

CHAPTER 8

**BLOOD PRESSURE CONTROL
AND
DYSLIPIDAEMIA
IN PATIENTS ON DIALYSIS**

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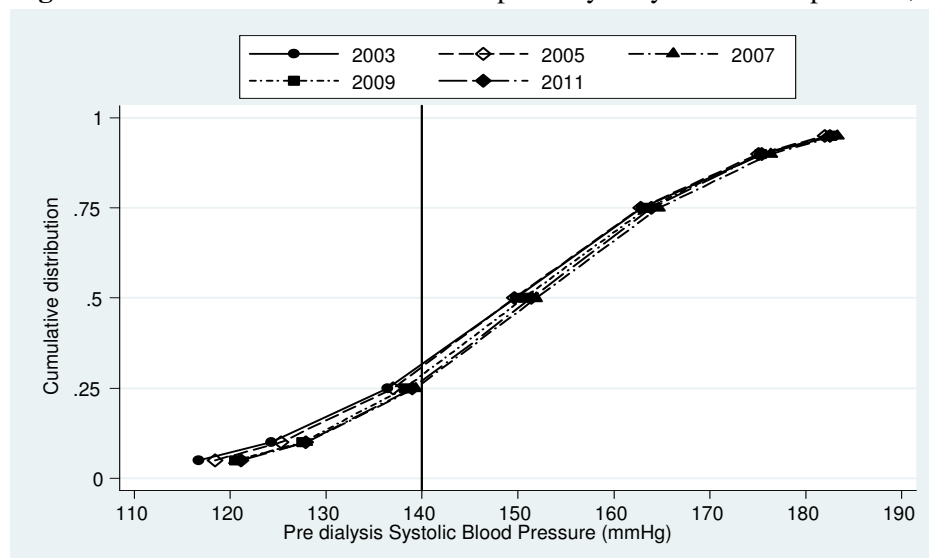
SECTION 8.1: BLOOD PRESSURE CONTROL ON DIALYSIS

Despite the introduction of newer antihypertensive medications in the Malaysian healthcare industry over the past few years, the difficulty in controlling pre-dialysis systolic blood pressure in haemodialysis patients persisted in 2011 with only 26% of haemodialysis patients achieving systolic blood pressure < 140 mmHg in 2011. (Table 8.1.1) The mean and median pre-dialysis systolic blood pressure in haemodialysis patients in 2011 is still unacceptably high at 151.5 mmHg and 151.4 mmHg respectively.

Table 8.1.1: Distribution of pre dialysis systolic blood pressure, HD patients 2002-2011

Year	Number of patients	Mean	SD	Median	LQ	UQ	% Patients <120 mmHg	% Patients 120-<140 mmHg	% Patients 140-<160 mmHg	% Patients 160-<180 mmHg	% Patients ≥160 mmHg
2002	5911	149.2	20.6	149	135.8	163.3	8	24	38	24	6
2003	6834	149.7	20.2	149.8	136.4	162.9	7	24	39	23	7
2004	7937	149.7	20	150	136.6	163.1	7	23	39	25	6
2005	9221	149.9	19.4	149.6	137	162.8	6	24	40	24	6
2006	11526	151.4	19.3	151.1	138.8	164	5	22	41	25	7
2007	12830	152.1	19.1	151.9	139.3	164.7	5	21	40	27	7
2008	15314	152.1	19	152	139.4	164.6	4	21	40	27	7
2009	17871	151	19	150.6	138.2	163.5	5	23	41	25	7
2010	19432	150.8	18.9	150.4	138.3	163.3	5	23	41	25	6
2011	22650	151.5	18.8	151.4	139	163.9	4	22	41	26	6

Figure 8.1.1: Cumulative distribution of pre dialysis systolic blood pressure, HD patients 2002-2011

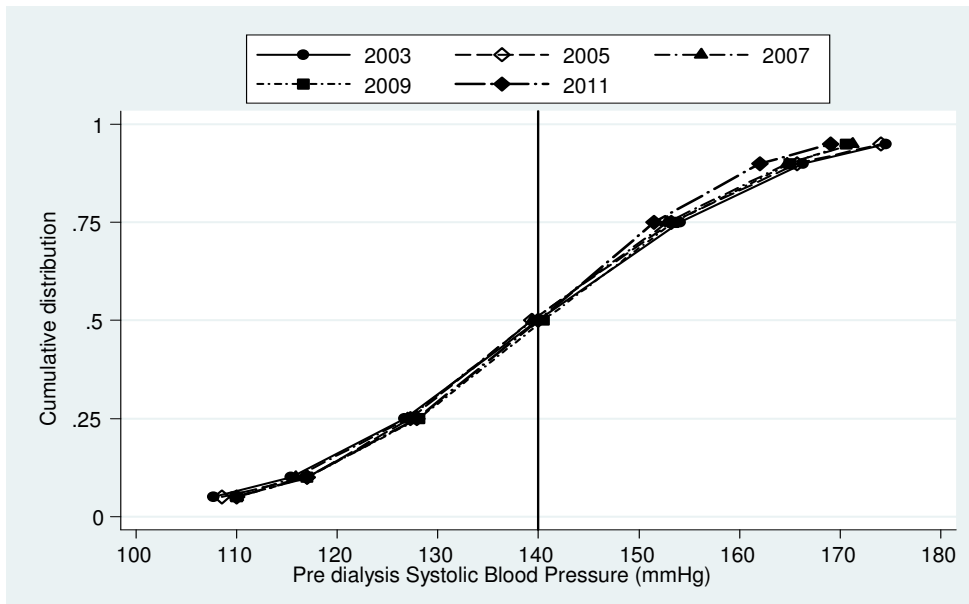


In contrast to haemodialysis patients, pre-dialysis systolic blood pressure was better controlled in peritoneal dialysis patients in 2011, with 49% of peritoneal dialysis patients having a pre-dialysis systolic blood pressure < 140 mmHg. (Table 8.1.2) The mean and median pre-dialysis systolic blood pressure in PD patients were also lower than haemodialysis patients at 139.7 mmHg and 140 mmHg respectively.

Table 8.1.2: Distribution of pre dialysis systolic blood pressure, PD patients 2002-2011

Year	Number of patients	Mean	SD	Median	LQ	UQ	% Patients <120 mmHg	% Patients 120-<140 mmHg	% Patients 140-<160 mmHg	% Patients 160-<180 mmHg	% Patients ≥160 mmHg
2002	843	139.8	20.5	140	127.1	151.8	14	36	34	12	4
2003	1154	140.5	20.1	140	126.7	154.1	15	35	32	15	3
2004	1259	141	19.8	140.9	127.4	154.5	13	34	36	14	3
2005	1351	140.4	20.2	139.3	127.3	153.2	13	38	32	14	3
2006	1523	139.3	19.3	138.4	126.7	151.6	14	40	32	11	2
2007	1753	139.9	19.2	139.4	127	152.8	15	37	33	13	2
2008	2049	139.4	18.7	139.5	126.7	151.4	15	36	35	12	2
2009	2177	140.7	18.7	140.5	128.1	153.4	13	35	35	14	2
2010	2327	140	17.8	140	128.3	151.4	12	37	38	11	2
2011	2578	139.7	18	140	127.9	151.5	13	36	38	11	2

Figure 8.1.2: Distribution of pre dialysis systolic blood pressure, PD patients 2002-2011

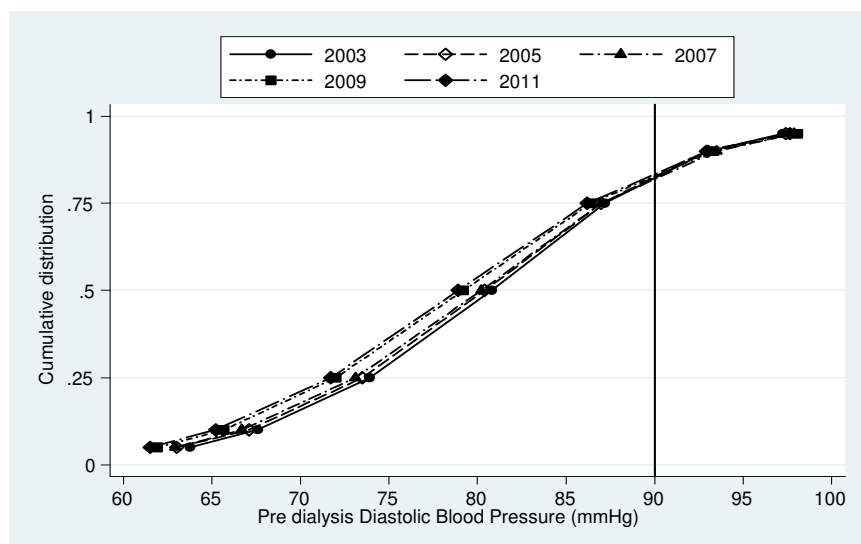


As in previous years, pre-dialysis diastolic blood pressure in haemodialysis patients is better controlled than pre-dialysis systolic blood pressure in 2011, with 85% of such patients achieving pre-dialysis diastolic blood pressure < 90 mmHg. (Table 8.1.3) The mean and median pre-dialysis diastolic blood pressure in haemodialysis patients was satisfactory at 79.3 mmHg and 78.9 mmHg respectively in 2011.

Table 8.1.3: Distribution of pre dialysis diastolic blood pressure, HD patients 2002-2011

Year	Number of patients	Mean	SD	Median	LQ	UQ	% Patients <70 mmHg	% Patients 70-<80 mmHg	% Patients 80-<90 mmHg	% Patients 90-<100 mmHg	% Patients ≥100 mmHg
2002	5907	81.2	10.4	81.3	74.5	88.1	13	30	37	16	3
2003	6832	80.6	10.2	80.8	73.9	87.2	14	32	37	14	3
2004	7935	80.3	10.2	80.3	73.6	86.9	15	33	36	14	3
2005	9221	80.3	10.6	80.4	73.5	87	15	32	36	14	3
2006	11525	80.4	11.1	80.4	73.3	87.1	16	32	35	14	3
2007	12830	80.4	11.1	80.2	73.1	87	16	32	34	14	4
2008	15312	79.8	11.1	79.6	72.4	86.7	18	33	33	13	3
2009	17870	79.7	12	79.2	72	86.4	19	33	31	12	4
2010	19430	79.4	11.8	79	71.8	86.2	20	34	31	12	4
2011	22649	79.3	11.9	78.9	71.7	86.2	20	34	31	12	4

Figure 8.1.3: Cumulative Distribution of pre dialysis diastolic blood pressure, HD patients 2002-2011

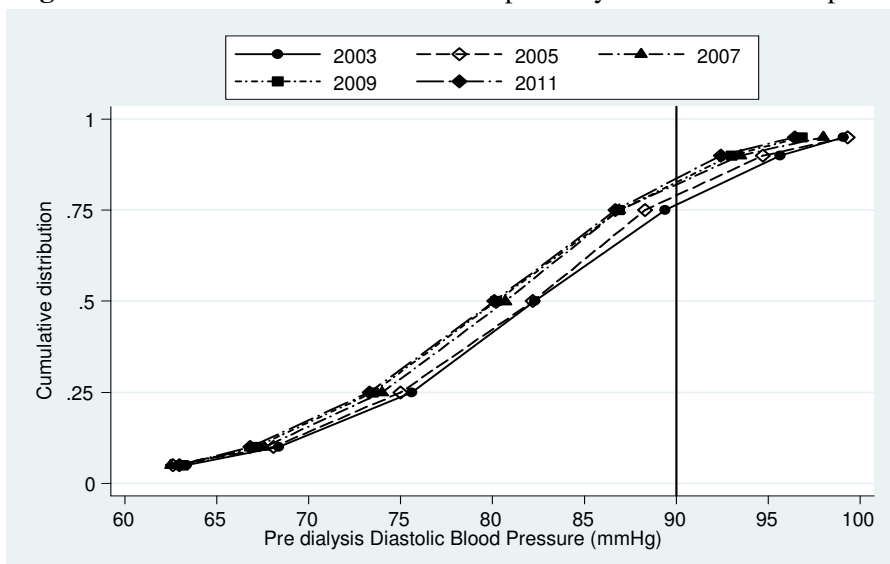


Similarly in peritoneal dialysis patients the pre-dialysis diastolic blood pressure was satisfactorily controlled in 2011 with 85% of these patients achieving diastolic blood pressure < 90 mmHg. (Table 8.1.4) The mean and median pre-dialysis diastolic blood pressure in peritoneal dialysis patients was satisfactory at 80 mmHg and 80.1 mmHg respectively in 2011. Table 8.1.4 also shows that there is a downward trend in the mean and median pre-dialysis diastolic blood pressure in peritoneal dialysis patients over the past 10 years.

Table 8.1.4: Distribution of pre dialysis diastolic blood pressure, PD patients 2002-2011

Year	Number of patients	Mean	SD	Median	LQ	UQ	% Patients <70 mmHg	% Patients 70-<80 mmHg	% Patients 80-<90 mmHg	% Patients 90-<100 mmHg	% Patients ≥100 mmHg
2002	843	82.8	10.8	83.4	76.1	90	11	24	41	21	5
2003	1156	82.2	10.9	82.3	75.6	89.4	12	26	38	19	4
2004	1258	82.2	10.5	83	75.4	89.2	11	28	38	18	4
2005	1351	81.6	10.9	82.2	75	88.3	12	29	40	15	5
2006	1522	81.3	10.6	81.5	74.8	88	13	28	40	15	3
2007	1752	80.6	10.7	80.7	74	86.9	14	32	38	12	3
2008	2049	79.7	10.1	80	73	86.3	16	32	36	13	2
2009	2177	80.2	10.3	80.2	73.5	86.9	15	33	35	14	3
2010	2327	79.9	10.4	80	72.9	86.8	17	33	34	13	3
2011	2578	80	10.2	80.1	73.3	86.7	16	33	36	13	2

Figure 8.1.4: Cumulative Distribution of pre dialysis diastolic blood pressure, PD patients 2002-2011



While there was only a mild variation in pre-dialysis median systolic blood pressure and pre-dialysis median diastolic blood pressure among haemodialysis centres in 2011, there are a few “outliers” at the extremes. Perhaps these “outlier” Dialysis Centres can be notified to check on the veracity of their data and to determine whether any further remedial action is required. (Figure 8.1.5a & Figure 8.1.5b).

Table 8.1.5: Variation in BP control among HD centres 2002-2011

Table 8.1.5 (a): Median systolic blood pressure among HD patients, HD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	146	128.3	136.7	144.8	149.2	153.9	162	169.7
2003	178	126.7	136.6	145	150	156	162.5	173.7
2004	216	120	136.9	145.8	150.1	155.4	162.7	169.8
2005	243	121.7	136.8	143.8	150.5	154.9	162.9	171.8
2006	286	127.9	138.6	146.4	151.5	156.8	163.5	180.3
2007	321	131.7	140.5	147.5	151.9	156.7	164.9	176
2008	375	130	140.4	147.5	152.4	156.8	164.2	175.3
2009	413	132.5	139.7	146.8	151.1	155.6	162.2	171.8
2010	451	130.1	139.6	146.4	150.4	155.3	162.1	175
2011	502	123.1	139.8	147.3	151.4	156.4	163.8	178

Figure 8.1.5 (a): Variation in median systolic blood pressure among HD patients, HD centres 2011

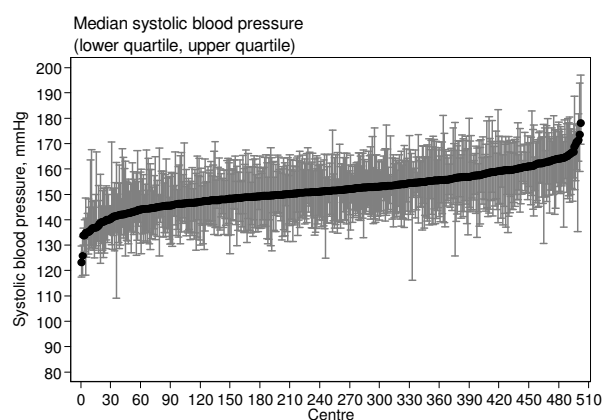


Figure 8.1.5 (b): Variation in median diastolic blood pressure among HD patients, HD centres 2011

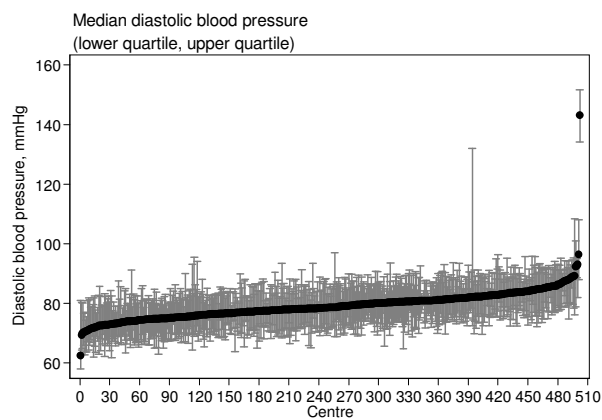


Table 8.1.5 (b): Median diastolic blood pressure among HD patients, HD centres

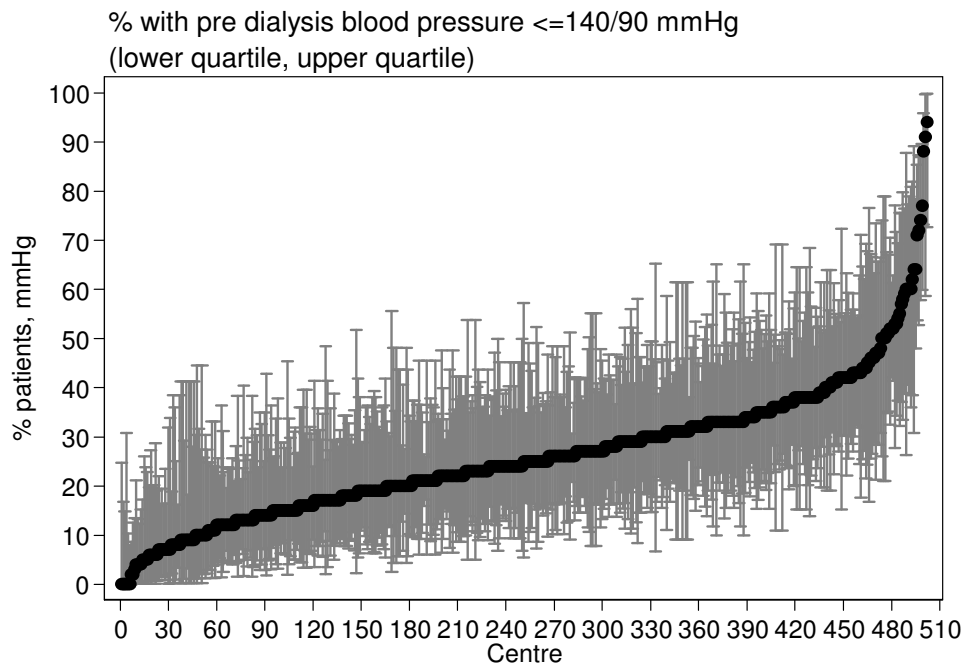
Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	146	72.3	75.9	79.4	81.3	83.8	87.8	92
2003	178	70.1	75	78.4	80.4	83.6	86.7	93.3
2004	216	70.2	74	78.2	80.7	82.7	86.8	89.1
2005	243	67.4	73.1	78.1	80.5	82.7	86.7	90.3
2006	286	68	74.5	77.8	80.5	83.1	86.8	101
2007	321	70.1	73.5	77.9	80.2	82.9	87.5	124.5
2008	375	66.8	73.5	77.1	79.7	82.5	86.8	92.3
2009	413	68.5	73.1	76.6	79.4	81.9	86.2	134.1
2010	451	68.6	72.5	76.7	79	81.8	85.3	142.2
2011	502	62.5	72.8	76.2	78.6	81.6	85.8	143.1

There appears to be more variation amongst haemodialysis centres in 2011 in the proportion of patients achieving blood pressure < 140/90 mmHg. (Table 8.1.5c & Figure 8.1.5c) Perhaps we can enquire further into the good antihypertensive practices in some of the “model” haemodialysis centres who reported more than 70% of their patients achieving blood pressure < 140/90 mmHg and help to disseminate these best practices to help some of the dialysis centres that are reporting less than 10% of their patients achieving target blood pressure < 140/90 mmHg.

Table 8.1.5 (c): Proportion of HD patients with pre dialysis blood pressure < 140/90 mmHg, HD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	146	0	11	21	29.5	39	59	71
2003	178	3	9	21	27.5	38	58	81
2004	216	0	8	20	29	38	58	90
2005	243	5	11	20	27	40	56	92
2006	286	0	9	17	24.5	34	52	76
2007	321	0	8	17	26	33	47	80
2008	375	0	8	17	25	33	50	73
2009	413	0	10	18	26	35	52	78
2010	451	0	8	18	26	35	50	87
2011	502	0	7	17	25	33	51	94

Figure 8.1.5 (c): Variation in proportion of HD patients with pre dialysis blood pressure < 140/90 mmHg, HD centers 2011



The number of peritoneal dialysis centres was much less than the number of haemodialysis centres in Malaysia in 2011.

There was some variation in pre-dialysis median systolic blood pressure and pre-dialysis median diastolic blood pressure among peritoneal dialysis centres in 2011. (Figure 8.1.6a & Figure 8.1.6b)

Table 8.1.6: Variation in BP control among PD centres 2002-2011

Table 8.1.6 (a): Median systolic blood pressure among PD patients, PD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	15	123.6	123.6	134.5	140	144.5	148.2	148.2
2003	18	123.8	123.8	132.4	142.4	144.3	151.8	151.8
2004	18	122.9	122.9	134.5	139.8	143.3	149.7	149.7
2005	19	122.6	122.6	134.8	136.5	142	158	158
2006	22	113	118.3	130.2	136.4	140.4	146	154.9
2007	22	115.8	116.3	135.2	138.4	141.8	147.6	153.5
2008	22	115.6	118.3	136.1	138.4	141.6	147.7	147.9
2009	24	113.7	116.3	135	139.2	146.7	150.3	161.5
2010	25	114.3	117.1	131.5	139	143	145.4	146.4
2011	27	113.1	114.9	128.4	140.1	141.9	146.1	147.8

Figure 8.1.6 (a): Variation in median systolic blood pressure among PD patients, PD centres 2011

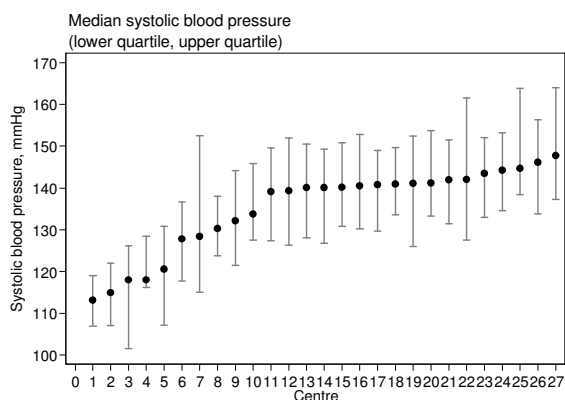


Figure 8.1.6 (b): Variation in median diastolic blood pressure among PD patients, PD centres 2011

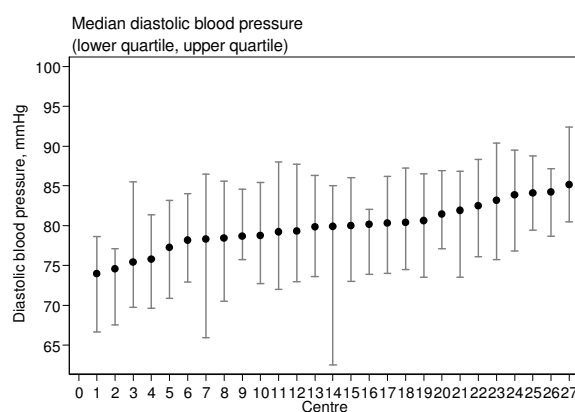


Table 8.1.6 (b): Median diastolic blood pressure among PD patients, PD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	15	75.7	75.7	81.8	83.3	85.7	89.5	89.5
2003	18	77.5	77.5	81.2	82.9	84	88	88
2004	18	77.5	77.5	80.8	83.4	84	87	87
2005	19	74.4	74.4	80.3	82.8	84.2	86	86
2006	22	71.6	74	78.9	81.4	82.5	86.5	88.4
2007	22	68.8	77	79.1	79.9	82.1	83.2	87
2008	22	75.3	76.2	78.2	79.8	82	84.5	86.8
2009	24	73.3	73.5	78.3	79.1	82.3	83.8	87.9
2010	25	74	74.8	77.4	79.3	81.8	84.8	86.7
2011	27	74	74.5	78.3	79.9	81.9	84.3	85.1

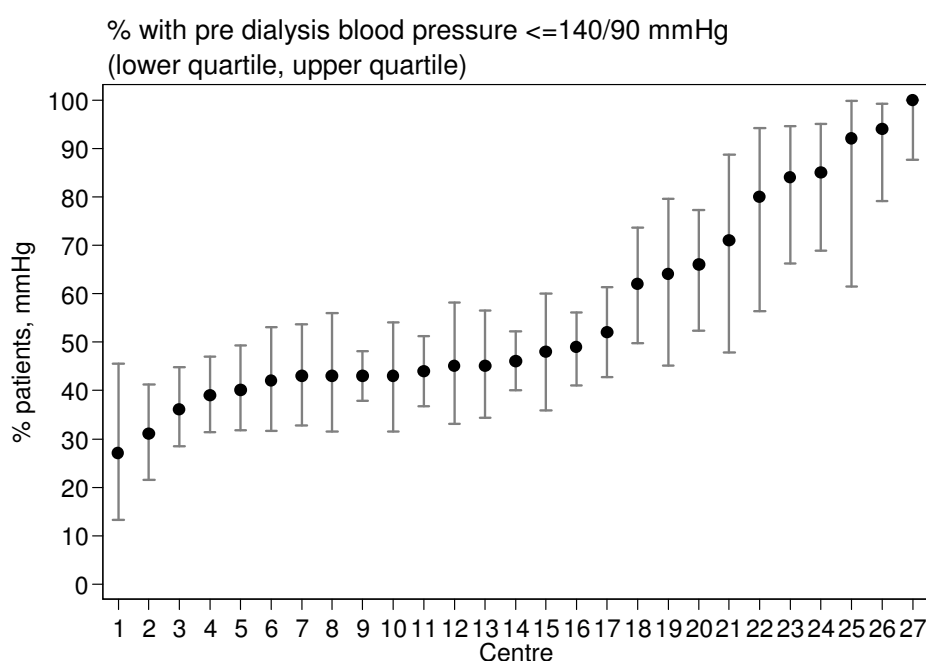
Similar to haemodialysis centres, there was also a wide variation amongst peritoneal dialysis centres in the proportion of patients achieving blood pressure < 140/90 mmHg in 2011 (Table 8.1.6c & Figure 8.1.6c). Figure 8.1.6a shows that there were 3 exemplary peritoneal dialysis centres where more than 90% of their patients were able to achieve target blood pressure of less than 140/90 mmHg. Again dissemination of their effective antihypertensive practices may be helpful to other centres.

Comparisons in blood pressure control between the peritoneal dialysis and haemodialysis populations suggest that blood pressure control is better in the peritoneal dialysis patients (46% vs. 25% achieving target pre-dialysis blood pressure < 140/90 mmHg). (Table 8.1.5.c & Table 8.1.6.c)

Table 8.1.6 (c): Proportion of PD patients with pre dialysis blood pressure < 140/90 mmHg, PD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	15	19	19	33	47	56	90	90
2003	18	28	28	38	46.5	65	74	74
2004	18	30	30	39	47	56	73	73
2005	19	23	23	43	55	62	92	92
2006	22	18	37	43	58.5	68	100	100
2007	22	27	29	45	53.5	68	91	91
2008	22	28	29	43	52.5	58	85	96
2009	24	10	29	40.5	49.5	57	92	96
2010	25	31	34	38	53	63	90	100
2011	27	27	31	43	46	71	94	100

Figure 8.1.6 (c): Variation in proportion of PD patients with pre dialysis blood pressure ≤140/90 mmHg, PD centres 2011



SECTION 8.2: DYSLIPIDEMIA IN DIALYSIS PATIENTS

The trend over the past 10 years of improving total cholesterol levels in haemodialysis patients continued in 2011, with 79% of haemodialysis patients achieving total cholesterol < 5.3 mmol/l. (Table & Figure 8.2.1) The mean and median serum cholesterol levels in haemodialysis patients in 2011 were 4.5 mmol/l and 4.4 mmol/l respectively compared to 5.0 mmol/l and 4.9 mmol/l a decade ago.

Table 8.2.1: Distribution of serum cholesterol, HD patients 2002-2011

Year	Number of patients	Mean	SD	Median	LQ	UQ	% Patients <3.5 mmol/L	% Patients 3.5-<5.3 mmol/L	% Patients 5.3-<6.2 mmol/L	% Patients ≥6.2 mmol/L
2002	4751	5	1.2	4.9	4.2	5.7	9	53	25	13
2003	5806	4.8	1.1	4.8	4.1	5.5	9	58	22	11
2004	6710	4.7	1.1	4.7	4	5.4	11	59	22	8
2005	7906	4.7	1.1	4.6	4	5.3	12	60	20	8
2006	10139	4.6	1.1	4.6	3.9	5.3	14	61	18	7
2007	11347	4.6	1.1	4.5	3.8	5.2	14	62	18	6
2008	13820	4.5	1.1	4.4	3.8	5.2	15	62	17	6
2009	15904	4.6	1.1	4.5	3.8	5.2	14	62	17	6
2010	17653	4.6	1.1	4.5	3.8	5.2	14	62	18	7
2011	20665	4.5	1.1	4.4	3.8	5.1	16	63	15	6

Figure 8.2.1: Cumulative distribution of cholesterol, HD patients 2002-2011

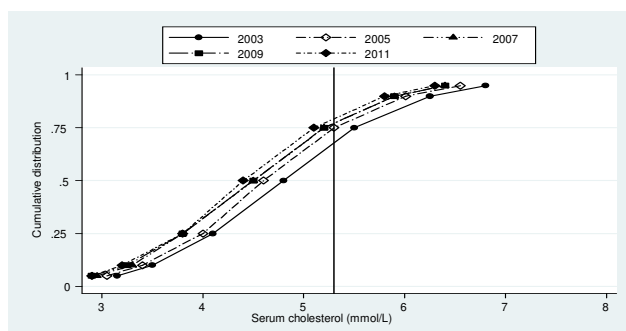
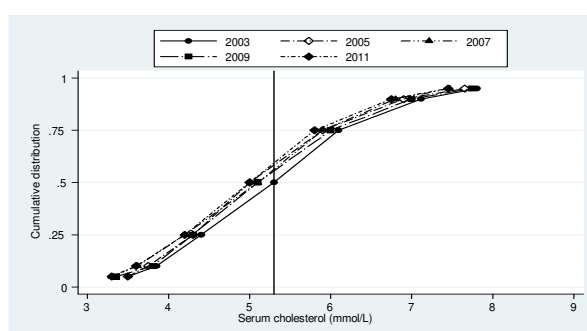


Figure 8.2.2: Cumulative distribution of cholesterol (mmol/l), PD patients 2002-2011



However total cholesterol levels in peritoneal dialysis patients were less optimally controlled in comparison with haemodialysis patients, with only 58% of peritoneal dialysis patients achieving total cholesterol < 5.3 mmol/l in 2011. (Table 8.2.2 & Figure 8.2.2) The mean and median serum cholesterol levels in peritoneal dialysis patients in 2011 were 5.1 mmol/l and 5.0 mmol/l respectively, still better than the figures 10 years before.

Table 8.2.2: Distribution of serum cholesterol, PD patients 2002-2011

Year	Number of patients	Mean	SD	Median	LQ	UQ	% Patients <3.5 mmol/L	% Patients 3.5-<5.3 mmol/L	% Patients 5.3-<6.2 mmol/L	% Patients ≥6.2 mmol/L
2002	766	5.6	1.4	5.5	4.6	6.4	4	36	30	29
2003	1104	5.4	1.4	5.3	4.4	6.1	5	44	28	23
2004	1230	5.3	1.4	5.2	4.4	6.1	5	47	27	21
2005	1242	5.2	1.3	5	4.3	5.9	5	53	24	18
2006	1395	5.2	1.4	5.1	4.3	5.9	6	50	26	18
2007	1629	5.1	1.3	5.1	4.2	5.9	8	48	26	18
2008	1902	5.2	1.4	5	4.3	5.9	7	50	24	18
2009	2016	5.3	1.5	5.1	4.3	6	6	48	26	20
2010	2186	5.2	1.4	5.1	4.3	6	7	48	25	20
2011	2350	5.1	1.3	5	4.2	5.8	8	50	25	17

Serum triglyceride control was slightly better in haemodialysis patients than peritoneal dialysis patients in 2011, with 76% of haemodialysis patients achieving serum triglyceride levels < 2.3 mmol/l (Table & Figure 8.2.3) compared with 74% of PD patients achieving serum triglyceride level < 2.3 mmol/l. (Table & Figure 8.2.4) For both haemodialysis and peritoneal dialysis patients, the mean and median triglyceride levels has been on a downward trend over the past 10 years.

Table 8.2.3: Distribution of serum triglyceride, HD patients 2002-2011

Year	Number of patients	Mean	SD	Median	LQ	UQ	% Patients <1.7 mmol/L	% Patients 1.7-<2.3 mmol/L	% Patients 2.3-<3.5 mmol/L	% Patients ≥3.5 mmol/L
2002	3861	2.1	1.4	1.8	1.2	2.5	47	22	18	12
2003	4710	2	1.3	1.7	1.2	2.5	48	23	18	11
2004	5607	2	1.2	1.7	1.2	2.4	51	23	17	10
2005	6950	2	1.3	1.7	1.2	2.4	50	22	18	10
2006	9522	2	1.3	1.6	1.2	2.3	54	21	16	9
2007	10882	1.9	1.2	1.6	1.1	2.3	55	21	16	8
2008	12927	1.9	1.2	1.6	1.1	2.3	56	20	15	8
2009	15183	1.9	1.3	1.6	1.1	2.3	54	21	16	9
2010	16970	1.9	1.3	1.6	1.1	2.3	54	21	16	9
2011	19722	1.9	1.2	1.6	1.1	2.3	55	21	16	8

Figure 8.2.3: Cumulative distribution of serum triglyceride, HD patients 2002-2011

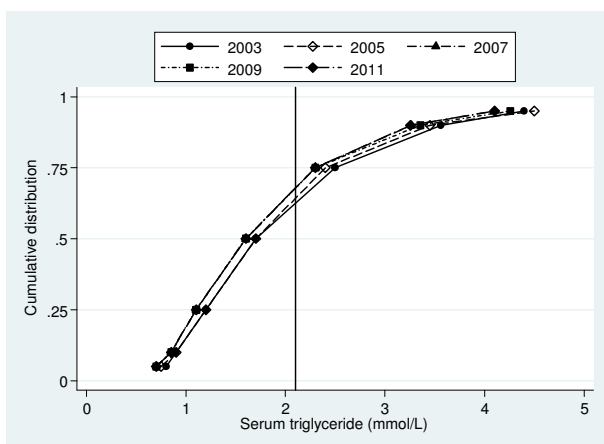


Figure 8.2.4: Cumulative distribution of serum triglyceride, PD patients 2002-2011

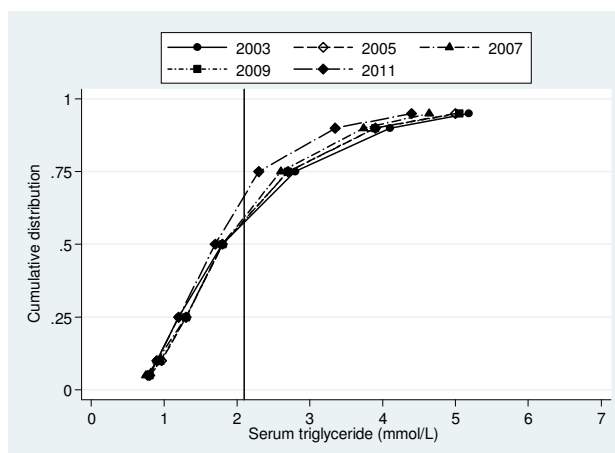


Table 8.2.4: Distribution of serum triglyceride, PD patients 2002-2011

Year	Number of patients	Mean	SD	Median	LQ	UQ	% Patients <1.7 mmol/L	% Patients 1.7-<2.3 mmol/L	% Patients 2.3-<3.5 mmol/L	% Patients ≥3.5 mmol/L
2002	767	2.5	1.7	2	1.4	3	39	21	22	18
2003	1100	2.3	1.6	1.8	1.2	2.8	45	20	21	14
2004	1223	2.2	1.6	1.8	1.3	2.6	47	23	17	13
2005	1241	2.2	1.5	1.8	1.3	2.7	43	24	18	14
2006	1391	2.2	1.6	1.7	1.2	2.6	47	21	18	13
2007	1625	2.1	1.4	1.8	1.3	2.6	45	24	19	12
2008	1907	2.2	1.5	1.8	1.3	2.7	45	21	20	14
2009	2017	2.2	1.6	1.8	1.3	2.7	46	21	20	14
2010	2177	2.1	1.4	1.8	1.3	2.5	47	23	18	11
2011	2365	2	1.3	1.7	1.2	2.3	51	23	17	9

There was a mild variation in median serum cholesterol levels and proportion of haemodialysis patients with serum cholesterol < 5.3mmol/l in haemodialysis centres in 2011. (Table 8.2.5a & Table 8.2.5b) There are some exemplary dialysis centres who reported more than 90% of their patients achieving serum cholesterol < 5.2 mmol/l in 2011 (Expert panel note - an evaluation of their lipid lowering strategies will be beneficial for other dialysis centres). Compared to 10 years ago, the median of the proportion of patients with serum cholesterol level < 5.3 mmol/l in haemodialysis centres has significantly increased (63% in 2002 to 80% in 2011). (Table 8.2.5b)

Table 8.2.5: Variation in dyslipidaemia among HD centres 2002-2011

Table 8.2.5 (a): Median serum cholesterol level among HD patients, HD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	123	4.3	4.5	4.7	4.9	5.1	5.6	6.4
2003	153	4.2	4.3	4.6	4.8	5	5.3	5.6
2004	186	3.9	4.1	4.5	4.7	4.9	5.4	6.1
2005	215	3.8	4.1	4.4	4.6	4.8	5.2	5.7
2006	265	3.4	3.9	4.3	4.5	4.8	5.2	5.7
2007	292	3.6	4	4.3	4.5	4.8	5	5.4
2008	349	3.5	3.8	4.2	4.5	4.7	5.1	6.3
2009	378	3.5	4	4.3	4.5	4.8	5.1	5.6
2010	420	3.6	4	4.3	4.5	4.7	5.1	5.8
2011	485	3.6	3.9	4.2	4.4	4.6	4.9	5.8

Figure 8.2.5 (a): Variation in median serum cholesterol level among HD patients, HD centres 2011

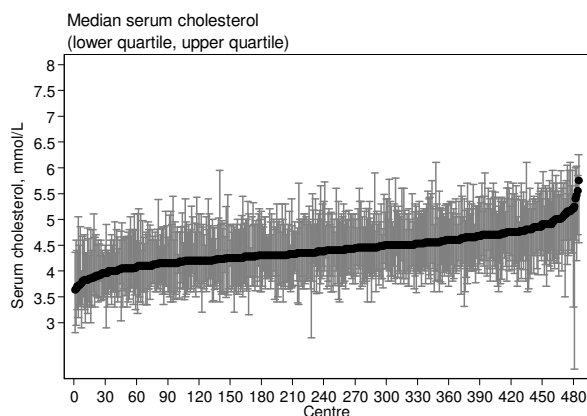


Figure 8.2.5 (b): Variation in proportion of patients with serum cholesterol < 5.3 mmol/l, HD centres 2011

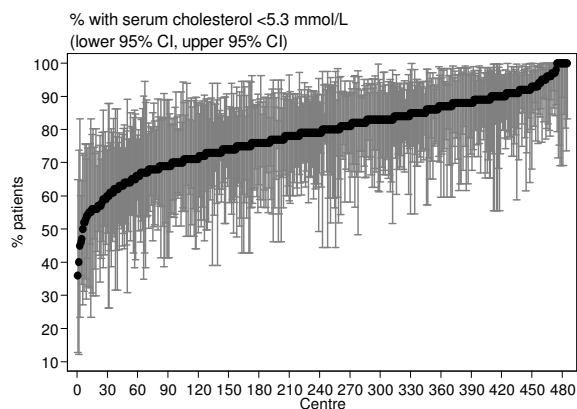


Table 8.2.5 (b): Proportion of HD patients with serum cholesterol < 5.3 mmol/l, HD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	123	22	40	55	63	70	77	93
2003	153	40	44	59	67	76	83	92
2004	186	25	45	61	69.5	77	90	97
2005	215	34	50	65	73	81	91	100
2006	265	29	54	67	74	82	92	100
2007	292	33	57	68	75	84	92	100
2008	349	30	56	69	77	84	92	100
2009	378	31	53	69	76	84	93	100
2010	420	27	55.5	69	76.5	84	92	100
2011	485	36	58	72	80	87	95	100

There is only a mild variation in median serum triglyceride levels amongst haemodialysis centres while the proportion of patients with serum triglyceride < 2.1 mmol/l in haemodialysis centres appear to have a wider variation in 2011. (Figure 8.2.5c & Figure 8.2.5d)

Table 8.2.5 (c): Median serum triglyceride level among HD patients, HD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	98	1.1	1.4	1.6	1.8	2	2.4	3.2
2003	129	1.2	1.3	1.5	1.7	1.9	2.2	2.5
2004	160	1	1.3	1.5	1.7	1.8	2.2	3
2005	194	0.9	1.4	1.5	1.7	1.8	2.2	2.6
2006	255	0.9	1.3	1.5	1.6	1.8	2.2	4
2007	278	0.8	1.2	1.4	1.6	1.8	2	2.9
2008	324	1	1.2	1.4	1.6	1.7	2	2.3
2009	359	1	1.2	1.4	1.6	1.8	2.1	2.4
2010	403	0.9	1.2	1.4	1.6	1.8	2.1	3.6
2011	464	1	1.2	1.4	1.6	1.8	2	6.3

Figure 8.2.5 (c): Variation in median serum triglyceride level among HD patients, HD centers, 2011

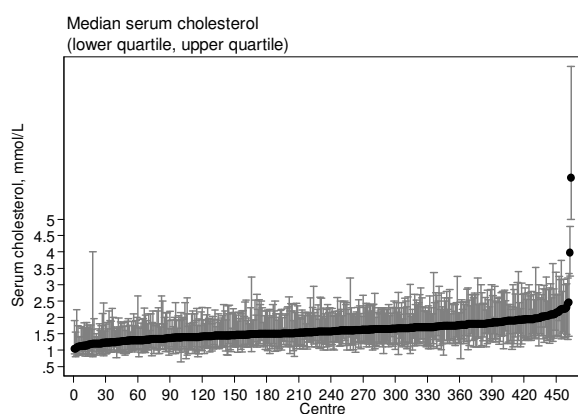


Figure 8.2.5 (d): Variation in proportion of patients with serum triglyceride < 2.1mmol/L, HD centers 2011

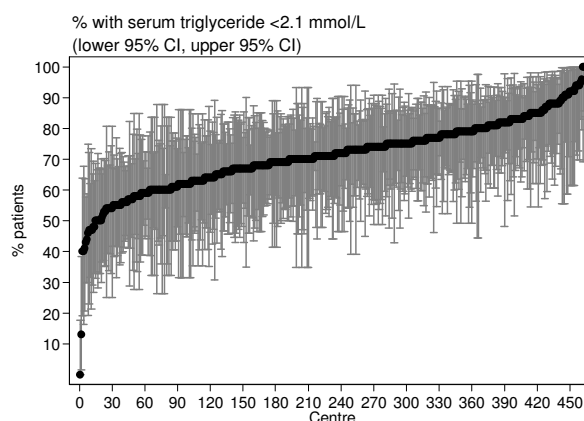


Table 8.2.5 (d): Proportion of HD patients with serum triglyceride < 2.1 mmol/L, HD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	98	27	44	55	66.5	72	83	93
2003	129	27	45	58	69	75	90	100
2004	160	20	48.5	59	69	79.5	88	96
2005	194	29	45	60	67	74	84	100
2006	255	14	47	64	70	76	88	100
2007	278	36	50	63	71	79	88	100
2008	324	36	54	64	71	79	89	100
2009	359	38	50	63	71	78	89	100
2010	403	9	50	62	71	78	88	100
2011	464	0	53	64	71	79	89	100

There was a mild variation in median cholesterol levels among peritoneal dialysis patients in 2011. (Table 8.2.6a & Figure 8.2.6a) The median of the proportion of peritoneal dialysis patients with serum cholesterol < 5.3 mmol/l has gradually increased from 38% in 2002 to 54.5% in 2011, reflecting better control of serum cholesterol levels in peritoneal dialysis patients over the past 10 years. (Table 8.2.6b & Figure 8.2.6b)

Table 8.2.6: Variation in dyslipidaemia among PD centres 2002-2011

Table 8.2.6 (a): Median serum cholesterol level among PD patients, PD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	15	4.9	4.9	5.4	5.5	5.7	6.2	6.2
2003	18	4.5	4.5	5	5.3	5.7	5.9	5.9
2004	18	4.6	4.6	4.9	5.3	5.5	6.1	6.1
2005	19	4.4	4.4	4.7	5	5.4	5.9	5.9
2006	21	4.4	4.6	4.8	5	5.3	6.1	6.2
2007	22	4.5	4.5	4.8	5.2	5.4	6.1	6.3
2008	21	4.3	4.5	4.8	5.1	5.4	5.5	6.2
2009	22	4.6	4.7	4.8	5.1	5.4	5.9	6.8
2010	24	4.6	4.7	4.9	5.2	5.4	6	7.3
2011	26	4.3	4.4	4.9	5.1	5.3	6	7.2

Figure 8.2.6 (a): Variation in median serum cholesterol level among PD patients, PD centres 2011

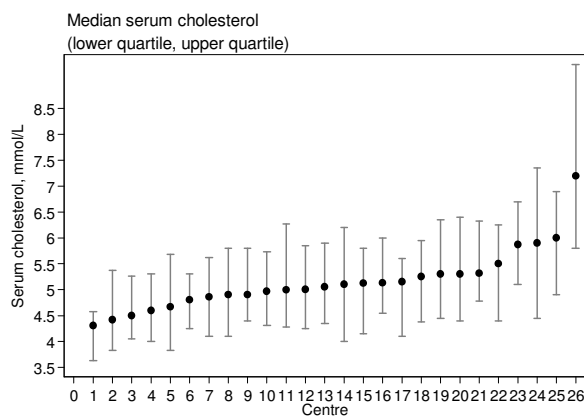


Figure 8.2.6 (b): Variation in proportion of patients with serum cholesterol < 5.3 mmol/L, PD centres 2011

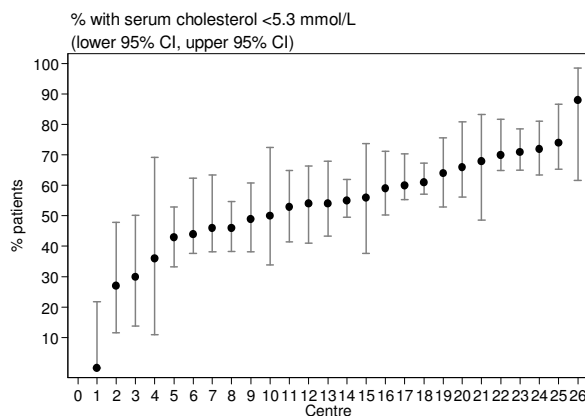


Table 8.2.6 (b): Proportion of PD patients with serum cholesterol < 5.3 mmol/L, PD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	15	13	13	29	38	44	80	80
2003	18	22	22	39	47.5	59	83	83
2004	18	24	24	42	49.5	60	69	69
2005	19	27	27	46	58	68	74	74
2006	21	20	25	47	57	63	72	79
2007	22	29	30	44	52.5	65	74	86
2008	21	40	42	45	55	68	73	74
2009	22	8	34	46	52.5	61	73	77
2010	24	9	25	43.5	52	61	70	72
2011	26	0	27	46	54.5	66	74	88

As in previous years, there was only mild variation in median triglyceride levels among peritoneal dialysis centres. (Figure 8.2.6c) Variation amongst peritoneal dialysis centres in the proportion of patients with serum triglyceride levels < 2.1 mmol/l was also mild. (Figure 8.2.6d)

In summary, lipid control is better in the haemodialysis population compared to peritoneal dialysis population due to the glycaemic load from peritoneal dialysis therapy with glucose-based solutions. The overall picture however has been improving over the last decade for both treatment modalities.

Table 8.2.6 (c): Median serum triglyceride level among PD patients, PD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	15	1.5	1.5	1.8	1.9	2	2.4	2.4
2003	18	1.2	1.2	1.7	1.8	1.9	2.3	2.3
2004	18	1.3	1.3	1.7	1.8	1.8	2.2	2.2
2005	19	1.4	1.4	1.6	1.9	2	2.2	2.2
2006	21	1.1	1.4	1.6	1.8	1.9	2	2.6
2007	22	1.2	1.5	1.7	1.8	1.9	2.1	2.7
2008	23	1.3	1.5	1.7	1.8	2	2.2	2.3
2009	23	1.3	1.5	1.7	1.8	1.9	2.1	2.6
2010	24	1.4	1.5	1.6	1.8	1.9	2.2	2.2
2011	26	1.2	1.4	1.6	1.6	1.8	2.1	2.2

Figure 8.2.6 (c): Variation in median serum triglyceride level among PD patients, PD centres 2011

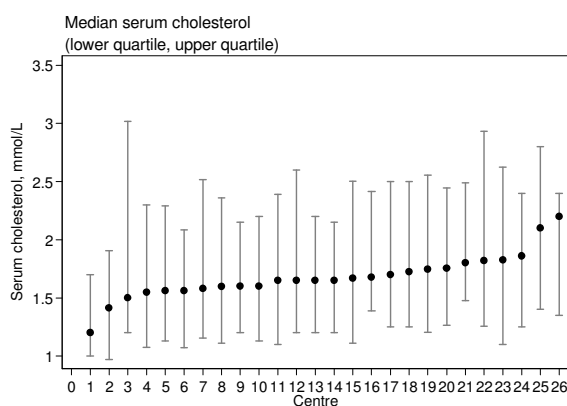


Figure 8.2.6 (c): Variation in median serum triglyceride level among PD patients, PD centres 2011

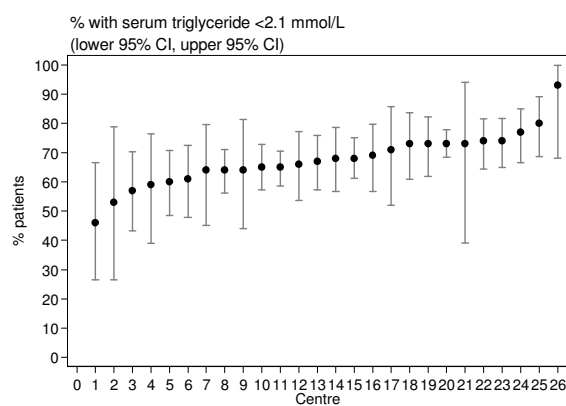


Table 8.2.6 (d): Proportion of PD patients with serum triglyceride < 2.1 mmol/L, PD centres

Year	Number of centres	Min	5 th Centile	LQ	Median	UQ	95 th Centile	Max
2002	15	38	38	52	56	58	76	76
2003	18	49	49	55	58.5	62	92	92
2004	18	47	47	60	62	65	88	88
2005	19	40	40	54	60	69	91	91
2006	21	33	52	56	61	64	78	82
2007	22	40	50	57	64.5	68	80	81
2008	23	48	48	56	60	65	82	84
2009	23	25	50	55	59	68	71	72
2010	24	47	48	58.5	62.5	69	74	77
2011	26	46	53	64	67.5	73	80	93