* was the commonest organism (9%) followed by *Pseudomonas aeruginosa* (8%). Fungal organisms accounted for 5% of cases. The culture negative rate reduced to 33% compared to 39% in 2006 (Table 13.5.2).

Catheter removal rate was highest in fungal infection (40%), followed by *Pseudomonas aeruginosa* (21%).

Table 13.5.1: Variation in peritonitis rate (pt-month/epi) among CAPD centres, 2000- 2007

Year	No. of centres	Min	5th Centile	LQ	Median	UQ	95th Centile	Max
2000	12	11.7	11.7	18.7	24.1	32.5	1145.1	1145.1
2001	11	10.8	10.8	19.9	22.8	39.6	60.3	60.3
2002	14	12.6	12.6	20.1	30.5	42.6	219.2	219.2
2003	13	18.3	18.3	21	32.9	40.7	312.1	312.1
2004	15	0	0	23.5	32.7	36.3	41.5	41.5
2005	15	18	18	25.4	35.3	43	56.8	56.8
2006	21	14.8	18.5	26.6	36.8	49.7	62.2	97.7
2007	24	12	13	30.6	40.9	55.8	75.1	106.7

Figure 13.5.1: Variation in peritonitis rate among CAPD centres, 2007

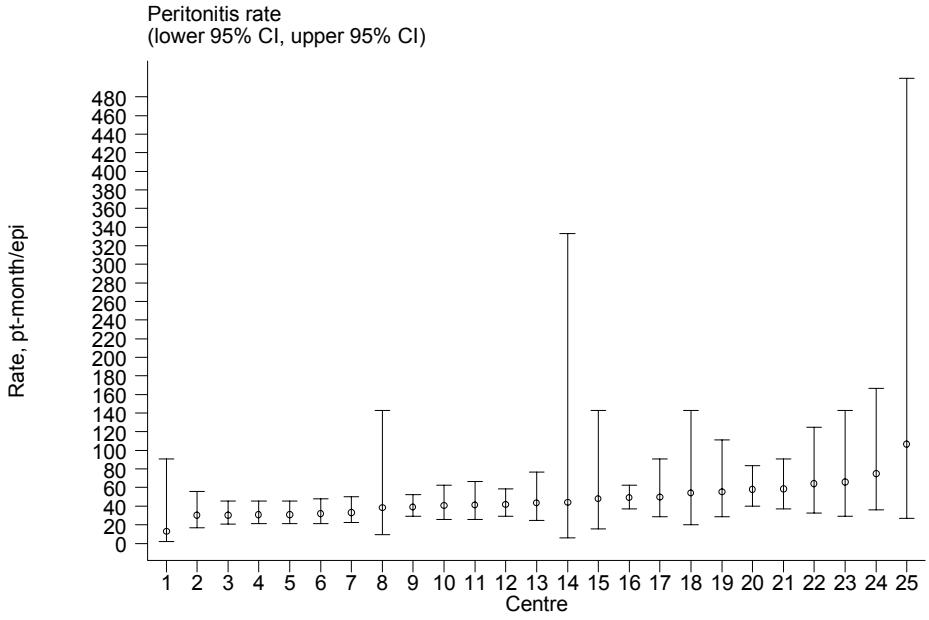


Table 13.5.2: Causative organism in PD peritonitis, 2000-2007

Microorganism	2000		2001		2002		2003		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
(A) Gram Positives																
Staph. Aureus	35	11	41	13	62	17	45	12	51	14	40	12	50	14	43	12
Staph Coagulase Neg.	34	11	30	10	39	11	47	13	41	11	43	13	32	9	30	8
Strep	17	6	17	5	11	3	16	4	13	3	10	3	16	4	14	4
Others	4	1	6	2	7	2	15	4	4	1	8	2	13	4	10	3
(B) Gram Negatives																
Pseudomonas	19	6	14	4	23	6	20	5	28	8	27	8	23	6	30	8
Acinetobacter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Klebsiella	10	3	7	2	18	5	27	7	25	7	20	6	8	2	21	6
Enterobacter	11	4	16	5	11	3	13	4	19	5	19	6	20	5	17	5
E.Coli	15	5	16	5	23	6	20	5	23	6	30	9	15	4	32	9
Others	9	3	17	5	15	4	15	4	16	4	17	5	14	4	14	4
(C) Polymicrobial	9	3	10	3	8	2	3	1	2	1	0	0	1	0	0	0
(D) Others																
Fungal	19	6	21	7	12	3	12	3	15	4	7	2	16	4	20	5
Mycobacterium	6	2	4	1	1	0	3	1	4	1	2	1	4	1	1	0
Others	2	1	14	4	14	4	13	4	8	2	3	1	11	3	15	4
(E) No growth	119	39	99	32	118	33	115	32	123	33	96	30	142	39	124	33
TOTAL	309	100	312	100	362	100	364	100	372	100	322	100	365	100	371	100

Table 13.5.3: Outcome of peritonitis by Causative organism, 2000-2007

Causative Organism	Outcome							
	Resolved		Not resolved, catheter removed		Death		Total	
	No.	%	No.	%	No.	%	No.	%
(A) Gram Positives								
Staph. Aureus	130	36	39	11	108	30	277	100
Staph Coagulase Neg.	112	38	14	5	104	35	230	100
Strep	39	34	6	5	47	41	92	100
Others	15	22	2	3	32	48	49	100
(B) Gram Negatives								
Pseudomonas	50	27	38	21	61	33	149	100
Acinetobacter	0		0		0		0	100
Klebsiella	47	35	20	15	41	30	108	100
Enterobacter	35	28	23	18	45	36	103	100
E.Coli	51	29	28	16	53	30	132	100
Others	35	30	23	20	32	27	90	100
(C) Polymicrobial	3	9	0	0	22	65	25	100
(D) Others								
Fungal	2	2	49	40	32	26	83	100
Mycobacterium	0	0	9	36	13	52	22	100
Others	17	21	9	11	29	36	55	100
(E) No growth	340	36	71	8	289	31	700	100

Table 13.5.4: Factors influencing peritonitis rate, 2000 -2007

Factors	N (no at risk)	Annualised rate Epi/pt-year	(95% CI)	
Age (years):				
<=14	70	0.393	(0.321	0.482)
15-24	38	0.453	(0.344	0.596)
25-34 (ref)	82	0.398	(0.335	0.473)
35-44	93	0.436	(0.367	0.518)
45-54	143	0.515	(0.448	0.591)
55-64	121	0.567	(0.486	0.662)
>=65	51	0.668	(0.526	0.849)
Gender:				
Male (ref)	282	0.483	(0.436	0.535)
Female	316	0.471	(0.43	0.516)
Diabetes:				
No (ref)	414	0.442	(0.408	0.479)
Yes	184	0.598	(0.526	0.681)
Income:				
RM 0-999 (ref)	210	0.531	(0.475	0.593)
RM 1000-1999	181	0.437	(0.386	0.496)
RM 2000-2999	83	0.4	(0.332	0.482)
>=RM 3000	45	0.585	(0.457	0.749)
Education:				
Nil	50	0.513	(0.404	0.652)
Primary	214	0.544	(0.487	0.607)
Secondary (ref)	267	0.404	(0.363	0.448)
Tertiary	38	0.537	(0.42	0.686)
Assistance to perform CAPD:				
Self care (ref)	415	0.449	(0.415	0.487)
Partially assisted	72	0.553	(0.456	0.672)
Completely assisted	99	0.578	(0.483	0.693)
Year vintage				
1 to < 2 (ref)	128	1.387	(1.19	1.617)
>2 to < 4	161	0.816	(0.707	0.941)
> 4	309	0.344	(0.315	0.376)