

## **CHAPTER 6**

# **MANAGEMENT OF ANAEMIA IN DIAYSIS PATIENTS**

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**6.1: Treatment of Anemia in Dialysis patients**

From 1997 to 2004 there was an increasing percentage of patients on erythropoietin (EPO) - as expected more haemodialysis patients were on EPO; 73% compared to 62%. Throughout this period, however, the blood transfusion rate has remained at 10 -15%

Surprisingly, there were a decreasing number of patients on oral iron supplements. The use of IV Iron has increased however, but this is still far from optimum (at best 10 %). Table 6.1.1 – 6.1.2

**Table 6.1.1:** Treatment for Anemia, HD patients 1997-2004

Year	No. of subjects	% on Erythropoietin	% received blood transfusion	% on oral Iron	% received parenteral Iron
1997	1695	46	8	92	4
1998	2141	46	13	92	4
1999	2996	51	15	90	5
2000	4392	56	15	88	5
2001	5194	62	13	88	5
2002	6108	67	10	85	7
2003	7043	71	12	83	8
2004	8123	73	11	79	10

**Table 6.1.2:** Treatment for Anemia, CAPD patients 1997-2004

Year	No. of subjects	% on Erythropoietin	% received blood transfusion	% on oral Iron	% received parenteral Iron
1997	476	37	12	96	3
1998	541	44	16	96	3
1999	610	44	14	94	0
2000	662	46	11	92	4
2001	781	45	11	91	2
2002	891	49	11	93	2
2003	1237	53	14	87	4
2004	1331	62	15	83	6

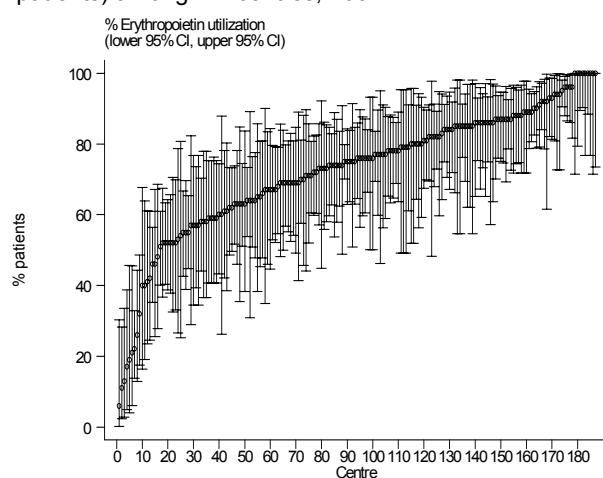
Comparing the years 2004 and 1997, 50% of centers (median) have 76% of their patients on EPO compared to 46% in 1997. At the 95<sup>th</sup> centile, 5% of centers have 96% of their patient on EPO compared to 71% in 1997. At the 5<sup>th</sup> centile, 5% of centers have 40 % of patients on EPO compared to 20% in 1997. A similar trend was seen in the CAPD centres. (Table / Figures 6.1.3 – 6.1.4)

What is surprising is that approximately 5% of the HD centers have all their patients on EPO. Centers with extremes in utilization of EPO, perhaps should have their EPO use reviewed.

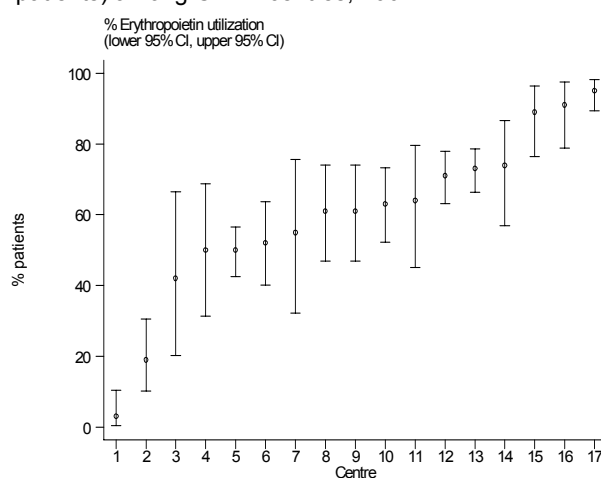
**Table 6.1.3:** Variation in Erythropoietin utilization (% patients) among HD centers, 2004

Year	No. of centers	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	46	7	20	36	46	63	71	92
1998	46	0	10	36	50.5	60	79	87
1999	69	9	18	43	54	66	82	93
2000	100	0	22.5	46.5	59.5	70	87.5	100
2001	118	8	32	50	61	75	92	100
2002	137	15	30	56	69	78	91	95
2003	160	16	37	58.5	75	84	96.5	100
2004	187	6	40	63	76	86	96	100

**Figure 6.1.3:** Variation in Erythropoietin utilization (% patients) among HD centres, 2004



**Figure 6.1.4:** Variation in Erythropoietin utilization (% patients) among CAPD centres, 2004



**Table 6.1.4:** Variation in Erythropoietin utilization (% patients) among CAPD centres, 2004

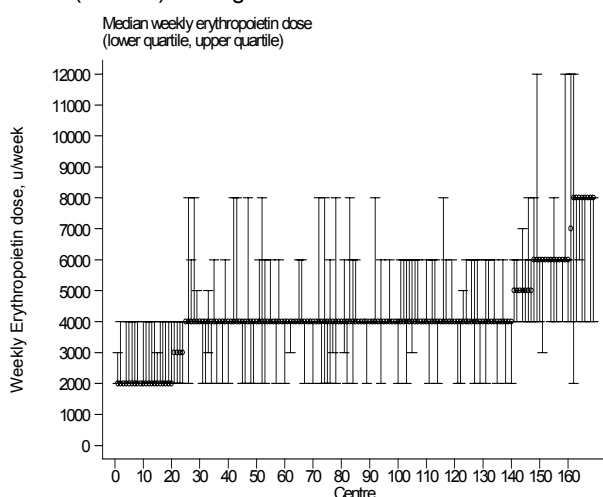
Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	7	19	19	21	41	49	53	53
1998	9	0	0	14	38	49	71	71
1999	9	17	17	33	40	43	79	79
2000	11	19	19	35	45	50	75	75
2001	12	28	28	31	44	53.5	86	86
2002	14	27	27	38	49	55	70	70
2003	17	22	22	35	50	58	92	92
2004	17	3	3	50	61	73	95	95

From 1997 to 2004, the median weekly EPO dose has remained at 4000 units in both HD and CAPD centres. In both HD and CAPD, at the 5<sup>th</sup> centile, 5% of centers have their weekly EPO dose at 2000 units. In HD patients, at the 95<sup>th</sup> centile, 5% of centers have their weekly EPO dose at 7000 units compared to 4000 units for CAPD patients. (Table / Figure 6.1.5 – 6.1.6)

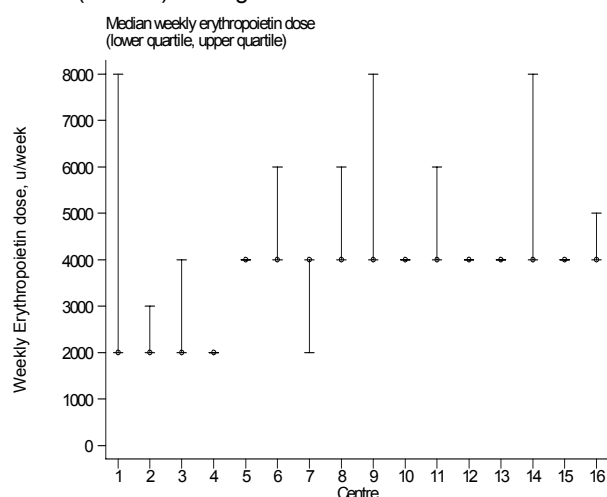
**Table 6.1.5:** Variation in median weekly Erythropoietin dose (u/week) among HD centres 2004

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	31	2000	2000	4000	4000	4000	6000	8000
1998	33	2000	2000	4000	4000	4000	4000	4000
1999	53	2000	2000	2000	4000	4000	4000	4000
2000	83	2000	2000	2000	4000	4000	4000	6000
2001	97	2000	2000	3000	4000	4000	6000	8000
2002	114	2000	2000	4000	4000	4000	5000	6000
2003	135	2000	2000	4000	4000	4000	6000	8000
2004	169	2000	2000	4000	4000	4000	7000	8000

**Figure 6.1.5:** Variation in median weekly Erythropoietin dose (u/week) among HD centres 2004



**Figure 6.1.6:** Variation in median weekly Erythropoietin dose (u/week) among CAPD centres 2004



**Table 6.1.6:** Variation in median weekly Erythropoietin dose (u/week) among CAPD centres 2004

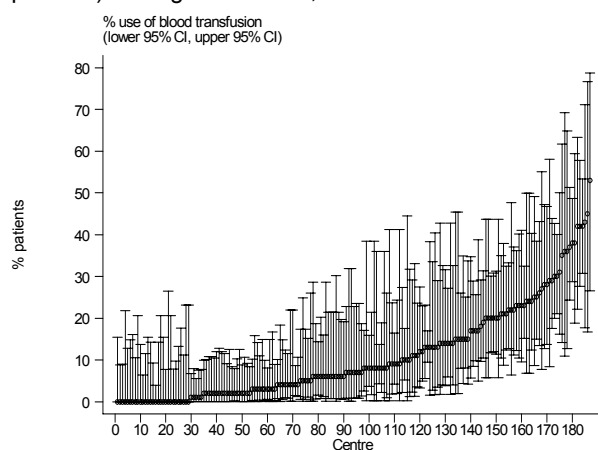
Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	6	4000	4000	4000	4000	4000	4000	4000
1998	7	2000	2000	4000	4000	4000	4000	4000
1999	7	2000	2000	2000	4000	4000	4000	4000
2000	8	2000	2000	3000	4000	4000	4000	4000
2001	10	2000	2000	4000	4000	4000	4000	4000
2002	12	2000	2000	3000	4000	4000	6000	6000
2003	15	2000	2000	4000	4000	4000	5000	5000
2004	16	2000	2000	3000	4000	4000	4000	4000

In HD centres, the usage of blood transfusion has dropped from 12% to 7%. However there has been an increase in the transfusion rate in CAPD centres to 17% in 2004. In both HD and CAPD centres, at the 95<sup>th</sup> centile, 5% of centers have 36% of their patients who had received blood transfusion.( Table / Figure 6.1.7 – 6.1.8)

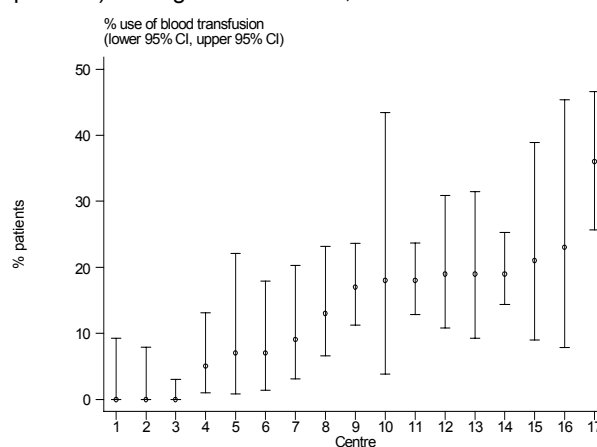
**Table 6.1.7:** Variation in use of blood transfusion (% patients) among HD centres, 2004

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	46	0	0	0	7	14	37	71
1998	46	0	0	5	9	16	43	47
1999	69	0	0	5	11	25	44	73
2000	100	0	0	5	12	21	52	88
2001	118	0	0	4	12	18	40	62
2002	137	0	0	3	8	16	39	64
2003	160	0	0	3	9	19	33	64
2004	187	0	0	2	7	17	36	53

**Figure 6.1.7:** Variation in use of blood transfusion (% patients) among HD centres, 2004



**Figure 6.1.8:** Variation in use of blood transfusion (% patients) among CAPD centres, 2004



**Table 6.1.8:** Variation in use of blood transfusion (% patients) among CAPD centres, 2004

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	7	1	1	4	6	29	47	47
1998	9	0	0	7	15	25	100	100
1999	9	0	0	3	7	22	48	48
2000	11	0	0	0	9	18	42	42
2001	12	0	0	0	4	15.5	37	37
2002	14	0	0	5	8	15	41	41
2003	17	0	0	4	13	25	57	57
2004	17	0	0	7	17	19	36	36

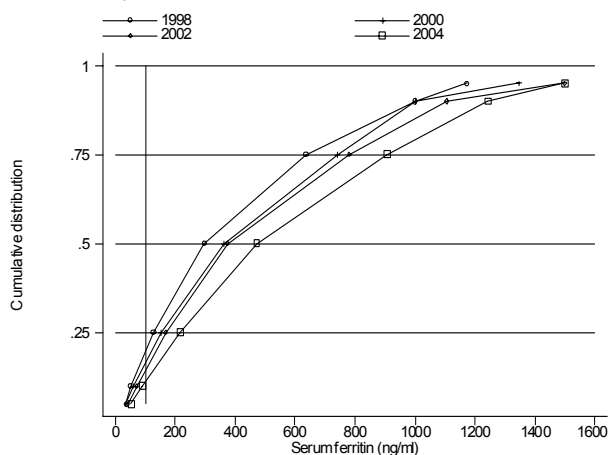
**6.2: Iron Status on Dialysis**

In both HD and CAPD, the mean and median serum ferritin and transferrin saturation in patients with or without EPO has slowly increased over the years. Likewise, more than 80% of patients have serum ferritin of at least 100 ng/ml and transferrin saturation greater than 20%. This is more so in CAPD compared to HD. (Tables / Figures 6.2.1 – 6.2.8)

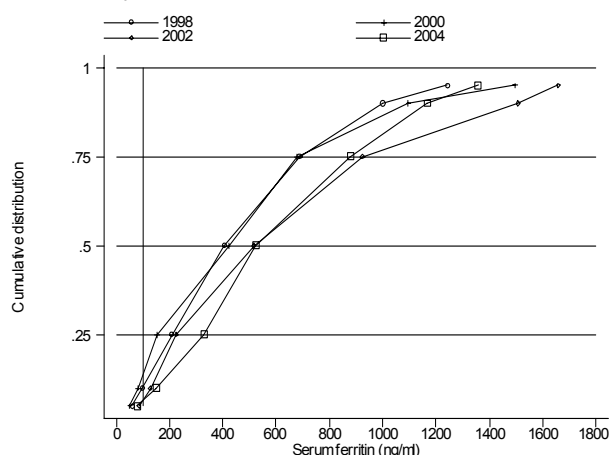
**Table 6.2.1:** Distribution of Serum Ferritin without Erythropoietin, HD patients 1997 –2004

Year	No of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients $\geq 100$ ng/ml
1997	280	493.1	349.3	435.5	162.5	850.5	86
1998	224	430.8	383.2	297.5	128.4	636.5	80
1999	337	517.9	424.3	402.8	162.8	809.5	86
2000	571	487.5	416.8	363.2	152.5	741	83
2001	758	537.6	453.9	383.5	172	828	87
2002	803	519.5	447.3	373	168.5	781	85
2003	917	551.5	434	457	190	826.5	87
2004	1044	588.9	462.9	471	218	905.6	89

**Figure 6.2.1:** Cumulative distribution of Serum Ferritin without Erythropoietin, HD patients 1997-2004



**Figure 6.2.2:** Cumulative distribution of Serum Ferritin without Erythropoietin, CAPD patients 1997-2004



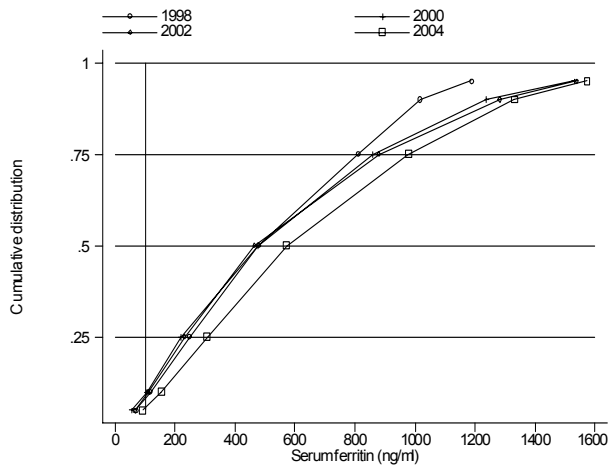
**Table 6.2.2:** Distribution of Serum Ferritin without Erythropoietin, CAPD patients 1997–2004

Year	No of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients $\geq 100$ ng/ml
1997	133	469	333.5	392	198	718	88
1998	92	492.4	368.3	405	208.2	687.5	87
1999	124	553.7	400.1	499.3	255.3	686.8	94
2000	144	505.9	433.8	420	152.3	675.5	88
2001	223	543.8	417.5	440	216.9	754	91
2002	236	634.8	491.2	514.9	226	924.6	93
2003	330	602.8	428.5	503.9	269	834	93
2004	302	606.9	385.4	522.4	330	877.5	94

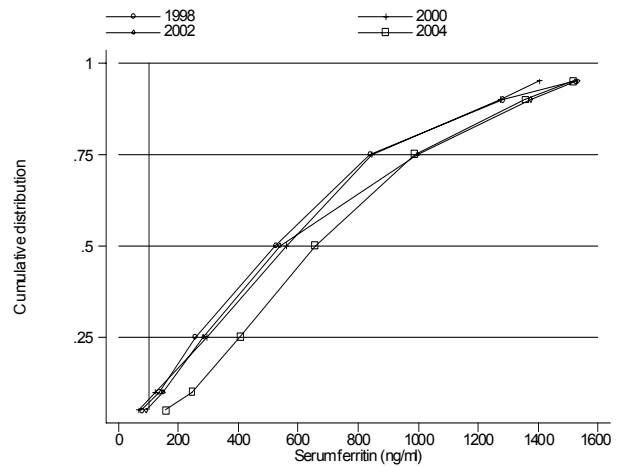
**Table 6.2.3:** Distribution of Serum Ferritin on Erythropoietin, HD patients 1997 – 2004

Year	No of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients $\geq 100$ ng/ml
1997	471	543.3	347	495.5	219	973	90
1998	328	549.9	382.4	476.5	248	809.8	91
1999	586	560.4	418.6	453	225	829	93
2000	1175	587.9	456.6	475	218.8	860	91
2001	1637	597.5	444.2	491	236	894.2	91
2002	2224	593.1	459.3	464.8	231.3	878.2	91
2003	3137	640.9	428	563	298.5	932	94
2004	3841	670.3	460.8	572	306	979	94

**Figure 6.2.3:** Cumulative distribution of Serum Ferritin on Erythropoietin, HD patients 1997-2004



**Figure 6.2.4:** Cumulative distribution of Serum Ferritin on Erythropoietin, CAPD patients 1997-2004



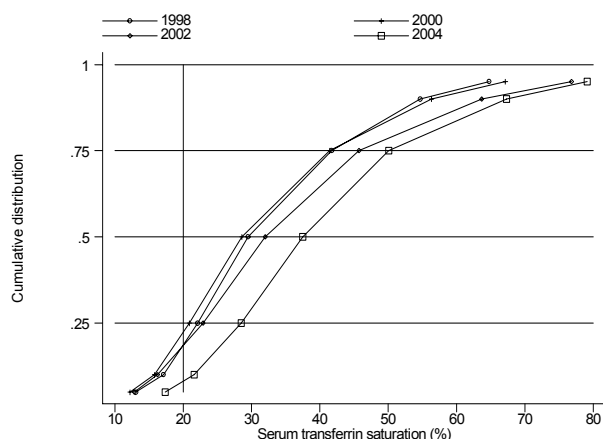
**Table 6.2.4:** Distribution of Serum Ferritin on Erythropoietin, CAPD patients 1997 – 2004

Year	No of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients $\geq 100$ ng/ml
1997	129	550.8	323.7	496	256	862	93
1998	135	611.2	438.3	524.7	257	839.5	93
1999	136	604.8	436.3	540.6	264.6	870.1	93
2000	180	608.2	416.7	560	295.2	846.3	92
2001	261	645.9	449.2	557.5	275.7	885.4	93
2002	345	666.8	462.4	538.5	284	999.5	94
2003	518	689.6	459.5	588.4	304	993.2	96
2004	542	728.8	426.9	655.6	405.5	987.4	98

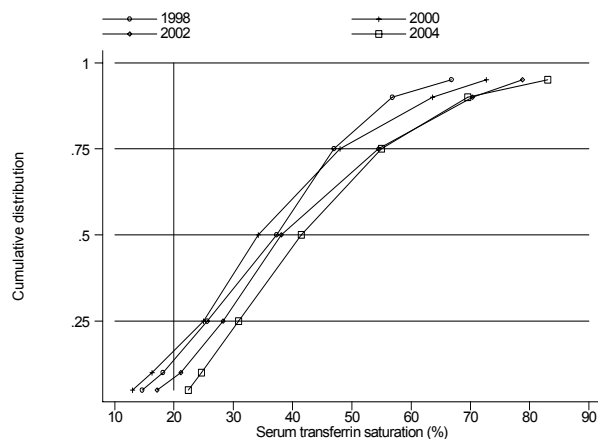
**Table 6.2.5:** Distribution of transferrin saturation without Erythropoietin, HD patients 1997 –2004

Year	No of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients $\geq 20\%$
1997	723	34.1	16.6	29.8	22.7	40.4	84
1998	599	33.3	16.2	29.5	22.1	41.7	82
1999	654	32.9	16.3	29.9	20.9	42.4	78
2000	800	32.7	16.9	28.6	20.9	41.4	78
2001	836	36.9	18.5	32.5	23.9	45.8	84
2002	811	36.5	18.9	32	22.9	45.7	83
2003	922	40.3	18.6	36.1	27.2	51.2	91
2004	1031	41.2	18.1	37.5	28.5	50.1	92

**Figure 6.2.5:** Cumulative distribution of transferrin saturation without Erythropoietin, HD patients 1997-2004



**Figure 6.2.6:** Cumulative distribution of transferrin saturation without Erythropoietin, CAPD patients 1997-2004



**Table 6.2.6:** Distribution of transferrin saturation without Erythropoietin, CAPD patients 1997–2004

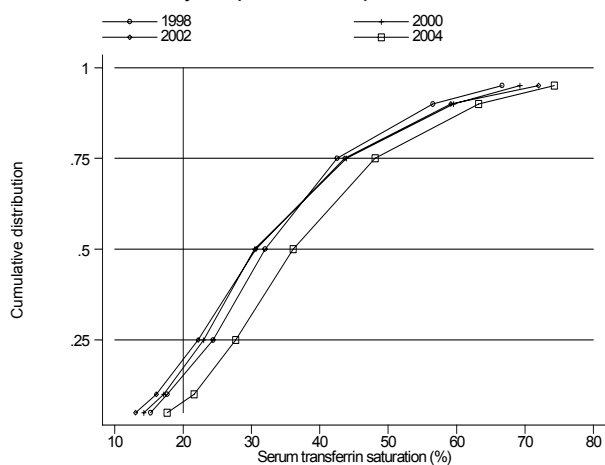
Year	No of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients $\geq 20\%$
1997	246	38.7	17.9	35.3	25.4	47.6	88
1998	184	37.7	15.7	37.3	25.6	47	85
1999	194	37.7	16.2	36.6	25.9	47	88
2000	237	37.9	18.5	34.2	25	48	86
2001	279	43.2	20.8	40	27.8	56.7	89
2002	332	42.7	19.1	38.1	28.3	54.5	92
2003	398	45.1	19.7	41.2	31.2	58.1	93
2004	378	44.5	18.1	41.5	30.9	55	98



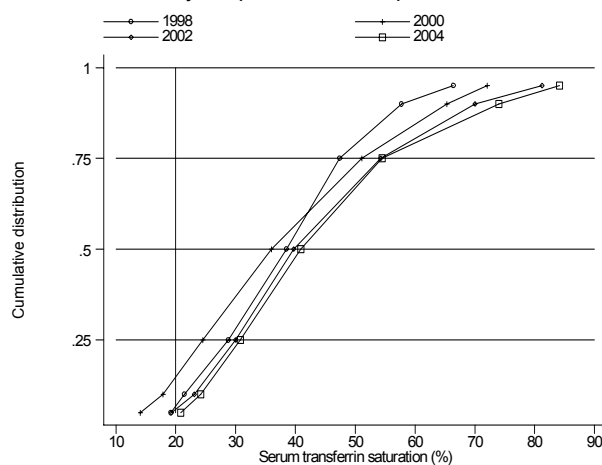
**Table 6.2.7:** Distribution of transferrin saturation on Erythropoietin, HD patients 1997 – 2004

Year	No of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients $\geq 20\%$
1997	636	35.9	17.3	31.4	24.2	43.3	87
1998	549	34.9	15.5	32	24.4	42.5	86
1999	703	34.5	16	31.6	23.2	42	85
2000	1249	34.9	16.7	30.4	23	43.9	84
2001	1634	36.2	17.9	32.3	23.6	45	84
2002	1995	34.6	17.6	30.6	22.2	43.6	81
2003	2645	39.6	18.4	36	26.6	48.9	90
2004	3264	39.6	17	36.1	27.7	48.1	93

**Figure 6.2.7:** Cumulative distribution of transferrin saturation on Erythropoietin, HD patients 1997-2004



**Figure 6.2.8:** Cumulative distribution of transferrin saturation on Erythropoietin, CAPD patients 1997-2004



**Table 6.2.8:** Distribution of transferrin saturation on Erythropoietin, CAPD patients 1997 – 2004

Year	No of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients $\geq 20\%$
1997	147	42.2	19.7	35.6	27	59	91
1998	111	39.4	13.8	38.5	28.8	47.4	94
1999	137	38.9	17	37	26.1	48.3	86
2000	238	38.9	18.7	36	24.5	51.1	86
2001	292	44.1	19.6	40.7	29.2	55.8	94
2002	363	43.6	18.6	39.7	30	54.3	94
2003	461	44.7	17.8	40.6	31.8	55.7	96
2004	694	44.7	18.7	40.9	30.8	54.5	96

In HD centers, from 1997 – 2004, 50% of centers (median) have an increasing serum ferritin and transferrin saturation in their patients on EPO. At the median, more than 90% of patients on EPO have a serum ferritin of greater than 100 ng/ml and more than 80% have a transferrin saturation of greater than 20%.

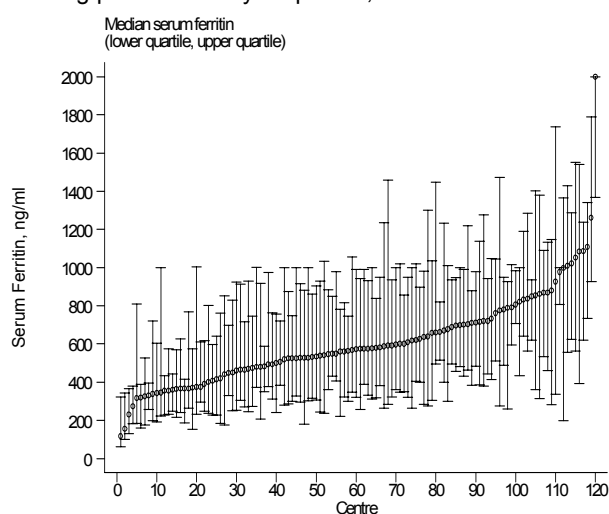
A similar trend was seen in the CAPD centers. (Table / Figure 6.2.9 – 6.2.10)

**Table 6.2.9:** Variation in iron status outcomes among HD centres 2004

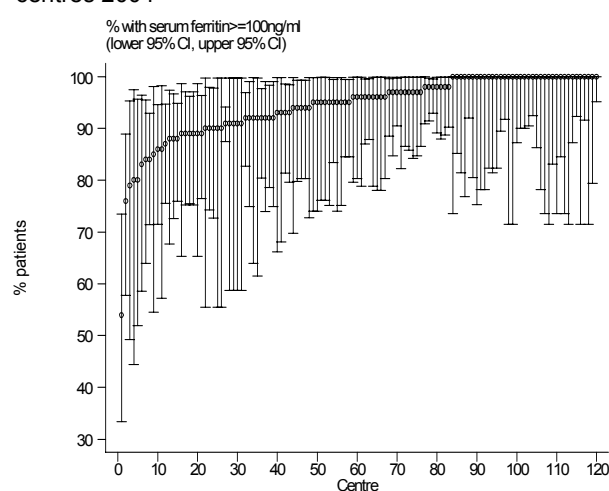
**(a) Median serum ferritin among patients on erythropoietin**

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	21	220.5	250	390	495.5	614.5	792	809.3
1998	11	205	205	425	457	575.4	711.8	711.8
1999	22	189.5	242	336	408	552	823.9	873.5
2000	40	125	192.3	353.1	501.7	642.1	876	1087.5
2001	53	198	255.3	412.3	508.5	643.5	923.5	1188.5
2002	74	135.4	213.5	364	462	608.5	836.5	1031
2003	96	145.5	284	451	552.4	690	997	1787.5
2004	120	116.5	322.2	463.1	572.6	714.3	1036.3	2000

**Figure 6.2.9(a):** Variation in median serum ferritin among patients on erythropoietin, HD centres 2004



**Figure 6.2.9(b):** Variation in proportion of patients on erythropoietin with serum ferritin ≥ 100 ng/ml, HD centres 2004



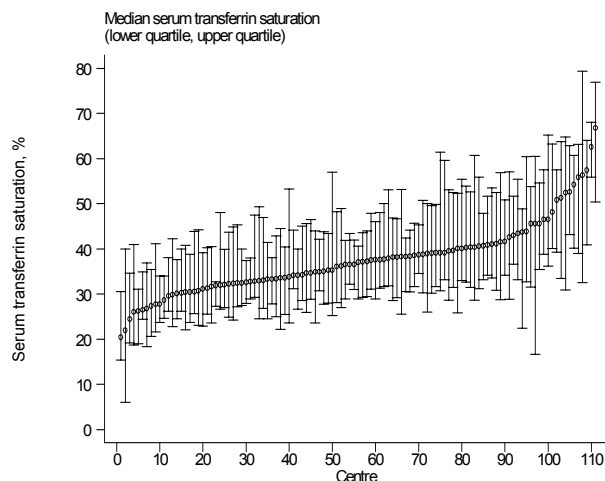
**(b) Proportion of patients on erythropoietin with serum ferritin ≥ 100 ng/ml**

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	21	71	75	86	91	93	100	100
1998	11	79	79	89	90	95	96	96
1999	22	76	81	91	94	97	100	100
2000	40	67	73	87.5	93	96	100	100
2001	53	69	79	88	93	96	100	100
2002	74	67	75	86	93	96	100	100
2003	96	63	79	91	96	100	100	100
2004	120	54	83.5	91	96	100	100	100

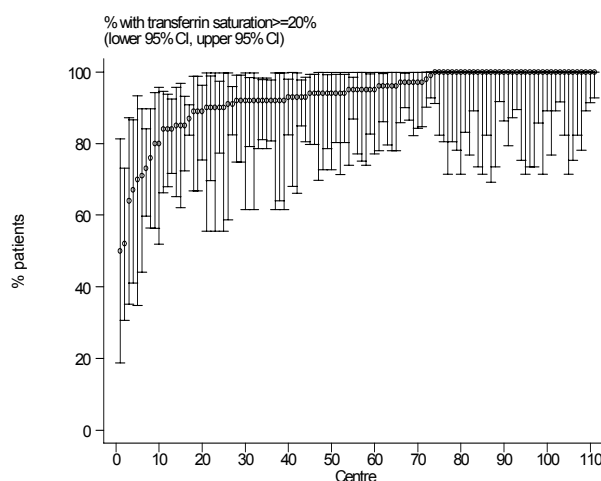
**Table 6.2.9(c)** Median transferrin saturation among patients on erythropoietin

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	27	20.8	22.6	27.6	32	37.1	68.5	69.2
1998	21	21.4	23.5	26.4	29.5	33.7	39.8	51.2
1999	27	18.7	21.6	26.3	31	36.4	41.3	44.8
2000	46	16.7	22.7	27.9	31.2	35.9	44.1	55.5
2001	53	21	22.7	26.8	31.7	36.5	47.8	74.9
2002	62	15.5	20.7	25.1	31.4	36.5	50.4	58.9
2003	87	18.5	24.2	30.7	34.9	42.2	56.3	71.6
2004	111	20.4	26.4	32.4	37	40.6	54.3	66.8

**Figure 6.2.9(c):** Variation in median transferrin saturation among patients on erythropoietin, HD centres 2004



**Figure 6.2.9(d):** Variation in proportion of patients on erythropoietin with transferrin saturation  $\geq 20\%$ , HD centres 2004



**(d)** Proportion of patients on erythropoietin with transferrin saturation  $\geq 20\%$

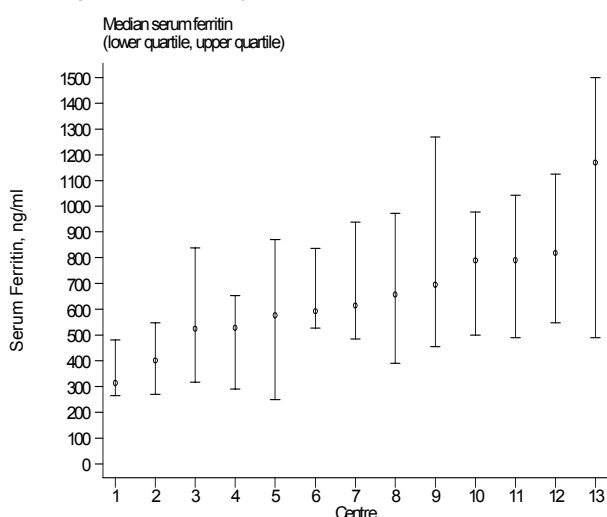
Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	27	50	69	82	90	94	100	100
1998	21	62	68	82	89	95	100	100
1999	27	42	63	82	87	94	100	100
2000	46	29	60	76	85.5	93	100	100
2001	53	56	62	75	88	95	100	100
2002	62	30	55	70	80	90	100	100
2003	87	43	69	85	92	100	100	100
2004	111	50	71	92	95	100	100	100

**Table 6.2.10:** Variation in iron status outcomes among CAPD centres 2004

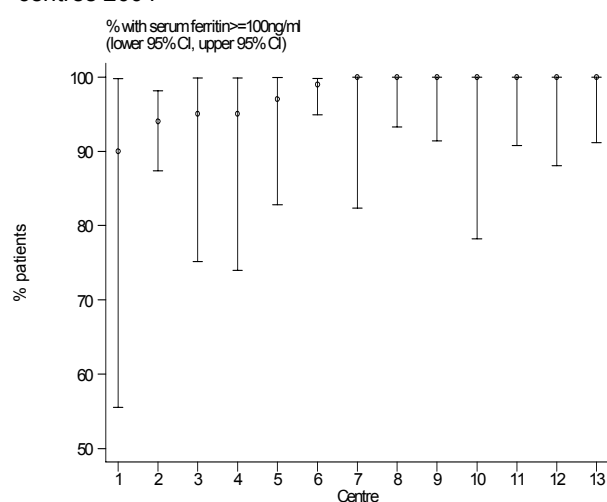
**(a) Median serum ferritin among patients on erythropoietin**

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	4	377.5	377.5	404.8	457.3	530	577.5	577.5
1998	4	409.4	409.4	458.7	528.8	606.3	663	663
1999	5	297.4	297.4	330	459.5	499.8	847	847
2000	6	335	335	439.6	681.3	775	775.8	775.8
2001	7	259.4	259.4	475.5	602.5	623	758	758
2002	10	360.4	360.4	450.8	477.4	571.3	826.5	826.5
2003	13	307.6	307.6	478.2	520.5	713.5	954.9	954.9
2004	13	312.4	312.4	527.8	613	788.5	1169.5	1169.5

**Figure 6.2.10(a):** Variation in median serum ferritin among patients on erythropoietin, CAPD centres 2004



**Figure 6.2.10(b):** Variation in proportion of patients on erythropoietin with serum ferritin  $\geq 100$  ng/ml, CAPD centres 2004



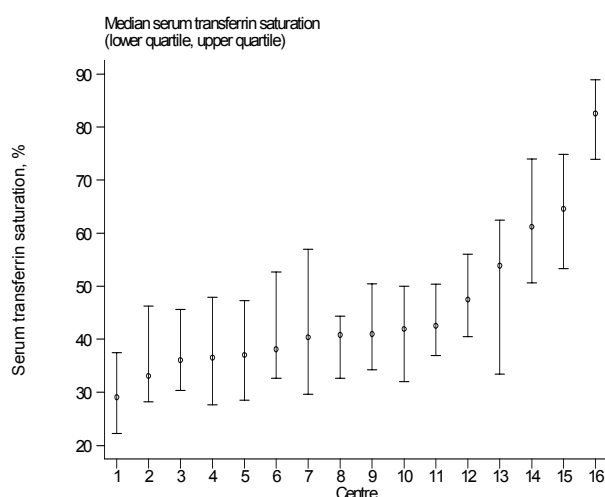
**(b) Proportion of patients on erythropoietin with serum ferritin  $\geq 100$  ng/ml**

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	4	84	84	88.5	93.5	97	100	100
1998	4	82	82	88.5	97.5	100	100	100
1999	5	85	85	93	94	100	100	100
2000	6	88	88	89	94.5	100	100	100
2001	7	83	83	91	96	100	100	100
2002	10	89	89	92	93.5	100	100	100
2003	13	86	86	95	97	98	100	100
2004	13	90	90	95	100	100	100	100

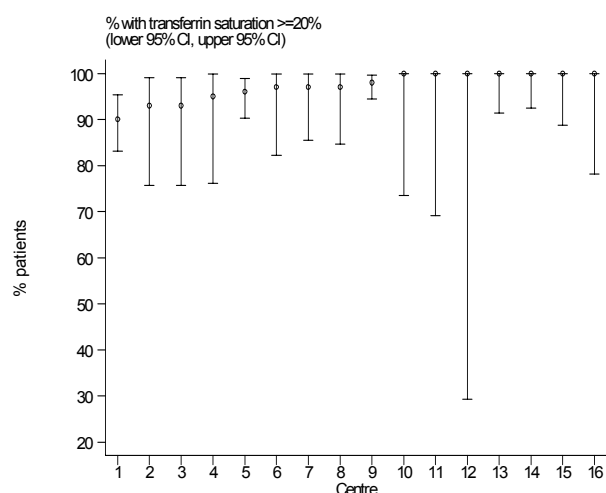
**Table 6.2.10(c)** Median transferrin saturation among patients on erythropoietin

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	6	26.7	26.7	27.6	33.6	42.5	70.5	70.5
1998	4	34.2	34.2	34.6	35.9	41.7	46.5	46.5
1999	6	24	24	27.2	33.5	39.5	44.4	44.4
2000	7	21.9	21.9	24.4	34.9	37.6	52.6	52.6
2001	8	28.4	28.4	30.4	38.1	48.1	79.8	79.8
2002	9	28.9	28.9	36.1	38.3	41	60	60
2003	12	32.3	32.3	35.6	40.7	48.1	63.1	63.1
2004	16	29.1	29.1	36.7	40.9	50.7	82.5	82.5

**Figure 6.2.10(c):** Variation in median transferrin saturation among patients on erythropoietin, CAPD centres 2004



**Figure 6.2.10(d):** Variation in proportion of patients on erythropoietin with transferrin saturation  $\geq 20\%$ , CAPD centres 2004



**Table 6.2.10(d)** Proportion of patients on erythropoietin with transferrin saturation  $\geq 20\%$

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	6	70	70	88	90.5	100	100	100
1998	4	81	81	88	95.5	96.5	97	97
1999	6	53	53	83	85.5	94	100	100
2000	7	64	64	73	87	100	100	100
2001	8	84	84	91.5	95	96.5	100	100
2002	9	78	78	91	93	98	100	100
2003	12	91	91	94	96	99	100	100
2004	16	90	90	95.5	97.5	100	100	100

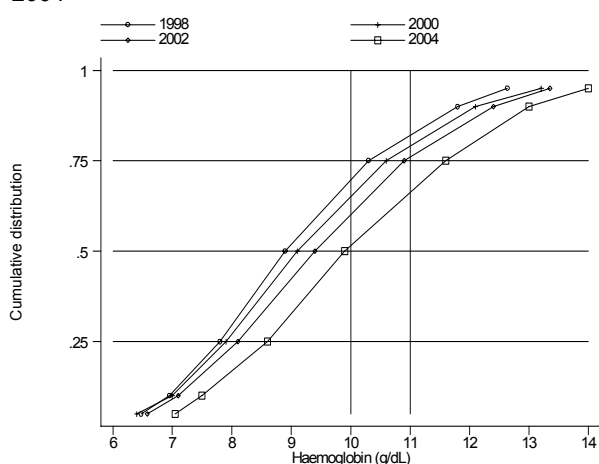
### 6.3: Haemoglobin Outcomes on Dialysis

The mean and median haemoglobin concentration in all dialysis patients with or without EPO was steadily increasing; in 2004 the mean and median haemoglobin ranged from 9.8 to 10.4 g/dl. The percentage of patients with the haemoglobin of > 10 or > 11 g/dl was also steadily increasing. In 2004, the percentage of patients with the haemoglobin > 10 gm/dl varied between 45 to 58 %. Similarly, the percentage of patient with the haemoglobin > 11 gm/dl varied between 23-33 %. (Table / Figure 6.3.1 – 6.3.4)

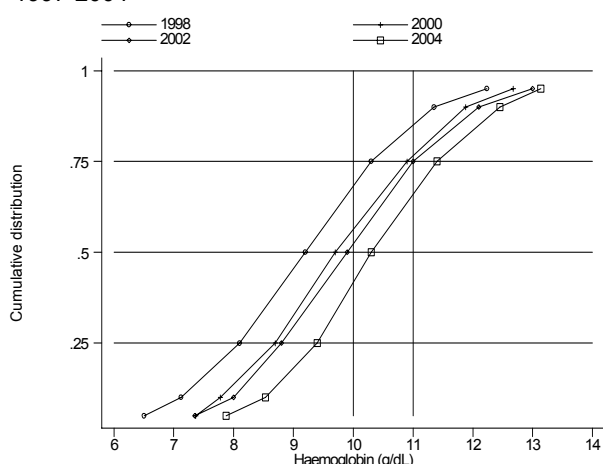
**Table 6.3.1:** Distribution of Haemoglobin Concentration without Erythropoietin, HD patients 1997 – 2004

Year	No. of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients ≤10 g/dL	% Patients >10 g/dL	% Patients ≤11 g/dL	% Patients >11 g/dL
1997	896	9.3	1.9	9	8	10.5	69	31	82	18
1998	1119	9.1	1.9	8.9	7.8	10.3	71	29	83	17
1999	1400	9.1	1.9	8.9	7.8	10.3	70	30	85	15
2000	1754	9.4	2.1	9.1	7.9	10.6	67	33	80	20
2001	1809	9.4	1.9	9.3	8	10.6	64	36	81	19
2002	1795	9.6	2.1	9.4	8.1	10.9	62	38	76	24
2003	1804	9.7	2.1	9.5	8.3	11	60	40	75	25
2004	1919	10.1	2.1	9.9	8.6	11.6	53	47	68	32

**Figure 6.3.1:** Cumulative distribution of haemoglobin Concentration without Erythropoietin, HD patients 1997-2004



**Figure 6.3.2:** Cumulative distribution of haemoglobin concentration without Erythropoietin, CAPD patients 1997-2004



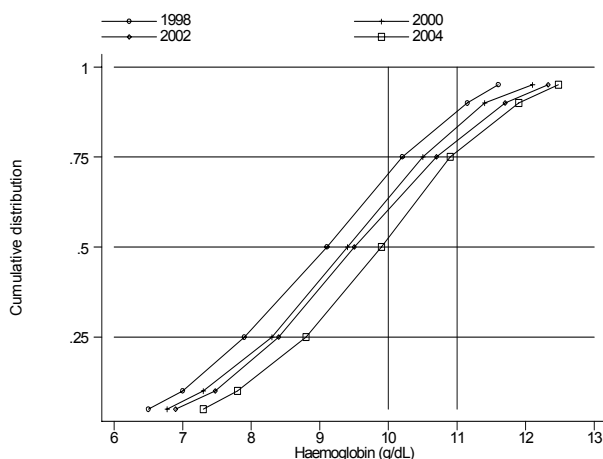
**Table 6.3.2:** Distribution of Haemoglobin Concentration without Erythropoietin, CAPD patients 1997– 2004

Year	No. of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients ≤10 g/dL	% Patients >10 g/dL	% Patients ≤11 g/dL	% Patients >11 g/dL
1997	297	9.2	1.6	9.1	8.1	10.3	72	28	86	14
1998	301	9.3	1.8	9.2	8.1	10.3	68	32	84	16
1999	336	9.5	1.6	9.5	8.4	10.5	66	34	84	16
2000	342	9.8	1.7	9.7	8.7	10.9	58	42	79	21
2001	405	9.8	1.8	9.7	8.6	10.7	59	41	78	22
2002	434	10	1.8	9.9	8.8	11	54	46	76	24
2003	543	10	1.7	9.9	8.9	11	52	48	76	24
2004	478	10.4	1.6	10.3	9.4	11.4	42	58	67	33

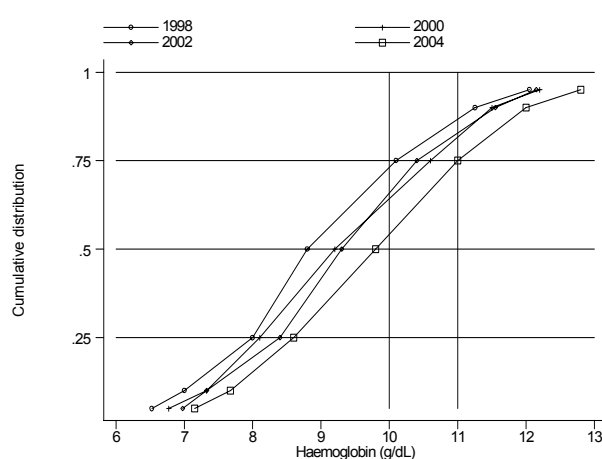
**Table 6.3.3:** Distribution of Haemoglobin Concentration on Erythropoietin, HD patients 1997 – 2004

Year	No. of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients $\leq 10$ g/dL	% Patients $> 10$ g/dL	% Patients $\leq 11$ g/dL	% Patients $> 11$ g/dL
1997	773	8.9	1.6	8.9	7.8	9.9	76	24	90	10
1998	971	9.1	1.6	9.1	7.9	10.2	71	29	88	12
1999	1503	9.2	1.5	9.1	8.1	10.2	71	29	89	11
2000	2333	9.4	1.7	9.4	8.3	10.5	65	35	85	15
2001	3049	9.4	1.6	9.4	8.3	10.5	65	35	85	15
2002	3859	9.5	1.7	9.5	8.4	10.7	62	38	81	19
2003	4785	9.6	1.6	9.6	8.5	10.7	61	39	81	19
2004	5723	9.8	1.6	9.9	8.8	10.9	55	45	77	23

**Figure 6.3.3:** Cumulative distribution of Haemoglobin Concentration on Erythropoietin, HD patients 1997-2004



**Figure 6.3.4:** Cumulative distribution of Haemoglobin Concentration on Erythropoietin, CAPD patients 1997-2004



**Table 6.3.4:** Distribution of Haemoglobin Concentration on Erythropoietin, CAPD patients 1997 – 2004

Year	No. of subjects	Mean	Std Dev	Median	LQ	UQ	% Patients $\leq 10$ g/dL	% Patients $> 10$ g/dL	% Patients $\leq 11$ g/dL	% Patients $> 11$ g/dL
1997	175	8.8	1.5	8.6	7.7	9.8	79	21	94	6
1998	238	9	1.6	8.8	8	10.1	74	26	88	12
1999	262	9	1.6	8.9	7.9	10.2	73	27	89	11
2000	299	9.4	1.7	9.2	8.1	10.6	65	35	82	18
2001	345	9.3	1.6	9.4	8.2	10.5	65	35	86	14
2002	432	9.4	1.6	9.3	8.4	10.4	69	31	83	17
2003	640	9.7	1.7	9.6	8.6	10.8	60	40	78	22
2004	797	9.8	1.7	9.8	8.6	11	54	46	76	24

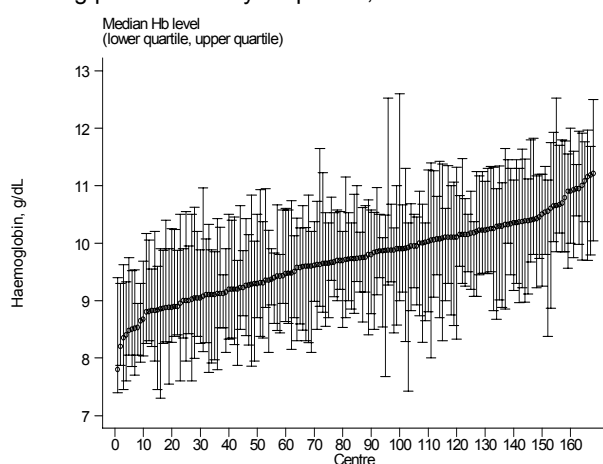
(Table/Figure 6.3.5 – 6.3.6) In HD patients on EPO, 50% of the centers (median) have their haemoglobin level at 9.7 gm/dl. At the 95<sup>th</sup> centile, 5% of the centers have their patient’s haemoglobin at 10.9g/dl. At the 5<sup>th</sup> centile, 5% of the centers have their patient’s haemoglobin at 8.6 g/dl. In 2004, 50% of centers (median) achieved haemoglobin of > 10 gm/dl or > 11 gm/dl in 41.5% or 19% of patients respectively. A similar trend was noted in CAPD patients

**Table 6.3.5:** Variation in Haemoglobin outcomes among HD centres 2004

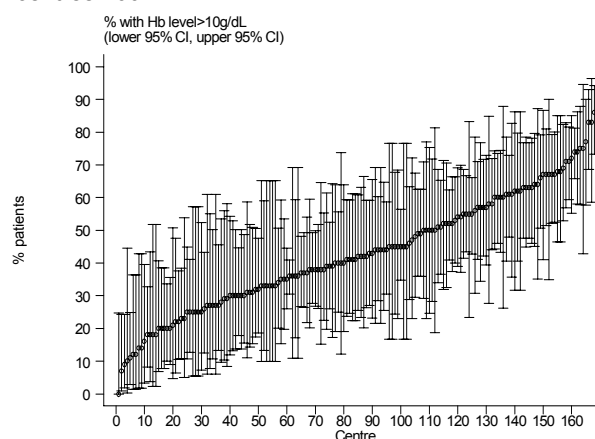
(a) Median haemoglobin level among patients on erythropoietin

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	31	7.8	7.9	8.5	8.9	9.4	10.4	10.6
1998	35	7.4	7.7	8.5	9.1	9.5	10.4	10.4
1999	52	7.9	8.1	8.6	9.1	9.7	10.1	10.8
2000	83	8	8.3	8.7	9.3	9.8	10.5	14.9
2001	95	7.6	8.3	8.9	9.4	9.9	10.6	11.3
2002	110	8.3	8.5	9	9.5	10	10.7	11.6
2003	137	7.8	8.5	9	9.5	10	10.8	11.4
2004	168	7.8	8.6	9.2	9.7	10.2	10.9	11.2

**Figure 6.3.5(a):** Variation in median haemoglobin level among patients on Erythropoietin, HD centres 2004



**Figure 6.3.5(b):** Variation in proportion of patients on erythropoietin with haemoglobin level > 10 g/dL, HD centres 2004



(b) Proportion of patients on erythropoietin with haemoglobin level > 10 g/dL

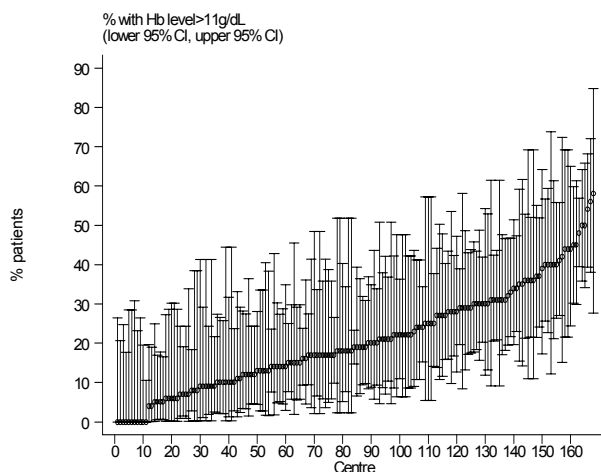
Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	31	0	0	13	25	31	60	82
1998	35	0	0	14	29	39	62	63
1999	52	7	8	16.5	25	39.5	57	71
2000	83	0	7	18	31	43	65	100
2001	95	5	10	23	33	46	68	71
2002	110	0	13	27	38	50	67	100
2003	137	0	10	24	38	50	69	100
2004	168	0	14	30	41.5	56.5	72	86



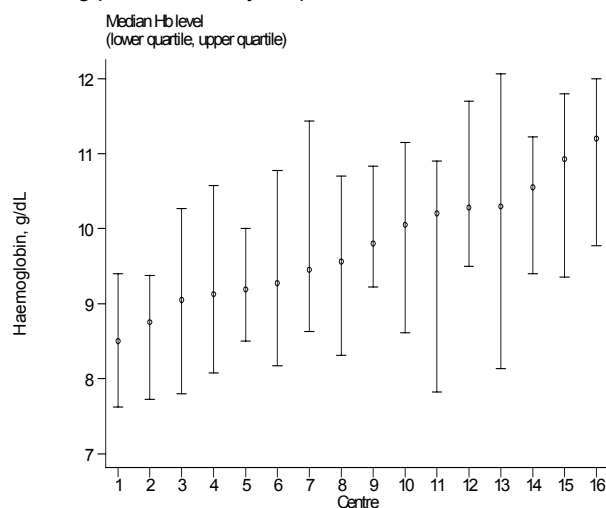
**Table 6.3.5(c)** Proportion of patients on erythropoietin with haemoglobin level > 11 g/dL

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	31	0	0	0	7	17	30	33
1998	35	0	0	5	9	17	27	31
1999	52	0	0	1.5	9	16	33	38
2000	83	0	0	4	13	18	33	95
2001	95	0	0	7	13	23	37	54
2002	110	0	3	12	19	28	40	82
2003	137	0	0	8	15	27	44	61
2004	168	0	0	10.5	19	30	44	58

**Figure 6.3.5(c):** Variation in proportion of patients on erythropoietin with haemoglobin level > 11 g/dL, HD centres 2004



**Figure 6.3.6(a):** Variation in median haemoglobin level among patients on Erythropoietin, CAPD centres 2004



**Table 6.3.6:** Variation in Haemoglobin outcomes among CAPD centres 2004

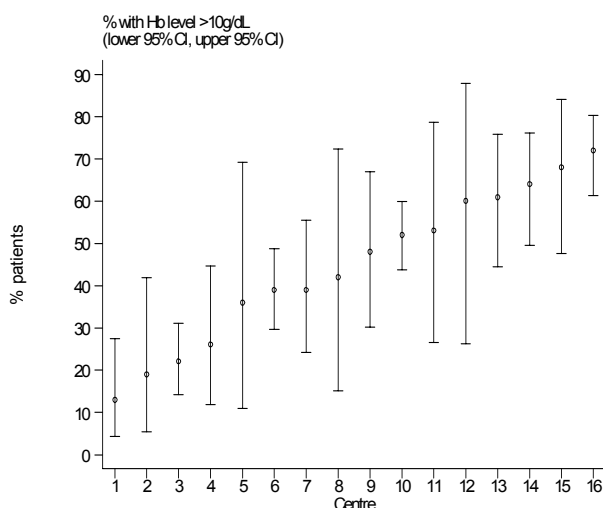
**(a)** Median haemoglobin level among patients on erythropoietin

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	6	7.8	7.8	7.8	8.7	9	9.5	9.5
1998	7	7.7	7.7	8.2	9	9.4	9.5	9.5
1999	7	8.1	8.1	8.4	8.7	9.5	9.5	9.5
2000	9	8.2	8.2	8.9	9	9.8	10.1	10.1
2001	11	9	9	9.2	9.4	9.6	9.9	9.9
2002	12	8.8	8.8	9	9.3	9.6	10.1	10.1
2003	15	8.5	8.5	9.3	9.6	10.1	11.3	11.3
2004	16	8.5	8.5	9.2	9.7	10.3	11.2	11.2

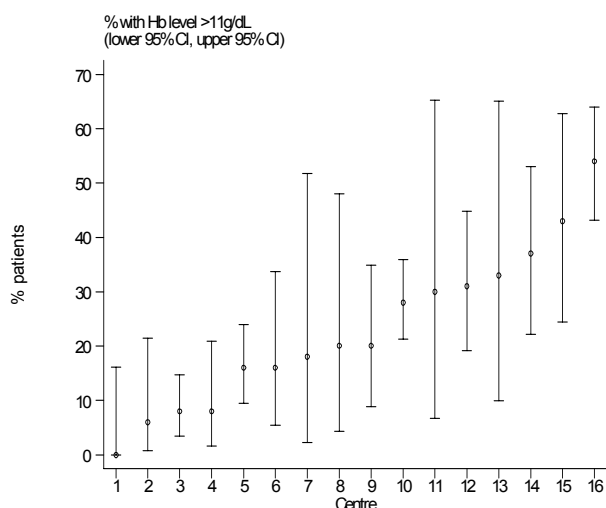
**Table 6.3.6(b)** Proportion of patients on erythropoietin with haemoglobin level > 10 g/dL

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	6	0	0	10	19	31	38	38
1998	7	11	11	15	23	30	40	40
1999	7	19	19	20	23	40	44	44
2000	9	24	24	30	34	43	50	50
2001	11	15	15	30	35	43	47	47
2002	12	15	15	23	31.5	40	50	50
2003	15	0	0	27	35	52	76	76
2004	16	13	13	31	45	60.5	72	72

**Figure 6.3.6(b):** Variation in proportion of patients on erythropoietin with haemoglobin level > 10 g/dL, CAPD centres 2004



**Figure 6.3.6(c):** Variation in proportion of patients on erythropoietin with haemoglobin level > 11 g/dL, CAPD centres 2004



**Table 6.3.6(c)** Proportion of patients on erythropoietin with haemoglobin level > 11 g/dL

Year	No. of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
1997	6	0	0	0	5.5	8	10	10
1998	7	0	0	8	12	13	20	20
1999	7	5	5	8	9	13	14	14
2000	9	10	10	15	17	20	36	36
2001	11	7	7	9	15	20	25	25
2002	12	6	6	12	19	23	25	25
2003	15	0	0	12	16	24	52	52
2004	16	0	0	12	20	32	54	54