SEVENTH REPORT

OF

THE MALAYSIAN

DIALYSIS AND TRANSPLANT

REGISTRY

1999

edited by

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10	JB Lions MAA Medical Charity Dialysis Centre
11	KAS-Rotary/NKF Dialysis Centre, Sarawak
12	Kiwanis Dialysis Centre
13	Lions Club of Alor Setar-NKF Dialysis Centre
14	MAA Medical Charity Dialysis Centre, Butterworth
15	MAA Medical Charity Dialysis Centre, Cheras
16	MAA Medical Charity Dialysis Centre, KL
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RENAL TRANSPLANTATION

INTRODUCTION

The 1999 report of the National Renal Registry marks another step forward in our efforts to provide comprehensive and timely reports to our participating centres. The report is released within the ensuing year. It is the aim of the committee to provide the report as early as possible. The committee is seriously considering plans to go for online reporting which will undoubtedly improve the timeliness of reporting. With electronic data reporting we will be able to provide more services. Apart from its early release the 1999 report also recorded an increase in participation by the private sector providers of dialysis. There has however been a decline in the reporting of transplant results. We hope to improve on this with the employment of more staff.

The data for 1999 showed resumption in the growth of dialysis treatment rate reflecting the nation's recovery from the Asian financial crisis. The dialysis acceptance rate increased to 60 per million population while the new renal transplant rate showed a modest increase to 4 per million population up from 3 the year before. Hemodialysis was still the main form of renal replacement therapy. CAPD constituted 14% of new dialysis patients. Dialysis practices in the government centres remain similar to that in previous years. In this report it was possible to analyse the data from private dialysis centres in a manner similar to data from the government dialysis centres. There were some differences in the practice of dialysis treatment between private and public funded program.

The year 2000 budget announced by the Finance Minister recently offers hope and reprieve for many dialysis patients. In the proposal the government will subsidise RM50.00 for the cost of every dialysis the patient undergoes. This applies only to centres run by non-profit non- governmental organisation. Further subsidies will also be given to any NGO developing a new dialysis facility. This generous act by the government will potentially increase significantly the number of new patients on dialysis. It will also increase the work for the registry as one of the conditions proposed for the subsidy is data submission to the registry. The registry will have to take steps to respond to this new demand. I am confident that with the experience gained so far we shall be able to meet this challenge.

Dr. Zaki Morad Mohd Zaher
Chairman
Malaysian Organ Sharing System/ National Renal Registry
Malaysian Society of Nephrology

REPORT SUMMARY

Malaysia was still suffering from the effects of Asian financial crisis in 1999. Although there was some growth of dialysis treatment rate, it did not reach pre-crisis levels.

Participation from private dialysis centres had increased in 1999 and thus a more detailed report of haemodialysis treatment in the private centres is included in this report.

A new sub-section based on centre survey data rather than individual patient data for the year 2000 is included in chapter two to provide up-to-date information on patient and centre census in Malaysia.

1 ALL RENAL REPLACEMENT THERAPIES

1.1 At 31st December 1999, 6224 patients were on renal replacement therapy, comprising 5138 on dialysis and 1086 with functioning transplants. 1355 new dialysis patients were accepted in 1999 compared to 1157 in 1997.

1.2 The new renal transplant rate was 4 per million population – a small increase compared to the rate in 1998. The overall dialysis acceptance rate had increased to 60 per million population and dialysis prevalence rate 227 per million population.

2 DIALYSIS IN MALAYSIA

2.1 Dialysis acceptance rate by state varied between 111 per million state population for Pulau Pinang to 25 per million per state population in Kelantan.

By age group, dialysis acceptance rate varied between a low of 3 per million child population to a high of 328 per million population for age group 55 to 64 years. Dialysis provision rate for patients older than 65 years was 261 per million population for age. A dramatic increase in dialysis treatment rate was seen in those more than 44 years of age.

2.2 Males made up 58% of all new dialysis patients

2.3 Haemodialysis (HD) accounted for 86% of new dialysis acceptance in1999 of which 84% were accepted in centre HD, and 2% in office HD. No new patients had been accepted into home HD programme from 1997. 14% of new dialysis patients were accepted into the CAPD programme.

2.4 The proportion of patients with unknown primary disease steadily decreased to 30% in 1999. Diabetic nephropathy continued to account for 40%, chronic glomerulonephritis 11% and obstructive uropathy 4%.

2.5 Overall death rate on dialysis was 10%; HD death rate was 9%, and CAPD death rate 18%. 32% of deaths were attributed to cardiovascular causes and 17% to sepsis unrelated to peritonitis. 17% died at home.

2.6 ***Centre survey 2000***: In a new dialysis centre survey for year 2000, there were a total of 7355 dialysis patients in Malaysia giving dialysis treatment rate was 316 per million population(pmp). There was a total of 196 dialysis centres with a total of 1989 dialysis machines.

By state, dialysis treatment rate ranged from 78 pmp in Kelantan to 605 pmp in Selangor and Wilayah Persekutuan. Centre HD capacity ranged from 790 pmp for Pulau Pinang to 108 in Sabah. HD capacity to patient ratio ranged from a low of 1.27 in Pahang to 2.37 in Kelantan.

Tthere were 69 private dialysis centres, 60 MOH centres and 55 NGO centres giving HD capacity of 3265, 2430 and 3925 respectively. There were a total of 2569 patients dialysed in MOH centres, 2476 in NGO centres and 2063 in private centes. Centre HD capacity to patient ratio ranged from 1.36 in MOH centres to 2.06 in centres managed by armed forces.

3 HAEMODIALYSIS

3.1 Haemodialysis in Government Centres

3.1.1 At 31st December 1999, 1869 patients were on HD in government centres - 85% were in centre HD, 4% in home HD and 11% in office HD.

3.1.2 94% of new patients were accepted into centre HD. 99% of new patients were financed by the government.

3.1.3 Death rate was 11% per year, highest for 10 years. Cardiovascular disorders, infections and deaths at home were the 3 commonest causes of death at 38%, 17% and 21% respectively

3.1.4 In 1999, there was a total of 55 government HD centres, 8 run by Ministry of Defence, 3 university hospital centres and the rest under the Ministry of Health.

3.1.5 New HD patients in 1999: Modal age-group 45 – 54 years; 64% males, 32% were diabetics, 7% had HBsAg, and 4% had anti-HCV antibodies.

3.1.6 Both HD patient and technique survival in government centres at 6 months for 1999 were similar at 91%.

3.1.7 Overall, 45% of HD patients were able to work part or full time. 66% had normal quality of life index.

3.1.8 ***Haemodialysis Practices***: In 1999, 80% were dialysed via wrist AVF, 16% via brachiocephalic fistula. 90% reported no difficulties with their vascular access; only 19% had vascular access complications. 75% had blood flow rates between 200 –299 ml/min. The proportion with blood flow rate >299 ml increased to 22% in 1999. Almost all were on thrice-weekly dialysis, 93% on 4 hours per session. Use of cellulosic membrane dialysers decreased further to 37% and synthetic membrane dialyser usage increased to 40%; 99% reused their dialysers three times or more, 52% reused 6 times. Usage of bicarbonate buffer increased to 76%. Median prescribed KT/V increased to 1.5; and a higher proportion of patients (77%) achieved a KT/V of more than 1.3.

3.1.9 ***Dyslipidaemia in haemodialysis patients***: In 1999, 69% of HD patients had serum cholesterol concentration < 5.3 mmol/l with median at 4.8 mmol/l. 88% had serum triglyceride concentration <3.5 mmol/l with median at 1.7 mmol/l; 93% had serum LDL concentration <5 mmol/l with median at 3.0 mmol/l; and 95% had serum HDL concentration of < 2 mmol/l with median at 1.1 mmol/l.

3.1.10 ***Renal bone disease***: In 1999, 91% of HD patients were on oral calcium carbonate, only 10% remained on aluminium hydroxide. Use of vitamin D decreased to 24%. 36% achieved serum phosphate concentration < 1.6 mmol/l; 51% had serum calcium concentration between 2.2 and 2.6 mmol/l, and 18% with iPTH between 100 – 250 ng/l.

3.1.11 ***Blood pressure control***: In 1999, 67% required anti-hypertensive therapy. Of these, 62% achieved systolic blood pressure(BP) < 160 mmHg, and 55% a diastolic blood pressure (BP)< 90 mmHg. Of the 33% not on anti-hypertensive therapy, 88% had systolic BP < 160 mmHg and 80% diastolic BP < 90 mmHg.

3.1.12 ***Management of anaemia****:* In 1999, 94% of patients were on oral iron supplements, IV iron use was very low at 5%. 48% of HD patients were on recombinant erythropoietin with 60% on 2000-4000 units weekly. 72% of those without erythropoietin and 74% on erythropoietin injections had serum iron > 10 umol/l. 70% of patients without erythropoietin and 77 % of those on erythropoietin supplements had serum ferritin > 100 ng/l. 10% and 8% of patients respectively without and with erythropoietin injections had haemoglobin concentration >12 g/dl.

3.1.13 ***Nutritional status:*** 60% of HD patients had serum albumin > 40 g/l with 61% with body mass index of between 18.5 and 25kg/m^2. 20% had BMI <18.5 kg/m^2.

3.1.14 ***Anti-HCV and HBsAg status***: In 1999, 25% and 6% were positive for anti-HCV antibody and HBsAg respectively

3.2 Haemodialysis in Non-Governmental Organisation (NGO) Centres

3.2.1 At 31st December 1999, 1579 patients were haemodialysing in centres managed by NGOs. 445 new patients were accepted into the programme.

3.2.3 Death rate in NGO HD centres was 7% in 1999. Cardiovascular disorders, infections and deaths at home were the 3 commonest causes of death at 27%, 9% and 13% respectively.

3.2.4 In 1999, there was a total of 51 NGO dialysis centres; of which 9 were run by the National Kidney Foundation, 8 by MAA Medicare Charity and 7 by various Rotary Clubs.

3.2.5 New HD patients in 1999: Modal age-group 45-54 years; 58% were males, 41% were diabetics, 5% had HBsAg and 6% had anti-HCV antibodies.

3.2.6 HD patient and technique survival in NGO centres at 6 months for 1999 were similar at 97%

3.2.7 Overall, 33% of HD patients were able to work part or full time, 28% were homemakers. 55% had normal quality of life index.

3.2.8 ***Haemodialysis Practices***: In 1999, 85% were dialysed via wrist arteriovenous fistulae (AVF). 92% reported no difficulties with their vascular access; only 12% had vascular access complications. 90% had blood flow rates between 200 and 299 ml/min, 98% on thrice-weekly dialysis of 4 hours per session. 56% used cellulosic membrane dialysers; 17% used synthetic membrane dialysers. 99% reused their dialysers at least three times, 61% reported 6 reuse. Usage of bicarbonate buffer was 96%. Median prescribed

KT/V was 1.5; 73% had KT/V more than 1.3.

3.2.9 ***Dyslipidaemia in haemodialysis patients***: In 1999, 67% of HD patients had serum cholesterol concentration < 5.3 mmol/l with median at 4.9 mmol/l. 88% had serum triglyceride concentration <3.5 mmol/l with median at 1.7 mmol/l.

3.2.10 ***Renal bone disease***: In 1999, 92% of HD patients were on oral calcium carbonate, only 6% were on aluminium hydroxide and 30% on active vitamin D supplements. 31% achieved serum phosphate concentration <1.6 mmol/l; 57% had serum calcium concentration between 2.2 and 2.6 mmol/l and 19% with iPTH between 100 – 250 ng/l.

3.2.11 ***Blood pressure control***: In 1999, 69% required anti-hypertensive therapy. Of these, 49% achieved systolic BP < 160 mmHg, and 58% diastolic BP < 90 mmHg. Of the 31% not on any anti-hypertensive therapy, 74% had systolic BP <160 mmHg and 73% diastolic BP < 90 mmHg.

3.2.12 ***Management of anaemia****:* In 1999, 54% were on recombinant erythropoietin with 70% on 2000 units weekly and 24% on 2000 – 4000 units weekly. 81% without erythropoietin and 80% on erythropoietin injections had serum iron > 10 umol/l. 7% of patients without erythropoietin and only 3% of those on erythropoietin had haemoglobin concentration >12 g/dl and 25% and 21% respectively had haemoglobin concentration between 10 and 12 g/dL..

3.2.13 ***Nutritional status:*** Proportion of patients with serum albumin concentration of >40 g/l was 42% in 1999. 60% had body mass index of between 18.5 and 25 kg/m^2 with 15% with BMI <18.5 kg/m^2.

3.2.14 ***Anti-HCV and HBsAg status***: In 1999, 18% and 8% were positive for anti-HCV antibody and HBsAg respectively.

3.3 Haemodialysis In Private Centres

3.3.1 At 31st December 1999, 1118 patients were dialysing in private dialysis centres. 408 new patients were accepted for HD in private centres.

3.3.3 Death rate in private centres was 5% in 1999. Cardiovascular disorders, deaths at home and infections were the 3 commonest causes of death at 20%, 28% and 10% each respectively.

3.3.5 New HD patients in 1999: Modal age-group > 54 years; 55% were males, 45% were diabetics, 4% had HBsAg, 7% had anti-HCV antibody

3.3.6 HD patient and technique survival in private centres at 6 months for 1999 were similar at 97%.

3.3.7 In 1999, 45% were able to work full or part time. 54% had a normal quality of life.

3.3.8 ***Haemodialysis Practices***: In 1999, 81% were dialysed via wrist arteriovenous fistulae (AVF). 94% reported no difficulties with their vascular

access; only 11% had vascular access complications. 90% had blood flow rates between 200 and 299 ml/min. Only 66% were on thrice-weekly dialysis, 33% only had twice weekly dialysis. 74% had 4 hours for session, 13% 4.5 hours. The majority – 80% used cellulosic membrane dialysers; only 14% used synthetic membrane dialysers. 12% did not reuse dialysers, 80% reused their dialysers at least three times. Usage of bicarbonate buffer was 84%. Median prescribed KT/V was 1.5; 68% had KT/V more than 1.3.

3.3.9 ***Dyslipidaemia in haemodialysis patients***: In 1999, 70% of HD patients had serum cholesterol concentration < 5.3 mmol/l with median at 5.0 mmol/l. 88% had serum triglyceride concentration <3.5 mmol/l with median at 1.7 mmol/l.

3.3.10 ***Renal bone disease***: In 1999, 80% of HD patients were on oral calcium carbonate, only 6% were on aluminium hydroxide and 27% on active vitamin D supplements. 27% achieved serum phosphate concentration <1.6 mmol/l; 52% had serum calcium concentration between 2.2 and 2.6 mmol/l and 24% with iPTH between 100 – 250 ng/l.

3.3.11 ***Blood pressure control***: In 1999, 62% required anti-hypertensive therapy. Of these, 51% achieved systolic BP < 160 mmHg, and 54% diastolic BP < 90 mmHg. Of the 38% not on any anti-hypertensive therapy, 69% had systolic BP <160 mmHg and 66% diastolic BP < 90 mmHg.

3.3.12 ***Management of anaemia****:* In 1999, 60% were on recombinant erythropoietin with 28% on 2000 units weekly and 65% on 2000 – 4000 units weekly. 27% of patients without erythropoietin and 34% on erythropoietin had haemoglobin concentration >10 g/dl. 23% still received blood transfusion.

3.3.13 ***Nutritional status:*** Proportion of patients with serum albumin concentration of >40 g/l was 24% in 1999. 60% had body mass index of between 18.5 and 25 kg/m^2 with 15% with BMI <18.5 kg/m^2.

3.3.14 ***Anti-HCV and HBsAg status***: In 1999, 16% and 4% were positive for anti-HCV antibody and HBsAg respectively.

4. CONTINUOUS AMBULATORY PERITONEAL DIALYSIS (CAPD)

4.1 At 31st December 1999, 572 patients were on CAPD. There were 201 new CAPD patients of which 85% were funded by the government.

4.3 In 1999, death rate on CAPD was 18%; transfer to HD 7%. Death at home, cardiovascular disorders and sepsis were the main causes of death accounting for 33%, 27% and 15% respectively. The main cause of transfer was peritonitis at 62% followed by membrane failure and patient preference.

4.4 There were 12 CAPD centres all within the government sector.

4.5 New CAPD patients in 1999: Modal age-group 55-64 years; 53% males, 43% were diabetics, Only 1% had HBsAg, 4% were anti-HCV antibody positive.

4.6 CAPD patient and technique survival at 6 months for 1999 were 94% and 89% respectively.

4.7 Overall, 28% of CAPD patients were able to work part or full time. 28% were homemakers and 13% full time students. 66% had normal quality of life index.

4.8 ***CAPD Practices***: In 1999, 96% were on standard CAPD dialysis regime; 58% used the usual Baxter disconnect system; 42% were converted or started on a new disconnect system by Braun. 97% had 4 exchanges per day and 96% were on 2-litre exchanges

4.9 ***Dyslipidaemia in CAPD patients***: In 1999, 48% of CAPD patients had serum cholesterol concentration < 5.3 mmol/l with median at 5.5 mmol/l. 82% had serum triglyceride concentration <3.5 mmol/l with median at 1.9 mmol/l. 82% had LDL concentration <5 mmol/l with median at 3.4 mmol/l; and 96% had HDL concentration < 2 mmol/l with median at 1.1 mmol/l.

4.10 ***Renal bone disease***: In 1999, 74% of CAPD patients were on oral calcium carbonate, only 6% were on aluminium hydroxide and 12% on active vitamin D supplements. 51% achieved serum phosphate concentration < 1.6 mmol/l; 55% had serum calcium concentration between 2.2 and 2.6 mmol/l and 17% with iPTH between 100 – 250 ng/l.

4.11 ***Blood pressure control***: In 1999, 82% required anti-hypertensive therapy. Of these, 72% achieved systolic BP < 160 mmHg, and 51% diastolic blood pressure < 90 mmHg. Of the 18% not on anti-hypertensive therapy, 87% had systolic BP < 160 mmHg and 76% a diastolic BP < 90 mmHg.

4.12 ***Management of anaemia****:* In 1999, 44% were on recombinant erythropoietin with 50% on 2000-4000 units weekly and 35% on 2000 units weekly. 78% of patients without erythropoietin and 81% on erythropoietin injections had serum iron concentration of >10 umol/l. 85% of those without erythropoietin and 85% on erythropoietin had transferrin saturation > 20%. 93% of those with and without erythropoietin had serum ferritin concentration > 100 ng/l. 39% of CAPD patients not on erythropoietin had haemoglobin concentration

>10 g/l and 7% had haemoglobin concentration of >12% compared to 25% and 6% respectively for those on erythropoietin.

4.13 ***Nutritional status:*** 18% of CAPD patients had serum albumin > 40 g/l with 56% with body mass index of between 18.5 and 25 kg/m^2. 22% had body mass index <18.5 kg/m^2.

4.14 ***Anti-HCV and HBsAg status***: In 1999, only 5% of CAPD had anti-HCV antibodies and 2% had HBsAg.

5. RENAL TRANSPLANTATION

5.1 At 31st December 1999, there were 1086 functioning renal transplants

5.2 Of 99 new transplant transplants in 1999, 37 were from living related donors, 10 from cadaveric donors; 3 from commercial living non-related donors; and 46 from commercial cadaveric donors.

5.3 In 1999, 2% of transplant recipients died and 4% lost their grafts. Sepsis was the commonest cause of death. Rejection accounted for 65% of graft loss.

5.4 91% of transplant recipients were followed up in government centres.

5.5 Modal age group for new transplant recipients was 35-44 years; 61% were males, 12% diabetics; 4% were HBsAg positive and 10% had anti-HCV antibodies at the time of transplantation.

5.6 Six month patient survival in 1999 was 99% and graft survival was 95%.

5.7 Overall, 69% of transplant recipients were able to work part or full time, and 20% were homemakers. 97% had normal quality of life index.

METHODS

1. COVERAGE

There were 198 dialysis centres in Malaysia as at 15th November 2000, of which 173 reported data to the Registry. Thus, centre coverage by the Registry is now 88%. This is largely because the Registry database is now also used to generate the transplant waiting list. We assessed patient ascertainment by comparing the Registry patient database and data obtained from the annual independent centre survey. The survey was primarily intended to update information on dialysis centres in the country for publication in the "Directory of Dialysis Centres in Malaysia" but data on number of patients were also sought to provide an up to date census of patient population in the country. Based on the patient prevalence estimates calculated from these 2 independent sources of data (227 versus 253 patients/million population), we estimated the coverage of patient by the Registry to be 90%.

2. STATISTICAL ANALYSIS

Kaplan Meier method[1] was used to estimate probability of survival and log rank test used to compare survival function. Technique failure is defined as occurrence of death or transfer to another modality of dialysis. Similarly, graft failure is defined as occurrence of death or returned to dialysis.

Annual death rates were calculated by dividing the number of deaths in a year by the estimated mid-year patient population.

For summarising continuous laboratory data, we have moved away from calculating summary statistics like mean, standard deviation and instead plot the cumulative frequency distribution graph. We are following the approach used by the UK Renal Registry[2]. Cumulative distribution plot shows a listing of the sample values of a variable on the X axis and the proportion of the observations less than or greater than each value on the Y axis. An accompanying table gives the Median (50% of values are above or below it), upper quartile (UQ, 25% of values above and 75% below it) and lower quartile (LQ, 75% of values above and 25% below it). Other percentiles can be read directly off the cumulative distribution plot. The table also shows percent of observations above or below a target value, or with an interval of values; the target value or interval obviously vary with the type of laboratory data.. For example, target value for prescribed KT/V is $\geq$1.3 and that for haemoglobin is $\geq$10 and $\leq$12 g/l. The choice of target value is arbitrary. We await guidelines from the dialysis community for appropriate choice of target values to set.

In contrast to other results reported in this report, Tables 2.12 and 2.13 are based on centre survey data rather than individual patient data reported to the Registry. This is to provide an up to date information on patient and centre census in the country and thus overcome the inevitable time lag between processing individual patient data and subsequent reporting of results. The survey was conducted between 20th November and

20th December 2000. Centre response rate to the survey was 99.5% (197/198 responded). Standard error estimates are not reported because no sample was taken. Results on distribution by state are also expressed in per million-population since states obviously vary in their population sizes. State population data are based on 2000 census population projection. It is very difficult to estimate the amount of cross boundary patient flow; this source of error is therefore not accounted for in computing state estimates. However, we minimise the bias by combining states (Selangor and Wilayah Persekutuan, Kedah and Perlis) based on geographical considerations. HD treatment capacity is derived by assuming on average patients underwent 3 HD sessions per week and a centre can maximally operate 2.5 shifts per day. A single HD machine can therefore support 5 patients' treatment. Obviously HD treatment capacity is calculated only for centre HD. The ratio of the number of centre HD capacity to number of centre HD patients is a useful measure of utilisation of available capacity. Only 1 centre did not respond. As the objective of this analysis is to estimate the total amount of dialysis provision in the country, we obviously cannot simply ignore the missing data and confine the analysis to available data. We therefore imputed the missing data based on regression imputation model and guided by the imputation principles described by Little[3]. The imputation model included sector (public, NGO or private), state, year of operation, number of dialysis personnel. These are well known correlates of level of dialysis provision in a centre. The imputations are then drawn by predictive mean matching[3]. Each centre with missing data was match with each respondent on its predicted values. We then use the data of the centre with the closest match to impute the missing data.

***References*:**

1. Kaplan EL, Meier P. Non-parametric estimation from incomplete observations. *J Am Stat Assoc* 1958; 53:457-81
2. UKRENALREG 1998 UK Renal Registry, Bristol, UK.
3. Little RJ. Missing data adjustments in large surveys. J Business Econ statistics 1988;6:287-301

RENAL REPLACEMENT THERAPY

IN

MALAYSIA

Stock and Flow

Treatment Provision Rate

I. RENAL REPLACEMENT THERAPY IN MALAYSIA

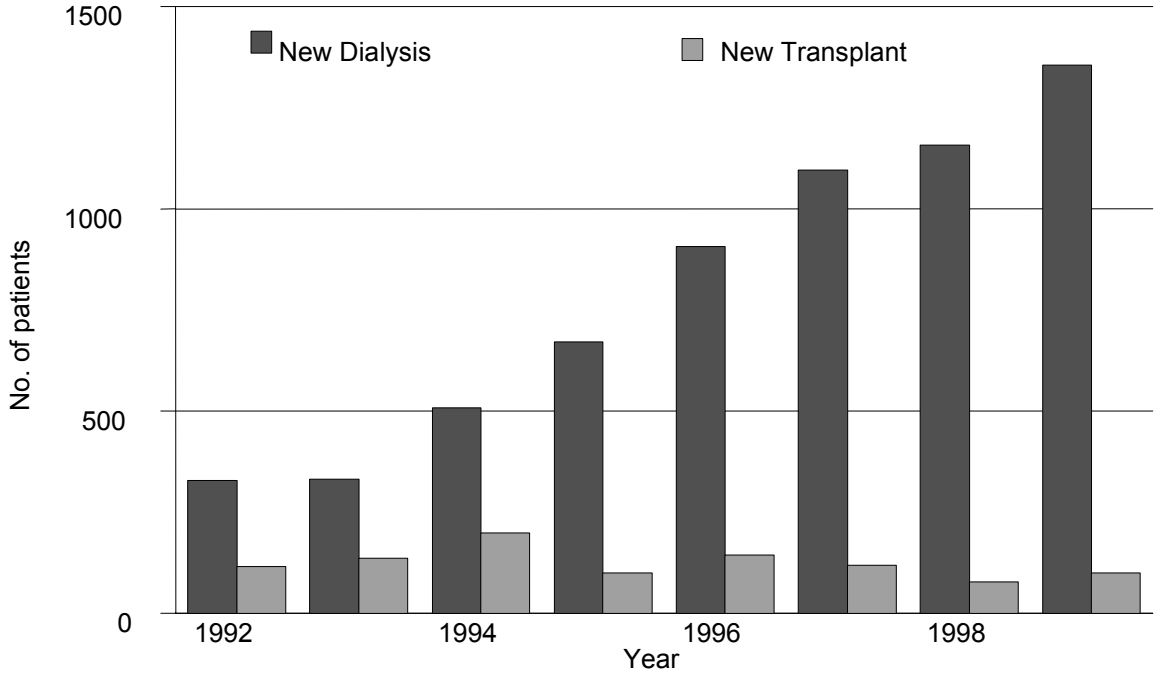
1.1 STOCK AND FLOW

Table 1.01 Stock and Flow of RRT, 1992 - 1999

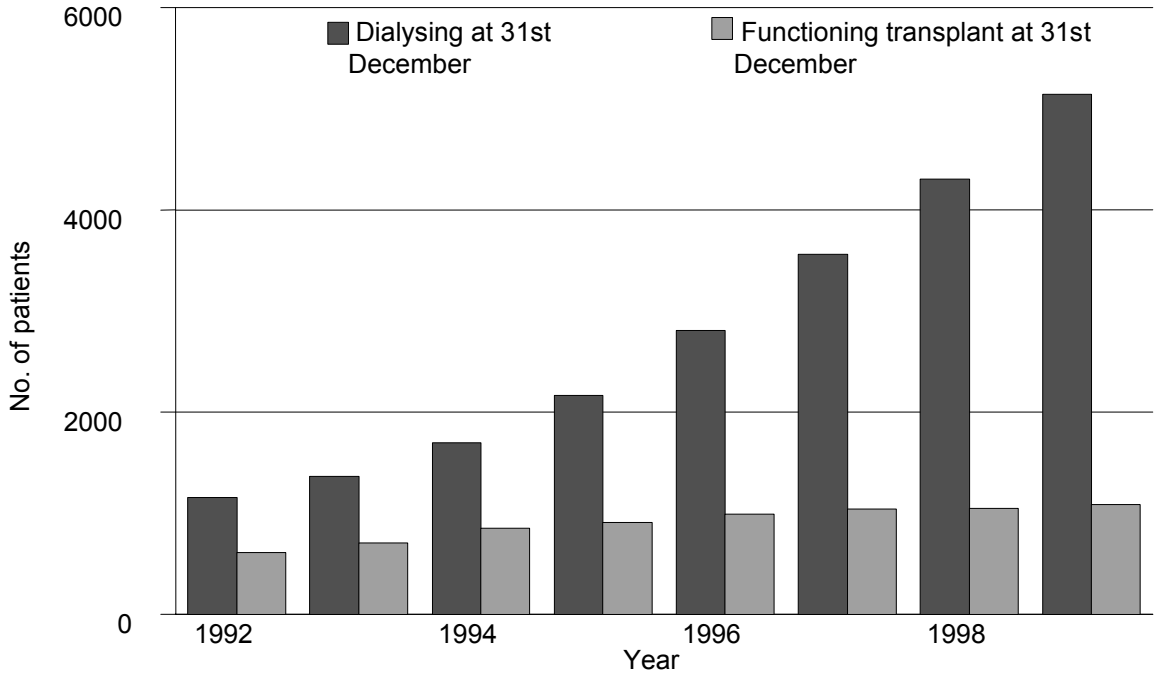
Year	1992	1993	1994	1995	1996	1997	1998	1999
New Dialysis patients	328	331	507	670	907	1095	1157	1355
New Transplants	115	136	199	100	144	119	77	99
Dialysis deaths	93	102	142	171	217	291	359	455
Transplant deaths	16	19	27	15	29	27	23	23
Dialysing at 31st December	1153	1362	1694	2164	2806	3557	4300	5138
Functioning transplant at 31st December	614	705	851	906	990	1039	1046	1086

Figure 1.01 Stock and Flow-of RRT 1992 - 1999

(a) New Dialysis and Transplant patients



(b) Patients Dialysing and with Functioning Transplants at 31st December 1992 – 1999



1.2 TREATMENT PROVISION RATE

Table 1.02 New Dialysis Acceptance Rate and New Transplant Rate per million population 1992 - 1999

Acceptance rate	1992	1993	1994	1995	1996	1997	1998	1999
New Dialysis	18	17	26	32	43	51	52	60
New Transplant	6	7	10	5	7	5	3	4

Figure 1.02 New Dialysis Acceptance and New Transplant Rate 1993 - 1999

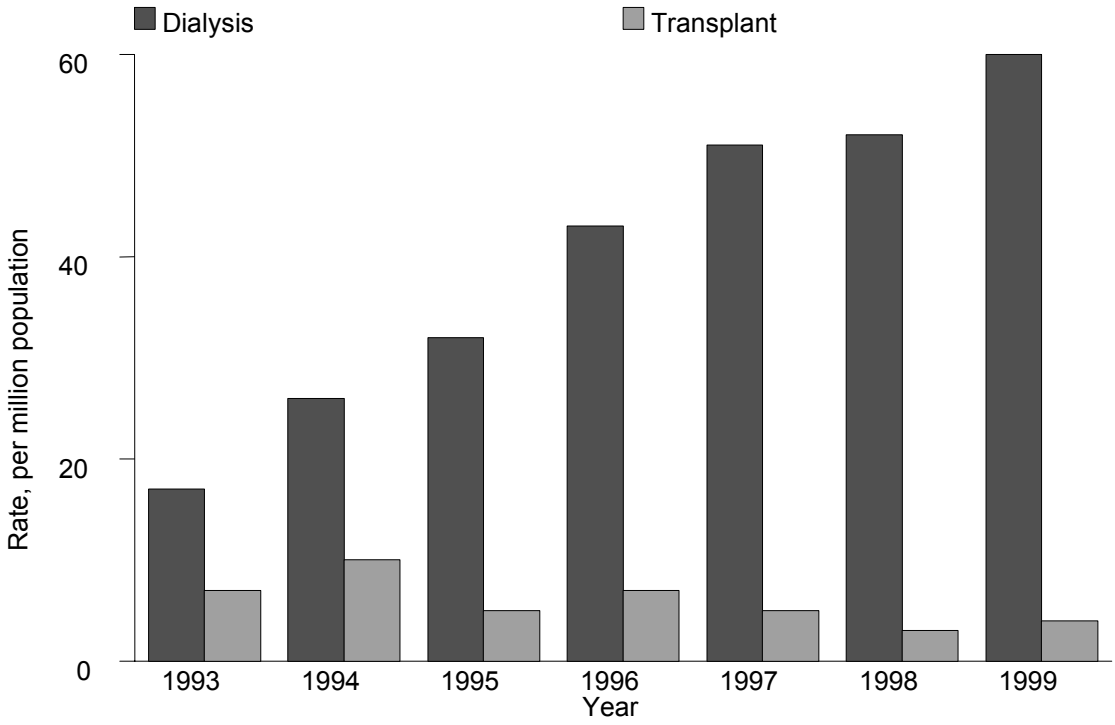
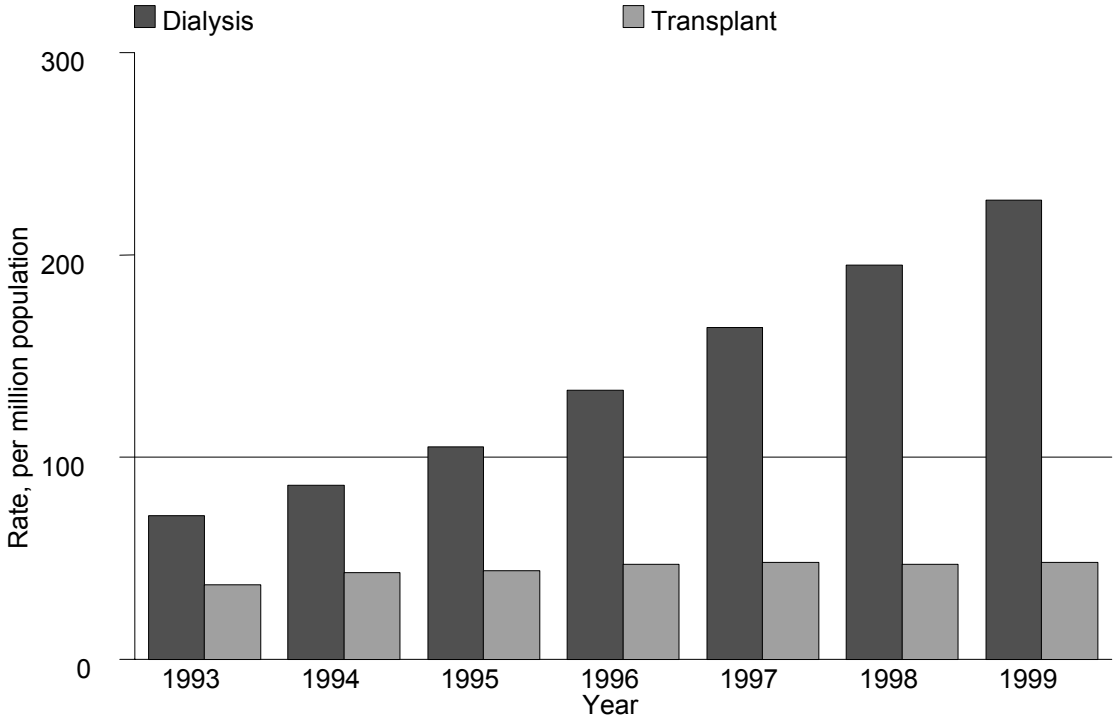


Table 1.03 RRT Prevalence Rate per million population 1992 – 1999

Prevalence rate	1992	1993	1994	1995	1996	1997	1998	1999
Dialysis	62	71	86	105	133	164	195	227
Transplant	33	37	43	44	47	48	47	48

Figure 1.03 Dialysis and Transplant Prevalence Rate per million population 1993 - 1999



DIALYSIS IN MALAYSIA

Dialysis Treatment Provision

Patient Demographics

Method and Location

Primary Renal Disease

Death on Dialysis

Dialysis Centre, Capacity and Treatment Provision
(centre survey 2000)

2. DIALYSIS IN MALAYSIA

2.1 DIALYSIS TREATMENT PROVISION

Table 2.01 Stock and flow – Dialysis Patients 1992 – 1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
New Dialysis patients	328	331	507	670	907	1095	1157	1355
Died	93	102	142	171	217	291	359	455
Transplanted	47	36	44	37	56	59	60	65
Lost to F/U	6	5	8	16	25	20	21	16
Dialysing at 31st December	1153	1362	1694	2164	2806	3557	4300	5138

Table 2.02 Dialysis Treatment Rate per million population 1992 – 1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
Acceptance rate	18	17	26	32	43	51	52	60
Prevalence rate	62	71	86	105	133	164	195	227

Table 2.03 Dialysis Treatment Rate by State, per million state population 1999

STATE	ACCEPTANCE RATE
Pulau Pinang	111
Negeri Sembilan Darul Khusus	93
Johor Darul Takzim	88
Selangor & W.Persekutuan	83
Negeri Melaka	79
Perak Darul Redzuan	69
Kedah & Perlis	55
Pahang Darul Makmur	45
Sarawak	43
Trengganu Darul Iman	33
Sabah	32
Kelantan Darul Naim	25

Table 2.04 Dialysis Treatment Rate by Gender, per million male or female population 1996– 1999

Gender	1996	1997	1998	1999
Male	50	61	58	72
Female	43	48	52	54

Figure 2.04 Dialysis Treatment by Gender 1996 - 1999

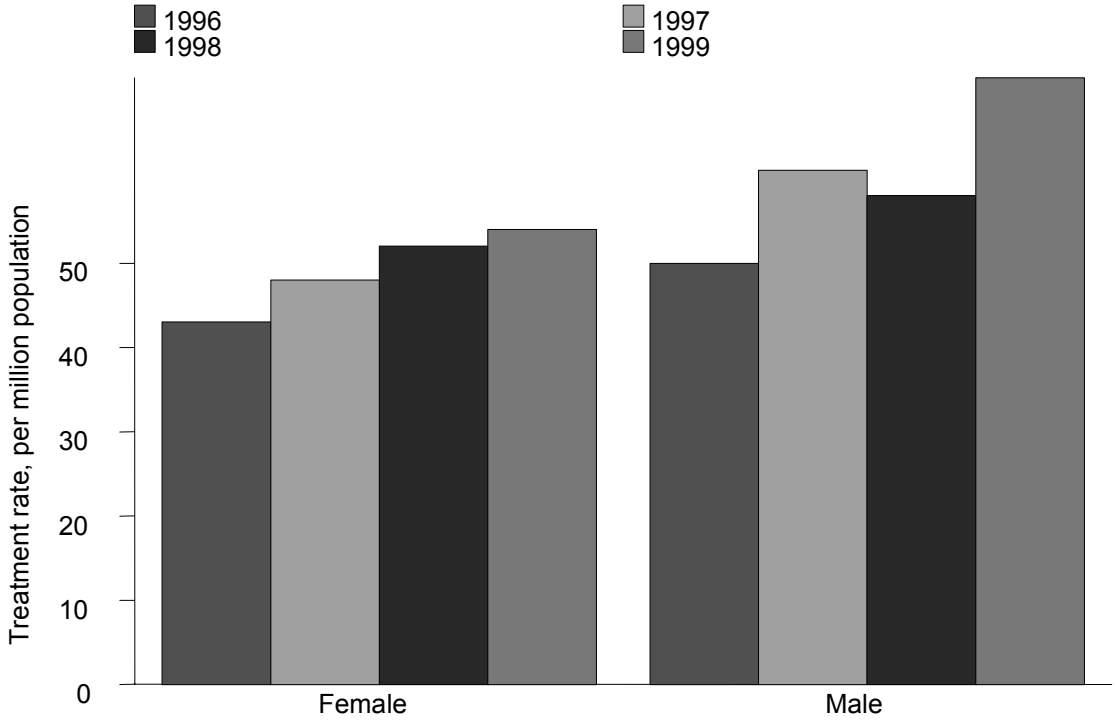
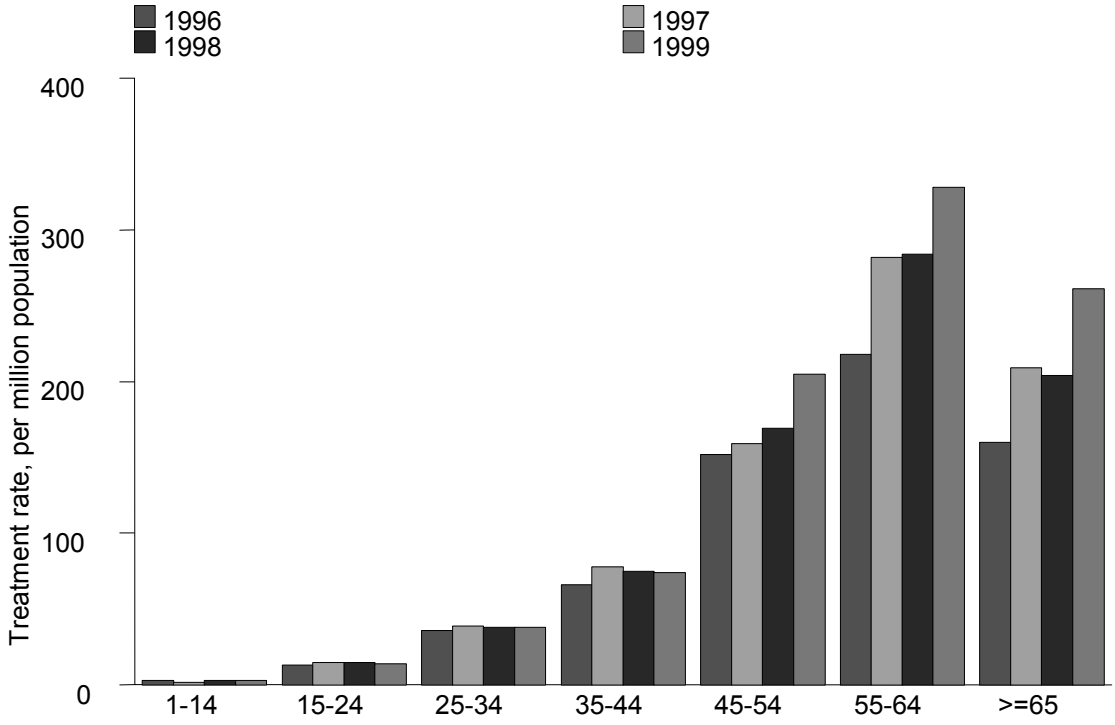


Table 2.05 Dialysis Treatment Rate by Age Group, per million age group population 1996 – 1999

Age groups (years)	1996	1997	1998	1999
1-14	3	2	3	3
15-24	13	15	15	14
25-34	36	39	38	38
35-44	66	78	75	74
45-54	152	159	169	205
55-64	218	282	284	328
≥ 65	160	209	204	261

Figure 2.05.: Dialysis Acceptance Rate by Age Group, 1996 - 1999



2.2 PATIENT DEMOGRAPHICS

Table 2.06 Percentage Age Distribution of Dialysis Patients 1996 – 1999

Year	1996	1997	1998	1999
New dialysis patients	907	1095	1157	1355
% 1-14 years	3	1	2	2
% 15-24 years	5	5	5	4
% 25-34 years	12	11	11	9
% 35-44 years	17	18	17	15
% 45-54 years	26	24	25	27
% 55-64 years	24	26	26	26
% ≥ 65 years	13	15	14	16
Dialysing at 31st December	2806	3557	4300	5138
% 1-14 years	2	2	2	2
% 15-24 years	6	5	5	5
% 25-34 years	18	17	16	15
% 35-44 years	24	23	22	21
% 45-54 years	24	24	24	25
% 55-64 years	18	20	21	21
% ≥65 years	8	9	9	11

Figure 2.06 Age Distribution of New Dialysis patients, 1996 – 1999

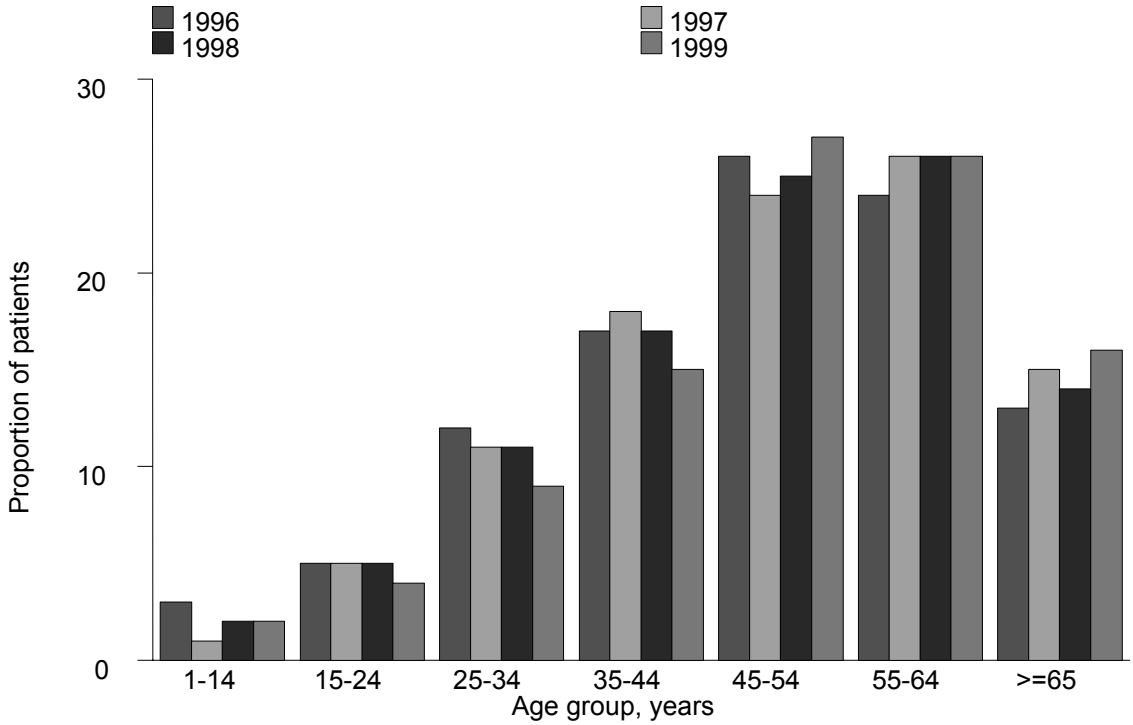
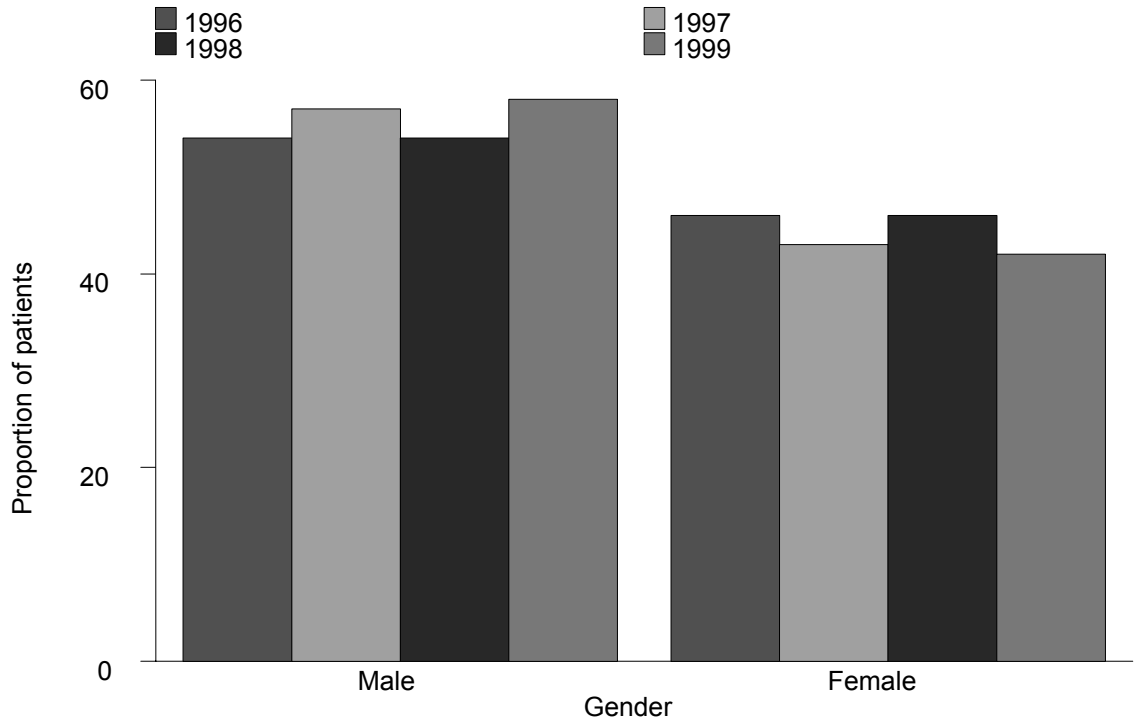


Table 2.07 Gender distribution of Dialysis Patients 1996 – 1999

Year	1996	1997	1998	1999
New Dialysis patients	907	1095	1157	1355
% Male	54	57	54	58
% Female	46	43	46	42
Dialysing at 31st December	2806	3557	4300	5138
% Male	57	57	56	56
% Female	43	43	44	44

Figure 2.07 Gender Distribution of New Dialysis patients, 1996 – 1999

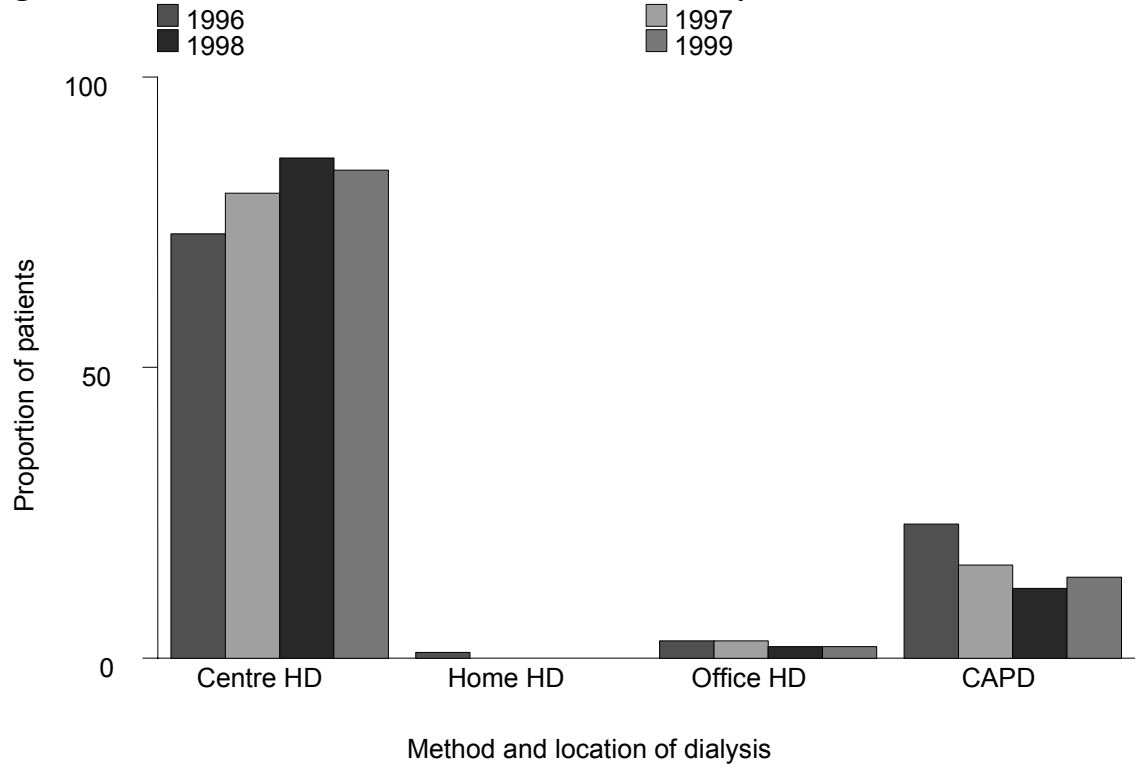


2.3 *METHOD AND LOCATION*

Table 2.08: Method and Location of Dialysis

Year	1996	1997	1998	1999
New Dialysis patients	907	1095	1157	1355
% Centre HD	73	80	86	84
% Home HD	1	0	0	0
% Office HD	3	3	2	2
% CAPD	23	16	12	14
Dialysing at 31st December	2806	3557	4300	5138
% Centre HD	72	76	80	82
% Home HD	5	3	2	2
% Office HD	7	6	5	5
% CAPD	16	14	12	11

Figure 2.08: Method and Location of New Dialysis Patients



2.4 PRIMARY RENAL DISEASE

Table 2.09: Primary Renal Disease, 1996 – 1999

Year	1996	1997	1998	1999
New Dialysis patients (No.)	907	1095	1157	1355
% Unknown cause	37	34	33	30
% Diabetic Nephropathy	29	36	40	40
% Glomerulonephritis	14	14	12	11
% Polycystic kidney	2	2	1	1
% Obstructive Uropathy	6	4	4	4
% Gouty Nephropathy	0	1	1	1
% Toxic Nephropathy	1	0	0	1
% Miscellaneous	10	9	9	12

2.5. DEATH ON DIALYSIS

Table 2.10: Deaths on Dialysis 1992 – 1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
No. of dialysis patients at risk	1053	1258	1528	1929	2485	3182	3929	4719
Dialysis deaths	93	102	142	171	217	291	359	455
Dialysis death rate %	9	8	9	9	9	9	9	10
No. of HD patients at risk	916	1081	1310	1643	2103	2715	3420	4172
HD deaths	70	79	100	113	157	220	285	357
HD death rate %	8	7	8	7	7	8	8	9
No. of CAPD patients at risk	137	177	218	286	382	467	509	547
CAPD deaths	23	23	42	58	60	71	74	98
CAPD death rate %	17	13	19	20	16	15	15	18

Figure 2.10: Death Rates on Dialysis, 1992 – 1999

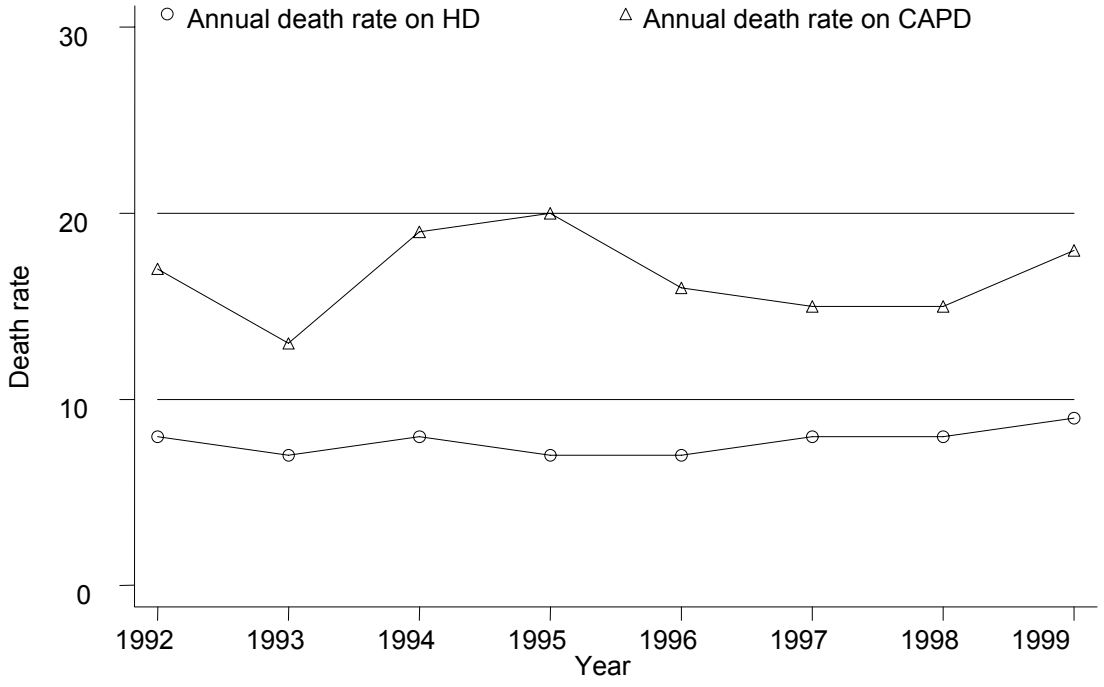


Table 2.11: Causes of Death on Dialysis 1996 - 1999

Year	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
Cardiovascular	44	26	53	24	73	26	108	32
Died at home	23	14	39	18	52	18	56	17
Sepsis	33	19	42	19	49	17	59	17
CAPD peritonitis	0	0	1	0	4	1	1	0
GIT bleed	1	1	2	1	2	1	6	2
Cancer	2	1	2	1	5	2	6	2
Liver disease	1	1	1	0	4	1	2	1
Others	52	24	64	22	79	22	96	21
Unknown	24	11	30	10	25	7	18	4
Total	217	100	291	100	359	100	455	100

2.6. DIALYSIS CENTRE, CAPACITY AND TREATMENT PROVISION

(Up-To- Date Results From Year 2000 Centre Survey, as at 20th December 2000)

Table 2.12: Number of dialysis centres, number of HD machines and treatment capacity, HD capacity to patient ratio By State, as at 20th December 2000

	Centres (No.)	Centre HD machines	Centre HD machines pmp	Centre HD capacity* (No.)	Centre HD capacity pmp	Centre HD patients (No.)	Centre HD patients pmp	HD capacity: patient ratio	All dialysis patients (No.)	Dialysis treatment rate pmp
Selangor & F. Territory	60	722	153	3610	766	2436	517	1.48	2852	605
P Pinang	20	199	158	995	790	613	487	1.62	694	551
Melaka	10	89	149	445	743	286	478	1.56	289	483
Johor	26	276	101	1380	505	969	355	1.42	1073	393
Perak	18	203	95	1015	477	664	312	1.53	728	342
Negeri Sembilan	8	75	88	375	441	207	244	1.81	264	311
Kedah & Perlis	17	107	58	535	291	370	202	1.45	377	205
Sarawak	11	116	56	580	281	335	162	1.73	413	200
Pahang	6	41	31	205	155	161	122	1.27	170	129
Trengganu	5	37	35	185	174	98	92	1.89	117	110
Sabah	7	68	22	340	108	226	72	1.5	256	82
Kelantan	8	56	36	280	179	118	76	2.37	122	78
Malaysia	196	1989	86	9945	428	6483	279	1.53	7355	316

pmp = per million population. *HD treatment capacity is derived by assuming an average patient underwent 3 HD sessions per week and a centre can maximally operate 2.5 shifts per day. A single HD machine can therefore support 5 patients' treatment.

Figure 2.12(a): Distribution of dialysis centres by State, as at 20th December 2000

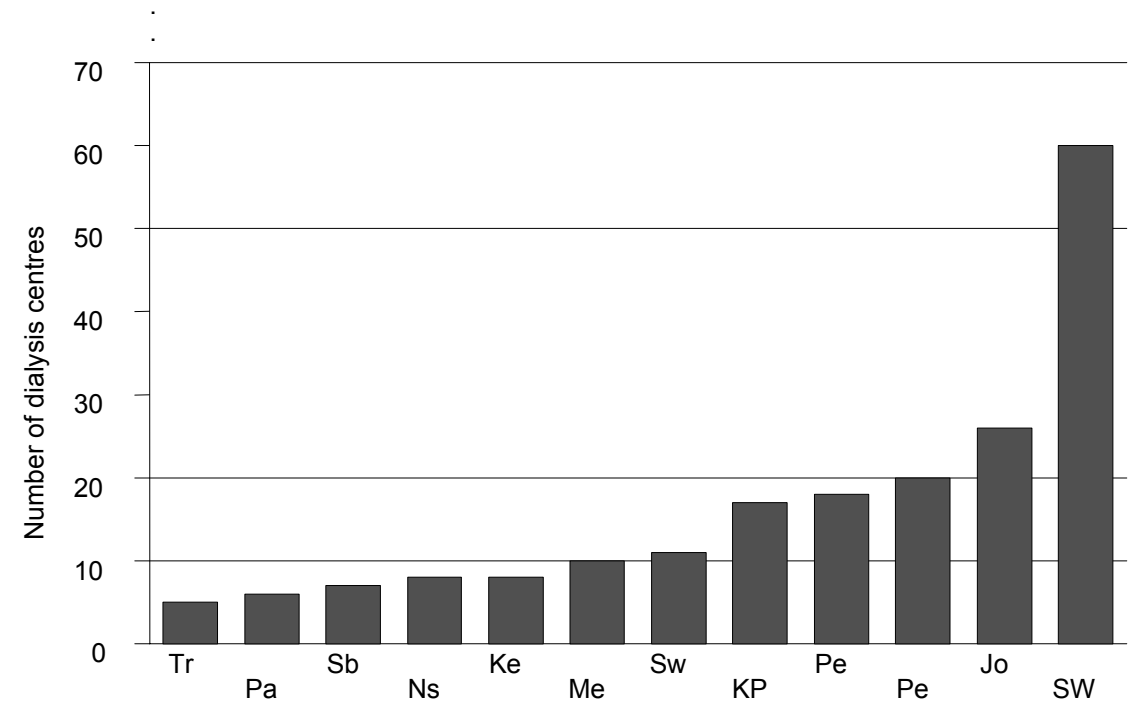


Figure 2.12 (b): Distribution of dialysis patients by State, as at 20th December 2000

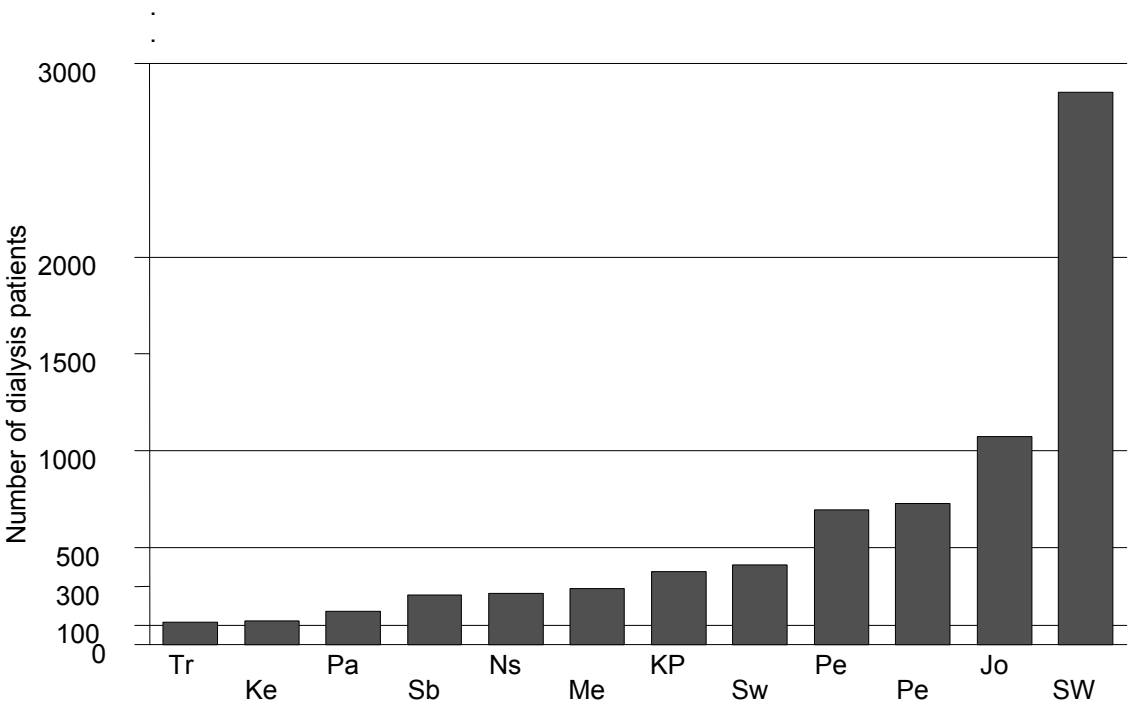


Figure 2.12 c): Distribution of patients per million population by State, as at 20th December 2000

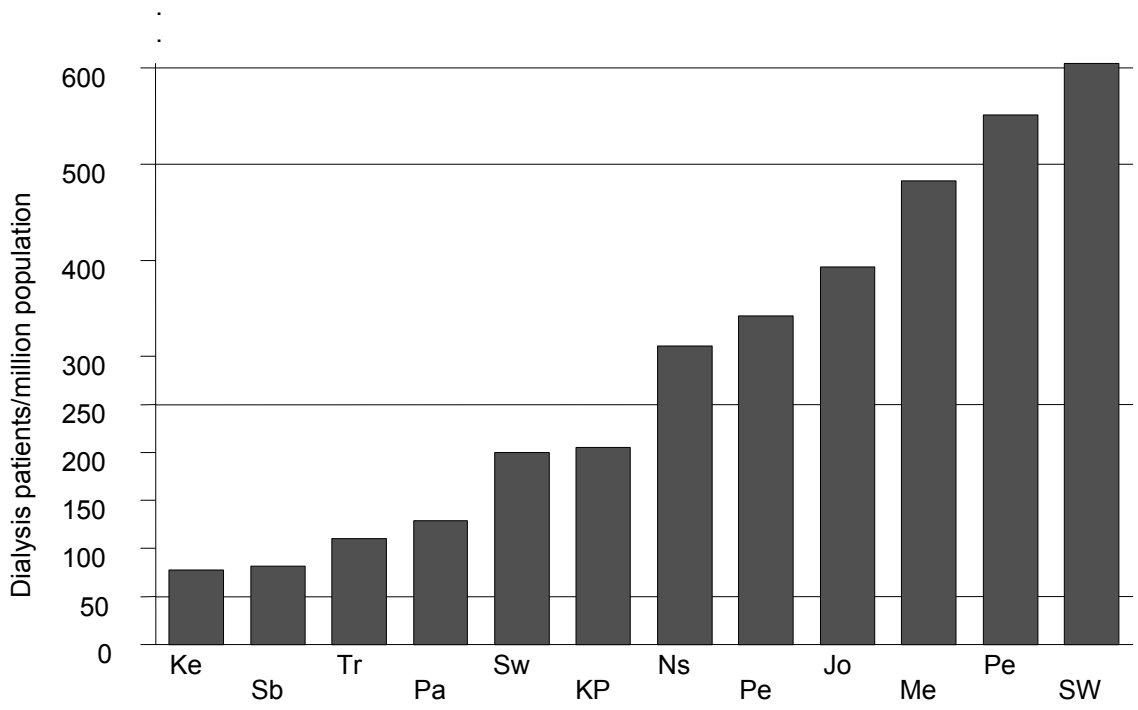


Figure 2.12 (d): HD capacity to patient ratio by State, as at 20th December 2000

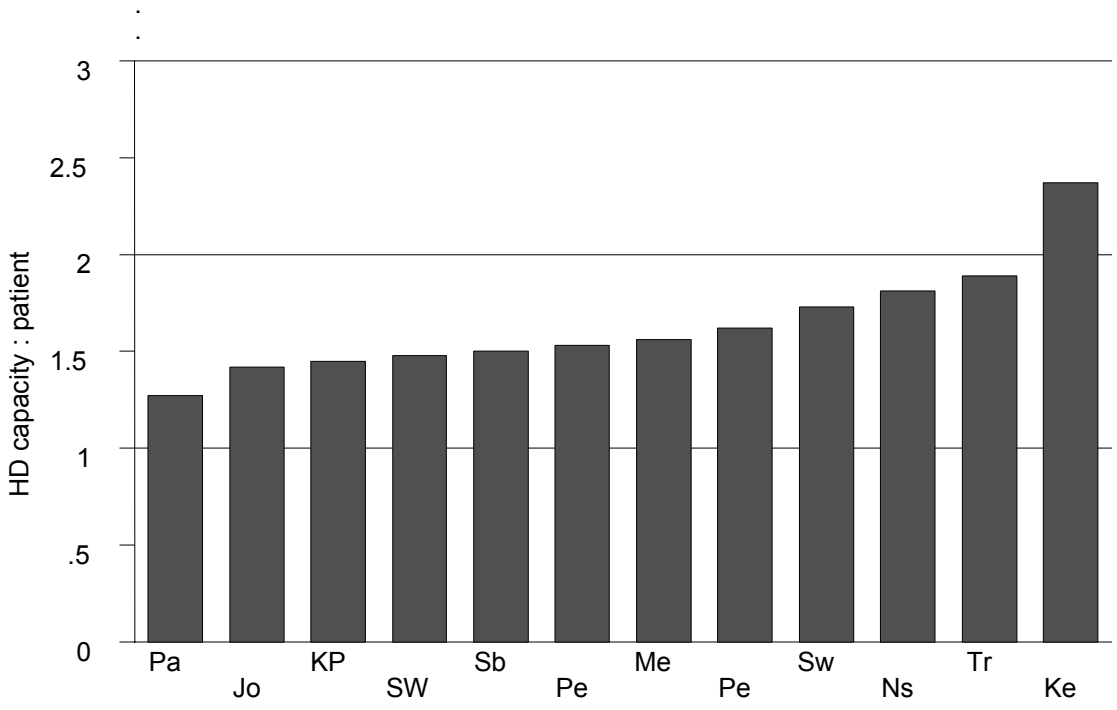


Table 2.13: Number of dialysis centres, dialysis patients and HD machines and treatment capacity, by sector as at 20th December 2000

Sector	Centre (No.)	Centre HD machines (No.)	Centre HD capacity (No.)	Centre HD patients (No.)	Centre HD capacity : patient ratio	All dialysis patients (No.)
MOH	60	486	2430	1782	1.36	2569
NGO	55	785	3925	2476	1.59	2476
Private	69	653	3265	2054	1.59	2063
University	5	36	180	93	1.94	216
Armed Forces	9	44	220	107	2.06	107

Figure 2.13 (a): Distribution of dialysis centres by Sector, as at 20th December 2000

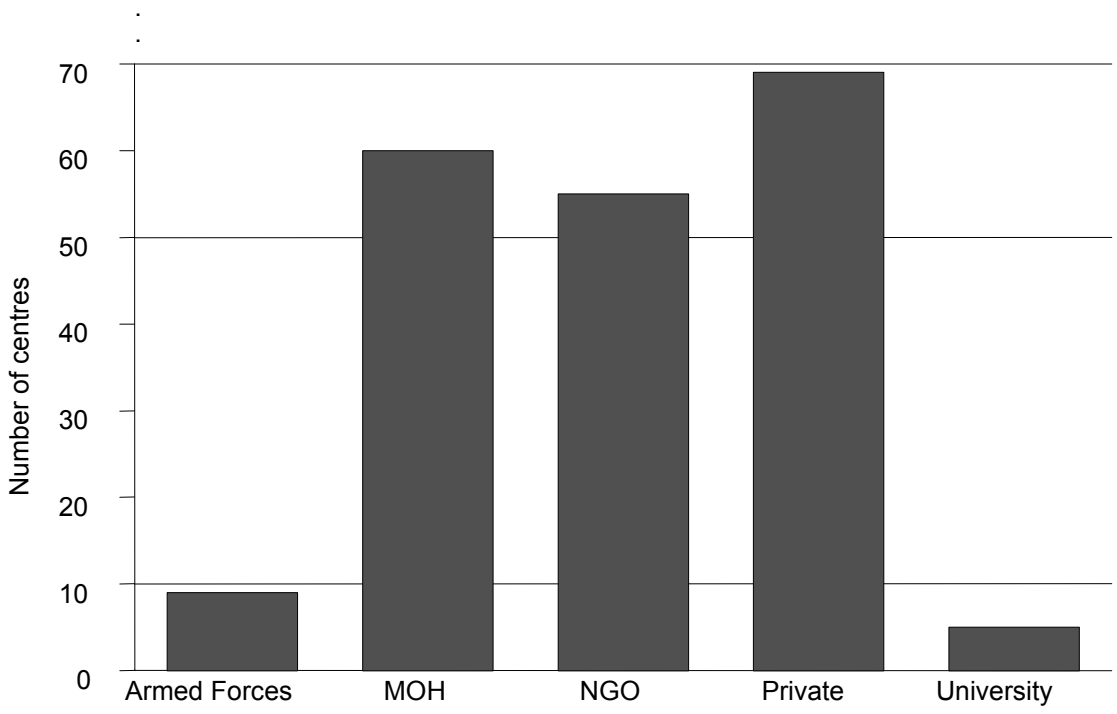


Figure 2.13 (b): Distribution of HD capacity by Sector, as at 20th December 2000

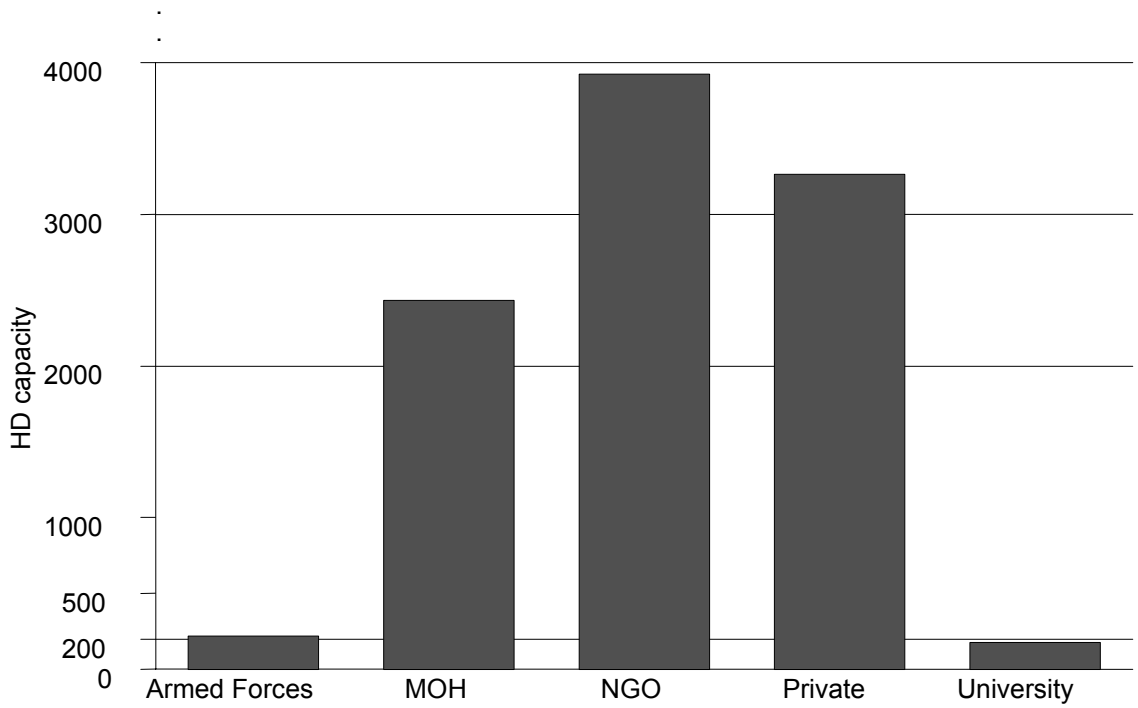


Figure 2.13 (c): Distribution of dialysis patients by Sector, as at 20th December 2000

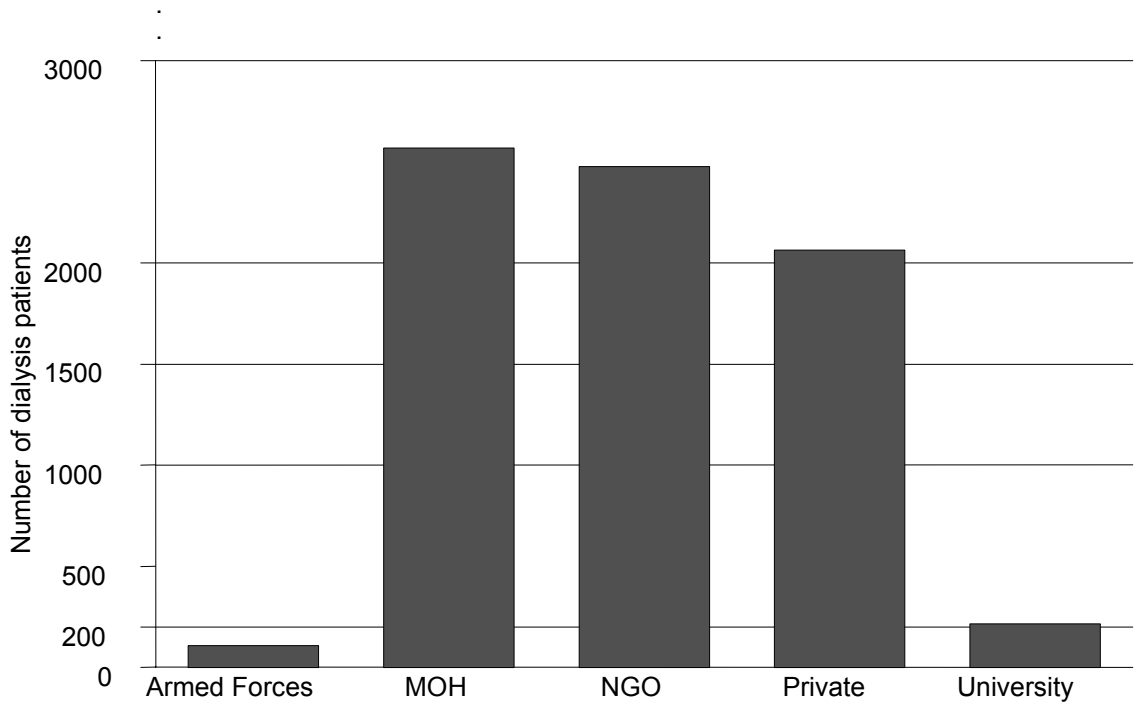
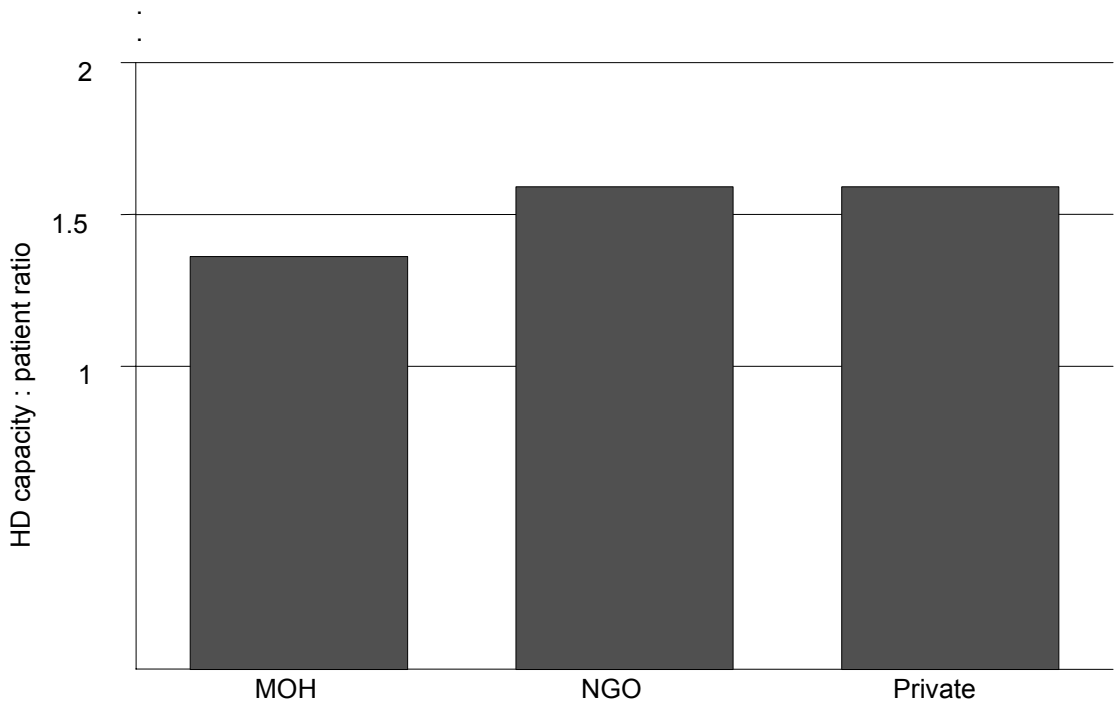


Figure 2.13 (d): HD capacity : patient ratio by Sector, as at 20th December 2000



HAEMODIALYSIS

IN

MALAYSIA

HAEMODIALYSIS IN GOVERNMENT CENTRES

HAEMODIALYSIS IN NON-GOVERNMENTAL ORGANISATION (NGO) CENTRES

HAEMODIALYSIS IN PRIVATE CENTRES

HAEMODIALYSIS IN GOVERNMENT CENTRES

Stock and Flow

Place of Haemodialysis and its Finance

Death on Haemodialysis and Transfer to PD

Government Haemodialysis Centres

Haemodialysis Patient Characteristics

Survival Analysis

Work related rehabilitation and quality of life

Haemodialysis practices

Dyslipidaemia in HD patients

Treatment of Renal Bone Disease

Management of Blood Pressure

Management of Anaemia

Nutritional status

Prevalence of anti-HCV and HBsAg

3. HAEMODIALYSIS IN MALAYSIA

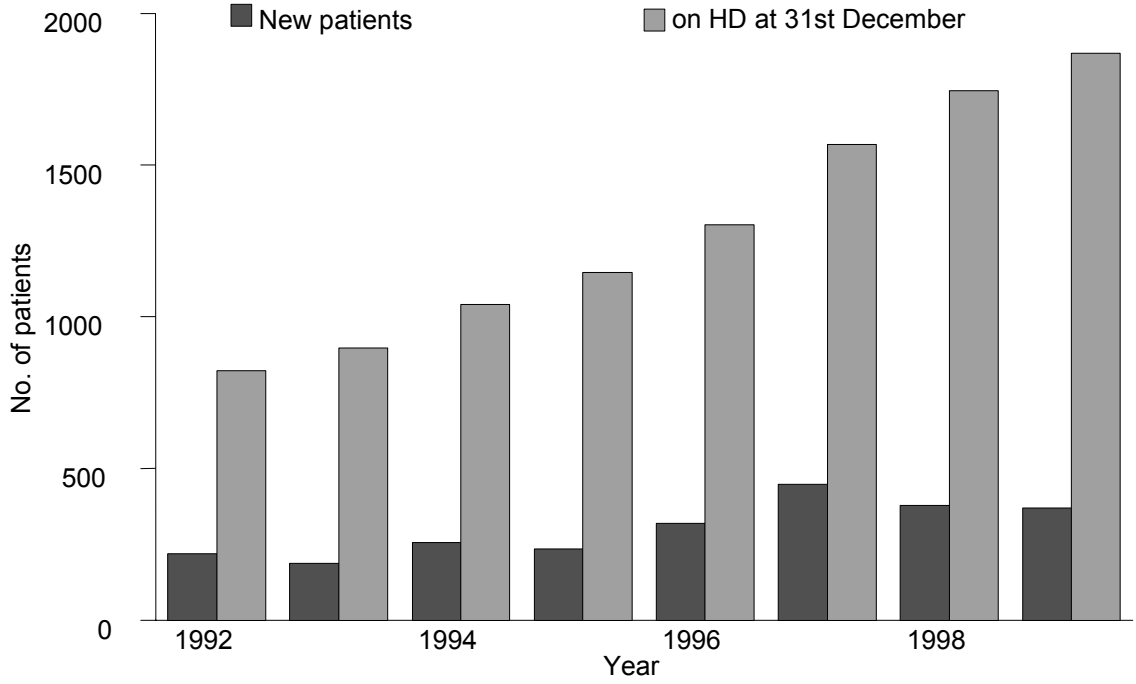
3.1 HAEMODIALYSIS IN GOVERNMENT CENTRES,

3.1.1 STOCK AND FLOW

Table 3.1.01 Stock and flow of Haemodialysis Patients, Government Centres 1992 – 1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
New patients	218	188	257	236	319	448	378	371
Died	70	74	79	85	115	135	158	205
Transferred to PD	4	6	7	12	7	9	6	10
Transplanted	45	29	29	26	35	34	30	25
Lost to follow up	4	3	0	7	4	6	8	6
on HD at 31st December	822	898	1040	1146	1304	1568	1744	1869

Figure 3.1.01: Stock and Flow HD patients, Government Centres 1992 - 1999



3.1.2 PLACE OF HAEMODIALYSIS AND ITS FINANCE

Table 3.1.02: Place for HD, Government Centres 1996 – 1999

Year	1996	1997	1998	1999
New patients	319	448	378	371
% Centre HD	88	92	94	94
% Home HD	3	0	0	1
% Office HD	9	8	6	5
on HD at 31st December	1304	1568	1744	1869
% Centre HD	76	80	83	85
% Home HD	9	7	5	4
% Office HD	15	13	12	11

Figure 3.1.02: Place of HD, Government Centres 1996 - 1999

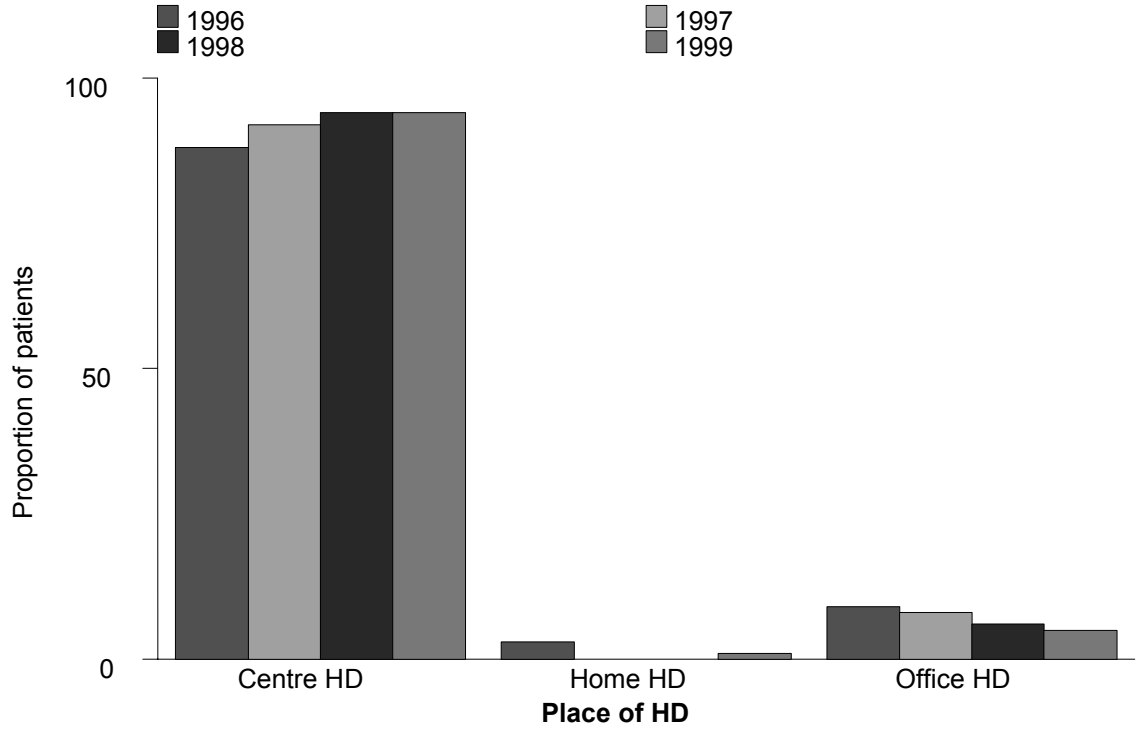
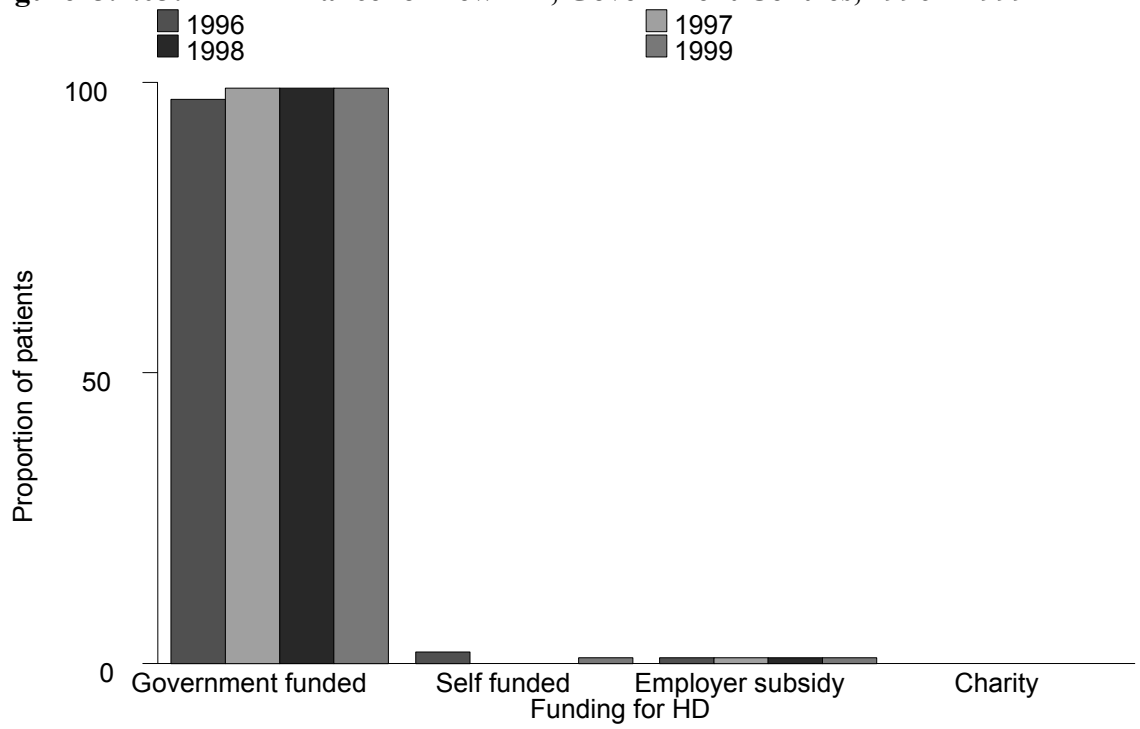


Table 3.1.03: Finance for HD, Government Centres, 1996 – 1999

Year	1996	1997	1998	1999
New patients (No.)	319	448	378	371
% Government funded	97	99	99	99
% Self funded	2	0	0	1
% Employer subsidy	1	1	1	1
% Charity	0	0	0	0
on HD at 31st December	1304	1568	1744	1869
% Government funded	92	94	95	96
% Self funded	6	4	3	3
% Employer subsidy	2	2	2	1
% Charity	0	0	0	0

Figure 3.1.03: Finance for new HD, Government Centres, 1996 – 1999



3.1.3 DEATH ON HAEMODIALYSIS AND TRANSFER TO PERITONEAL DIALYSIS

Table 3.1.04: HD Death Rate and Transfer to PD, Government Centres 1992 - 1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
No. at risk	822	860	969	1093	1225	1436	1656	1807
Deaths	70	74	79	85	115	135	158	205
Death rate %	9	9	8	8	9	9	10	11
Transfer to PD	4	6	7	12	7	9	6	10
Transfer to PD rate %	0	1	1	1	1	1	0	1
All Losses	74	80	86	97	122	144	164	215
All Losses rate %	9	9	9	9	10	10	10	12

Figure 3.1.04: Death Rate on HD, Government Centres 1992 - 1999

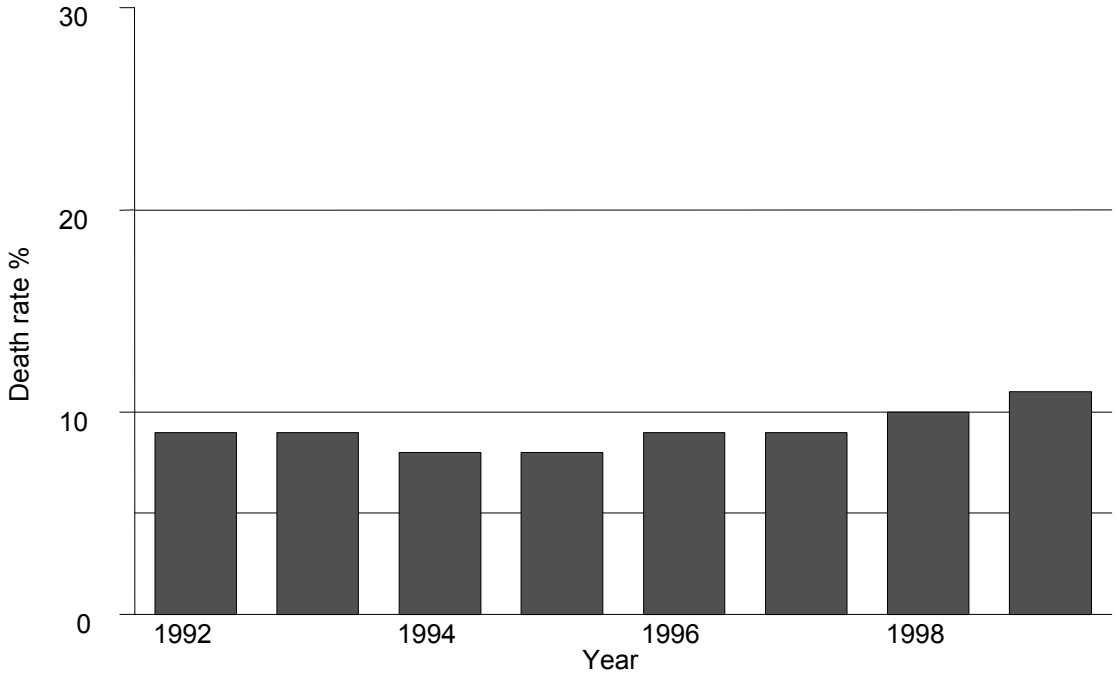


Table 3.1.05: Causes of Death on HD, Government Centres 1996 – 1999

Cause of death	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
Cardiovascular	26	23	43	32	50	32	77	38
Died at home	19	17	20	15	34	22	43	21
Sepsis	21	18	31	23	34	22	35	17
GIT bleed	2	2	2	1	5	3	6	3
Cancer	2	2	4	3	4	3	2	1
Liver disease	1	1	3	2	1	1	2	1
Others	34	30	23	17	21	13	36	18
Unknown	10	9	9	7	9	6	4	2
Total	115	100	135	100	158	100	205	100

3.1.4 GOVERNMENT HAEMODIALYSIS CENTRES

Table 3.1.07: Centre Distribution of HD patients, Government Centres 1999

No	Centre	No	percent
0	No.on RRT at 31st December	1869	100
1	801 RSAT Kuching	8	0
2	807 RSAT Sg. Petani	6	0
3	810 RSAT Majidee	3	0
4	819 RSAT TUDM	7	0
5	94 HAT Terendak	28	1
6	95 HAT Kinrara	24	1
7	96 HAT Lumut	19	1
8	Alor Setar Hospital	75	4
9	Baling Hospital	4	0
10	Batu Pahat Hospital	27	1
11	Besut Hospital	10	1
12	Bintulu Hospital	10	1
13	Bukit Mertajam Hospital	36	2
14	Dutches of Kent Hospital	19	1
15	HTAA, Kuantan	41	2
16	Ipoh Hospital	109	6
17	Kajang Hospital	14	1
18	Kangar Hospital	38	2
19	Kemaman Hospital	7	0
20	Keningau Hospital	13	1
21	Kluang Hospital	7	0
22	Kota Bharu Hospital	47	3
23	Kuala Krai Hospital	6	0
24	Kuala Lumpur Hospital	190	10
25	Kuala Nerang Hospital	2	0
26	Kuala Pilah Hospital	24	1
27	Kuala Terengganu Hospital	57	3
28	Kuching Hospital	103	6
29	Kulim Hospital	4	0

No	Centre	No	percent
30	Labuan Hospital	18	1
31	Langkawi Hospital	8	0
32	Melaka Hospital	43	2
33	Mentakab Hospital	30	2
34	Miri Hospital	67	4
35	Muar Hospital	44	2
36	Pulau Pinang Hospital	70	4
37	Pusat Hemodialisis KEMENTAH	15	1
38	Pusat Rawatan Angkatan Tentera (KB)	6	0
39	Queen Elizabeth Hospital	91	5
40	Raub Hospital	19	1
41	Segamat Hospital	18	1
42	Selayang Hospital	17	1
43	Seremban Hospital	53	3
44	Sg Petani Hospital	27	1
45	Sibu Hospital	42	2
46	Sik Hospital	7	0
47	Sultanah Aminah Hospital	104	6
48	Taiping Hospital	38	2
49	Tawau Hospital	51	3
50	Teluk Intan Hospital	30	2
51	Tg Ampuan Rahimah	65	3
52	UKM Hospital	17	1
53	USM Hospital	8	0
54	University Hospital	39	2
55	Yan Hospital	4	0

3.1.5 *HAEMODIALYSIS PATIENT CHARACTERISTICS*

Table 3.1.08: Age Distribution of HD patients, Government Centres 1996 – 1999

Year	1996	1997	1998	1999
New patients (No.)	319	448	378	371
% 1-14 years	1	0	1	1
% 15-24 years	10	7	7	9
% 25-34 years	14	13	13	12
% 35-44 years	22	21	22	16
% 45-54 years	28	22	28	32
% 55-64 years	18	29	21	24
% >=65 years	8	8	8	6
Dialysing at 31st December	1304	1568	1744	1869
% 1-14 years	1	1	1	1
% 15-24 years	8	7	8	8
% 25-34 years	22	20	19	19
% 35-44 years	27	26	26	25
% 45-54 years	24	23	24	25
% 55-64 years	15	18	18	17
% >=65 years	5	5	5	5

Table 3.1.09: HD Patient Characteristics, Government Centres 1996 – 1999

Year	1996	1997	1998	1999
New patients (No)	319	448	378	371
Mean age ± sd	44±14	47±14	46±14	46±14
% Male	59	62	62	64
% Diabetic	22	30	31	32
% HbsAg+	5	5	6	7
% Anti-HCV+	16	12	9	4

3.1.6 *SURVIVAL ANALYSIS*

Table 3.1.10: HD Patient Survival related to Year of Entry, Government Centres 1994 – 1999

Year	1994			1995			1996		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	94	1	235	98	1	223	95	1	292
12	90	2	214	96	1	207	91	2	270
24	82	2	189	87	2	177	85	2	239
36	72	3	164	80	3	157	76	3	194
48	67	3	149	76	3	140			
60	57	3	124						

Year	1997			1998			1999		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	93	1	409	94	1	347	91	2	159
12	88	2	380	90	2	318			
24	82	2	340						

No. = number at risk *SE = standard error*

Figure 3.1.10: HD Patient Survival related to Year of Entry, Government Centres 1995 – 1999

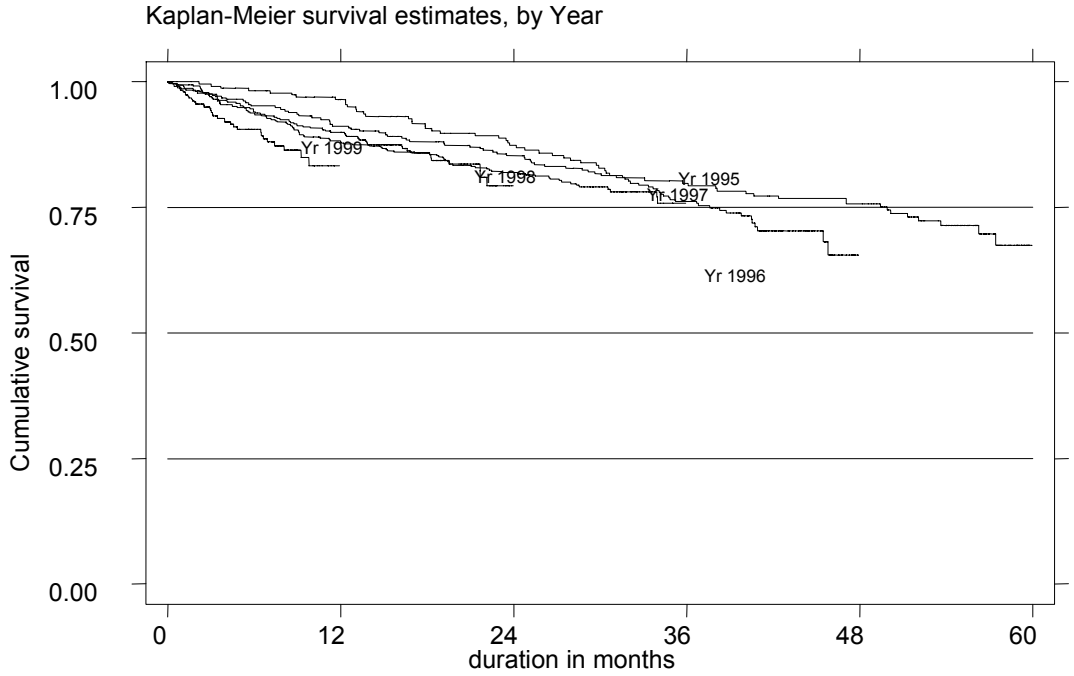


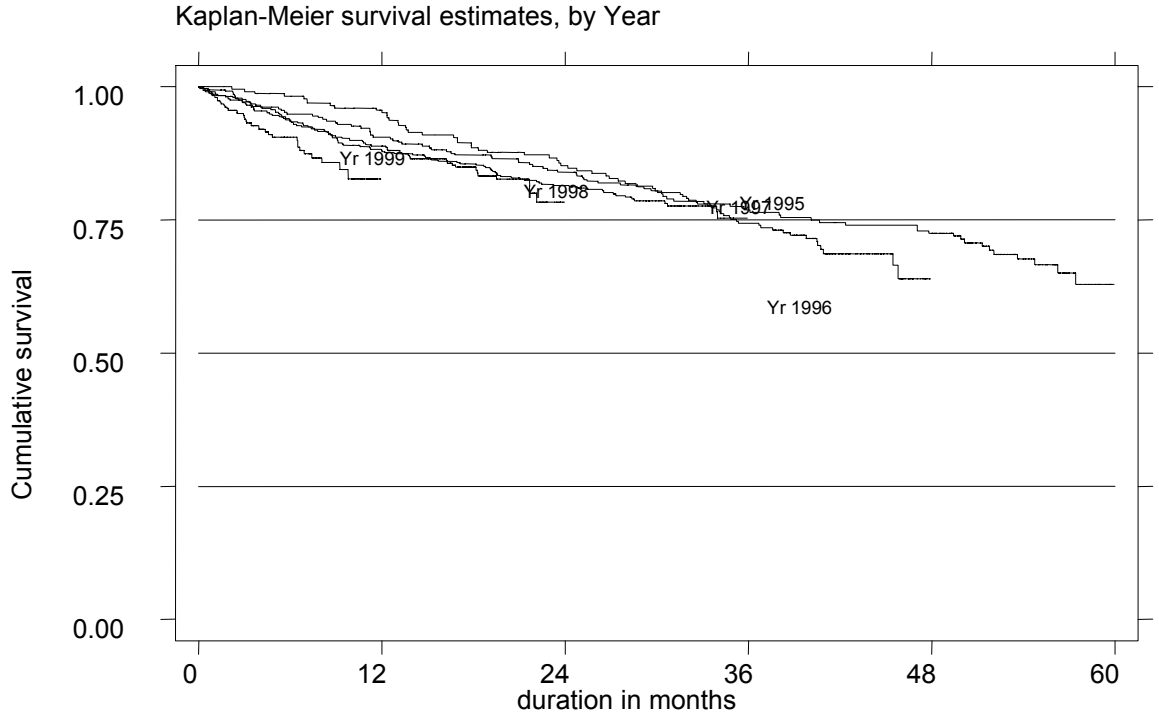
Table 3.1.11: HD Technique Survival related to Year of Entry, Government Centres 1994– 1999

Year	1994			1995			1996		
Interval	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	93	2	235	98	1	224	95	1	292
12	87	2	214	95	1	207	90	2	270
24	79	3	189	85	2	177	84	2	239
36	69	3	164	77	3	157	74	3	195
48	63	3	149	73	3	144			
60	54	3	124						

Year	1997			1998			1999		
Interval	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	93	1	409	93	1	347	91	2	159
12	88	2	380	89	2	318			
24	82	2	340						

No. = number at risk *SE = standard error*

Figure 3.1.11 HD Technique Survival by Year of Entry Government Centres 1995 – 1999



3.1.7 *WORK RELATED REHABILITATION AND QUALITY OF LIFE ON HAEMODIALYSIS, GOVERNMENT CENTRES*

Table 3.1.12: Work Related Rehabilitation on HD, Government Centres, 1996 - 1999

REHABILITATION STATUS	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
Full time work for pay	474	47	499	40	529	40	613	36
Part time work for pay	47	5	110	9	115	9	161	9
Able to work but unable to get a job	18	2	39	3	45	3	43	2
Able to work but not yet due to dialysis schedule	15	1	29	2	19	1	50	3
Able but disinclined to work	12	1	14	1	9	1	30	2
Home maker	201	20	260	21	272	21	360	21
Full time student	12	1	10	1	15	1	24	1
Age<15 years	0	0	3	0	3	0	4	0
Retired	126	13	129	10	159	12	202	12
Age>65 years	48	5	70	6	85	6	97	6
Unable to work due to poor health	53	5	70	6	67	5	139	8
Total	1006	100	1233	100	1318	100	1723	100

Table 3.1.13: Quality of Life on Haemodialysis, Government Centres, 1996 – 1999

QOL Index Summated Score	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
0 (Worst QOL)	0	0	0	0	1	0	2	0
1	1	0	0	0	1	0	2	0
2	2	0	5	0	5	0	6	0
3	10	1	6	0	8	1	12	1
4	13	1	14	1	23	2	25	1
5	33	3	26	2	37	3	55	3
6	38	4	55	4	61	5	67	4
7	49	5	64	5	56	4	109	6
8	72	7	118	9	92	7	120	7
9	91	9	112	9	96	7	171	10
10 (Best QOL)	709	70	849	68	909	71	1114	66
Total	1018	100	1249	100	1289	100	1683	100

3.1.8 *HAEMODIALYSIS PRACTICES IN GOVERNMENT CENTRES*

Table 3.1.14: Vascular Access on Haemodialysis, Government Centres, 1996 - 1999

Access types	1996		1997		1998		1999	
	No	%	No	%	No	%	No	%
Wrist AVF	907	85	1121	84	1382	83	1486	80
BCF*	141	13	182	14	227	14	295	16
venous graft	0	0	2	0	3	0	2	0
artificial graft	8	1	9	1	17	1	23	1
PERMCATH	2	0	4	0	8	0	12	1
temporary CVC	4	0	17	1	32	2	49	3
Total	1062	100	1335	100	1669	100	1867	100

- *BCF = Brachiocephalic fistula*
- *CVC = Central venous catheter*

Table 3.1.15: Difficulties reported with Vascular Access, Government Centres 1996 - 1999

Access difficulty	1996		1997		1998		1999	
	No	%	No	%	No	%	No	%
Difficulty with needle placement	31	3	41	3	68	4	99	5
Difficulty in obtaining desired blood flow rate	10	1	27	2	36	2	59	3
Other difficulty	5	0	7	1	21	1	28	1
No difficulty	1017	96	1260	94	1553	93	1687	90
Total	1063	100	1335	100	1678	100	1873	100

Table 3.1.16: Complications reported with Vascular Access, Government Centres 1996 - 1999

Complication	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
thrombosis	27	3	50	4	59	4	88	5
bleed	3	0	7	1	27	2	14	1
aneurysmal dilatation	36	3	103	8	122	7	123	7
swollen limb	4	0	15	1	20	1	22	1
access related infection, local/systemic	3	0	17	1	13	1	19	1
distal limb ischaemia	2	0	2	0	4	0	7	0
venous outflow obstruction	9	1	18	1	25	1	29	2
carpal tunnel	13	1	15	1	11	1	25	1
other	11	1	6	0	30	2	23	1
no complication	955	90	1102	83	1368	81	1523	81
	1063	100	1335	100	1679	100	1873	100

Table 3.1.17: Blood Flow Rates in Government HD Units, 1996 – 1999

Blood flow rates	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
<150 ml/min	1	0	2	0	4	0	5	0
150-199 ml/min	16	2	27	2	28	2	42	2
200-249 ml/min	498	49	455	35	516	31	429	23
250-299 ml/min	418	41	642	50	803	49	951	52
300-349 ml/min	77	8	151	12	270	16	382	21
> 350 ml/min	9	1	18	1	27	2	21	1
Total	1019	100	1295	100	1648	100	1830	100

Table 3.1.18: Number of HD Sessions per week, Government HD Units, 1996 - 1999

HD sessions Per week	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
1	0	0	1	0	1	0	1	0
2	4	0	4	0	2	0	9	0
3	1047	99	1323	99	1671	100	1856	99
4	6	1	7	1	2	0	1	0
Total	1057	100	1335	100	1676	100	1867	100

Table 3.1.19 Duration of HD in Government Units, 1996 - 1999

Duration of HD per session	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
≤3 hours	2	0	7	1	3	0	2	0
3.5 hours	1	0	3	0	17	1	0	0
4 hours	1019	96	1251	94	1554	93	1744	93
4.5 hours	27	3	68	5	88	5	104	6
5 hours	8	1	7	1	8	0	17	1
≥5 hours	0	0	1	0	3	0	0	0
Total	1057	100	1337	100	1673	100	1867	100

Table 3.1.20: Dialyser membrane types in Government HD Units, 1996 - 1999

Dialyser membrane	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
Cellulosic	782	77	916	72	805	54	511	37
Cellulose acetate	206	20	284	22	325	22	320	23
Synthetic	33	3	66	5	373	25	545	40
Total	1021	100	1266	100	1503	100	1376	100

Table 3.1.21: Dialyser Reuse Frequency in Government HD Units, 1996 - 1999

Dialyser reuse frequency	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
1*	14	1	17	1	14	1	16	1
2	10	1	7	1	5	0	6	0
3	724	76	948	75	174	11	128	7
4	154	16	125	10	104	7	94	5
5	11	1	45	4	106	7	125	7
6	30	3	97	8	760	50	919	52
7	0	0	2	0	36	2	41	2
8	1	0	4	0	65	4	82	5
9	10	1	25	2	109	7	174	10
10	0	0	0	0	69	5	66	4
11	0	0	0	0	23	2	5	0
12	0	0	0	0	63	4	105	6
≥13	0	0	0	0	0	0	0	0
Total	954	100	1270	100	1528	100	1761	100

* 1 is single use ie no reuse

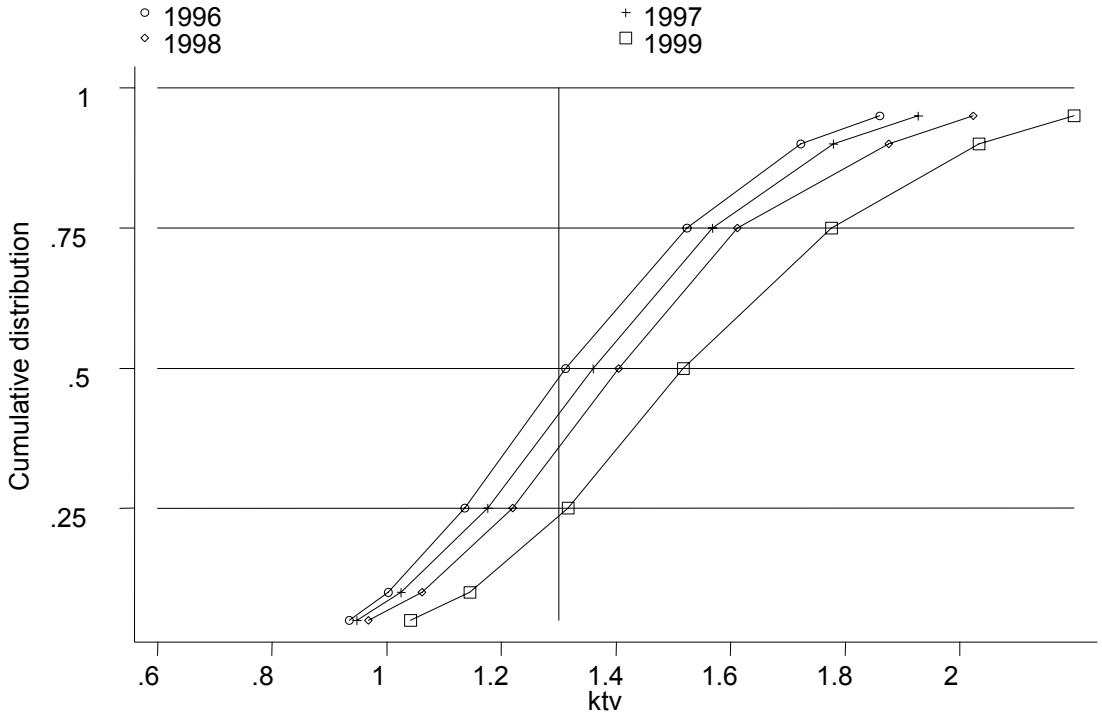
Table 3.1.22 Dialysate Buffer used in Government HD Units, 1996 - 1999

Dialysate buffer	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
Acetate	605	57	514	39	564	34	456	24
Bicarbonate	462	43	818	61	1086	66	1412	76
Total	1067	100	1332	100	1650	100	1868	100

Table 3.1.23: Distribution of Prescribed KT/V, Government Centres 1996 - 1999

Year	No of subjects	No of observations	median	LQ	UQ	% > 1.3
1996	1001	10491	1.3	1.1	1.5	52
1997	1255	12955	1.4	1.2	1.6	58
1998	1616	16757	1.4	1.2	1.6	64
1999	1803	18181	1.5	1.3	1.8	77

Figure 3.1.23: Cumulative Distribution of Prescribed KT/V by Year



3.1.9. DYSLIPIDAEMIA IN HD PATIENTS, GOVERNMENT CENTRES

Table 3.1.24: Distribution of Serum Cholesterol Levels (mmol/l), HD patients, Government Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients < 5.3 mmol/l
1996	626	1072	5	4.1	5.9	62
1997	859	1522	5.1	4.2	6	63
1998	1066	1736	5	4.2	5.9	63
1999	1555	2550	4.8	4	5.7	69

Figure 3.1.24: Cumulative distribution of serum cholesterol concentration by year

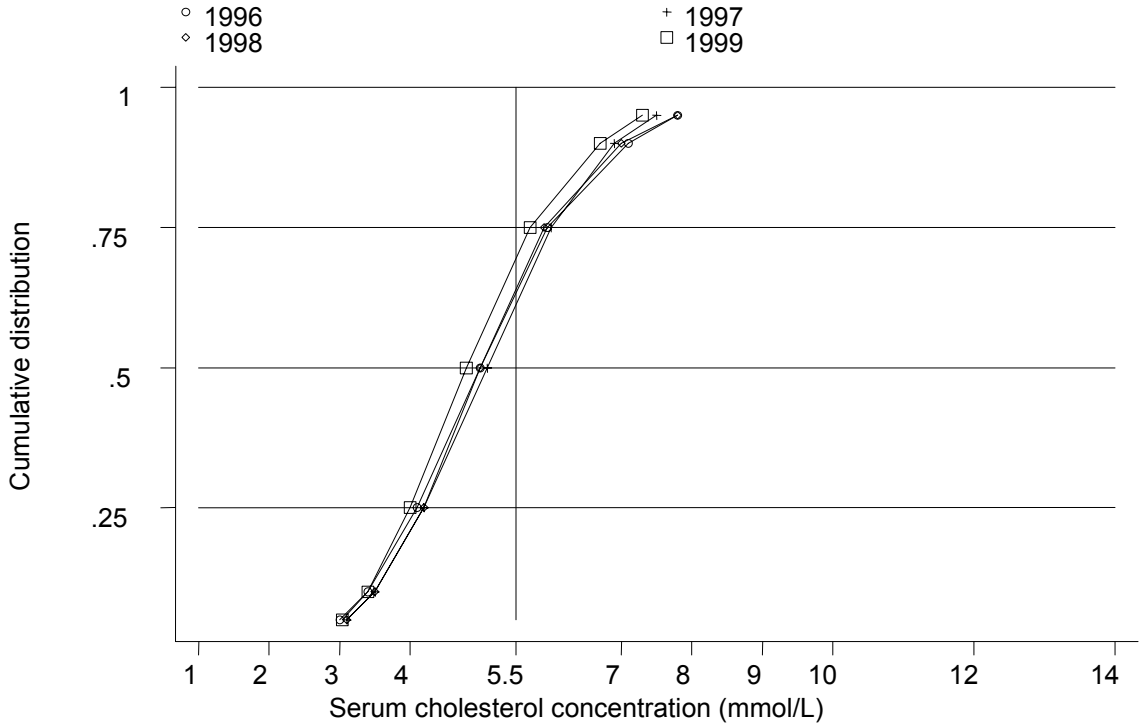


Table 3.1.25: Distribution of Serum Triglyceride (mmol/l), HD patients, Government Centres 1996 - 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients < 3.5 mmol/l
1996	556	942	1.8	1.2	2.7	87
1997	808	1442	1.8	1.2	2.5	87
1998	1004	1614	1.8	1.2	2.6	86
1999	1450	2305	1.7	1.2	2.5	88

Figure 3.1.25: Cumulative distribution of serum triglyceride concentration by year

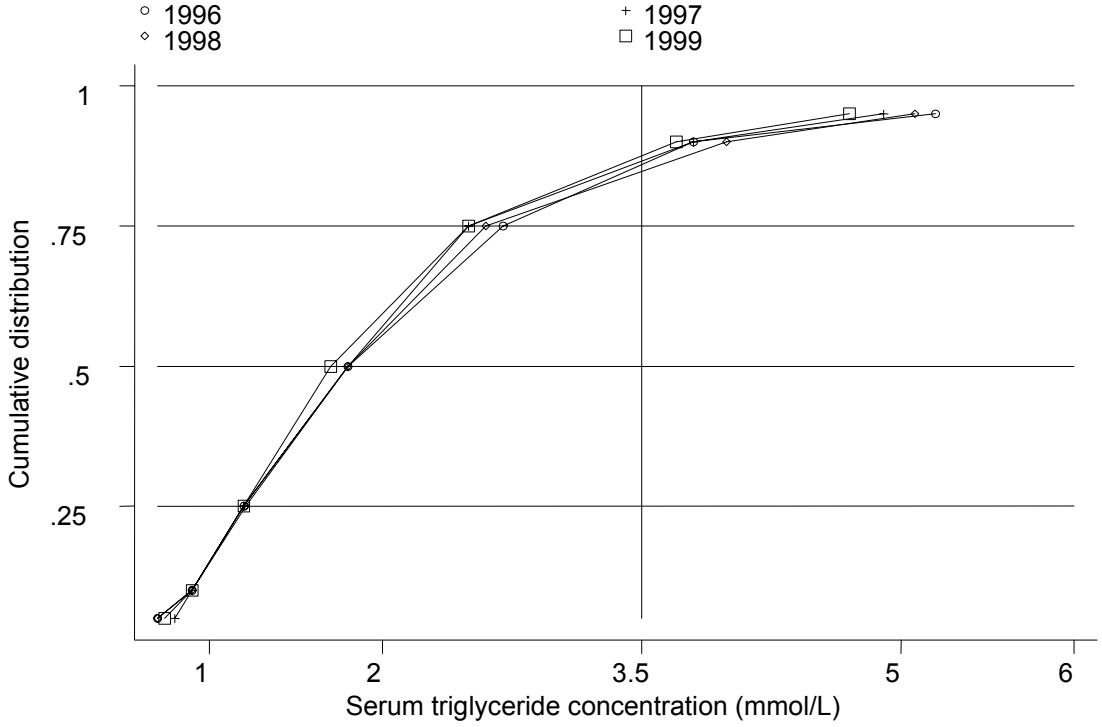


Table 3.1.26: Distribution of serum LDL (mmol/l), HD patient, Government Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients <5 mmol/l
1996	279	450	3.3	2.4	4.3	86
1997	403	676	3.2	2.4	4.2	92
1998	477	737	3	2.2	3.9	92
1999	742	1047	3	2.3	3.9	93

Figure 3.1.26 : Cumulative distribution of serum LDL by year

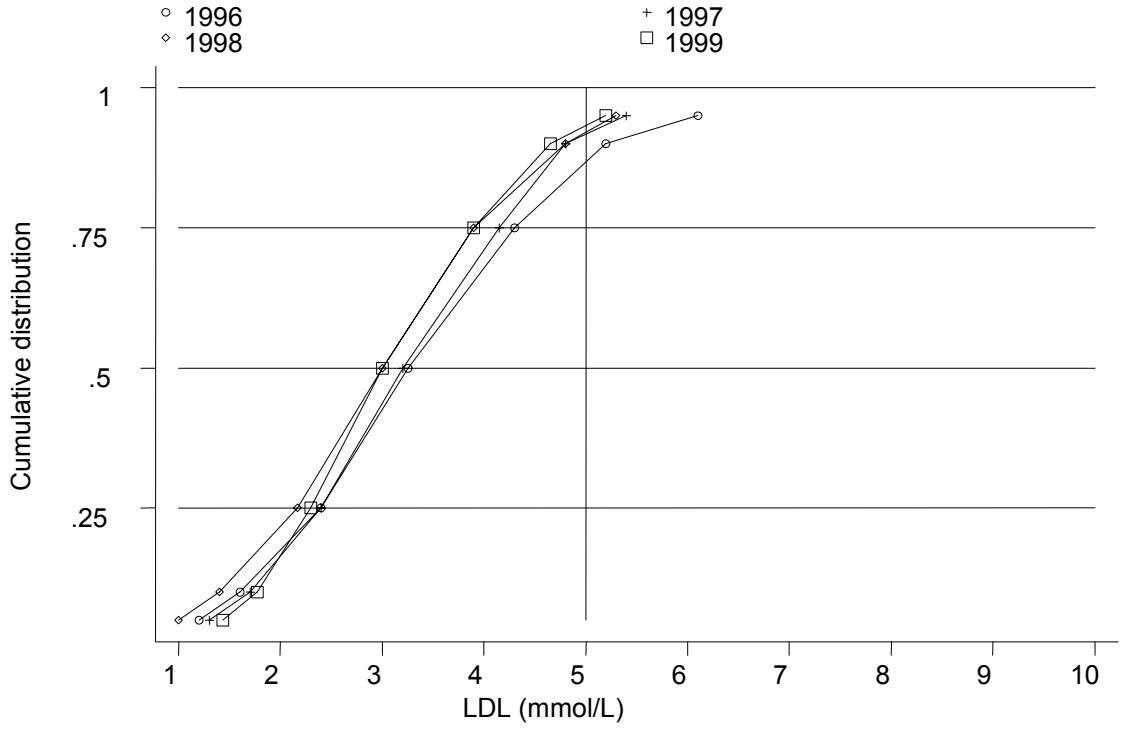
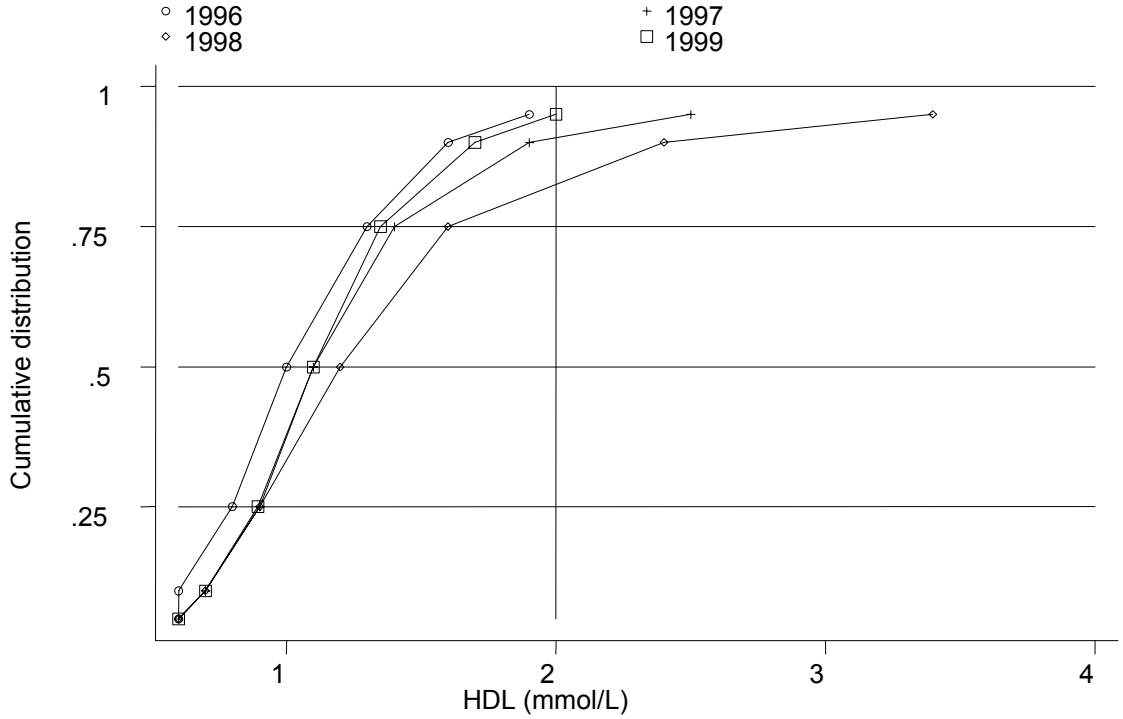


Table 3.1.27: Distribution of serum HDL (mmol/l), HD patient, Government Centres 1996 - 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients < 2mmol/l
1996	259	426	1	.8	1.3	95
1997	389	661	1.1	.9	1.4	91
1998	482	751	1.2	.9	1.6	84
1999	757	1080	1.1	.9	1.4	95

Figure 3.1.27: Cumulative distribution of serum HDL by year



3.1.10 MANAGEMENT OF RENAL BONE DISEASE, GOVERNMENT CENTRES

Table 3.1.28: Treatment for Renal Bone Disease, HD patients, Government Centres 1996- 1999

year	No of subjects	% on CaCO3	% on Al(OH)3	% on Vit D
1996	1071	90	45	54
1997	1347	90	26	40
1998	1690	90	18	28
1999	1884	91	10	24

Table 3.1.29: Distribution of serum Phosphate (mmol/l), HD patients, Government Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients < 1.6 mmol/l
1996	1052	3632	1.9	1.5	2.3	31
1997	1313	4418	1.8	1.5	2.3	33
1998	1623	5360	1.9	1.5	2.3	30
1999	1831	5916	1.8	1.4	2.3	36

Figure 3.1.29 Cumulative Distribution of serum Phosphate by year

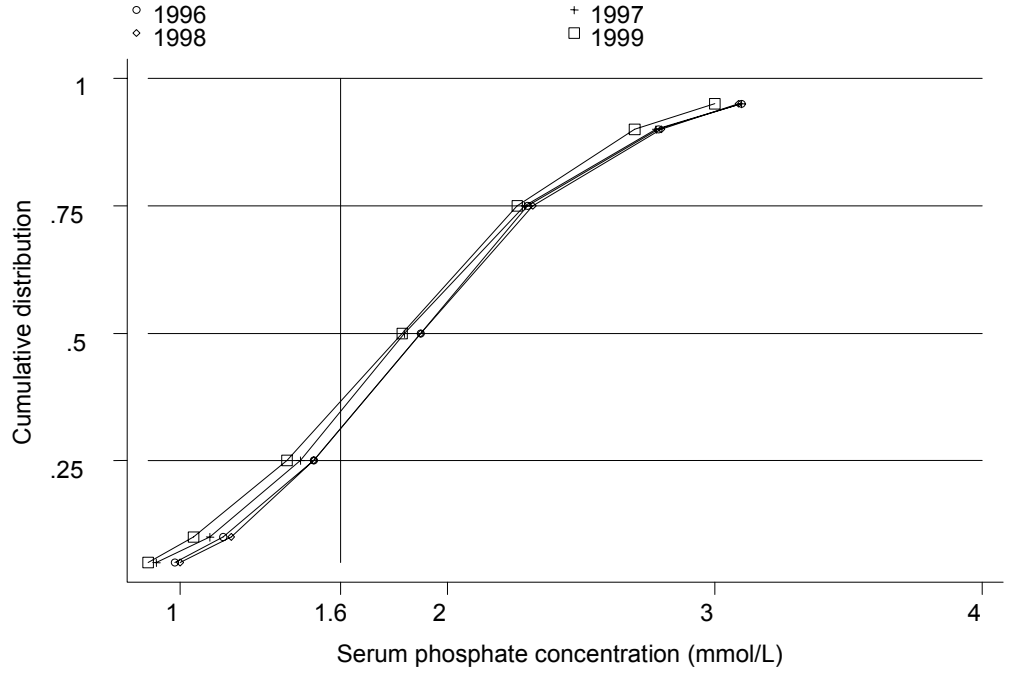


Table 3.1.30: Distribution of serum Calcium (mmol/l), HD patients, Government Centres 1996– 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients ≥ 2.2 & ≤2.6 mmol/l
1996	1055	3653	2.4	2.2	2.6	54
1997	1313	4442	2.4	2.2	2.6	52
1998	1653	5462	2.3	2.2	2.5	53
1999	1847	6048	2.3	2.2	2.5	51

Figure 3.1.30: Cumulative distribution of Serum Calcium by year

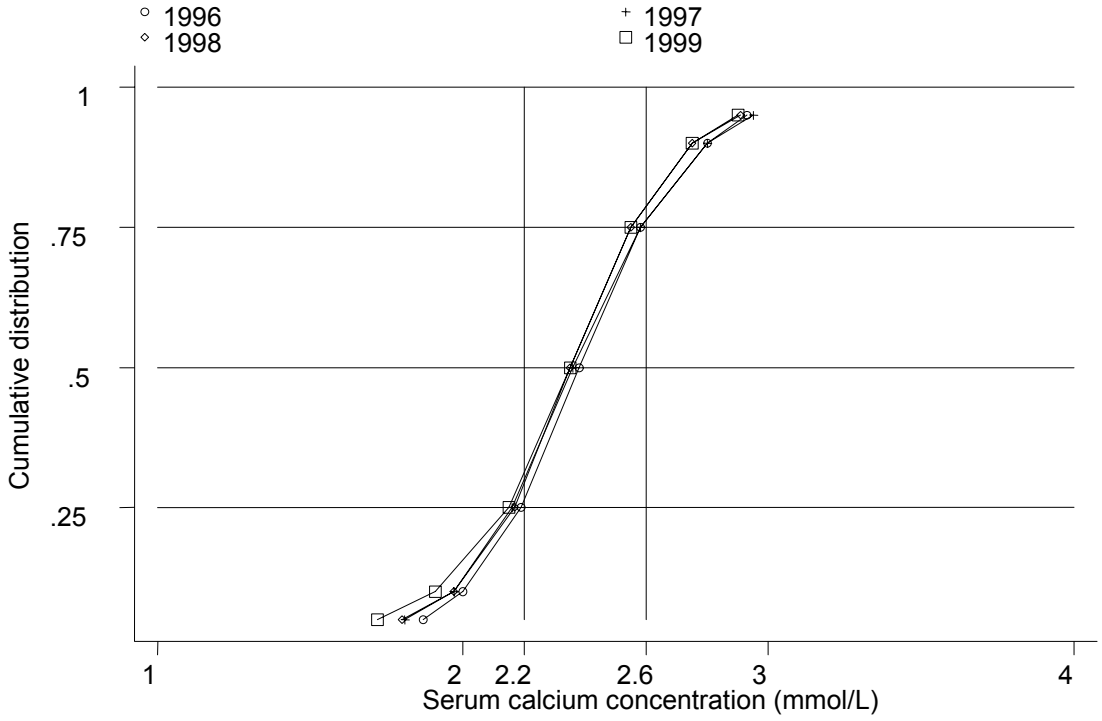
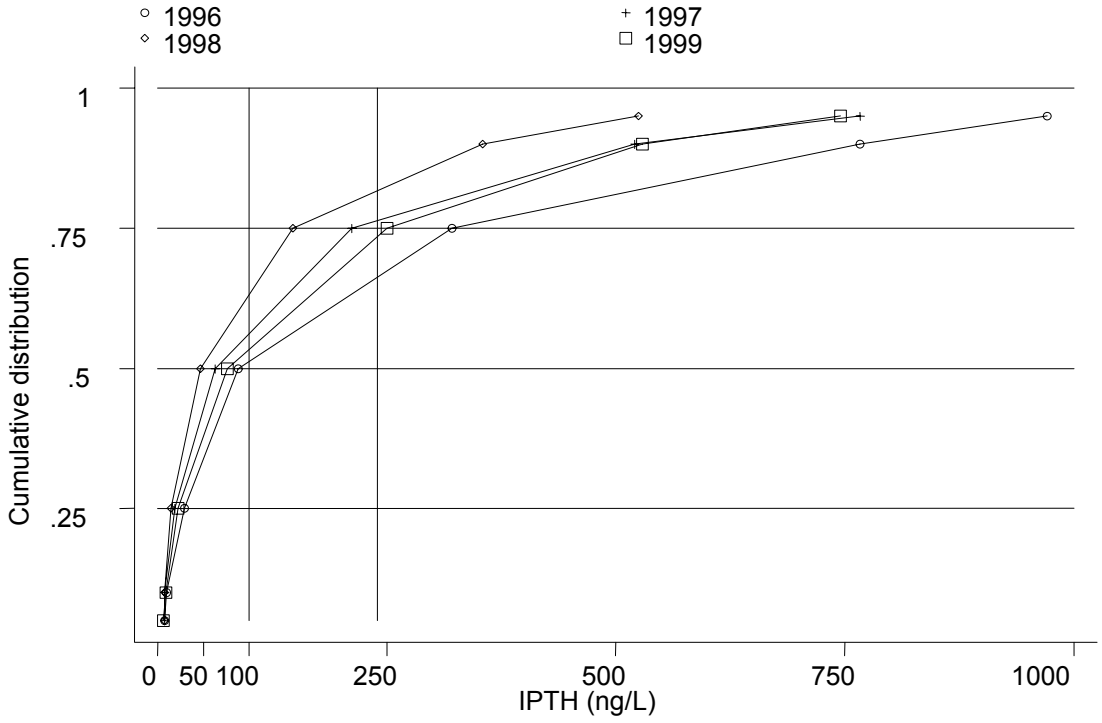


Table 3.1.31: Distribution of serum iPTH(ng/L), HD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients ≥ 100 & ≤ 250 ng/l
1996	328	368	88	29	321.5	15
1997	829	1253	63	19	212	16
1998	759	1027	47	15	148	16
1999	1226	1864	76.2	22	250.5	18

Figure 3.1.31: Cumulative Distribution of serum iPTH by year



3.1.11. MANAGEMENT OF HYPERTENSION, GOVERNMENT CENTRES

Table 3.1.32: Treatment for hypertension, HD patients, Government Centres 1996 - 1999

Year	No.	% on anti-hypertensives	% on 1 anti-hypertensives	% on 2 anti-hypertensives	% on 3 anti-hypertensives
1996	1071	58	32	19	6
1997	1347	62	35	21	6
1998	1690	64	37	20	7
1999	1884	67	35	24	8

Table 3.1.33: Distribution of Systolic BP without anti-hypertensives, HD patients, Government Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients < 160 mmHg
1996	450	4817	130	116	142	88
1997	500	5373	130	115	145	88
1998	606	6442	130	117	148	86
1999	612	6325	130	118	148	88

Figure 3.1.33: Cumulative Distribution of Systolic BP without anti-hypertensives by year

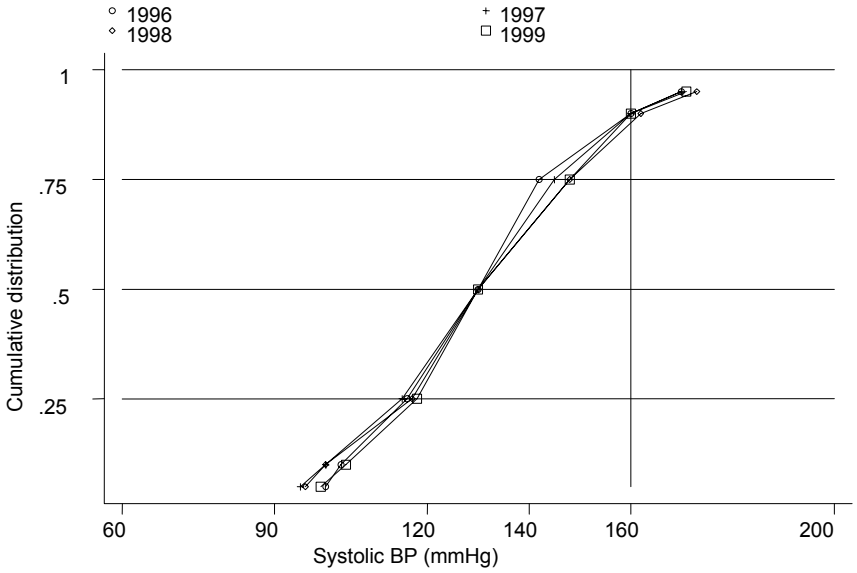


Table 3.1.34: Distribution of Diastolic BP without anti-hypertensives, HD patients, Government Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 90 mmHg
1996	450	4817	80	70	90	74
1997	500	5363	80	70	90	75
1998	606	6441	80	70	88	77
1999	612	6322	79	70	86	80

Figure 3.1.34: Cumulative Distribution of Diastolic BP without anti-hypertensives by year

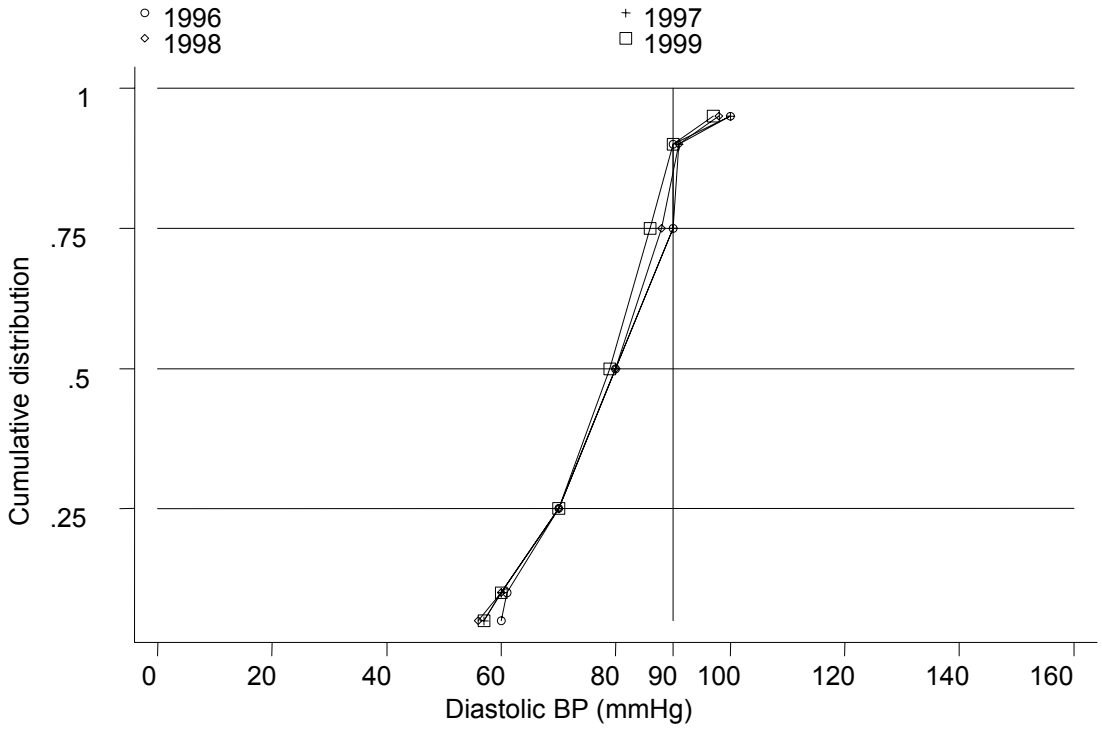


Table 3.1.35: Distribution of systolic BP on anti-hypertensives, HD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 160 mmHg
1996	611	6297	150	130	160	65
1997	824	8312	150	132	167	63
1998	1063	10840	150	137	166	62
1999	1256	12535	150	136	167	62

Table 3.1.35: Cumulative Distribution of systolic BP on anti-hypertensives, by year

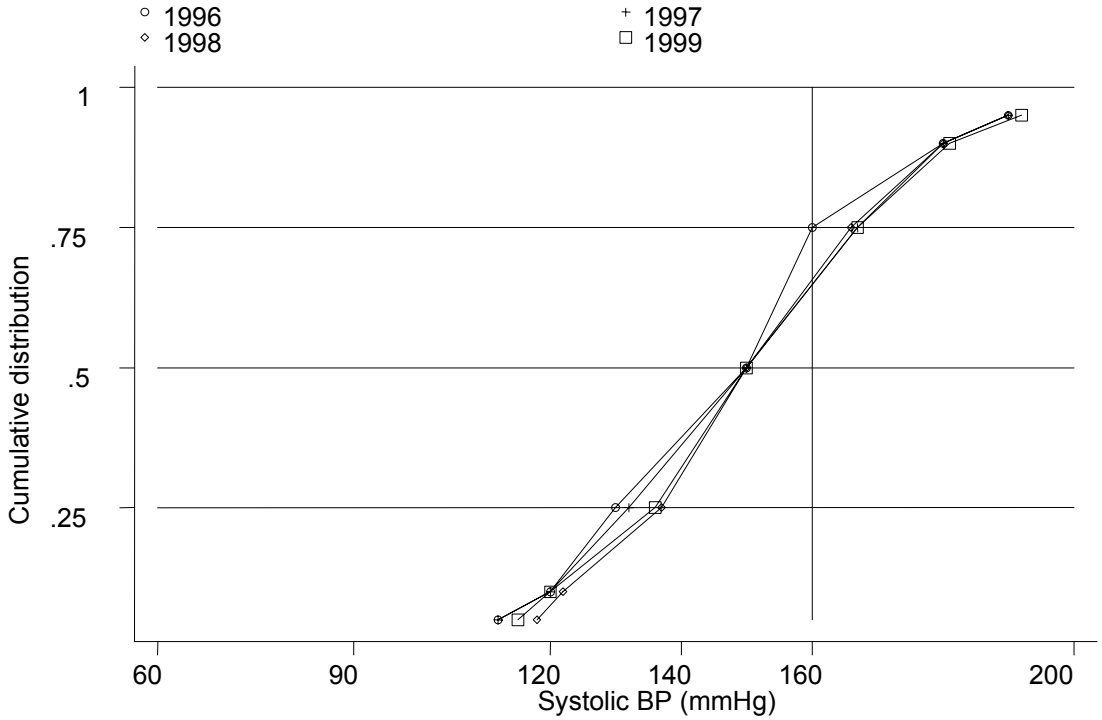
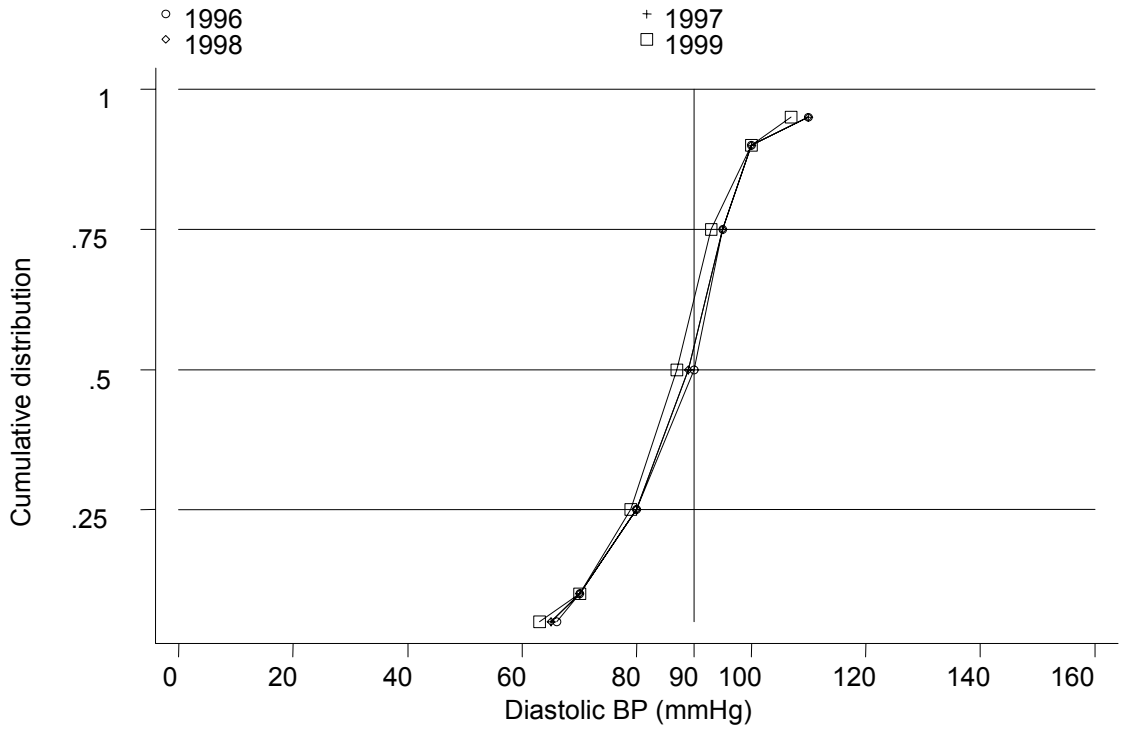


Table 3.1.36: Distribution of diastolic BP on anti-hypertensives, HD patients, Government Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients < 90 mmHg
1996	611	6299	90	80	95	49
1997	824	8308	89	80	95	50
1998	1063	10846	89	80	95	51
1999	1256	12537	87	79	93	55

Figure 3.1.36: Cumulative Distribution of diastolic BP on anti-hypertensives by year



3.1.12. TREATMENT OF ANAEMIA, GOVERNMENT HD CENTRES

Table 3.1.37: Treatment for Anaemia, HD patients, Government Centres 1996 - 1999

Year	No	% on rHuEpo	% received blood transfusion	% on oral Iron	% received parenteral Iron
1996	1071	34	7	94	3
1997	1347	45	8	92	5
1998	1690	45	14	92	5
1999	1884	48	16	94	5

Table 3.1.38: Distribution of rHuEpo dose per week, HD patients, Government Centres 1996 - 1999

Year	1996	1997	1998	1999
No. of patients	351	581	706	871
% on 2000 u/week	4	11	17	19
% on 2-4000 u/week	70	67	61	60
% on 4-6000 u/week	6	6	7	6
% on 6-8000 u/week	18	14	13	14
% on 8-12000 u/week	2	2	3	2
% on >12000 u/week	0	0	0	0

Table 3.1.39: Distribution of serum Iron without rHuEpo, HD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 10 umol/l
1996	611	1789	14	10	19	72
1997	622	1606	14	10	20	71
1998	600	1481	14	10	21	73
1999	657	1555	14.1	10	22.3	72

Figure 3.1.39: Cumulative Distribution of serum Iron without rHuEpo by year

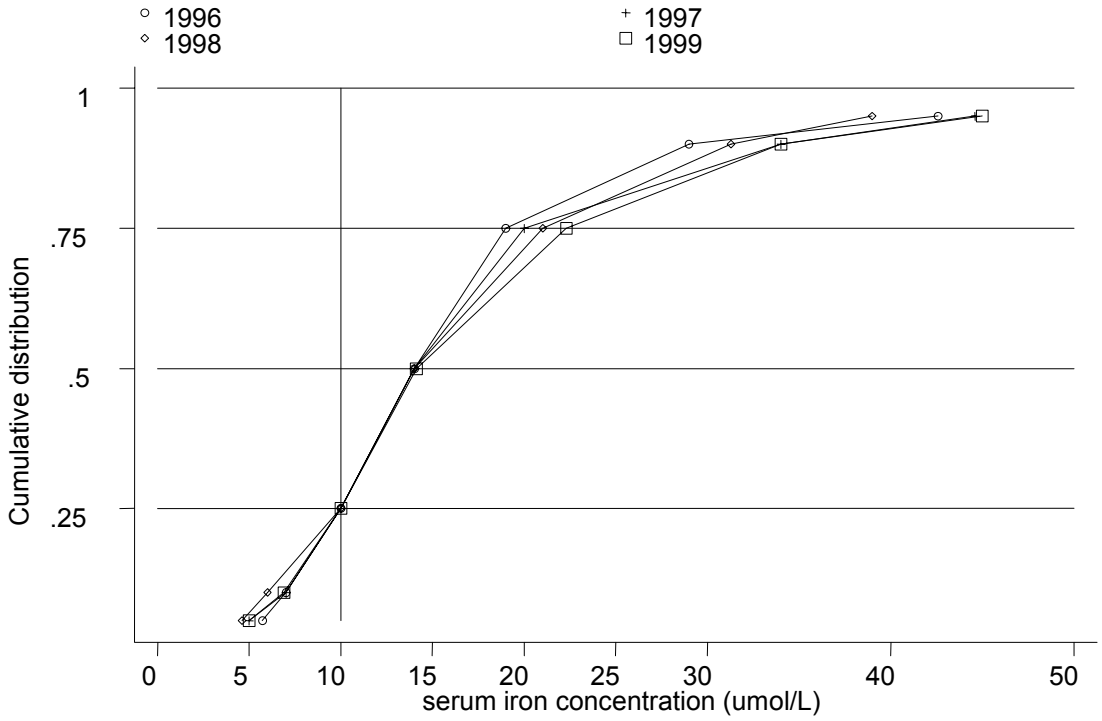


Table 3.1.40: Distribution of serum Iron on rHuEpo, HD patients, Government Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 10 umol/l
1996	316	1024	15	10.6	23	75
1997	520	1484	14	10	21	72
1998	533	1566	14.4	10	22	73
1999	643	1871	14	10	23.2	74

Figure 3.1.40:Cumulative Distribution of serum Iron on rHuEpo, by year.

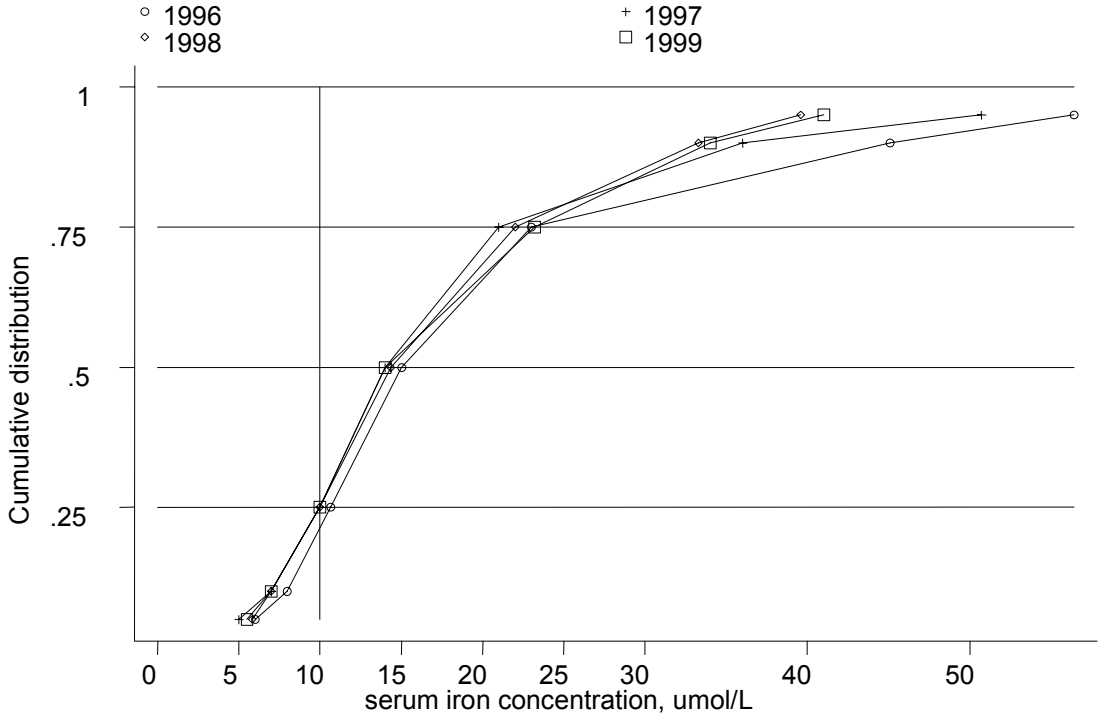


Table 3.1.41: Distribution of Transferrin Saturation without rHuEpo, HD patients, Government Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 20%
1996	583	2332	27.8	19.4	38.3	72
1997	591	2364	29.3	20.4	42.2	76
1998	422	1688	29.8	18.2	43.6	70
1999	395	1580	27.2	18.4	41	70

Figure 3.1.41: Cumulative Distribution of serum Transferrin Saturation without rHuEpo by year

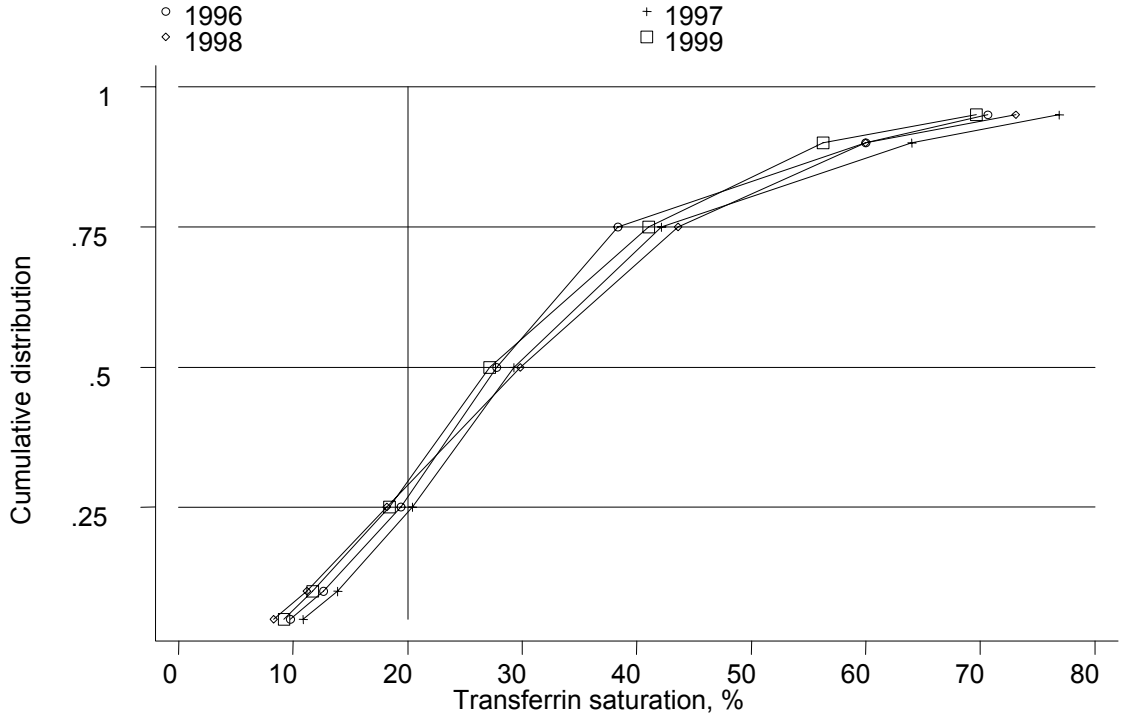


Table 3.1.42: Distribution of Transferrin Saturation on rHuEpo, HD patients, Government Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 20%
1996	296	1184	32.8	23	49.6	79
1997	485	1940	30.3	22.2	43.9	81
1998	426	1704	31.2	22	44.7	81
1999	485	1940	30.3	20.9	42.4	77

Figure 3.1.42: Cumulative Distribution of serum Transferrin Saturation on rHuEpo by year

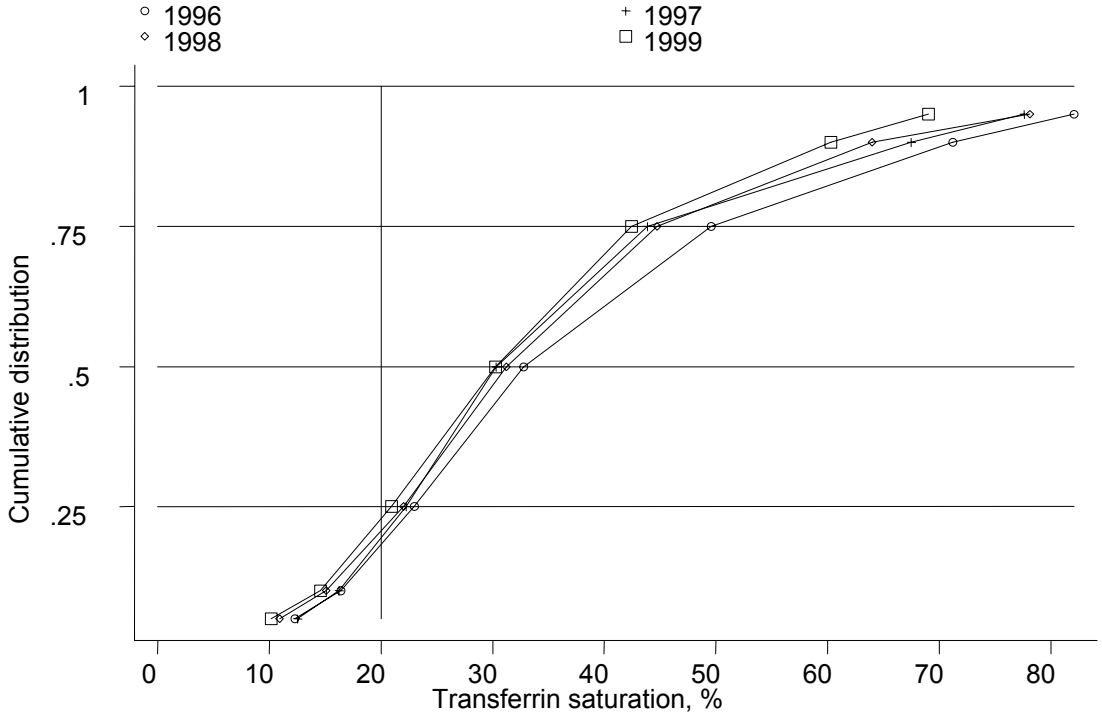


Table 3.1.43: Distribution of serum Ferritin without rHuEpo, HD patients, Government Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients > 100 ug/l
1996	56	76	200.5	84	444	70
1997	149	216	387.5	105.5	867.5	77
1998	191	259	250	124	611.7	80
1999	295	446	379	155	826.5	84

Figure 3.1.43:Cumulative Distribution of serum Ferritin without rHuEpo by year

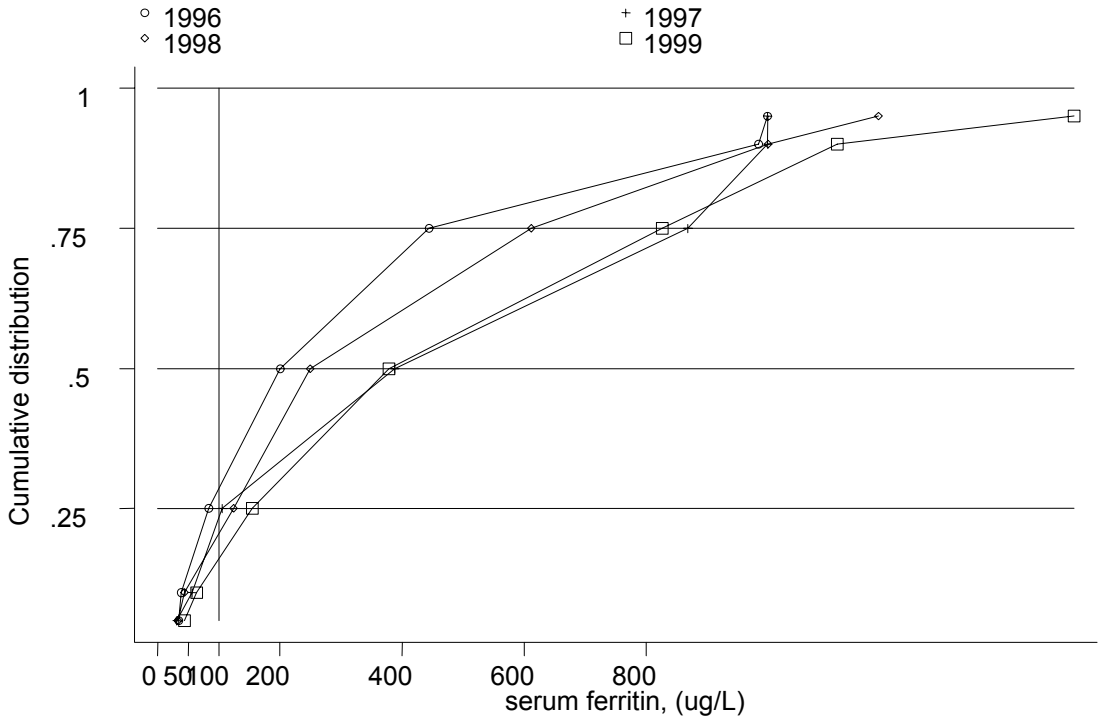


Table 3.1.44: Distribution of serum Ferritin on rHuEpo, HD patients, Government Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients > 100 ug/l
1996	145	217	383	172	889	87
1997	318	525	424	184	897	87
1998	296	447	472	221	838	91
1999	446	701	426.8	210.7	840.7	91

Figure 3.1.44: Cumulative Distribution of serum Ferritin on rHuEpo, by year

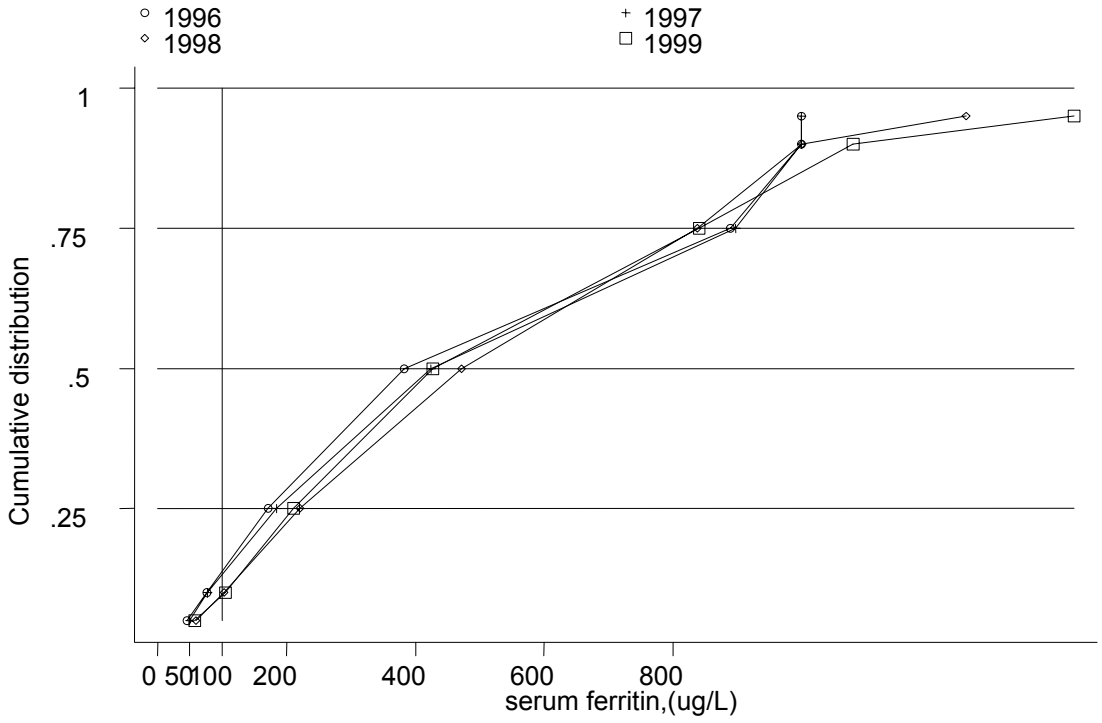


Table 3.1.45: Distribution of Haemoglobin concentration without rHuEpo, HD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients <10 g/dl	% patients ≥10 & ≤12 g/dl	% patients >12 g/dl
1996	703	2447	8.9	7.6	10.5	68	23	9
1997	727	2415	9.3	7.9	10.8	62	26	12
1998	906	2852	9.1	7.8	10.6	66	24	10
1999	958	2953	9.3	7.8	10.7	63	27	10

Table 3.1.45:Cumulative Distribution of Haemoglobin concentration without rHuEpo by year

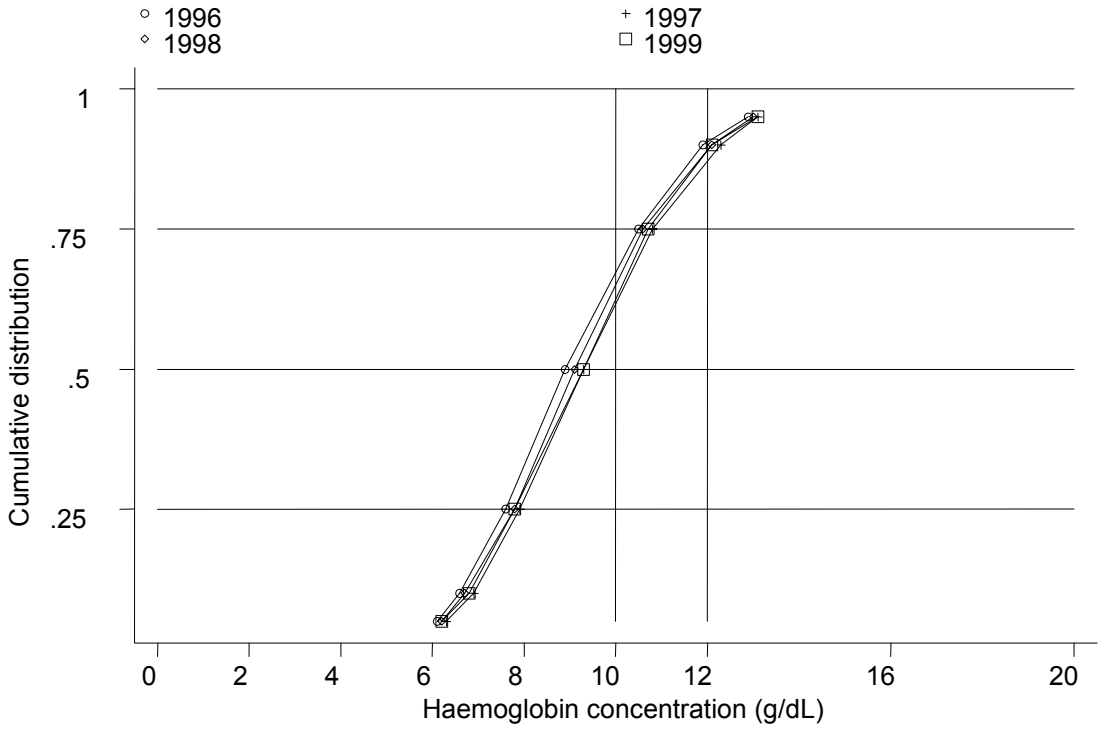
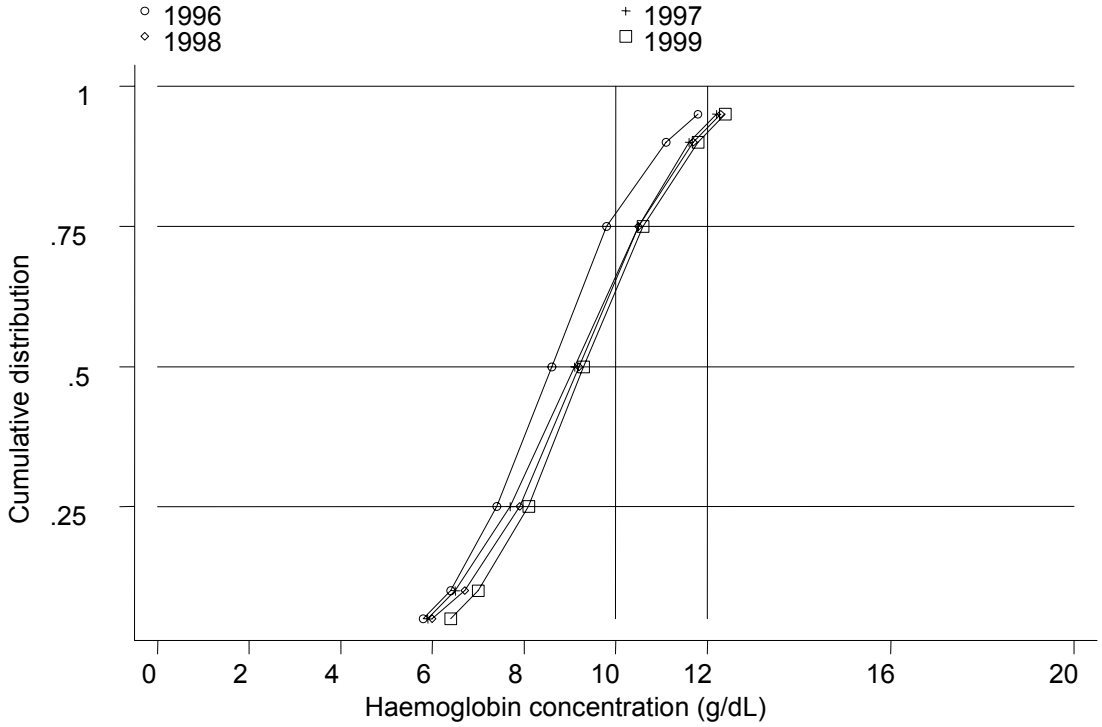


Table 3.1.46: Distribution of Haemoglobin concentration on rHuEpo, HD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients <10 g/dl	% patients ≥10 & ≤12 g/dl	% patients >12 g/dl
1996	359	1304	8.6	7.4	9.8	78	18	4
1997	601	2155	9.1	7.7	10.5	67	28	6
1998	756	2732	9.2	7.9	10.5	64	29	7
1999	905	3240	9.3	8.1	10.6	62	30	8

Figure 3.1.46: Cumulative Distribution of Haemoglobin concentration on rHuEpo, by year



3.1.13 NUTRITIONAL STATUS OF HD PATIENTS GOVERNMENT CENTRES

Table 3.1.47: Distribution of serum Albumin (g/L), HD patients, Government Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients >40g/l
1996	1024	3610	41	38	45	63
1997	1308	4420	41	38	45	63
1998	1654	5486	42	38	46	66
1999	1836	6024	41	37	44	60

Figure 3.1.47: Cumulative Distribution of serum Albumin by year

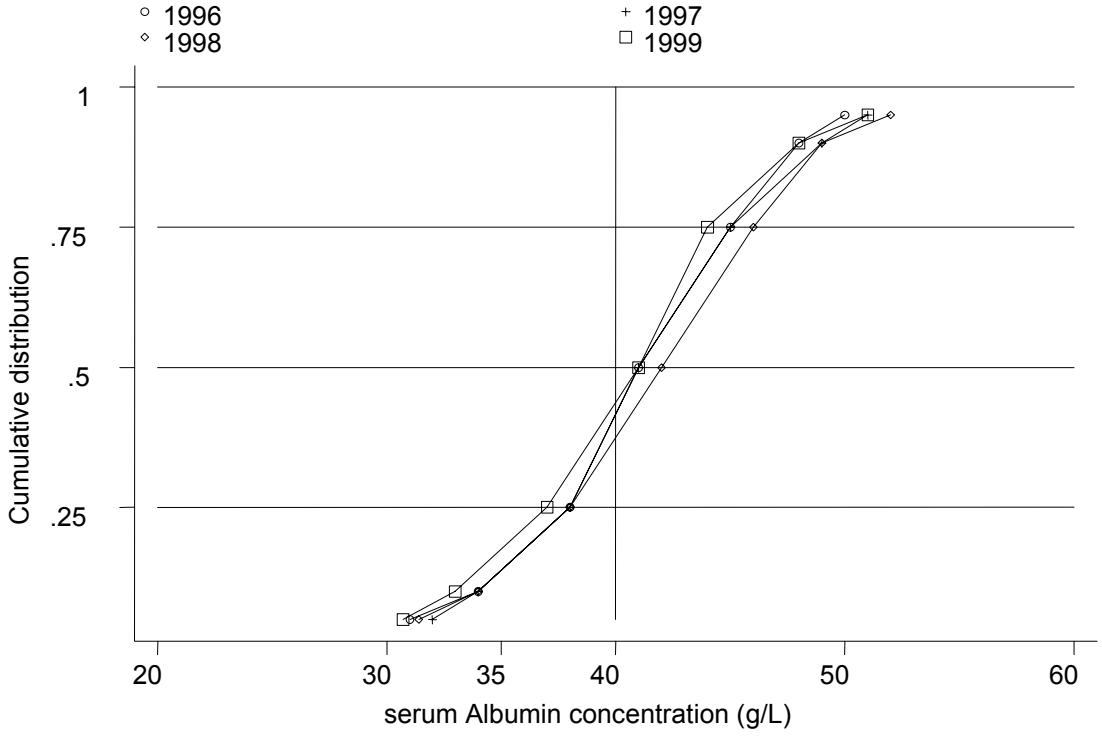
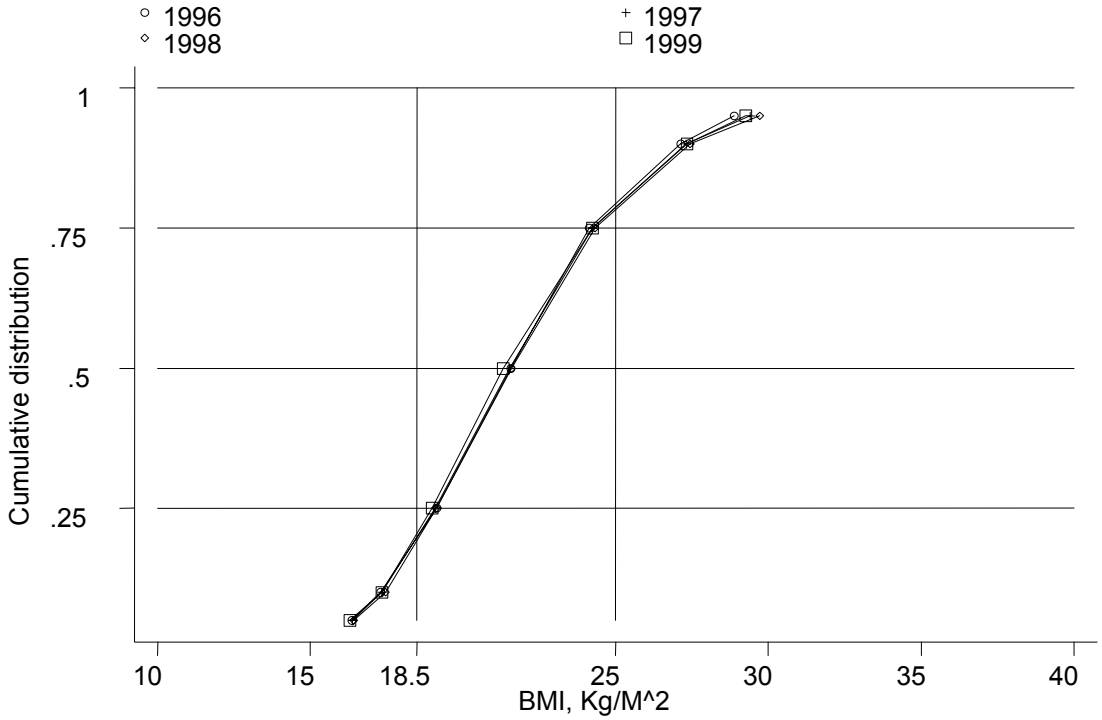


Table 3.1.48: Distribution of Body Mass Index
HD patients, Government Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients <18.5	% patients ≥18.5 & ≤25	% patients >25
1996	977	10199	21.6	19.1	24.1	19	62	19
1997	1239	12725	21.5	19.1	24.2	19	61	20
1998	1584	16395	21.6	19.1	24.3	18	61	20
1999	1773	17847	21.3	19	24.2	20	61	20

Figure 3.1.48: Cumulative Distribution of BMI by year

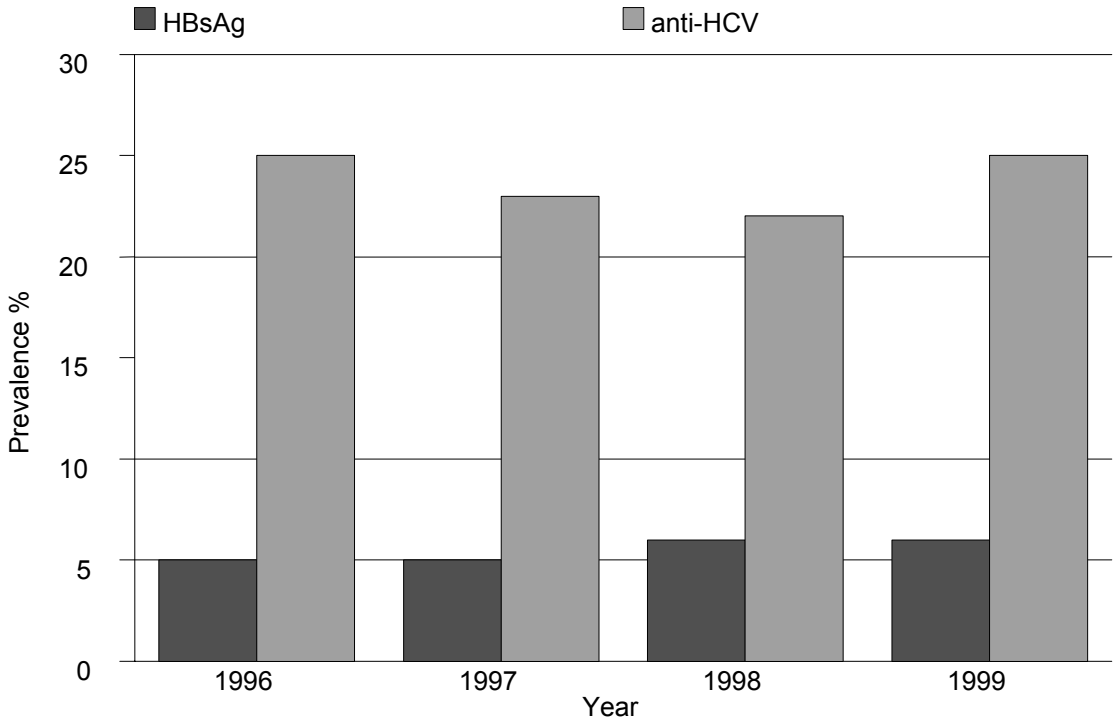


3.1.14 *SEROLOGICAL STATUS, HD PATIENTS GOVERNMENT CENTRES*

Table 3.1.49: Prevalence of positive anti-HCV and HbsAg HD patients, Government Centres 1996 – 1999

Year	No	% HbsAg positive	% anti-HCV positive
1996	1071	5	25
1997	1347	5	23
1998	1690	6	22
1999	1884	6	25

Figure 3.1.49: Prevalence of positive anti-HCV and HbsAg HD patients, Government Centres 1996 – 1999



HAEMODIALYSIS

IN

NON-GOVERNMENTAL ORGANISATION (NGO)

CENTRES

Stock and Flow

Death on Haemodialysis

NGO Haemodialysis Centres

Haemodialysis Patient Characteristics

Survival Analysis

Work related rehabilitation and quality of life

Haemodialysis practices

Dyslipidaemia in HD patients

Treatment of Renal Bone Disease

Management of Blood Pressure

Management of Anaemia

Nutritional status

Prevalence of anti-HCV antibodies and HBsAg

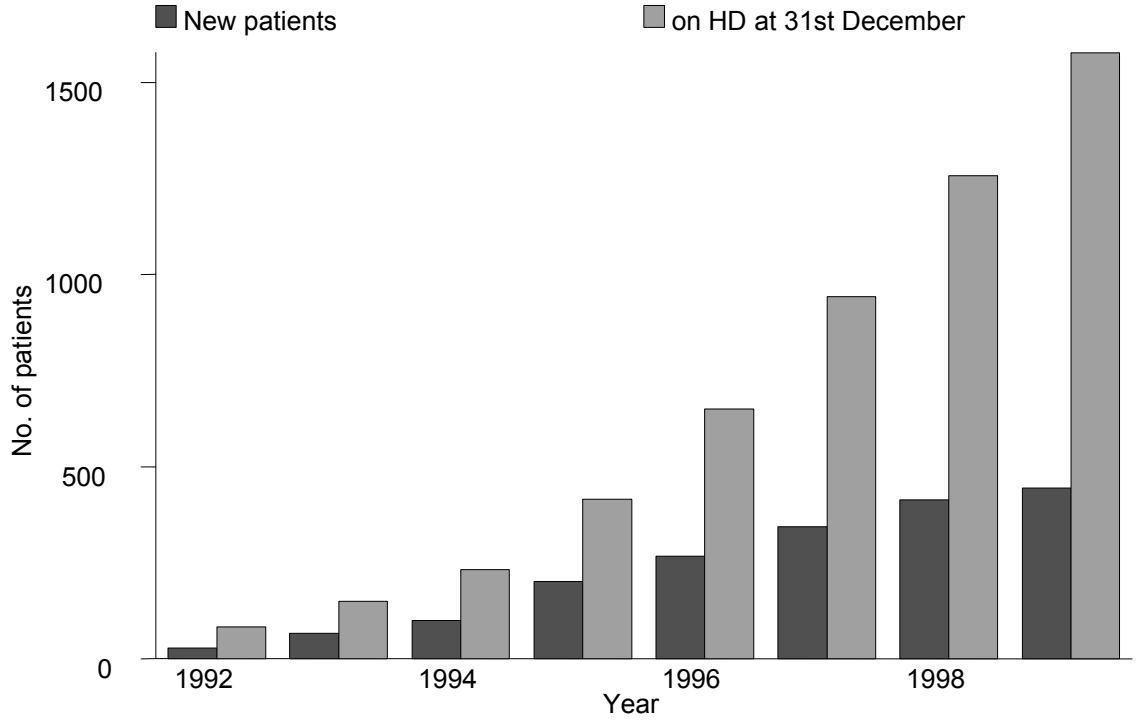
3.2: HAEMODIALYSIS IN NON-GOVERNMENTAL ORGANISATION (NGO) CENTRES

3.2.1 STOCK AND FLOW

Table 3.2.01: Stock and Flow: NGO Centres 1996 - 1999

Year	1996	1997	1998	1999
New patients	268	343	413	445
Died	20	40	81	102
Transferred to PD	0	0	1	4
Transplanted	5	8	13	14
Lost to follow up	8	2	3	4
Dialysing at 31st December	650	943	1258	1579

Figure 3.2.01: Stock and Flow, HD patients, NGO Centres 1992 - 1999



3.2 3 DEATH ON HAEMODIALYSIS, NGO CENTRES

Table 3.2.04: Death Rate on HD: NGO Centres 1996 – 1999

Year	1996	1997	1998	1999
No. at risk	533	797	1101	1419
Deaths	20	40	81	102
Death rate %	4	5	7	7
Transfer to PD	0	0	1	4
Transfer to PD rate %	0	0	0	0
All Losses	20	40	82	106
All Losses rate %	4	5	7	7

Figure 3.2.04: Death Rate on HD, NGO Centres to 1999

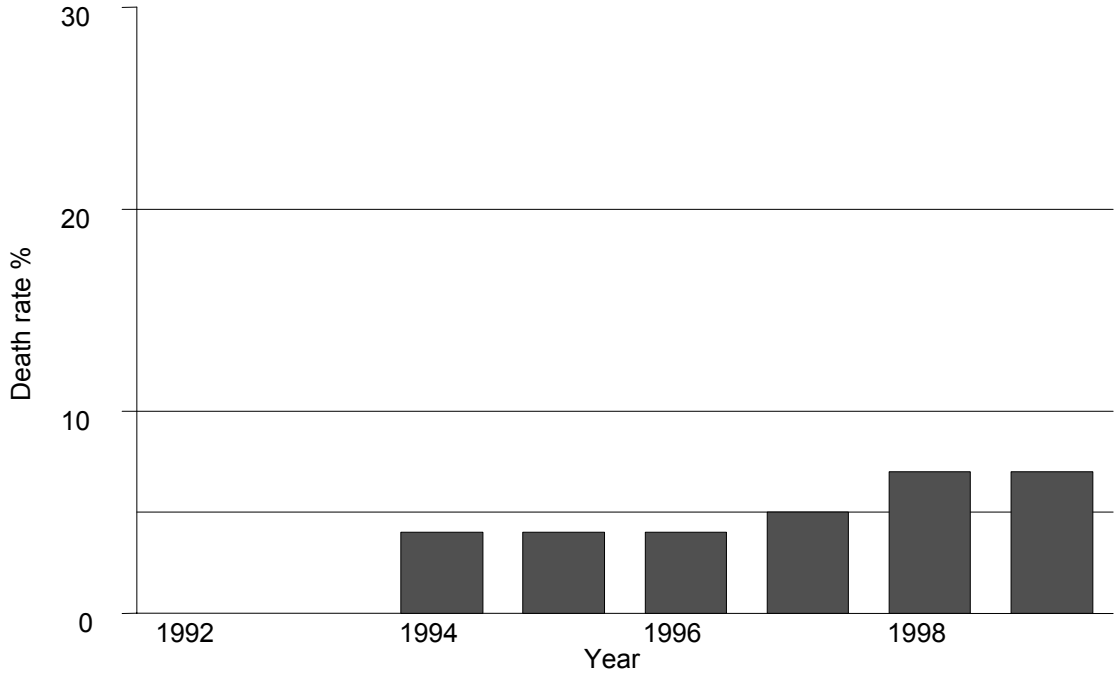


Table 3.2.05: Causes of Death: NGO Centres 1996 – 1999

	1996		1997		1998		1999	
Causes of death	No.	%	No.	%	No.	%	No.	%
Cardiovascular	7	35	9	23	35	43	28	27
Died at home	0	0	5	13	6	7	13	13
Sepsis	1	5	2	5	6	7	9	9
GIT bleed	0	0	0	0	2	2	3	3
Cancer	0	0	0	0	1	1	2	2
Liver disease	0	0	0	0	1	1	4	4
Others	12	60	18	45	27	33	34	33
Unknown	0	0	6	15	3	4	9	9
Total	20	100	40	100	81	100	102	100

3.2.4 NGO HAEMODIALYSIS CENTRES

Table 3.2.07: Centre Distribution of HD patients, NGO Centres

No	Centre	No	percent
0	No. on HD at 31st December	1579	100
1	Amitabha Centre	3	0
2	Association Klang	37	2
3	Buddhist Pahang	20	1
4	Buddhist Tzu Chi	26	2
5	CHKMUS-MAA	40	3
6	Che Eng Khor	13	1
7	Fo En Haemodialysis	2	0
8	Islam PJ	4	0
9	KAS-Rotary/NKF Sarawak	15	1
10	Kidney Sibu	26	2
11	Kiwanis Dialysis	8	1
12	Lions Muar	61	4
13	MAA Cheras	16	1
14	MAA Butterworth	39	2
15	MAA KL	105	7
16	MAA Lions JB	66	4
17	MAA Teluk Intan	25	2
18	MMA Kajang	15	1
19	Mawar N. Sembilan (Bahau)	11	1
20	Mawar N. Sembilan (Lukut)	12	1
21	Mawar N. Sembilan (Seremban)	82	5
22	NKF Charis (Cheras)	60	4
23	NKF Alor Setar	33	2
24	NKF Bakti (Kelang)	56	4
25	NKF Berjaya (PJ)	56	4
26	NKF Hang Lekiu	55	3
27	NKF Ipoh	59	4
28	NKF Manjong (Setiawan)	37	2
29	NKF Rotary Damansara (Kepong)	57	4
30	NKF Trengganu	19	1
31	Penang Community	27	2
32	Persatuan Buah Pinggang Sabah	24	2
33	Persatuan Bulan Sabit Merah (Miri)	20	1
34	Persatuan Membaiki Akhlak Che Luan Khor	10	1
35	Pertubuhan Hemodialisis SPS	2	0
36	Pusat Darul Iltizam	16	1
37	Pusat Hemodialisis (MCA Cawagan Pasar Meru)	1	0

No.	Centre	No	percent
38	Pusat Muhibah	52	3
39	Pusat Yayasan Felda	1	0
40	Rotary AMD	9	1
41	Rotary Batu Pahat	57	4
42	Rotary JB	44	3
43	Rotary Kluang	4	0
44	Rotary Kota Tinggi	4	0
45	Rotary Kulai	45	3
46	Rotary MAA (KB), HD	2	0
47	Rotary Pontian	40	3
48	SJAM Bacang	82	5
49	SJAM-KPS (Kelang)	19	1
50	Woh Peng Cheang Seah	3	0
51	Yayasan Kebajikan SSL Heamodialisis	59	4

3.2.5. HAEMODIALYSIS PATIENTS' CHARACTERISTICS, NGO CENTRES

Table 3.2.08: Age Distribution of Dialysis Patients, NGO Centres 1996 – 1999

Year	1996	1997	1998	1999
New Dialysis patients (No.)	268	343	413	445
1-14 years	0	0	0	0
15-24 years	4	6	3	2
25-34 years	12	10	11	12
35-44 years	18	22	18	16
45-54 years	32	25	28	31
55-64 years	21	26	26	26
≥65 years	14	11	13	13
Dialysing at 31st December	650	943	1258	1579
1-14 years	0	0	0	0
15-24 years	4	4	4	3
25-34 years	16	15	14	13
35-44 years	24	24	23	22
45-54 years	29	28	28	29
55-64 years	18	21	22	23
≥65 years	9	9	9	10

Table 3.2.09: Patient Characteristics , NGO Centres 1996 – 1999

Year	1996	1997	1998	1999
New Dialysis patients	268	343	413	445
Mean age±sd	49±13	49±13	50±13	50±13
% male	58	57	52	58
% Diabetic	34	33	45	41
% HBsAg+	5	5	4	5
% Anti-HCV+	9	6	4	6

3.2.6. SURVIVAL ANALYSIS, NGO CENTRES

Table 3.2.10: HD Patient Survival, NGO Centres 1994-1999

Year	1994			1995			1996		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	98	1	90	97	1	192	97	1	257
12	95	2	86	94	2	183	95	1	247
24	95	2	85	92	2	174	90	2	232
36	91	3	82	89	2	166	78	3	198
48	88	3	79	85	3	156			
60	83	4	68						
Year	1997			1998			1999		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	95	1	327	96	1	396	97	1	225
12	92	1	309	94	1	371			
24	83	2	271						

No. = number at risk
SE = standard error

Figure 3.2.10: HD Patient Survival, NGO Centres 1995-1999

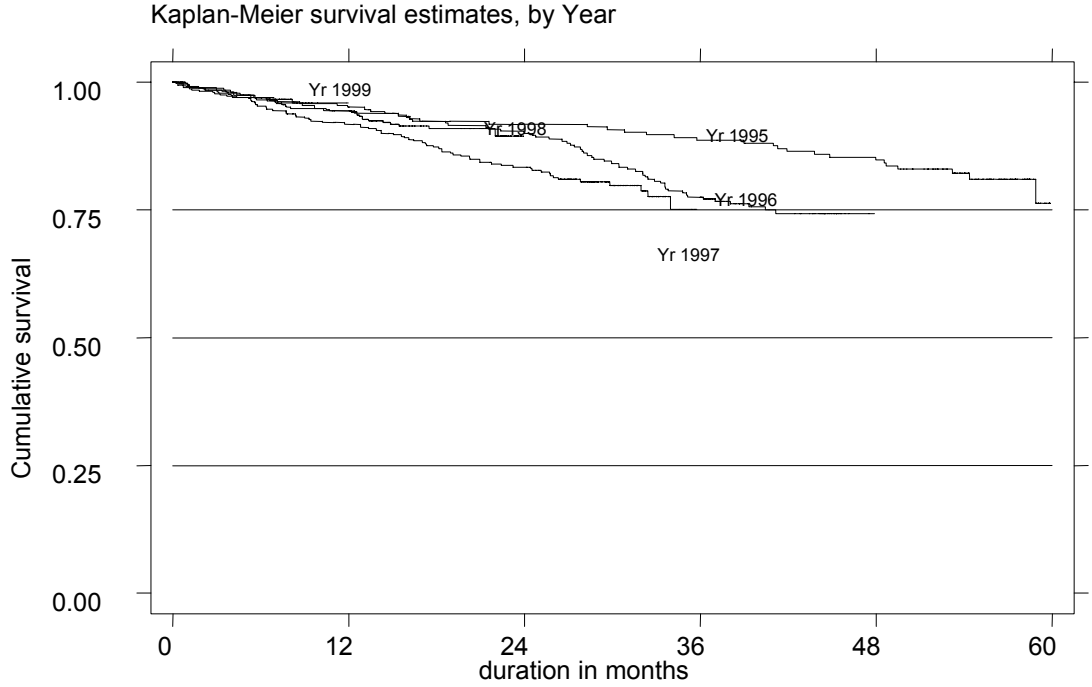


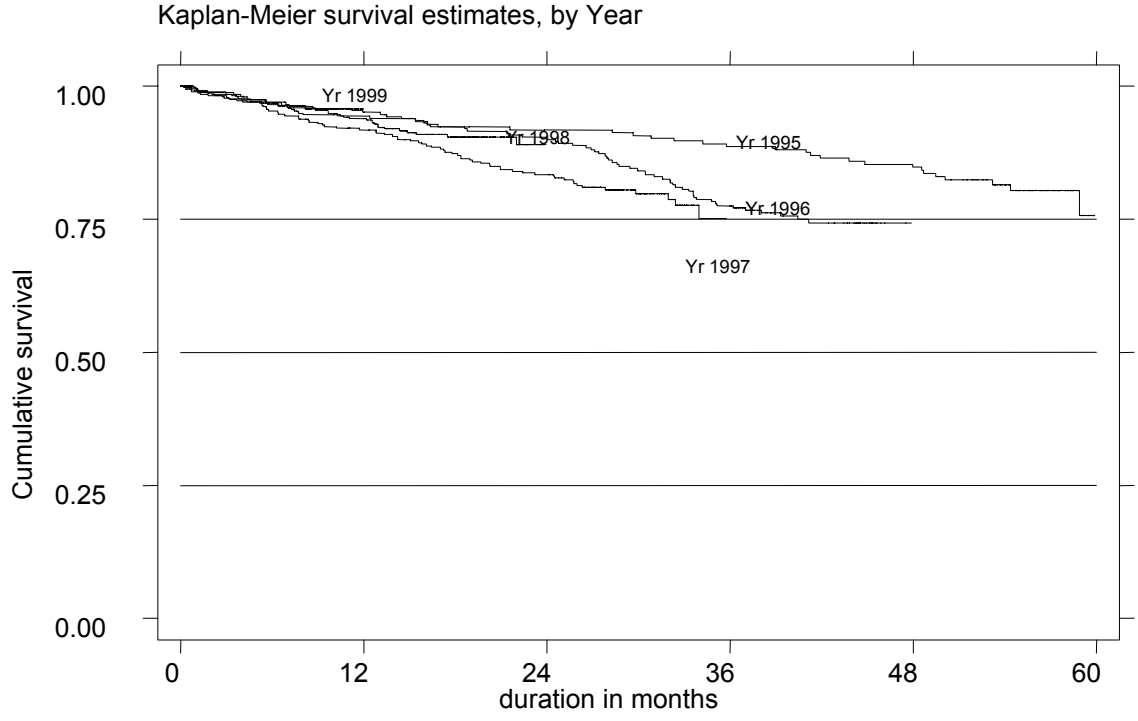
Table 3.2.11: HD Technique Survival, NGO Centres 1994-1999

Year	1994			1995			1996		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	98	1	90	97	1	192	97	1	257
12	95	2	86	94	2	183	95	1	247
24	95	2	85	92	2	174	90	2	232
36	91	3	82	89	2	166	78	3	198
48	88	3	79	85	3	156			
60	83	4	68						

Year	1997			1998			1999		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	95	1	327	96	1	396	97	1	225
12	92	1	309	94	1	371			
24	83	2	271						

No. = number at risk
SE = standard error

Figure 3.2.11 HD Technique Survival by year of entry, NGO centres



3.2.7 WORK RELATED REHABILITATION AND QUALITY OF LIFE ON HAEMODIALYSIS, NGO CENTRES

Table 3.2.12: Work Related Rehabilitation on HD, NGO centres 1997-1999

REHABILITATION STATUS	1997		1998		1999	
	No.	%	No.	%	No.	%
Full time work for pay	88	28	69	19	102	16
Part time work for pay	54	17	55	15	110	17
Able to work but unable to get a job	15	5	15	4	33	5
Able to work but not yet due to dialysis schedule	7	2	10	3	37	6
Able but disinclined to work	10	3	3	1	21	3
Home maker	70	22	111	31	181	28
Full time student	1	0	0	0	1	0
Age<15 years	1	0	0	0	0	0
Retired	16	5	24	7	45	7
Age>65 years	17	5	23	6	34	5
Unable to work due to poor health	38	12	47	13	73	11
Total	317	100	357	100	637	100

Table 3.2.13: Quality of Life on Haemodialysis, NGO Centres, 1997 – 1999

QOL Index Summated Score	1997		1998		1999	
	No.	%	No.	%	No.	%
0 (Worst QOL)	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	0	2	0
3	4	1	4	1	4	1
4	14	4	11	3	15	2
5	13	4	9	3	24	4
6	25	8	21	6	32	5
7	31	10	19	6	56	9
8	43	13	35	10	76	12
9	43	13	29	8	73	12
10 (Best QOL)	150	46	216	63	350	55
Total	323	100	344	100	632	100

3.2.8 HAEMODIALYSIS PRACTICES IN NGO CENTRES

Table 3.2.14: Vascular Access on Haemodialysis, NGO Centres, 1997 -1999

Access types	1997		1998		1999	
	No.	%	No.	%	No.	%
Wrist AVF	287	89	355	87	589	85
BCF*	28	9	41	10	90	13
venous graft	2	1	3	1	2	0
artificial graft	3	1	3	1	5	1
PERMCATH	0	0	0	0	2	0
temporary CVC	3	1	5	1	9	1
Total	323	100	407	100	697	100

- *BCF = Brachiocephalic fistula*
- *CVC = Central venous catheter*

Table 3.2.15: Difficulties reported with Vascular Access, NGO Centres 1997 – 1999

Access difficulty	1997		1998		1999	
	No.	%	No.	%	No.	%
Difficulty with needle placement	14	4	12	3	23	3
Difficulty in obtaining desired blood flow rate	6	2	11	3	18	3
Other difficulty	3	1	4	1	12	2
No difficulty	300	93	391	94	648	92
Total	323	100	418	100	701	100

Table 3.2.16: Complications reported with Vascular Access, NGO Centres 1997 – 1999

Complication	1997		1998		1999	
	No.	%	No.	%	No.	%
thrombosis	19	6	9	2	27	4
bleed	6	2	7	2	2	0
aneurysmal dilatation	11	3	3	1	15	2
swollen limb	3	1	1	0	7	1
access related infection, local/systemic	1	0	3	1	3	0
distal limb ischaemia	0	0	2	0	0	0
venous outflow obstruction	7	2	8	2	17	2
carpal tunnel	1	0	0	0	0	0
other	3	1	8	2	13	2
no complication	272	84	377	90	617	88
Total	323	100	418	100	701	100

Table 3.2.17: Blood Flow Rates in NGO HD Units, 1997 – 1999

Blood flow rates	1997		1998		1999	
	No.	%	No.	%	No.	%
<150 ml/min	0	0	0	0	0	0
150-199 ml/min	7	2	8	2	13	2
200-249 ml/min	186	62	208	53	327	48
250-299 ml/min	83	28	146	37	282	42
300-349 ml/min	24	8	28	7	54	8
≥350 ml/min	0	0	2	1	1	0
Total	300	100	392	100	677	100

Table 3.2.18: Number of HD Sessions per week, NGO HD Units, 1997 – 1999

HD sessions per week	1997		1998		1999	
	No.	%	No.	%	No.	%
1	0	0	0	0	1	0
2	2	1	3	1	11	2
3	317	99	407	99	686	98
4	2	1	0	0	1	0
Total	321	100	410	100	699	100

Table 3.2.19 Duration of HD in NGO Units, 1997 – 1999

Duration of HD per session	1997		1998		1999	
	No.	%	No.	%	No.	%
≤3 hours	0	0	0	0	1	0
3.5 hours	0	0	0	0	1	0
4 hours	319	99	408	99	692	99
4.5 hours	2	1	3	1	2	0
5 hours	1	0	0	0	2	0
≥5 hours	0	0	0	0	0	0
Total	322	100	411	100	698	100

Table 3.2.20: Dialyser membrane types in NGO HD Units, 1997 – 1999

Dialyser membrane	1997		1998		1999	
	No.	%	No.	%	No.	%
Cellulosic	219	74	252	68	327	56
Cellulose acetate	70	24	85	23	157	27
Synthetic	8	3	36	10	102	17
Total	297	100	373	100	586	100

Table 3.2.21: Dialyser Reuse Frequency in NGO HD Units, 1997 – 1999

Dialyser reuse frequency	1997		1998		1999	
	No.	%	No.	%	No.	%
1*	3	1	1	0	5	1
2	2	1	0	0	2	0
3	39	13	28	7	40	6
4	47	16	8	2	21	3
5	143	48	28	7	94	15
6	57	19	303	79	396	61
7	0	0	1	0	3	0
8	0	0	1	0	37	6
9	5	2	0	0	4	1
10	0	0	15	4	30	5
11	0	0	0	0	0	0
12	0	0	0	0	12	2
≥13	0	0	0	0	0	0
Total	296	100	385	100	644	100

1 is single use ie no reuse

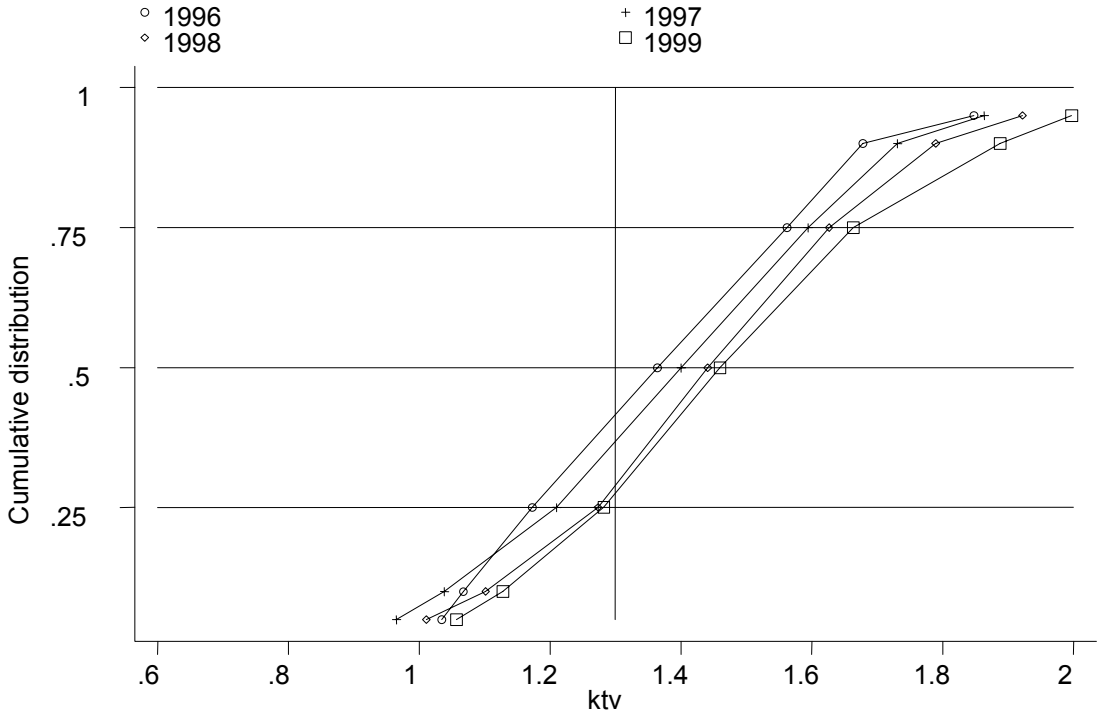
Table 3.2.22 Dialysate Buffer use in NGO HD Units, 1997 – 1999

Dialysate buffer	1997		1998		1999	
	No.	%	No.	%	No.	%
Acetate	26	8	34	8	27	4
Bicarbonate	296	92	368	92	660	96
Total	322	100	402	100	687	100

Table 3.2.23: Distribution of Prescribed KT/V, NGO Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% > 1.3
1996	148	1002	1.4	1.2	1.6	61
1997	286	2351	1.4	1.2	1.6	63
1998	376	3701	1.4	1.3	1.6	72
1999	669	6691	1.5	1.3	1.7	73

Figure 3.2.23: Cumulative Distribution of Prescribed KT/V by Year



3.2.9 DYSLIPIDAEMIA IN HD PATIENTS, NGO CENTRES

Table 3.2.24: Distribution of Serum Cholesterol Concentrations (mmol/l), HD patients, NGO Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 5.3 mmol/l
1996	30	53	4.2	3.7	5.1	85
1997	290	465	4.9	4	5.9	65
1998	84	136	4.8	4.1	5.5	74
1999	124	202	4.9	4.1	5.6	67

Figure 3.2.24: Cumulative distribution of serum cholesterol concentration by year

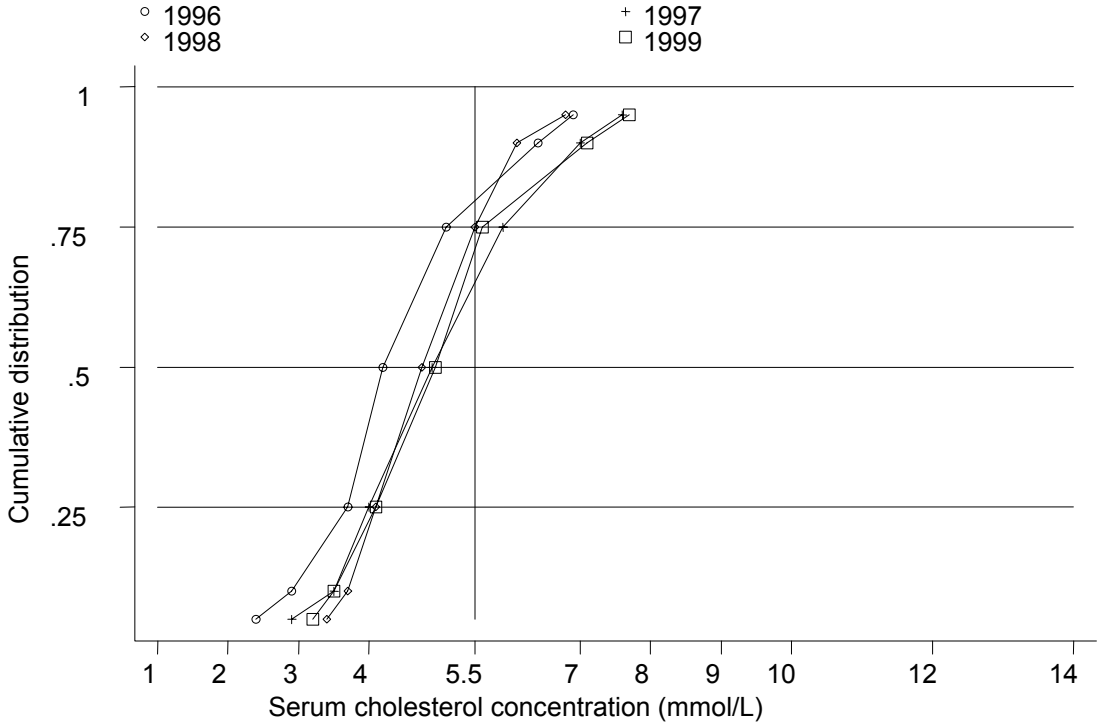


Table 3.2.25: Distribution of Serum Triglyceride (mmol/l), HD patients, NGO Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 3.5 mmol/l
1996	1	1	2.4	2.4	2.4	100
1997	7	10	2.4	2	3.3	80
1998	15	18	1.9	1.1	2.4	89
1999	74	96	1.7	1.2	2.7	88

Figure 3.2.25: Cumulative distribution of serum triglyceride concentration by year

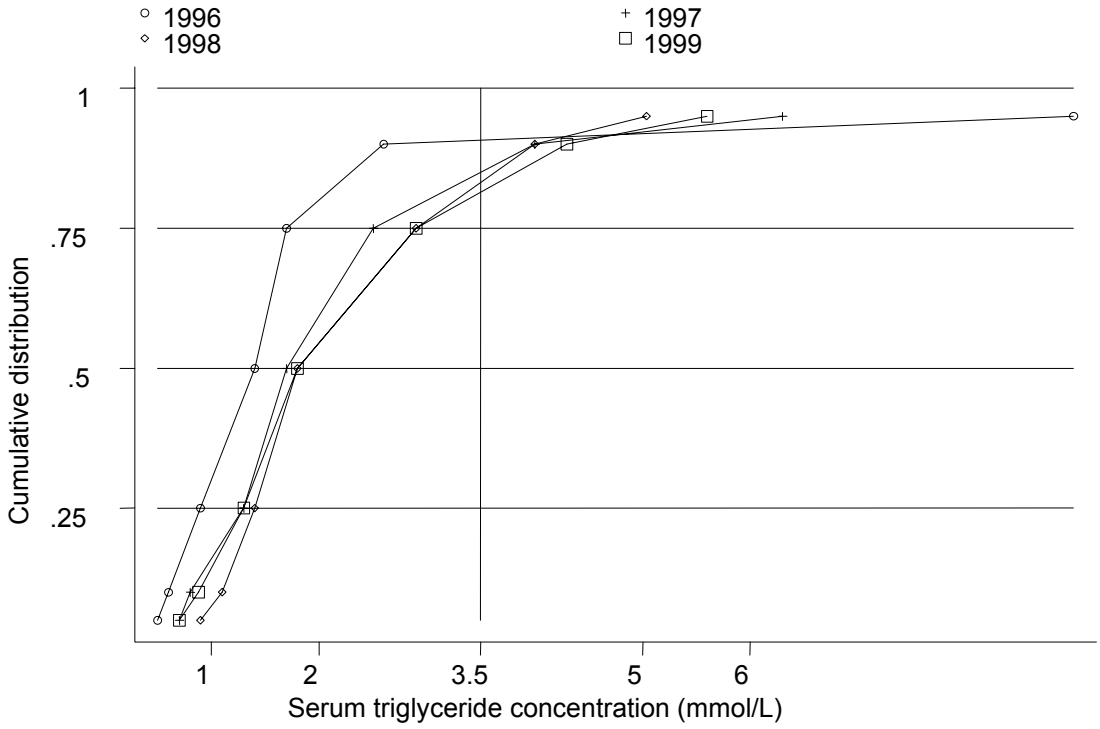


Table 3.2.26: Distribution of serum LDL (mmol/l), HD patients, NGO Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients <5 mmol/l
1996	3	5	1.9	1.7	2.6	100
1997	228	341	2.9	2.2	3.7	94
1998	29	41	2.6	1.7	3.2	98
1999	23	28	2.6	2.4	3	100

Figure 3.2.26 : Cumulative distribution of serum LDL by year

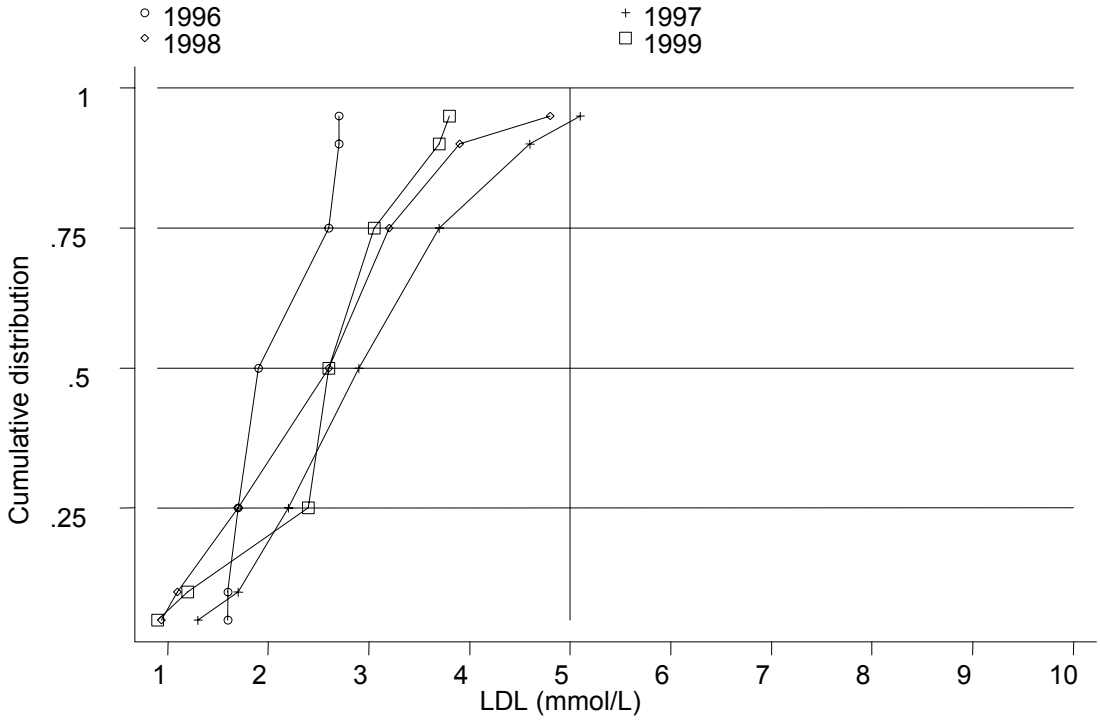
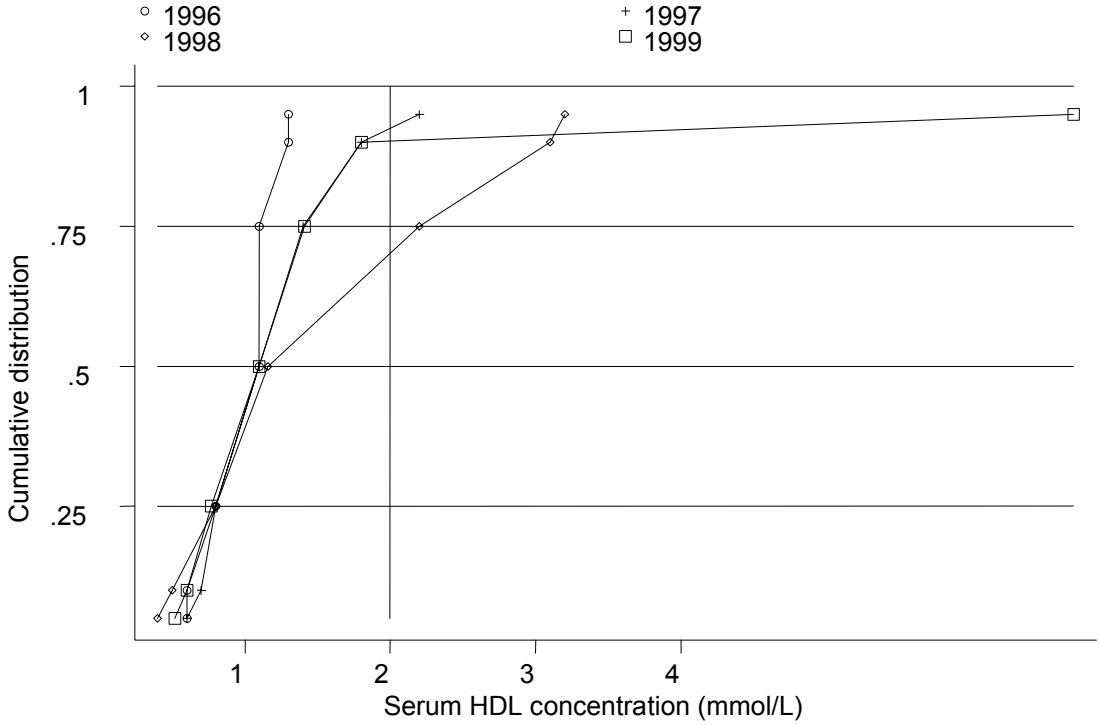


Table 3.2.27: Distribution of serum HDL (mmol/l), HD patients, NGO Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 2mmol/l
1996	3	5	1.1	.8	1.1	100
1997	243	370	1.1	.8	1.4	91
1998	30	43	1.2	.8	2.2	72
1999	25	29	1.1	.8	1.4	93

Figure 3.2.27: Cumulative distribution of serum HDL by year



3.2.10 MANAGEMENT OF RENAL BONE DISEASE, NGO CENTRES

Table 3.2.28: Treatment for Renal Bone Disease, HD patients, NGO Centres 1996- 1999

Year	No of subjects	% on CaCO3	% on Al(OH)3	% on Vitamin D
1996	157	88	39	32
1997	325	96	17	41
1998	419	97	8	39
1999	703	92	6	30

Table 3.2.29: Distribution of serum Phosphate (mmol/l), HD patients, NGO Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients < 1.6 mmol/l
1996	97	237	1.7	1.3	2.2	41
1997	315	947	2	1.5	2.5	28
1998	396	1081	1.9	1.5	2.3	28
1999	667	1831	1.9	1.5	2.3	31

Figure 3.2.29 Cumulative Distribution of serum Phosphate by year

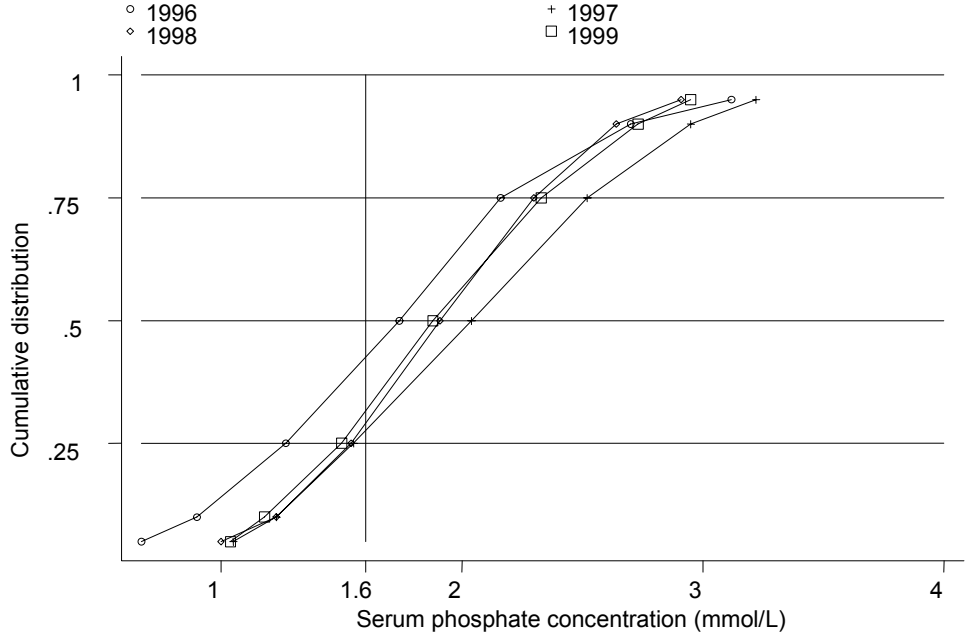


Table 3.2.30: Distribution of serum Calcium (mmol/l), HD patients, NGO Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients ≥ 2.2 & ≤2.6 mmol/l
1996	105	260	2.4	2.2	2.6	56
1997	316	946	2.3	2.2	2.5	57
1998	401	1093	2.3	2.2	2.5	56
1999	675	1847	2.3	2.2	2.5	57

Figure 3.2.30: Cumulative distribution of Serum Calcium by year

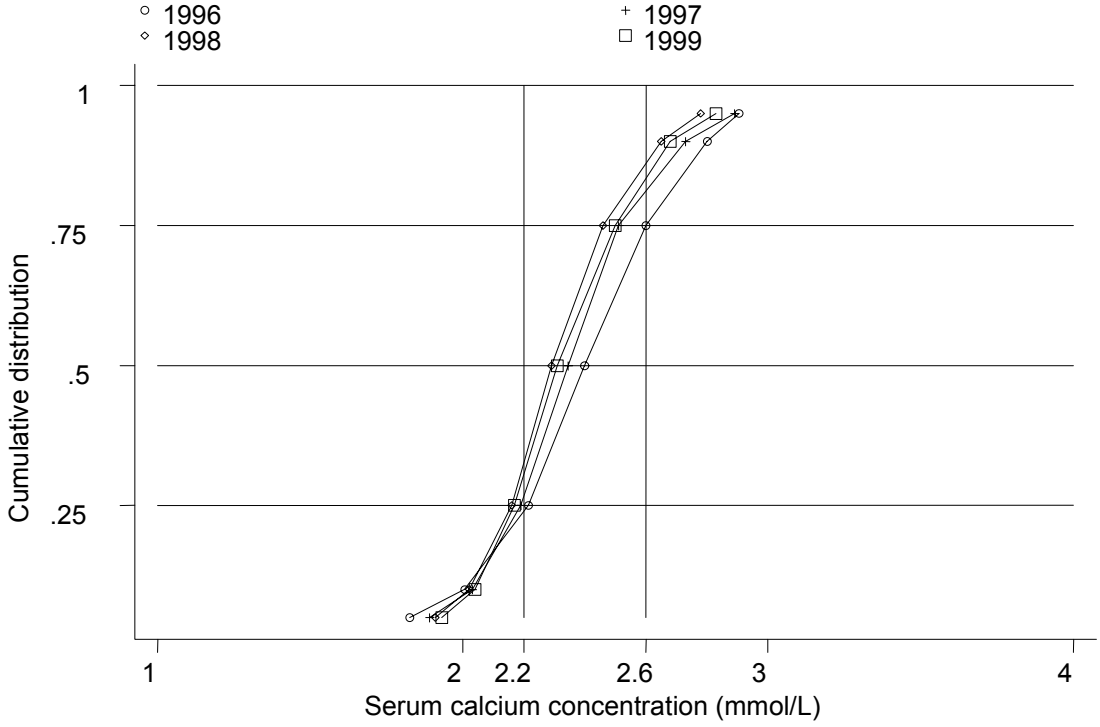
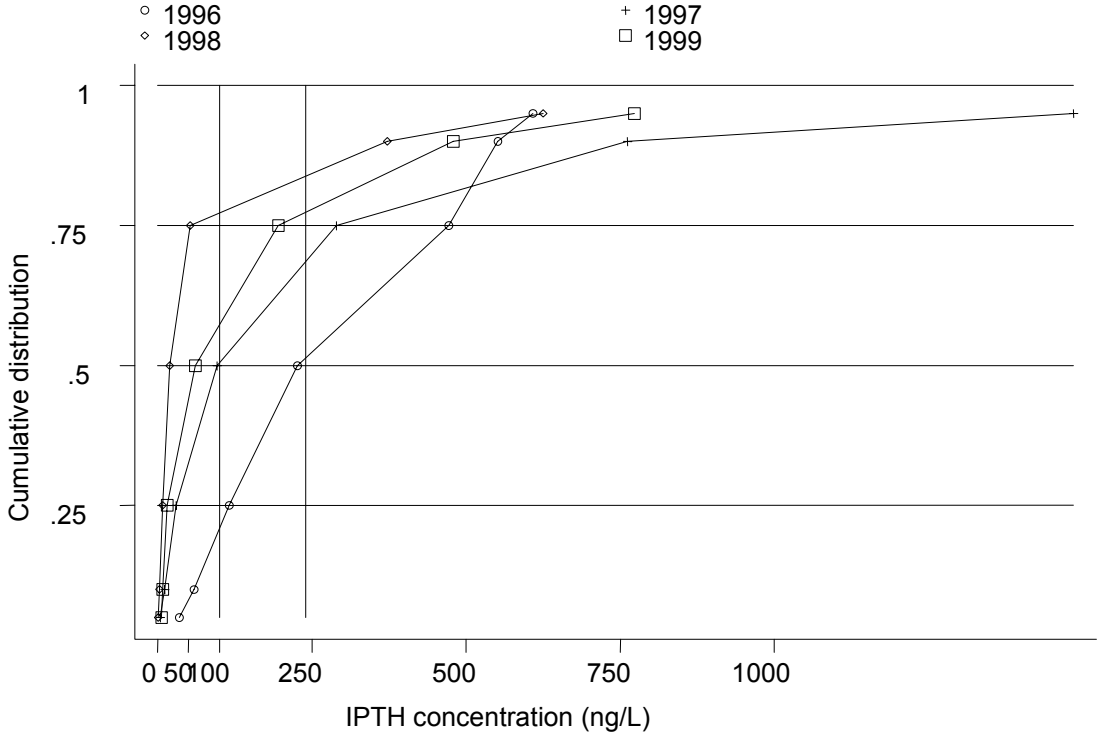


Table 3.2.31: Distribution of serum iPTH (ng/L), HD patients, NGO Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients ≥ 100 & ≤ 250 ng/l
1996	8	10	226.5	116	472	30
1997	249	369	96	30	290	19
1998	163	169	19.7	8	52.5	7
1999	259	289	61.6	16	195.6	19

Figure 3.2.31: Cumulative Distribution of serum iPTH by year,



3.2.11 MANAGEMENT OF BLOOD PRESSURE, NGO CENTRES

Table 3.2.32: Treatment for hypertension, HD patients, NGO Centres 1996 - 1999

Year	No.	% on anti-hypertensives	% on 1 anti-hypertensives	% on 2 anti-hypertensives	% on 3 anti-hypertensives
1996	157	62	41	15	6
1997	325	59	30	20	9
1998	419	61	33	21	7
1999	703	69	38	22	9

Table 3.2.33: Distribution of Systolic BP without anti-hypertensives, HD patients, NGO Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 160 mmHg
1996	58	388	140	120	150	84
1997	122	1015	134	120	150	85
1998	160	1631	140	126	157	77
1999	215	2242	143	125	160	74

Figure 3.2.33: Cumulative Distribution of Systolic BP without anti-hypertensives by year

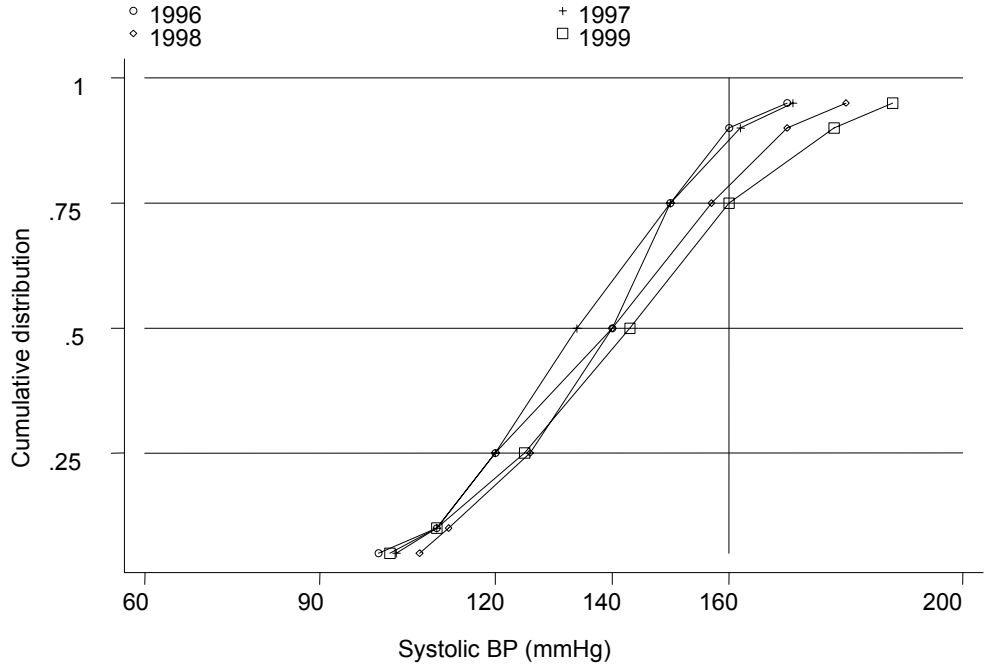


Table 3.2.34: Distribution of Diastolic BP without anti-hypertensives, HD patients, NGO Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 90 mmHg
1996	58	388	87.5	80	90	51
1997	123	1016	80	70	90	70
1998	160	1632	80	70	90	72
1999	215	2239	80	70	90	73

Figure 3.2.34: Cumulative Distribution of Diastolic BP without anti-hypertensives by year

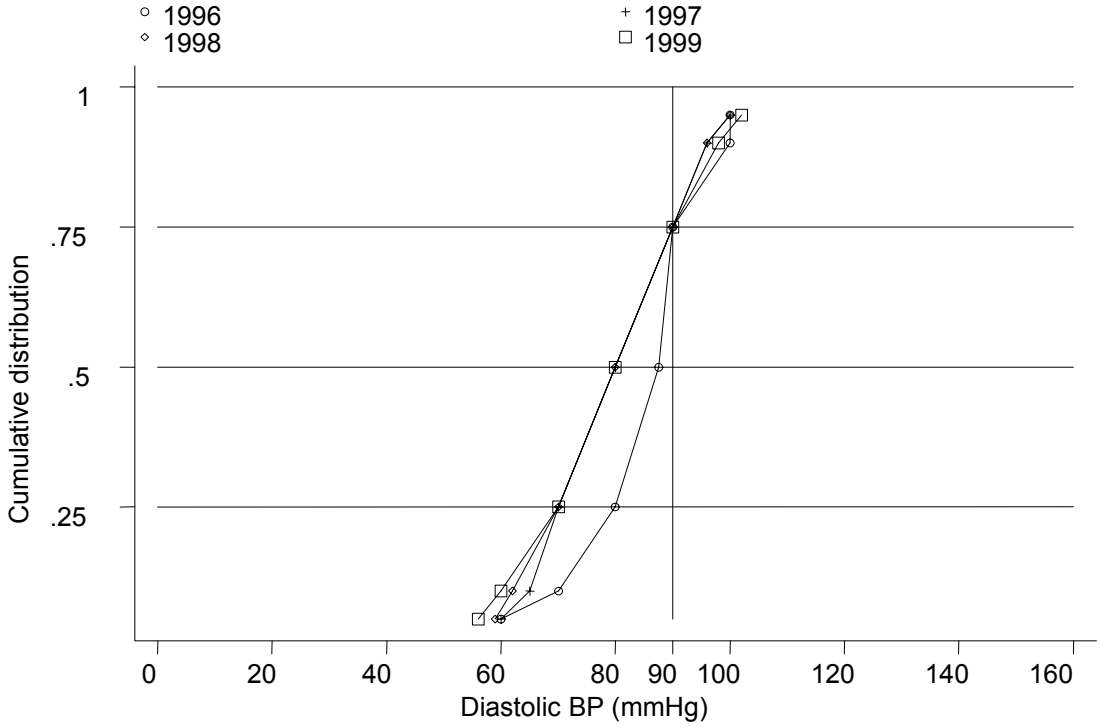


Table 3.2.35: Distribution of systolic BP on anti-hypertensives, HD patients, NGO Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 160 mmHg
1996	93	646	150	137	170	56
1997	191	1509	152	140	170	56
1998	248	2409	159	140	175	51
1999	485	4798	160	142	179	49

Table 3.2.35: Cumulative Distribution of systolic BP on anti-hypertensives, by year

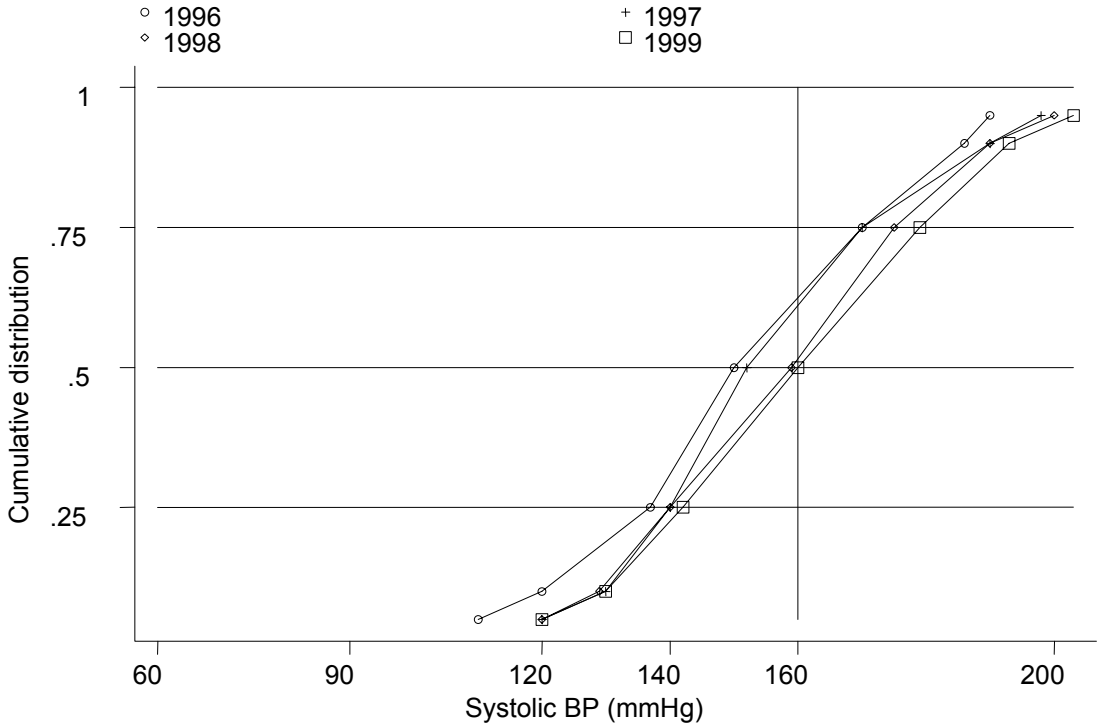
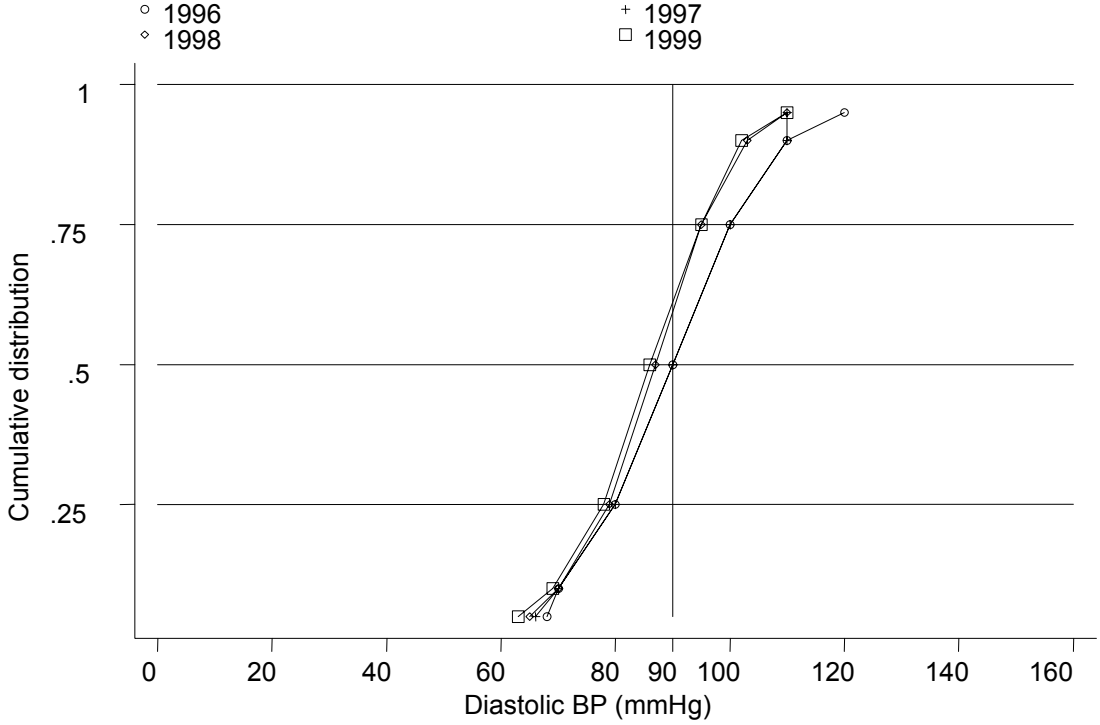


Table 3.2.36: Distribution of diastolic BP on anti-hypertensives, HD patients, NGO Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients < 90 mmHg
1996	93	646	90	80	100	37
1997	191	1509	90	80	100	44
1998	248	2411	87	79	95	55
1999	485	4804	86	78	95	58

Figure 3.2.36: Cumulative Distribution of diastolic BP on anti-hypertensives by year



3.2.12 TREATMENT OF ANAEMIA, NGO CENTRES

Table 3.2.37: Treatment for Anaemia, HD patients, NGO Centres 1996 - 1999

Year	No of subjects	% on rHuEpo	% received blood transfusion	% received oral iron	% received parenteral iron
1996	157	27	15	80	1
1997	325	52	9	88	1
1998	419	50	7	91	1
1999	703	54	9	87	1

Table 3.2.38: Distribution of rHuEpo dose per week, HD patients, NGO Centres 1996 - 1999

Year	1996	1997	1998	1999
No. of patients	41	164	201	365
% on 2000 u/week	49	55	63	70
% on 2-4000 u/week	41	40	32	24
% on 4-6000 u/week	2	2	3	4
% on 6-8000 u/week	5	1	1	1
% on 8-12000 u/week	0	1	0	0
% on >12000 u/week	2	1	0	0

Table 3.2.39: Distribution of serum Iron without rHuEpo, HD patients, NGO Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 10 umol/l
1996	20	53	14.3	9.9	24	72
1997	134	233	15.2	11	19.8	80
1998	20	50	13.9	8.5	22.5	68
1999	22	54	13.8	10.5	18.8	81

Figure 3.2.39: Cumulative Distribution of serum Iron without rHuEpo by year

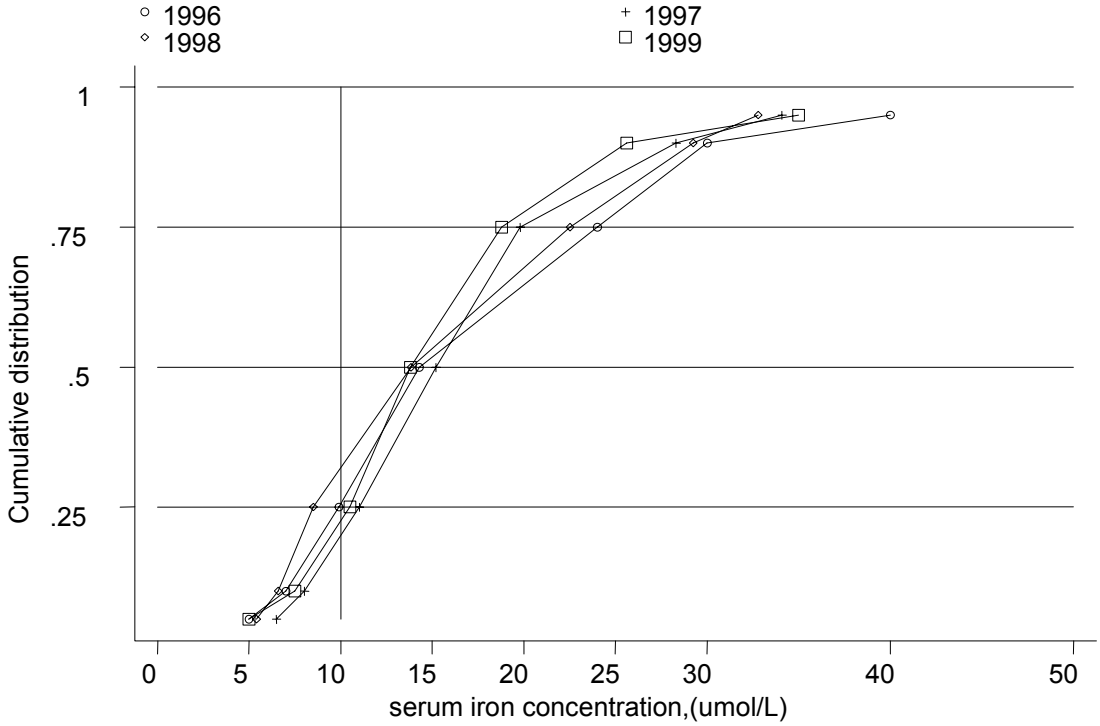


Table 3.2.40: Distribution of serum Iron on rHuEpo, HD patients, NGO Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 10 umol/l
1996	14	22	13.4	9	19.9	68
1997	154	300	14	10	20.1	75
1998	42	113	14.6	10	21.4	72
1999	35	91	15	11	23	80

Figure 3.2.40:Cumulative Distribution of serum Iron on rHuEpo, by year.

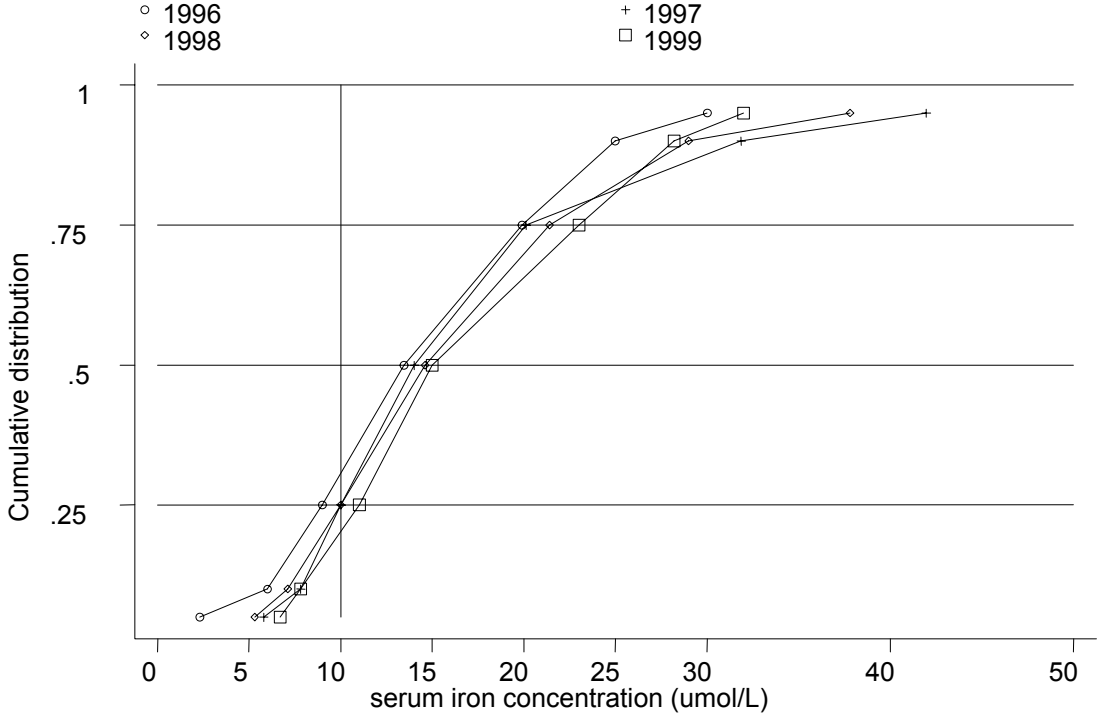


Table 3.2.41: Distribution of serum Transferrin Saturation without rHuEpo, HD patients, NGO Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 20%
1996	19	76	41.3	24.7	47.1	84
1997	110	440	30.5	21.2	42.5	79
1998	16	64	21.5	16.7	27	63
1999	16	64	27.7	21.3	46.5	81

Figure 3.2.41: Cumulative Distribution of serum Transferrin Saturation without rHuEpo by year

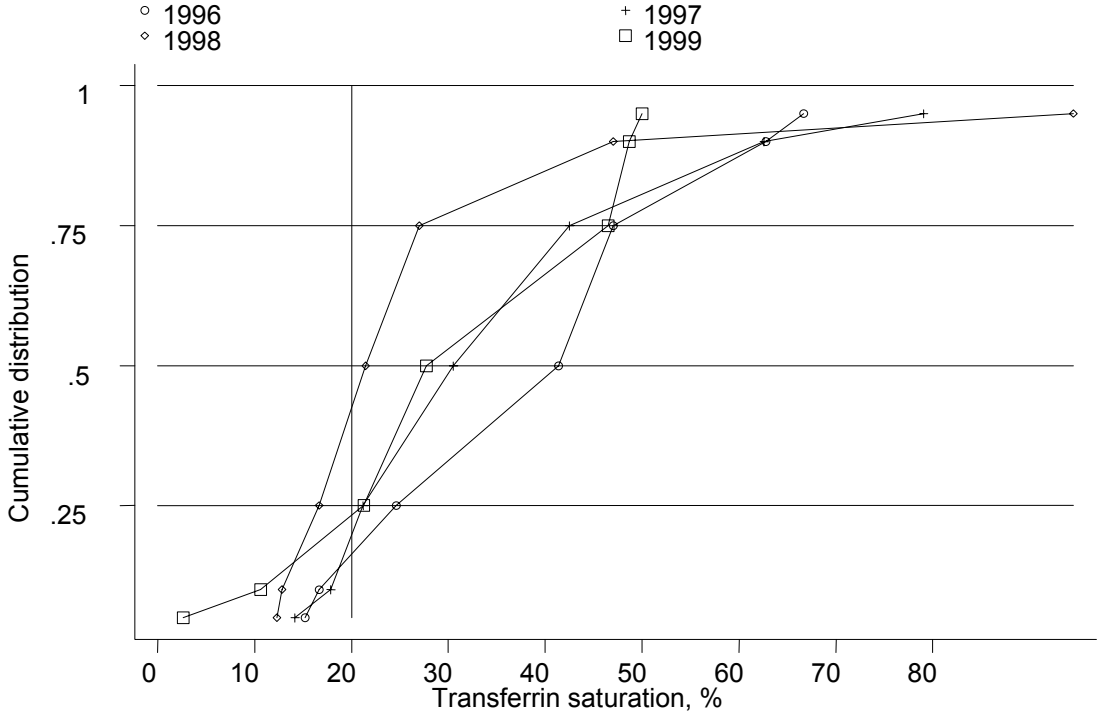


Table 3.2.42: Distribution of serum Transferrin Saturation on rHuEpo, HD patients, NGO Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 20%
1996	13	52	29.6	22.2	40	85
1997	133	532	32.3	25.8	42.5	87
1998	21	84	17.7	13.2	35	43
1999	26	104	30	18.6	42.1	73

Figure 3.2.42: Cumulative Distribution of serum Transferrin Saturation on rHuEpo by year

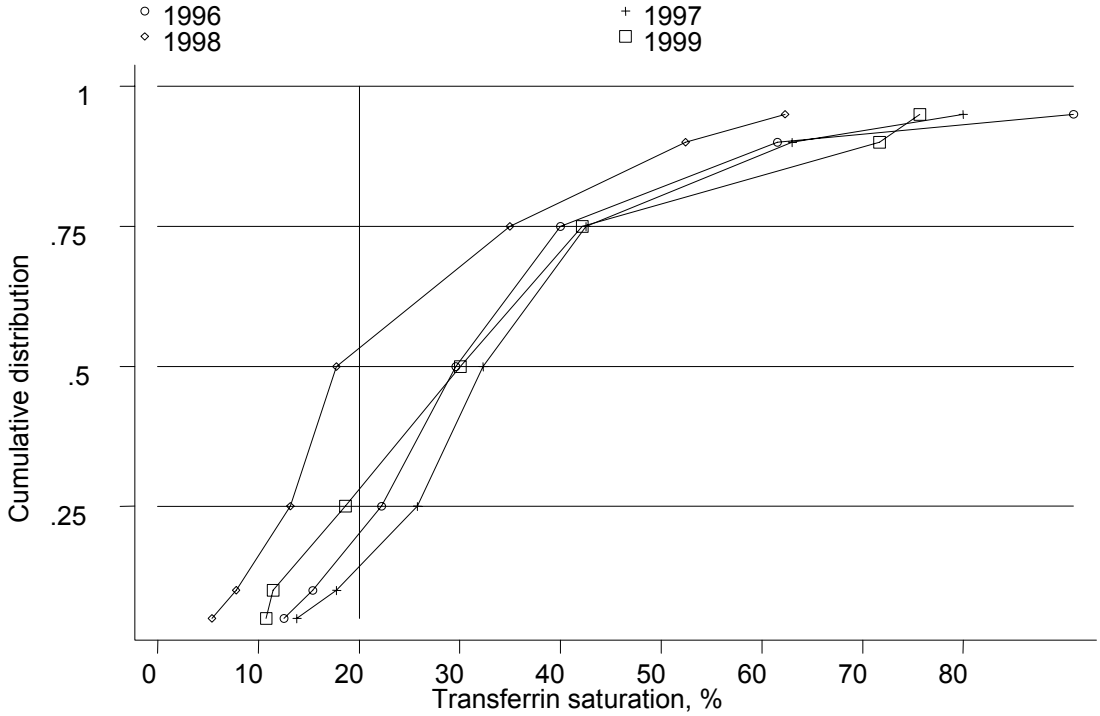


Table 3.2.43: Distribution of serum Ferritin without rHuEpo, HD patients, NGO Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients > 100 ug/l
1997	126	198	438.5	152	907	86
1998	28	47	505	212.6	842	89
1999	24	38	459	164.4	688	87

Figure 3.2.43:Cumulative Distribution of serum Ferritin without rHuEpo by year

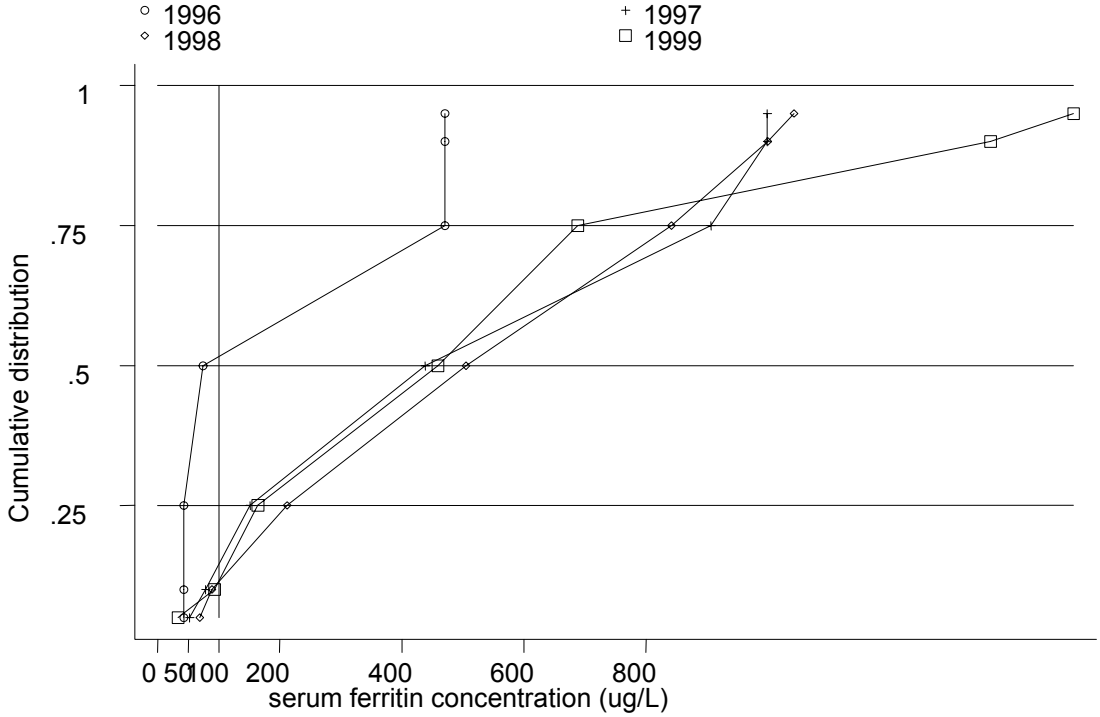


Table 3.2.44: Distribution of serum Ferritin on rHuEpo, HD patients, NGO Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients > 100 ug/l
1996	10	13	356	142	599	77
1997	149	219	638	271	999	90
1998	26	44	377.8	232	989	93
1999	32	52	399	214.6	1000	94

Figure 3.2.44: Cumulative Distribution of serum Ferritin on rHuEpo, by year

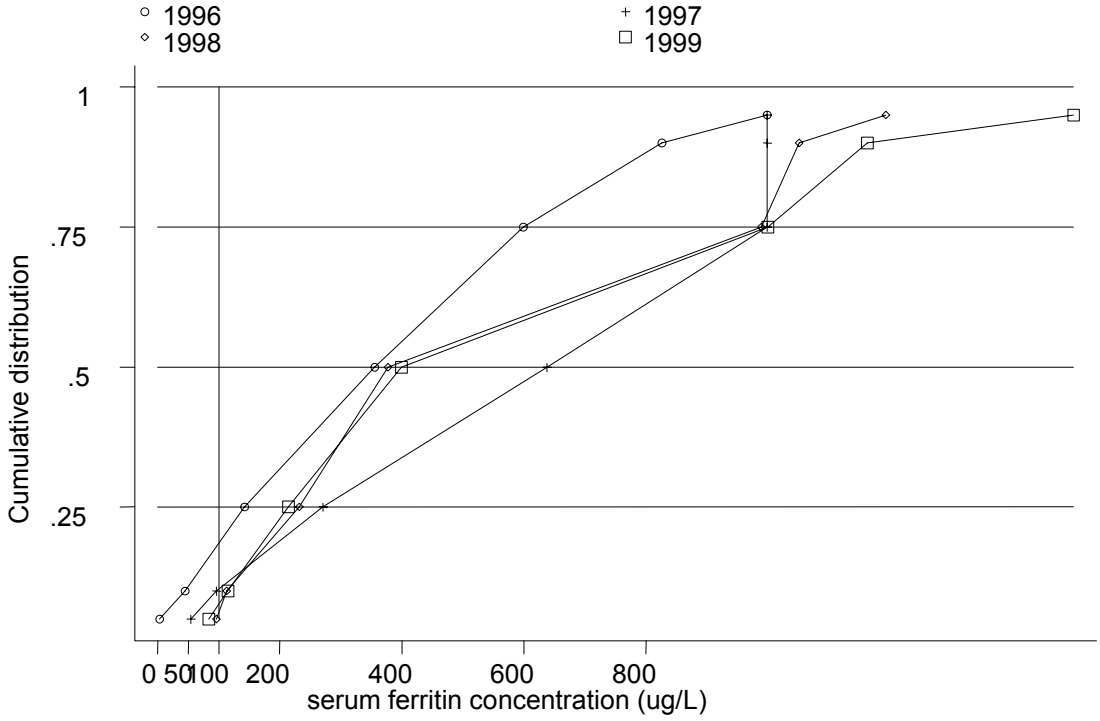


Table 3.2.45: Distribution of Haemoglobin without rHuEpo, HD patients, NGO Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients <10 g/dl	% patients ≥10 & ≤12 g/dl	% patients >12 g/dl
1996	87	228	8.4	7.1	10.5	69	22	9
1997	152	450	9	7.9	10.6	68	22	11
1998	194	537	8.7	7.5	10	73	18	8
1999	302	799	9	7.9	10.3	68	25	7

Figure 3.2.45:Cumulative Distribution of Haemoglobin without rHuEpo by year

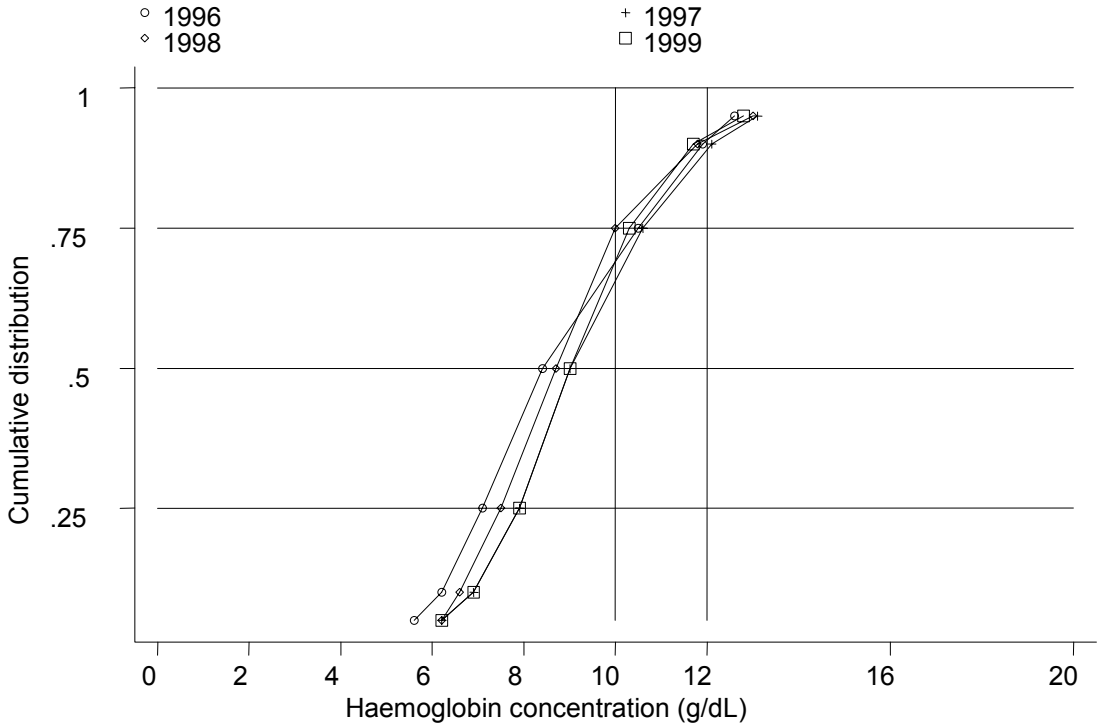
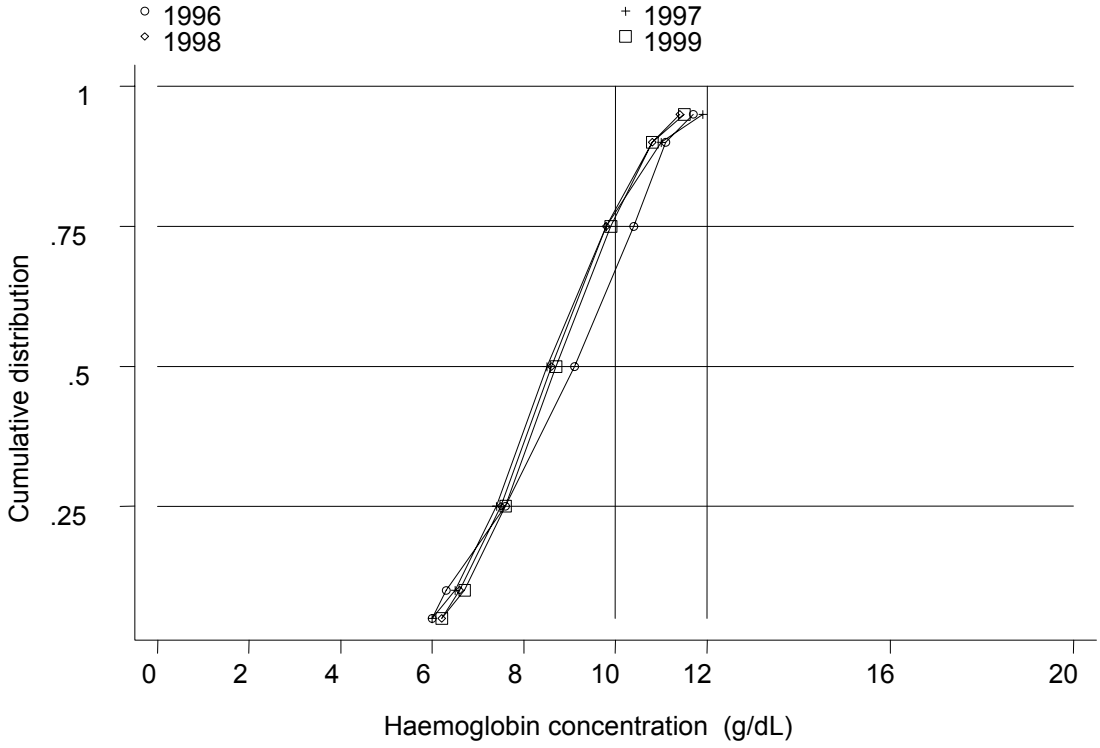


Table 3.2.46: Distribution of Haemoglobin on rHuEpo, HD patients, NGO Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients <10 g/dl	% patients ≥10 & ≤12 g/dl	% patients >12 g/dl
1996	36	103	9.1	7.6	10.4	69	27	4
1997	167	517	8.5	7.4	9.8	77	19	3
1998	202	574	8.6	7.5	9.8	78	18	3
1999	370	1074	8.7	7.6	9.9	76	21	3

Figure 3.2.46: Cumulative Distribution of Haemoglobin on rHuEpo, by year



3.2.13 NUTRITIONAL STATUS OF HD PATIENTS, NGO CENTRES

Table 3.2.47: Distribution of serum Albumin (g/L), HD patients, NGO Centres 1996– 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients >40g/l
1996	93	252	43	39	46	72
1997	315	939	41	37	44	58
1998	389	1006	39	36	42	45
1999	624	1373	39	36	42	42

Figure 3.2.47: Cumulative Distribution of serum Albumin by year

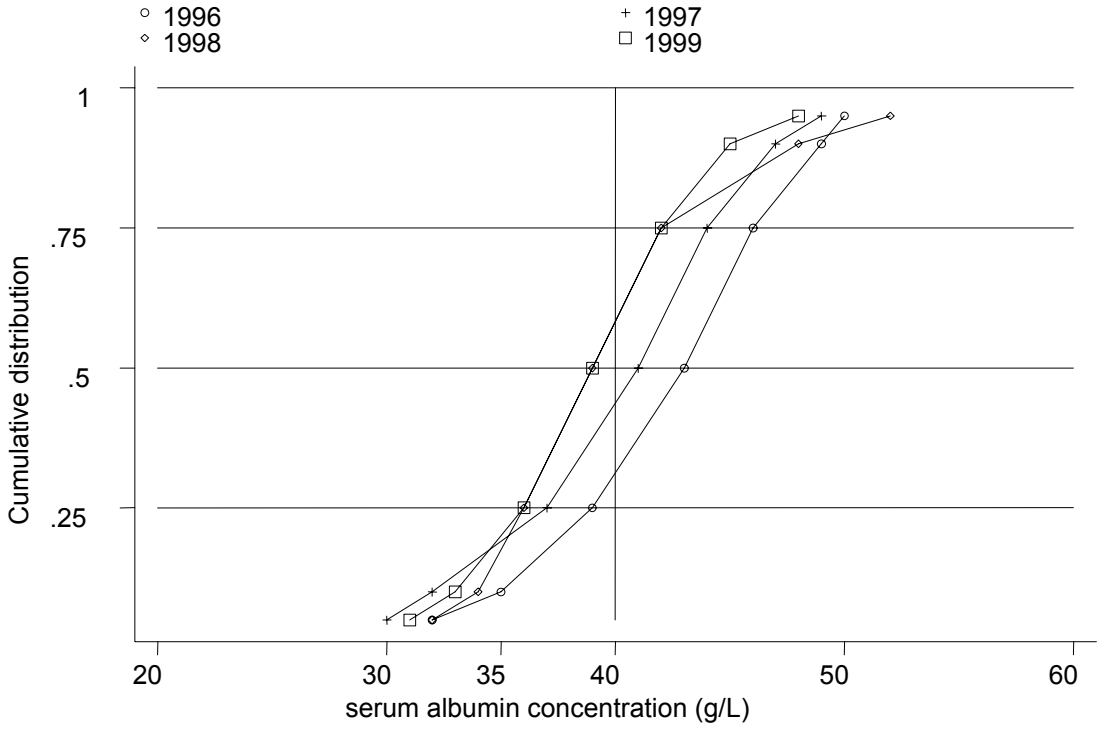
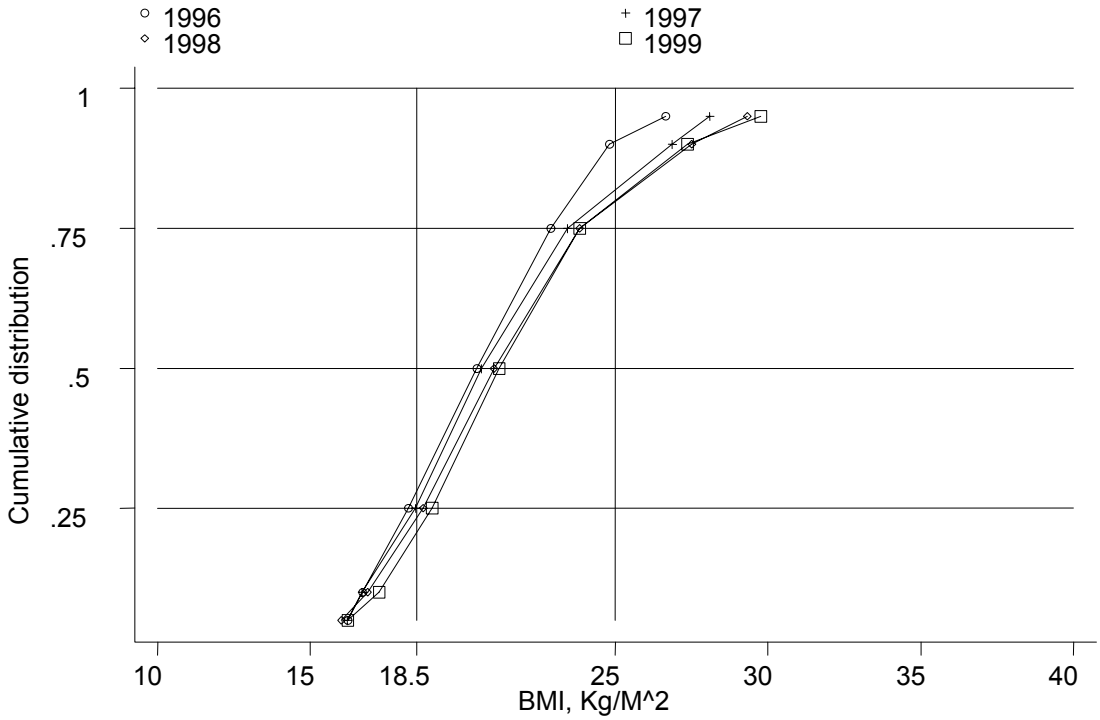


Table 3.2.48: Distribution of Body Mass Index
HD patients, NGO Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients <18.5	% patients ≥18.5 & ≤25	% patients >25
1996	27	224	23.7	21	24.8	2	74	24
1997	22	229	22.8	21.3	26.6	4	63	32
1998	31	290	22.4	20.1	26.1	14	60	26
1999	280	1838	21.7	19.4	25	15	60	25

Figure 3.2.48: Cumulative Distribution of BMI by year

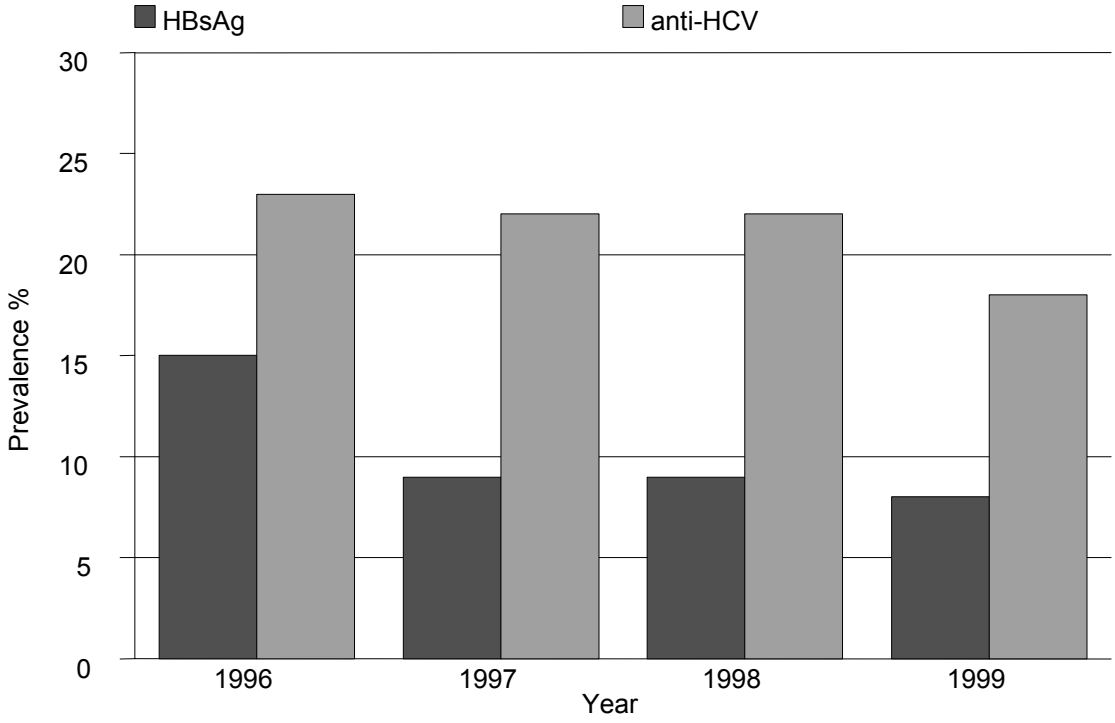


3.2.14 SEROLOGICAL STATUS, HD PATIENTS , NGO CENTRES

Table 3.2.49: Prevalence of positive anti-HCV and HBsAg HD patients, NGO Centres 1995 – 1998

year	No	% HBsAg positive	% anti-HCV positive
1996	157	15	23
1997	325	9	22
1998	419	9	22
1999	703	8	18

Figure 3.2.49: Prevalence of positive anti-HCV and HBsAg HD patients, NGO Centres 1996 – 1999



HAEMODIALYSIS

IN

PRIVATE CENTRES

Stock and Flow

Death on Haemodialysis

Haemodialysis Patient Characteristics

Survival Analysis

Work related rehabilitation and quality of life

Haemodialysis practices

Dyslipidaemia in HD patients

Treatment of Renal Bone Disease

Management of Blood Pressure

Management of Anaemia

Nutritional status

Prevalence of anti-HCV antibodies and HBsAg

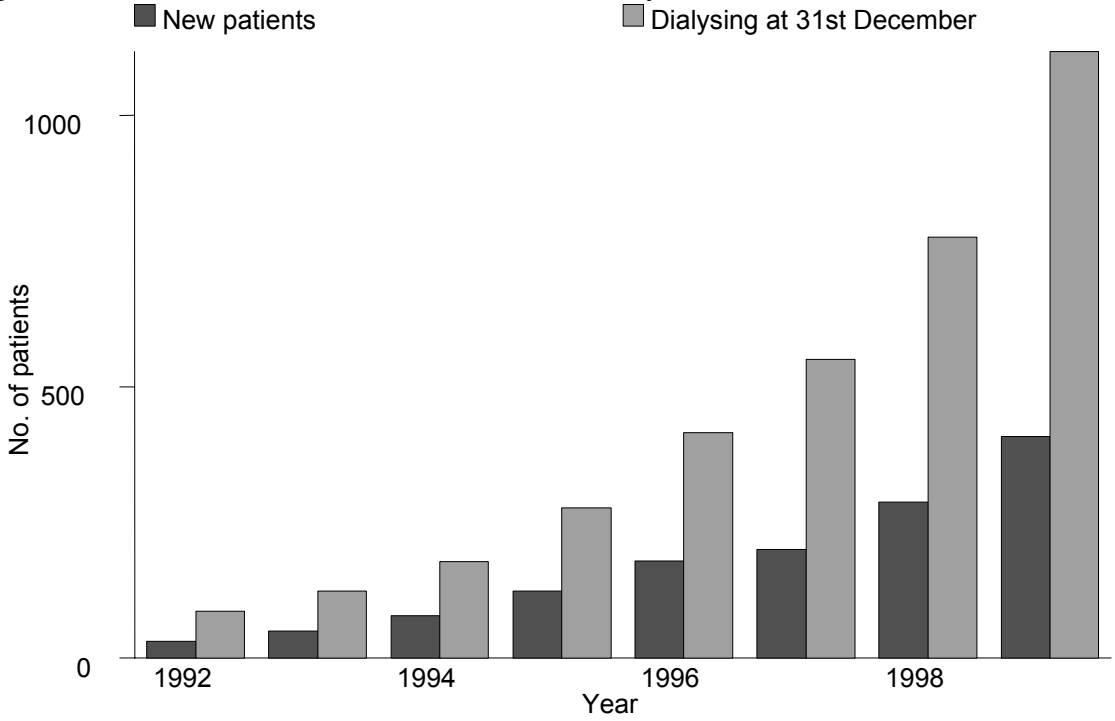
3.3: HAEMODIALYSIS IN PRIVATE CENTRES

3.3.1 STOCK AND FLOW

Table 3.3.01: Stock and Flow: Private Dialysis Centres 1992 - 1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
New patients	31	49	78	123	179	200	287	408
Died	0	5	13	15	22	45	46	50
Transferred to PD	0	0	0	1	2	2	0	0
Transplanted	1	5	6	2	8	7	5	13
Lost to follow up	2	1	6	6	8	11	10	3
Dialysing at 31st December	86	124	177	276	415	550	776	1118

Figure 3.3.01: Stock and Flow: Private Dialysis Centres 1992 – 1998



3.3.3 DEATH ON HAEMODIALYSIS, PRIVATE CENTRES

Table 3.3.04: Death Rate on HD: Private Centres 1992 – 1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
No. at risk	86	105	151	227	346	483	663	947
Deaths	0	5	13	15	22	45	46	50
Death rate %	0	5	9	7	6	9	7	5
Transfer to PD	0	0	0	1	2	2	0	0
Transfer to PD rate %	0	0	0	0	1	0	0	0
All Losses	0	5	13	16	24	47	46	50
All Losses rate %	0	5	9	7	7	10	7	5

Figure 3.3.04: Death Rate on HD: Private Centres 1993 - 1999

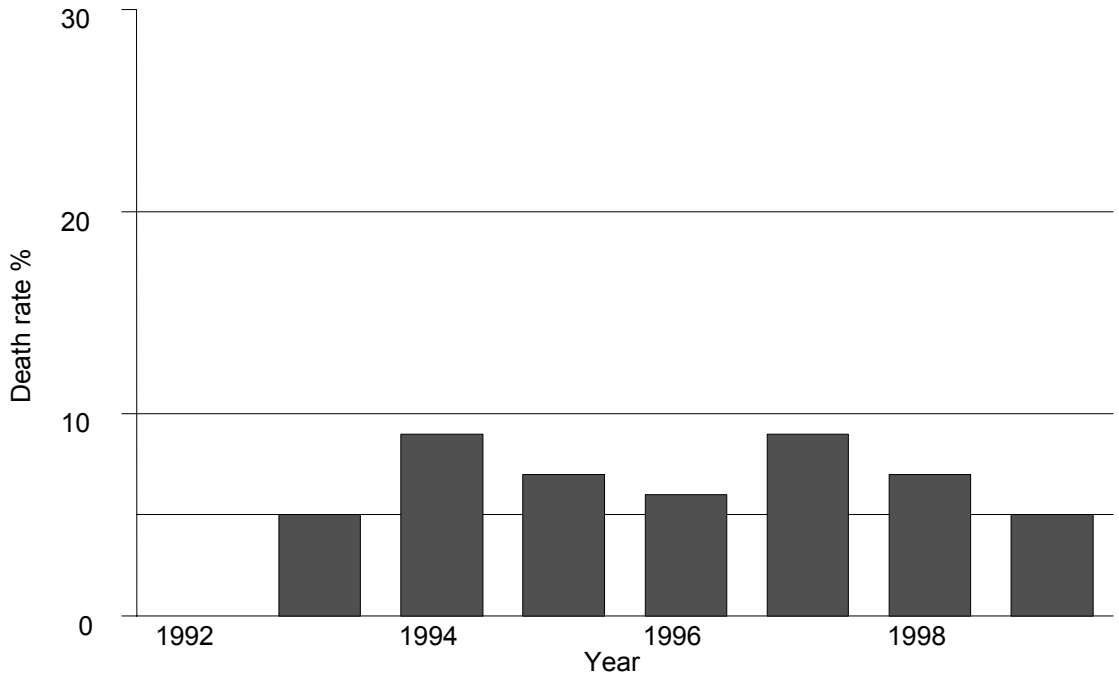


Table 3.3.05: Causes of Death: Private Centres 1996 – 1999

	1996		1997		1998		1999	
Causes of death	No.	%	No.	%	No.	%	No.	%
Cardiovascular	2	9	5	11	8	17	10	20
Died at home	3	14	10	22	10	22	14	28
Sepsis	1	5	2	4	3	7	5	10
GIT bleed	0	0	0	0	1	2	1	2
Cancer	0	0	1	2	3	7	1	2
Liver disease	0	0	1	2	0	0	2	4
Others	6	27	12	27	19	41	15	30
Unknown	10	45	14	31	2	4	2	4
Total	22	100	45	100	46	100	50	100

3.3.5. HAEMODIALYSIS PATIENTS' CHARACTERISTICS, PRIVATE CENTRES

Table 3.3.08: Age Distribution of Dialysis Patients, Private Centres 1996 – 1999

Year	1996	1997	1998	1999
New Dialysis patients	179	200	287	408
1-14 years	0	0	0	0
15-24 years	3	1	3	2
25-34 years	13	8	7	7
35-44 years	13	11	14	15
45-54 years	17	20	21	23
55-64 years	34	29	30	27
≥65 years	21	32	25	27
Dialysing at 31st December	415	550	776	1118
1-14 years	0	0	0	0
15-24 years	3	2	3	2
25-34 years	16	14	12	11
35-44 years	21	19	17	17
45-54 years	16	17	19	20
55-64 years	26	27	28	28
≥65 years	17	21	21	23

Table 3.3.09: Patients' Characteristics , Private Centres 1996 – 1999

Year	1996	1997	1998	1999
New Dialysis patients (no)	179	200	287	408
Mean age±sd (years)	53±14	57±14	54±14	55±14
% male	46	49	48	55
% Diabetic	32	42	46	45
% HBsAg+	2	2	3	4
% Anti-HCV+	15	11	12	7

3.3.6. SURVIVAL ANALYSIS, PRIVATE CENTRES

Table 3.3.10: HD Patient Survival, Private Centres 1996-1999

Year	1996			1997		
Interval	% survival	SE	No	% survival	SE	No
6 months	91	2	153	93	2	182
12 months	88	2	142	90	2	175
24 months	82	3	129	87	2	163
36 months	76	3	110			
Year	1998			1999		
Interval	% survival	SE	No	% survival	SE	No
6 months	94	1	261	97	1	191
12 months	93	2	235			

No. = number at risk
SE = standard error

Figure 3.3.10: HD Patient Survival by year of entry, Private Centres

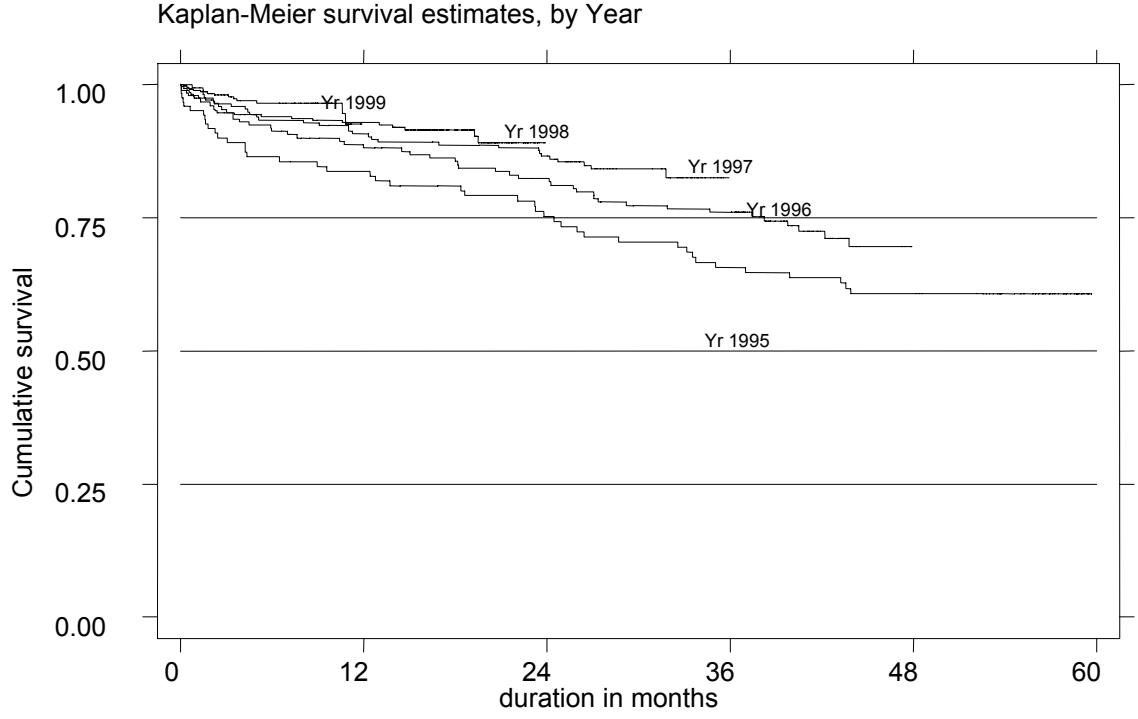
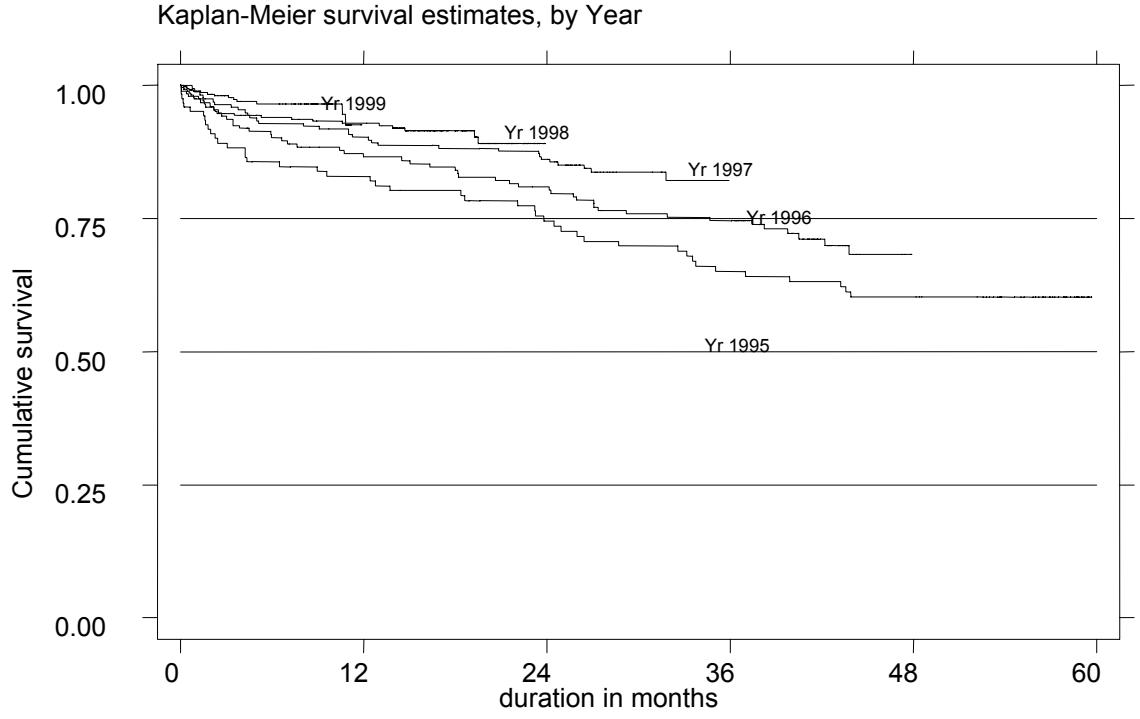


Table 3.3.11: HD Technique Survival , Private Centres 1996 - 1999

Year	1996			1997		
Interval	% survival	SE	No	% survival	SE	No
6 months	90	2	153	93	2	182
12 months	87	3	142	90	2	175
24 months	80	3	129	86	2	163
36 months	75	3	110			
Year	1998			1999		
Interval	% survival	SE	No	% survival	SE	No
6 months	94	1	261	97	1	191
12 months	93	2	235			

No. = number at risk
SE = standard error

Figure 3.3.11 HD Technique Survival by year of entry, Private Centres



3.3.7 WORK RELATED REHABILITATION AND QUALITY OF LIFE ON HAEMODIALYSIS, PRIVATE CENTRES

Table 3.3.12: Work Related Rehabilitation on HD, Private Centres 1999

REHABILITATION STATUS	1999	
	No.	%
Full time work for pay	117	30
Part time work for pay	23	6
Able to work but unable to get a job	4	1
Able to work but not yet due to dialysis schedule	6	2
Able but disinclined to work	3	1
Home maker	92	24
Full time student	1	0
Age<15 years	0	0
Retired	45	12
Age>65 years	62	16
Unable to work due to poor health	35	9
Total	388	100

Table 3.3.13: Quality of Life on Haemodialysis, Private Centres, 1999

QOL Index Summated Score	1999	
	No.	%
0 (Worst QOL)	1	0
1	0	0
2	2	1
3	0	0
4	4	1
5	22	6
6	26	7
7	42	11
8	33	9
9	47	12
10 (Best QOL)	204	54
Total	381	100

3.3.8 HAEMODIALYSIS PRACTICES IN PRIVATE CENTRES

Table 3.3.14: Vascular Access on Haemodialysis, Private Centres, 1999

Access types	1999	
	No	%
Wrist AVF	330	81
BCF*	46	11
venous graft	4	1
artificial graft	6	1
PERMCATH	3	1
temporary CVC	19	5
Total	408	100

- *BCF = Brachiocephalic fistula*
- *CVC = Central venous catheter*

Table 3.3.15: Difficulties reported with Vascular Access, Private Centres 1999

Access difficulty	1999	
	No	%
Difficulty with needle placement	11	3
Difficulty in obtaining desired blood flow rate	8	2
Other difficulty	6	1
No difficulty	383	94
Total	408	100

Table 3.3.16: Complications reported with Vascular Access, Private Centres 1999

Complication	1999	
	No.	%
thrombosis	13	3
bleed	3	1
aneurysmal dilatation	12	3
swollen limb	6	1
access related infection, local/systemic	1	0
distal limb ischaemia	1	0
venous outflow obstruction	1	0
carpal tunnel	1	0
other	5	1
no complication	365	89
Total	408	100

Table 3.3.17: Blood Flow Rates in Private HD Units, 1999

Blood flow rates	1999	
	No.	%
<150 ml/min	1	0
150-199 ml/min	9	2
200-249 ml/min	207	55
250-299 ml/min	133	35
300-349 ml/min	19	5
≥350 ml/min	9	2
Total	378	100

Table 3.3.18: Number of HD Sessions per week, Private HD Units, 1999

HD sessions Per week	1999 No.	%
1	2	0
2	133	33
3	269	66
4	1	0
Total	405	100

Table 3.3.19 Duration of HD in Private Units, 1999

Duration of HD per session	1999 No.	%
≤3 hours	1	0
-3.5 hours	8	2
-4 hours	299	74
-4.5 hours	54	13
-5 hours	42	10
≥5 hours	0	0
Total	404	100

Table 3.3.20: Dialyser membrane types in Private HD Units, 1999

Dialyser membrane	1999 No.	%
Cellulosic	148	80
Cellulose acetate	11	6
Synthetic	25	14
Total	184	100

Table 3.3.21: Dialyser Reuse Frequency in Private HD Units, 1999

Dialyser reuse frequency	1999 No.	%
1*	44	12
2	5	1
3	24	7
4	135	38
5	45	13
6	98	27
7	2	1
8	3	1
9	1	0
10	0	0
11	1	0
12	1	0
≥13	0	0
Total	359	100

- 1 is single use ie no reuse

Table 3.3.22 Dialysate Buffer Use in Private HD Units, 1999

Dialysate buffer	1999 No.	%
Acetate	66	16
Bicarbonate	343	84
Total	409	100

Table 3.3.23: Distribution of Prescribed KT/V, Private Centres 1999

year	No of subjects	No of observations	median	LQ	UQ	% > 1.3
1999	358	2438	1.5	1.2	1.7	68

3.3.9. DYSLIPIDAEMIA IN HD PATIENTS, PRIVATE CENTRES

Table 3.3.24: Distribution of Serum Cholesterol Levels (mmol/l), HD patients, Private Centres 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients < 5.3 mmol/l
1999	191	287	5	4.2	5.7	70

Table 3.3.25: Distribution of Serum Triglyceride (mmol/l), HD patients, Private Centres 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients < 3.5 mmol/l
1999	74	96	1.7	1.2	2.7	88

Table 3.3.26: Distribution of serum LDL (mmol/l), HD patient, Private Centres 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients <5 mmol/l
1999	66	84	3	2.5	3.9	95

Table 3.3.27: Distribution of serum HDL (mmol/l), HD patient, Private Centres 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients < 2mmol/l
1999	68	87	1.1	.9	1.4	94

3.3.10 *MANAGEMENT OF RENAL BONE DISEASE, PRIVATECENTRES*

Table 3.3.28: Treatment for Renal Bone Disease, HD patients, Private Centres 1999

Year	No of subjects	% on CaCO3	% on Al(OH)3	% on Vit D
1999	409	80	6	27

Table 3.3.29: Distribution of serum Phosphate (mmol/l), HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 1.6 mmol/l
1999	363	949	1.9	1.6	2.4	27

Table 3.3.30: Distribution of serum Calcium (mmol/l), HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients ≥ 2.2 & ≤2.6 mmol/l
1999	364	976	2.3	2.1	2.5	52

Table 3.3.31: Distribution of serum iPTH (ng/L), HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients ≥ 100 & ≤ 250 ng/l
1999	47	58	48.4	10	169.9	24

3.3.11 *MANAGEMENT OF BLOOD PRESSURE, PRIVATE CENTRES*

Table 3.3.32: Treatment for hypertension, HD patients, Private Centres 1999

Year	No.	% on anti-hypertensives	% on 1 anti-hypertensives	% on 2 anti-hypertensives	% on 3 anti-hypertensives
1999	409	62	39	18	5

Table 3.3.33: Distribution of Systolic BP without anti-hypertensives, HD patients Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 160 mmHg
1999	146	867	140	130	160	69

Table 3.3.34: Distribution of Diastolic BP without anti-hypertensives, HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 90 mmHg
1999	146	869	80	72	90	66

Table 3.3.35: Distribution of systolic BP on anti-hypertensives, HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 160 mmHg
1999	251	1813	158	140	170	51

Table 3.3.36: Distribution of diastolic BP on anti-hypertensives, HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 90 mmHg
1999	251	1812	85	80	90	54

3.3.12 *TREATMENT OF ANAEMIA, PRIVATE CENTRES*

Table 3.3.37: Treatment for Anaemia, HD patients, Private Centres 1999

Year	No	% on rHuEpo	% received blood transfusion	% received oral iron	% received parenteral iron
1999	409	60	23	79	13

Table 3.3.38: Distribution of rHuEpo dose per week, HD patients, Private Centres 1999

Year	1999
No. of patients	238
% on 2000 u/week	28
% on 2-4000 u/week	65
% on 4-6000 u/week	3
% on 6-8000 u/week	2
% on 8-12000 u/week	3
% on >12000 u/week	0

Table 3.3.39: Distribution of serum Iron without rHuEpo, HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 10 umol/l
1999	13	18	11.1	9.6	17.1	67

Table 3.3.40: Distribution of serum Iron on rHuEpo, HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 10 umol/l
1999	75	98	12.7	9.1	18.3	67

Table 3.3.41: Distribution of serum Transferrin Saturation without rHuEpo, HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 20%
1999	7	28	25.1	19.1	29.7	71

Table 3.3.42: Distribution of serum Transferrin Saturation on rHuEpo, HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 20%
1999	47	188	31.6	21.6	49.8	85

Table 3.3.43: Distribution of serum Ferritin without rHuEpo, HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 100 ug/l
1999	18	22	442	126	916	77

Table 3.3.44: Distribution of serum Ferritin on rHuEpo, HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 100 ug/l
1999	109	150	478.9	315	876	95

Table 3.3.45: Distribution of Haemoglobin concentration without rHuEpo, HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients <10 g/dl	% patients ≥10 & ≤12 g/dl	% patients >12 g/dl
1999	139	361	8.5	7.5	10.1	73	19	8

Table 3.3.46: Distribution of Haemoglobin concentration on rHuEpo, HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients <10 g/dl	% patients ≥10 & ≤12 g/dl	% patients >12 g/dl
1999	229	717	9.3	8.2	10.4	66	28	6

3.3.13 NUTRITIONAL STATUS OF HD PATIENTS PRIVATE CENTRES

Table 3.3.47: Distribution of serum Albumin (g/L), HD patients, Private Centres 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients >40g/l
1999	295	802	36	34	39	24

Table 3.3.48: Distribution of Body Mass Index HD patients, Private Centres 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients <18.5	% patients ≥18.5 & ≤25	% patients >25
1999	280	1838	21.7	19.4	25	15	60	25

3.3.14 SEROLOGICAL STATUS, HD PATIENTS PRIVATECENTRES

Table 3.3.49: Prevalence of positive anti-HCV and HbsAg HD patients, Private Centres 1999

year	No	% HbsAg positive	% anti-HCV positive
1999	409	4	16

CHRONIC PERITONEAL DIALYSIS

IN

GOVERNMENT CENTRES

Stock and Flow

Funding for CPD

Death on CPD and Transfer to HD

Government CAPD Centres

CAPD Patient Characteristics

Survival Analysis

Work related rehabilitation and quality of life

CAPD practices

Dyslipidaemia in CAPD patients

Treatment of Renal Bone Disease

Management of Blood Pressure

Management of Anaemia

Nutritional status

Serological Status on CAPD

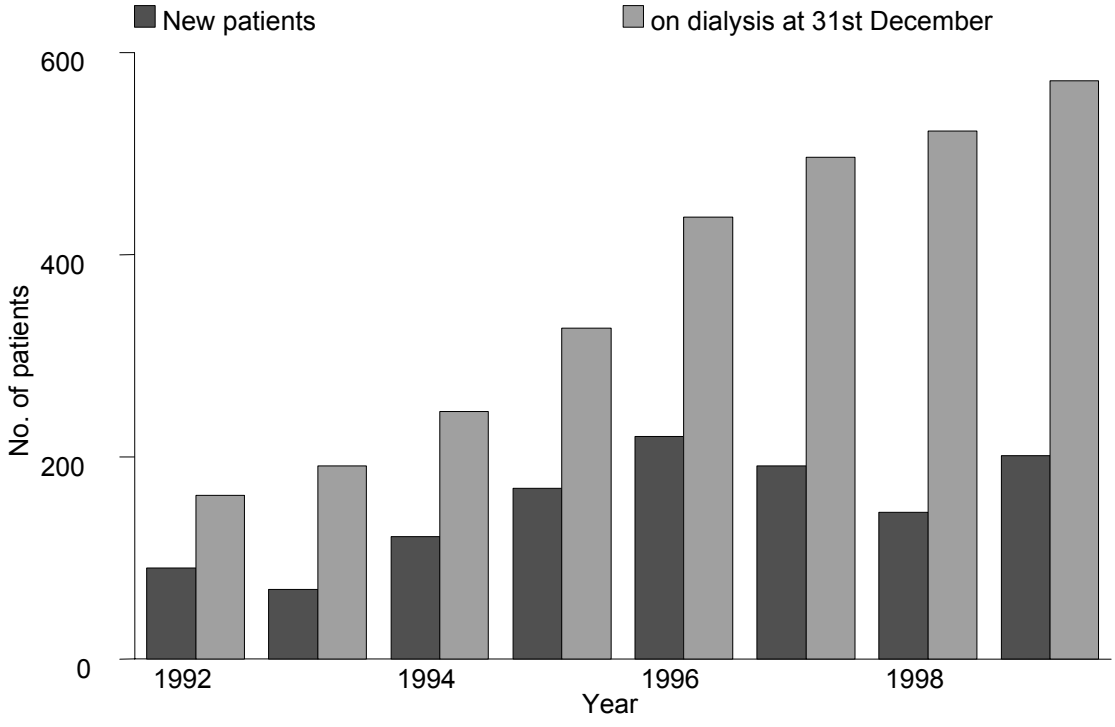
4. CHRONIC PERITONEAL DIALYSIS

4.1 STOCK AND FLOW

Table 4.01 Stock and Flow of Chronic PD Patients, 1992- 1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
New Dialysis patients	90	69	121	169	220	191	145	201
Died	23	23	42	58	60	71	74	98
Transferred to HD	17	14	22	22	37	50	33	37
Transplanted	0	2	3	7	8	10	12	13
Lost to follow up	0	1	0	0	5	1	0	3
Dialysing at 31st December	162	191	245	327	437	496	522	572

Figure 4.01 Stock and Flow of Chronic PD Patients, 1992- 1999

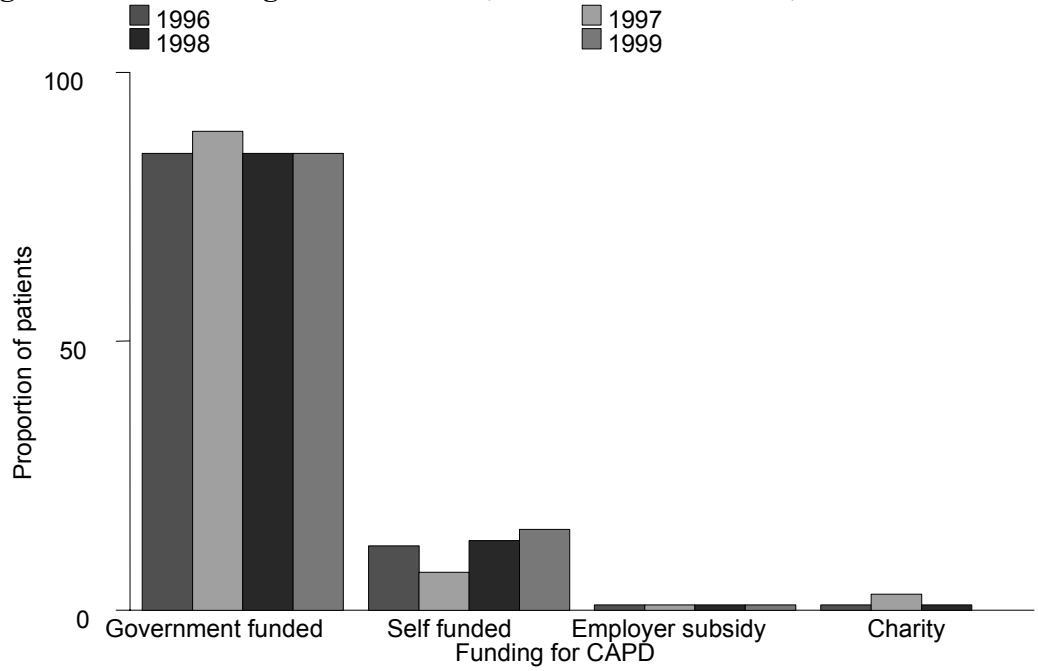


4.2 FUNDING FOR CHRONIC PERITONEAL DIALYSIS

Table 4.03: Funding for CAPD, Government Centres, 1996 – 1999

Year	1996	1997	1998	1999
New Dialysis patients (No)	220	191	145	201
% Government funded	85	89	85	85
% Self funded	12	7	13	15
% Employer subsidised	1	1	1	1
% Charity	1	3	1	0
Dialysing at 31st December	437	496	522	572
% Government funded	82	87	85	86
% Self funded	14	9	12	12
% Employer subsidised	2	1	1	1
% Charity	3	2	2	1

Figure 4.03: Funding for new CAPD, Government Centres, 1996 – 1999



4.3 DEATH ON CAPD AND TRANSFER TO HAEMODIALYSIS

Table 4.04: Death Rate and Transfer to HD Government Centres 1992 - 1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
No. at risk	162	177	218	286	382	467	509	547
Death (No.)	23	23	42	58	60	71	74	98
Death rate %	14	13	19	20	16	15	15	18
No transferred to HD	17	14	22	22	37	50	33	37
Transfer to HD rate %	10	8	10	8	10	11	6	7
All losses	40	37	64	80	97	121	107	135
All losses rate %	25	21	29	28	25	26	21	25

Figure 4.04: Death Rates on CAPD, Government Centres 1992 - 1999

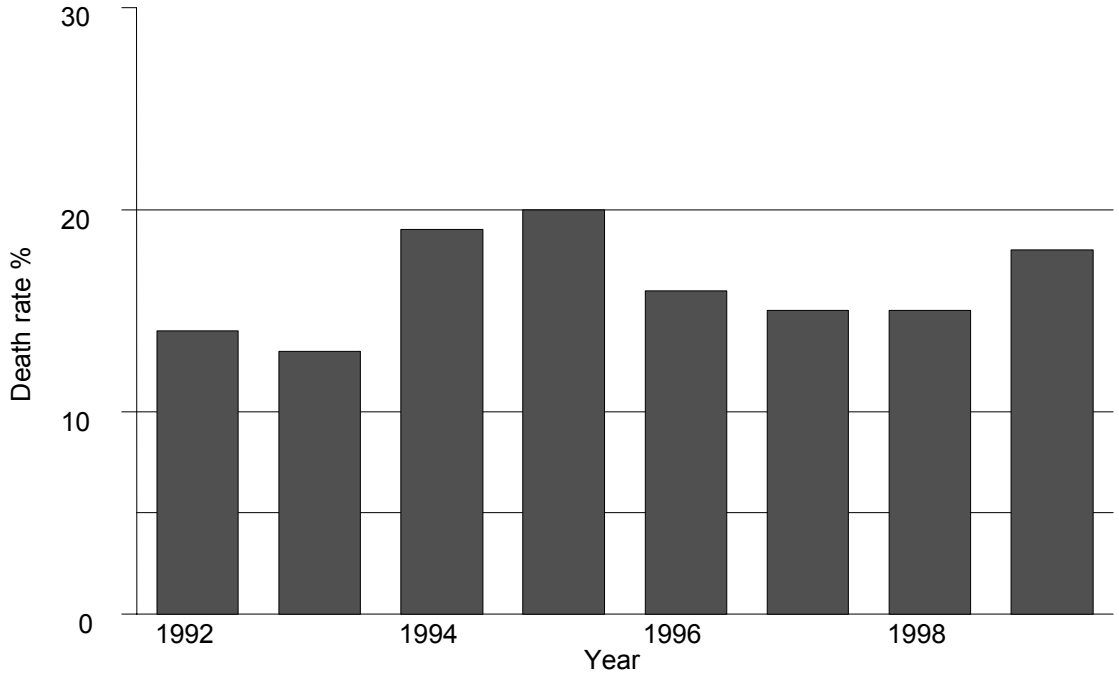


Table 4.05: Causes of Death on CAPD, Government Centres 1996– 1999

Year	1996		1997		1998		1999	
	No	%	No	%	No	%	No	%
Cardiovascular	18	30	21	30	23	31	26	27
Died at home	17	28	18	25	11	15	32	33
Sepsis	20	33	15	21	16	22	15	15
CAPD peritonitis	1	2	4	6	1	1	7	7
GIT bleed	0	0	0	0	0	0	3	3
Cancer	0	0	1	1	0	0	1	1
Liver disease	0	0	0	0	0	0	0	0
Others	0	0	11	15	12	16	11	11
Unknown	4	7	1	1	11	15	3	3
Total	60	100	71	100	74	100	98	100

Table 4.06: Causes of Transfer to HD, 1996 - 1999

Year	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
Peritonitis	23	62	29	58	17	52	23	62
Catheter related infection	0	0	3	6	0	0	2	5
Technical problem	2	5	0	0	3	9	0	0
Membrane failure	3	8	6	12	3	9	3	8
Patient preference/cannot cope	2	5	0	0	2	6	3	8
Others	0	0	2	4	0	0	3	8
Unknown	7	19	10	20	8	24	3	8
Total	37	100	50	100	33	100	37	100

4.4 GOVERNMENT CAPD CENTRES

Table 4.07: Centre Distribution of CAPD patients, 1999

No	Centre	No	Percent
0	No. dialysing at 31st December	572	100
1	Ipoh Hospital	37	6
2	Kota Bharu Hospital	2	0
3	Kuala Lumpur Hospital	163	28
4	Kuala Lumpur Hospital (Paed)	24	4
5	Kuala Terengganu Hospital	15	3
6	Pulau Pinang Hospital	93	16
7	Queen Elizabeth Hospital	11	2
8	Selayang Hospital	4	1
9	Seremban Hospital	46	8
10	Sultanah Aminah Hospital	79	14
11	Tg Ampuan Rahimah	15	3
12	University Hospital	83	15

4.5 CAPD PATIENT CHARACTERISTICS

Table 4.08: Percentage Age Distribution of CAPD patients, 1996 – 1999

Year	1996	1997	1998	1999
New Dialysis patients	220	191	145	201
% 1-14 years	10	8	13	10
% 15-24 years	4	7	9	7
% 25-34 years	13	14	14	6
% 35-44 years	18	16	12	13
% 45-54 years	22	29	19	21
% 55-64 years	22	12	25	24
% ≥65 years	11	14	8	16
Dialysing at 31st December	437	496	522	572
% 1-14 years	10	10	11	12
% 15-24 years	4	4	5	6
% 25-34 years	12	14	16	14
% 35-44 years	16	16	16	16
% 45-54 years	26	27	25	24
% 55-64 years	23	19	18	19
% ≥65 years	10	10	9	9

Table 4.09: CAPD Patient Characteristics, 1996 - 1999

Year	1996	1997	1998	1999
New Dialysis patients	220	191	145	201
Mean age ± sd	44±18	44±18	42±19	47±19
% male	50	52	48	53
% Diabetic	30	42	37	43
% HBsAg+	3	3	0	1
% Anti-HCV+	2	6	3	3

4.6. SURVIVAL ANALYSIS

Table 4.10: CAPD Patient Survival related to Year of Entry, Government Centres 1994 – 1999

Year	1994			1995			1996		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	91	3	106	93	2	152	94	2	200
12	82	4	84	88	3	140	88	2	176
24	64	5	56	71	4	96	77	3	139
36	49	5	35	59	4	70	67	3	105
48	42	6	27	45	4	48			
60	37	6	20						
Year	1997			1998			1999		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	96	1	180	94	2	134	94	2	97
12	91	2	163	86	3	116			
24	78	3	133						

No. = number at risk *SE = standard error*

Figure 4.10: CAPD Patient Survival related to Year of Entry, Government Centres 1995 – 1999

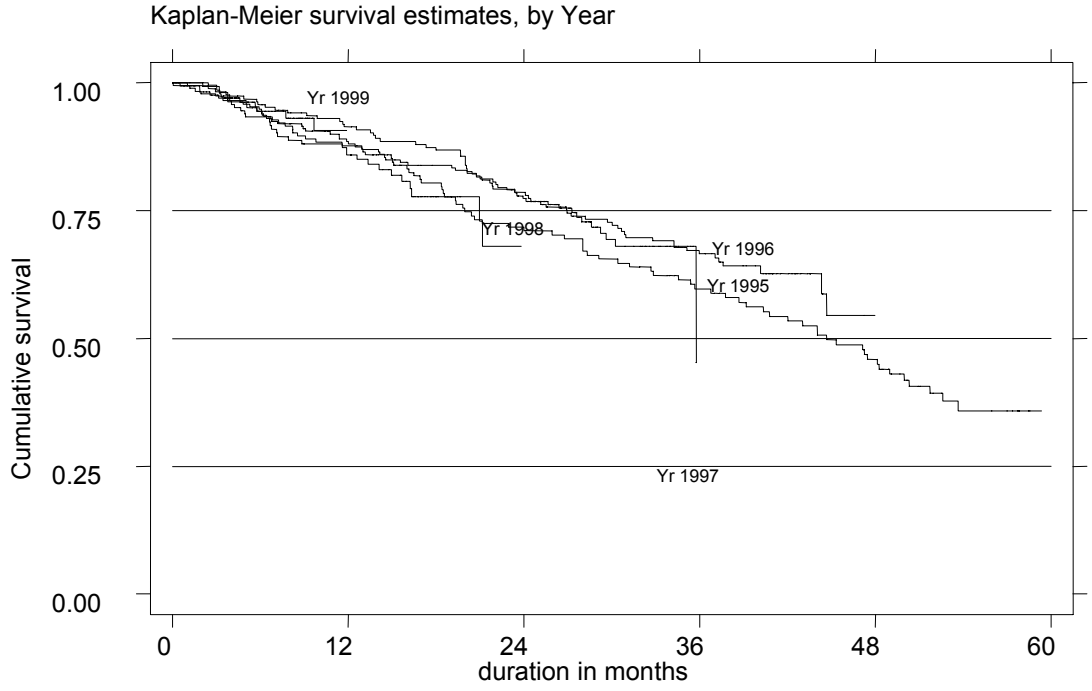


Table 4.11: CAPD Technique Survival related to Year of Entry, Government Centres 1994 – 1999

Year	1994			1995			1996		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	87	3	106	91	2	152	91	2	199
12	72	4	84	84	3	140	82	3	176
24	50	5	56	59	4	96	68	3	139
36	31	4	35	44	4	70	52	3	105
48	23	4	27	30	4	48			
60	17	4	19						

Year	19976			1998			1999		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	94	2	180	92	2	134	89	3	96
12	87	2	163	83	3	116			
24	73	3	133						

No. = number at risk *SE = standard error*

Figure 4.11 CAPD Technique Survival by Year of Entry Government Centres 1995 – 1999

4.7 WORK RELATED REHABILITATION AND QUALITY OF LIFE ON CAPD

Table 4.12: Work Related Rehabilitation on CAPD, Government Centres, 1996 - 1999

REHABILITATION STATUS	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
Full time work for pay	67	21	78	19	83	20	96	19
Part time work for pay	14	4	26	6	23	6	45	9
Able to work but unable to get a job	5	2	15	4	13	3	14	3
Able to work but not yet due to dialysis schedule	1	0	0	0	4	1	3	1
Able but disinclined to work	2	1	7	2	7	2	11	2
Home maker	96	30	126	31	121	29	143	28
Full time student	33	10	43	11	45	11	67	13
Age<15 years	5	2	5	1	11	3	13	3
Retired	46	14	42	10	37	9	38	7
Age>65 years	26	8	38	9	38	9	39	8
Unable to work due to poor health	24	8	26	6	36	9	43	8
Total	319	100	406	100	418	100	512	100

Table 4.13: Quality of Life on CAPD, Government Centres, 1996 – 1999

QOL Index Summated Score	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
0 (Worst QOL)	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0
2	1	0	1	0	2	0	1	0
3	4	1	3	1	8	2	3	1
4	8	3	12	3	11	3	16	3
5	11	3	18	4	26	6	19	4
6	16	5	20	5	14	3	25	5
7	32	10	29	7	32	8	26	5
8	36	11	44	11	32	8	37	7
9	38	12	47	11	45	11	46	9
10 (Best QOL)	173	54	236	58	236	58	338	66
Total	320	100	410	100	406	100	511	100

4.8 CAPD PRACTICES

Table 4.14: Chronic Peritoneal Dialysis Regimes, 1996 - 1999

PD regime	1996		1997		1998		1999	
	No	%	No	%	No	%	No	%
Standard CAPD	346	95	440	94	492	93	577	96
DAPD	17	5	26	6	32	6	16	3
Automated PD	2	1	4	1	6	1	6	1
Total	365	100	470	100	530	100	599	100

Table 4.15: CAPD Connectology, 1996 - 1999

CAPD connectology	1996		1997		1998		1999	
	No	%	No	%	No	%	No	%
UVXD	66	18	36	8	11	2	4	1
Baxter disconnect	296	81	426	90	500	95	343	58
Braun disconnect	2	1	10	2	18	3	248	42
Total	364	100	472	100	529	100	595	100

Table 4.16: CAPD Number of Exchanges per day, 1996- 1999

No of Exchanges/day	1996		1997		1998		1999	
	No	%	No	%	No	%	No	%
2	0	0	0	0	2	0	0	0
3	2	1	3	1	4	1	4	1
4	353	97	455	97	508	96	579	97
5	8	2	12	3	16	3	13	2
100	363	100	470	100	531	100	597	100

Table 4.17: CAPD Volume per Exchange, 1996 - 1999

Volume per Exchange (L)	1996		1997		1998		1999	
	No	%	No	%	No	%	No	%
1	22	6	24	5	25	5	19	3
2	338	94	445	95	496	95	557	96
3	0	0	0	0	0	0	2	0
Total	360	100	469	100	521	100	578	100

4.9. DYSLIPIDAEMIA IN CAPD PATIENTS, GOVERNMENT CENTRES

Table 4.24: Distribution of Serum Cholesterol Concentrations (mmol/l), CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 5.3 mmol/l
1996	318	582	5.9	4.9	6.9	38
1997	421	795	6	5.1	7	35
1998	348	519	5.9	5	6.8	39
1999	434	619	5.5	4.8	6.5	48

Figure 4.24: Cumulative distribution of serum cholesterol concentration by year

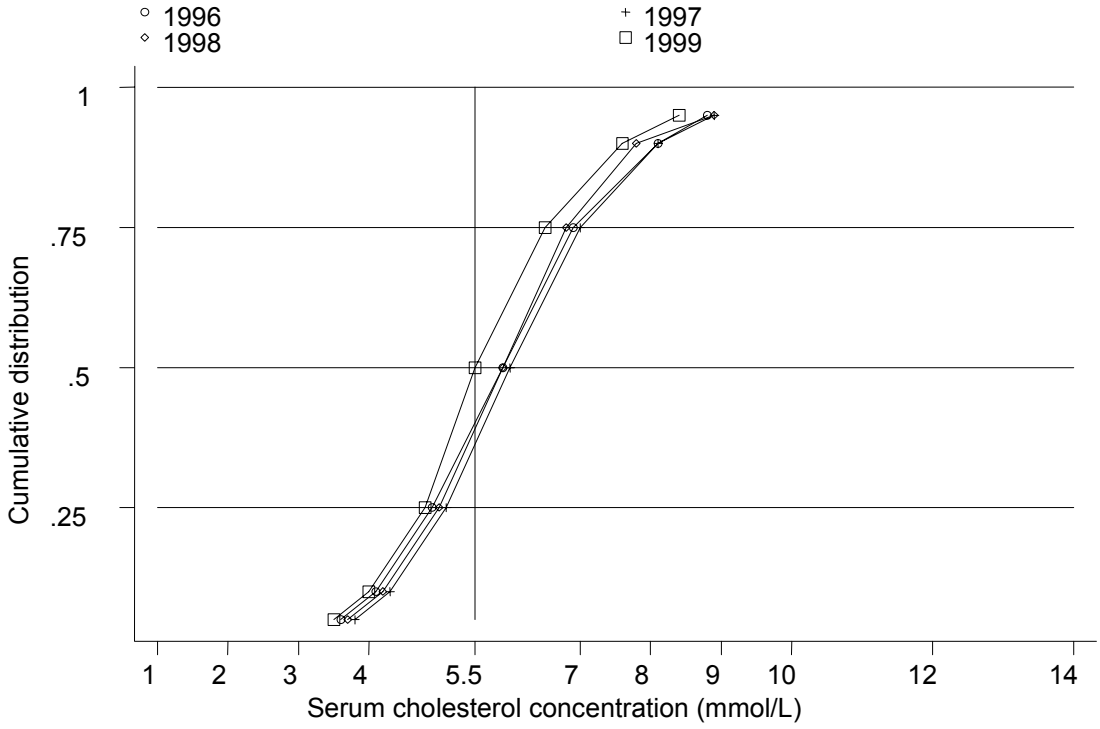


Table 4.25: Distribution of Serum Triglyceride (mmol/l), CAPD patients, Government Centres 1996 - 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 3.5 mmol/l
1996	318	581	2	1.3	3.2	78
1997	414	782	2	1.4	3.1	79
1998	344	511	1.8	1.2	3	81
1999	421	602	1.9	1.3	2.9	82

Figure 4.25: Cumulative distribution of serum triglyceride concentration by year

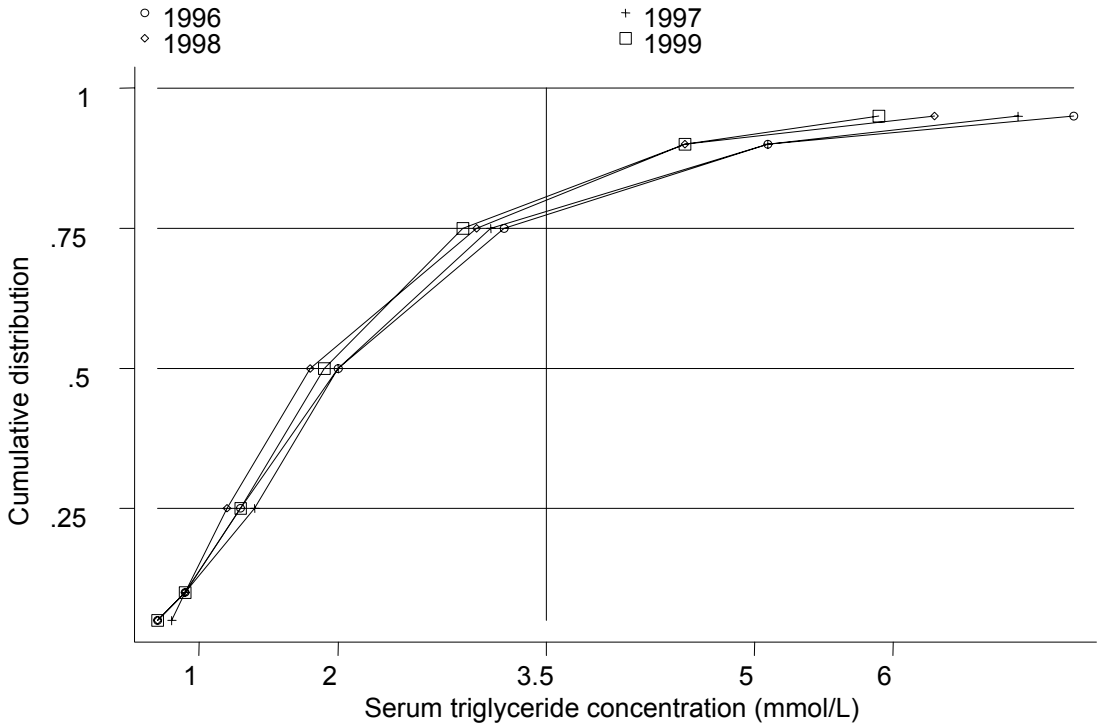


Table 4.26: Distribution of serum LDL (mmol/l), CAPD patient, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients <5 mmol/l
1996	180	325	3.8	2.9	4.7	78
1997	259	456	3.7	2.8	4.7	80
1998	146	187	3.9	3.1	4.6	84
1999	198	263	3.4	2.8	4.4	82

Figure 4.26 : Cumulative distribution of serum LDL by year

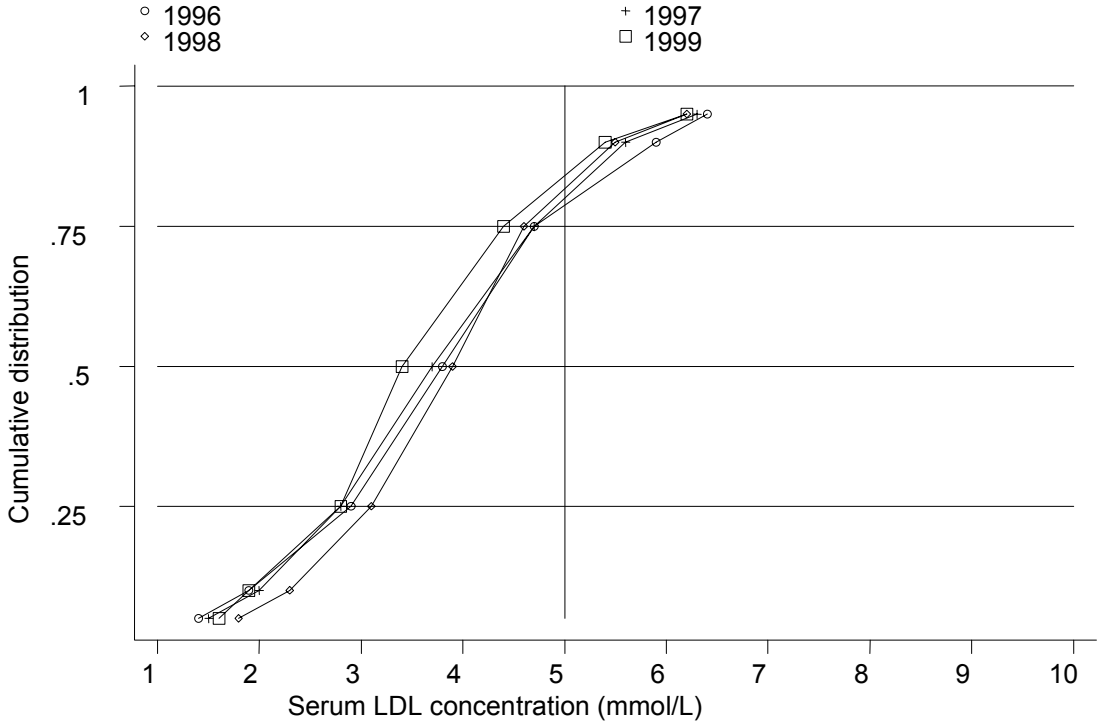
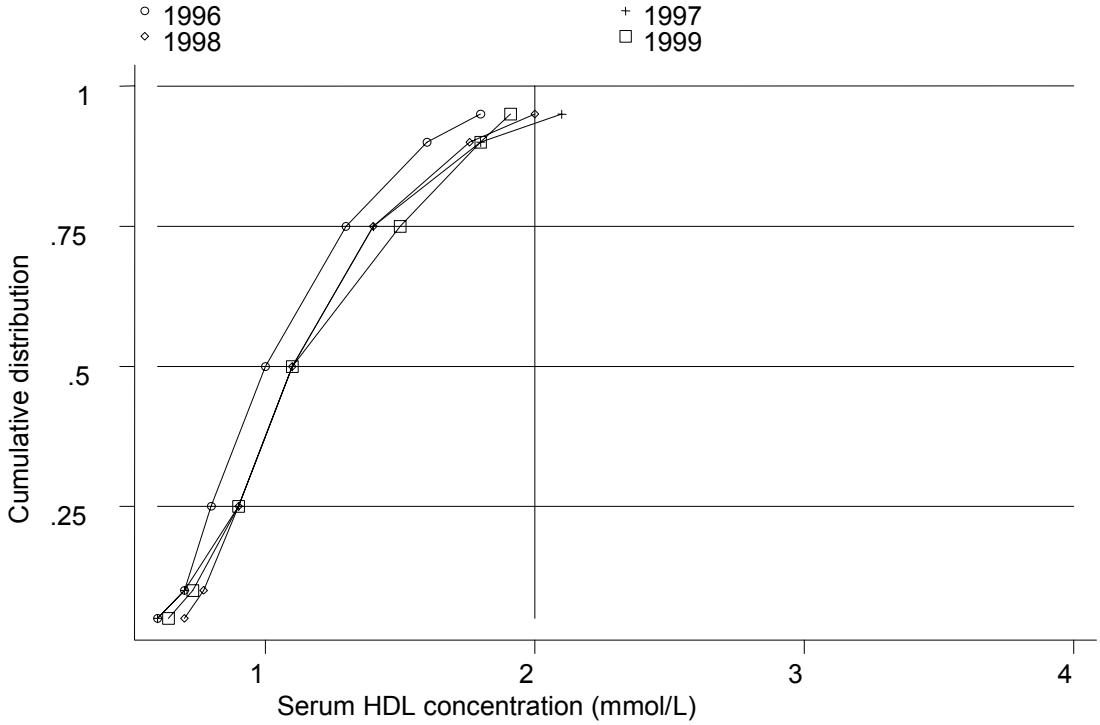


Table 4.27: Distribution of serum HDL (mmol/l), CAPD patient, Government Centres 1996 - 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 2mmol/l
1996	174	322	1	.8	1.3	98
1997	259	465	1.1	.9	1.4	92
1998	152	198	1.1	.9	1.4	93
1999	210	279	1.1	.9	1.5	96

Figure 4.27: Cumulative distribution of serum HDL by year



4.10 MANAGEMENT OF RENAL BONE DISEASE, GOVERNMENT CENTRES

Table 4.28: Treatment for Renal Bone Disease, CAPD patients, Government Centres 1996- 1999

Year	No of subjects	% on CaCO3	% on Al(OH)3	% on Vitamin D
1996	371	84	18	41
1997	477	83	12	24
1998	541	79	9	20
1999	610	74	6	12

Table 4.29: Distribution of serum Phosphate concentration (mmol/l), CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 1.6 mmol/l
1996	359	1121	1.5	1.2	1.9	56
1997	471	1562	1.5	1.2	1.9	56
1998	537	1680	1.6	1.3	1.9	52
1999	583	1783	1.6	1.3	2	51

Figure 4.29 Cumulative Distribution of serum Phosphate by year

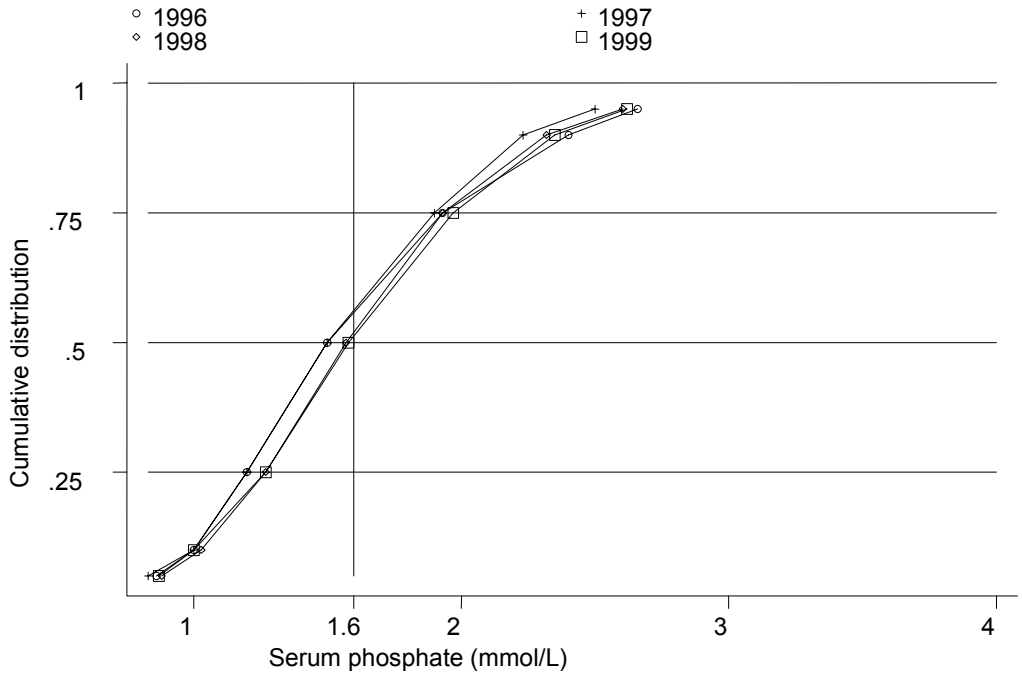


Table 4.30: Distribution of serum Calcium concentration (mmol/l), CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients ≥ 2.2 & ≤2.6 mmol/l
1996	359	1137	2.4	2.2	2.6	55
1997	472	1577	2.4	2.2	2.6	55
1998	539	1707	2.3	2.2	2.5	52
1999	594	1830	2.4	2.2	2.5	55

Figure 4.30: Cumulative distribution of Serum Calcium concentration by year

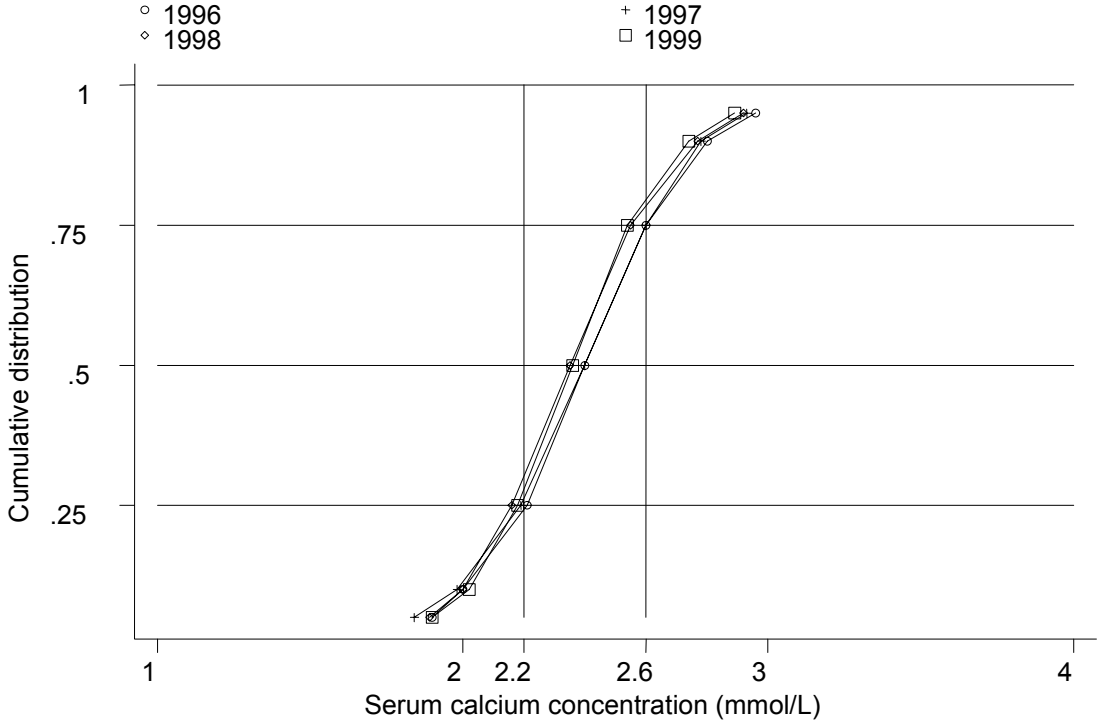
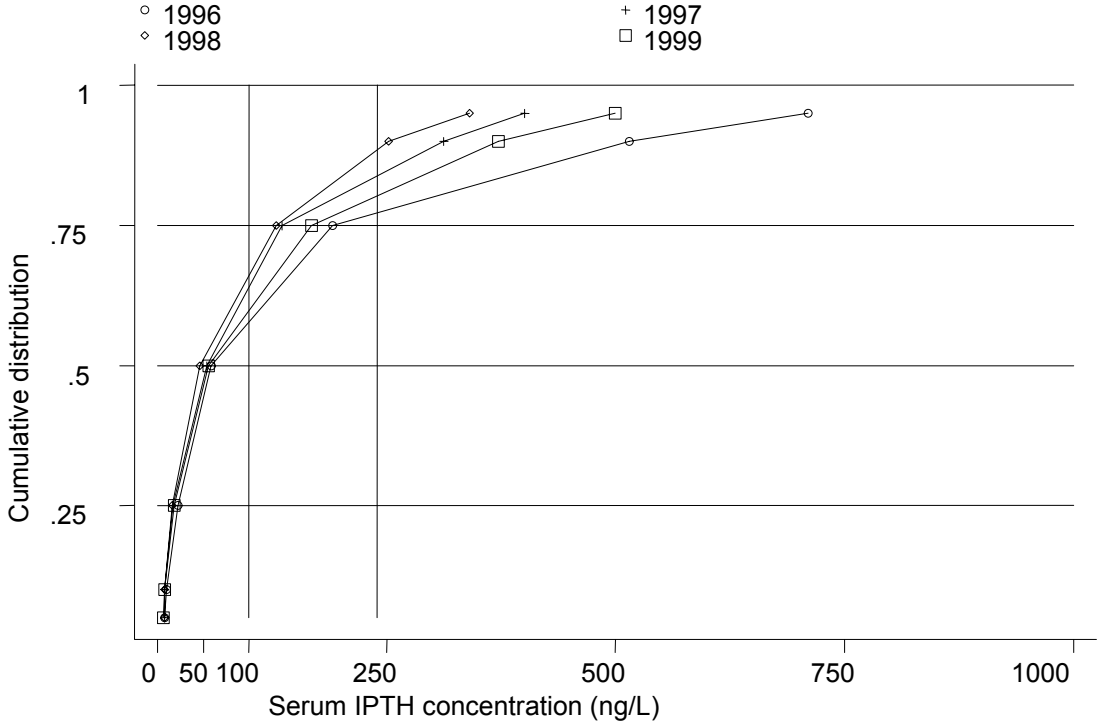


Table 4.31: Distribution of serum iPTH(ng/L) concentration, CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients ≥ 100 & ≤ 250 ng/l
1996	111	122	58.5	22	191	20
1997	293	428	53.5	17	136	19
1998	280	346	46	16	130	19
1999	365	482	56	18	168	17

Figure 4.31: Cumulative Distribution of serum iPTH by year,



4.11 MANAGEMENT OF BLOOD PRESSURE, CAPD PATIENTS

Table 4.32: Treatment for hypertension, CAPD patients, Government Centres 1996 - 1999

Year	No.	% on anti-hypertensives	% on 1 anti-hypertensives	% on 2 anti-hypertensives	% on 3 anti-hypertensives
1996	371	82	38	25	20
1997	477	83	32	33	18
1998	541	88	34	31	23
1999	610	82	30	33	19

Table 4.33: Distribution of Systolic BP without anti-hypertensives, CAPD patients, Government Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 160 mmHg
1996	66	516	123	110	140	88
1997	78	608	120	110	140	87
1998	63	491	120	110	145	86
1999	98	699	120	110	142	87

Figure 4.33: Cumulative Distribution of Systolic BP without anti-hypertensives by year

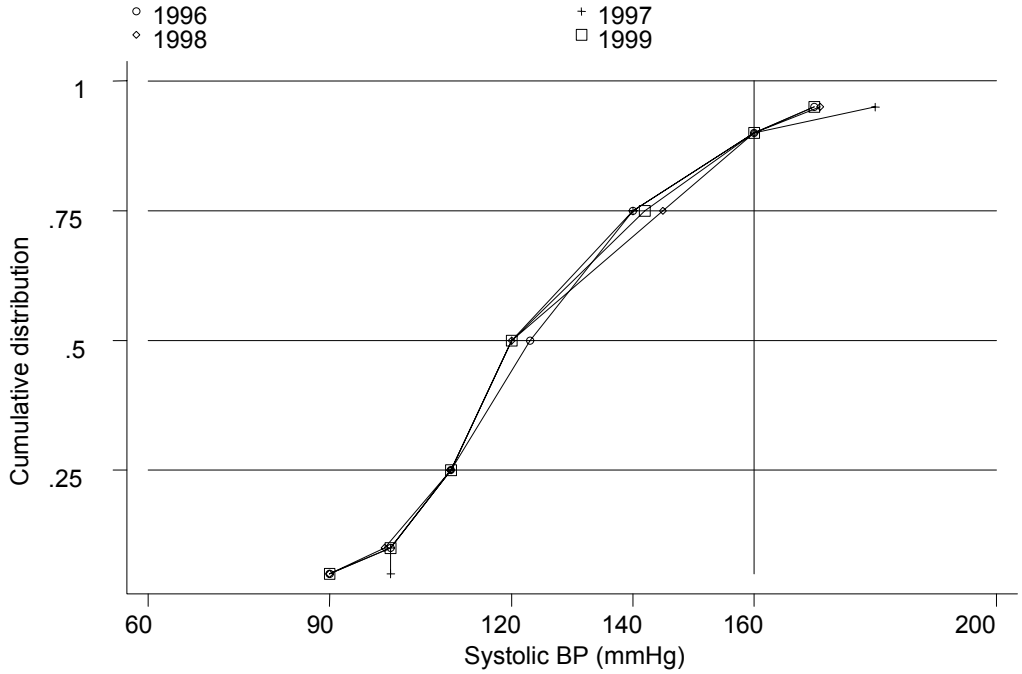


Table 4.34: Distribution of Diastolic BP without anti-hypertensives, CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 90 mmHg
1996	66	516	77	70	85.5	77
1997	78	606	80	70	90	73
1998	63	492	80	70	89	76
1999	98	700	76.5	67	87.5	76

Figure 4.34: Cumulative Distribution of Diastolic BP without anti-hypertensives by year

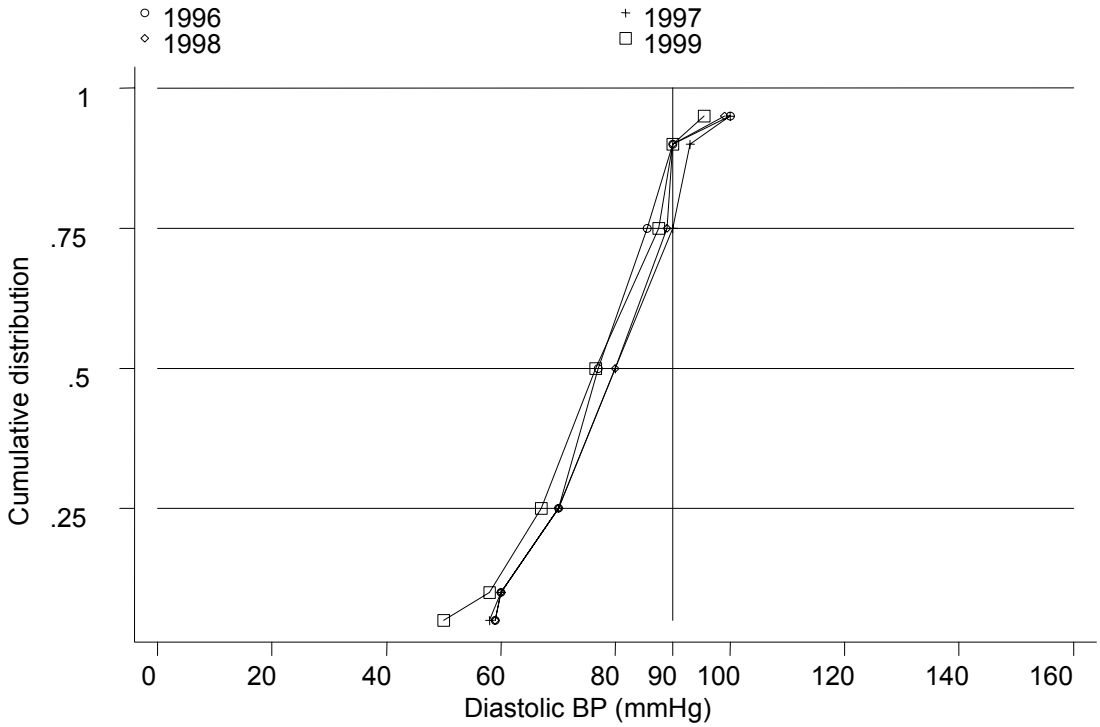


Table 4.35: Distribution of systolic BP on anti-hypertensives CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 160 mmHg
1996	292	2271	142	130	160	67
1997	391	3303	140	130	160	69
1998	456	3900	140	124	160	72
1999	478	3833	140	130	160	72

Figure 4.35: Cumulative Distribution of systolic BP on anti-hypertensives, by year

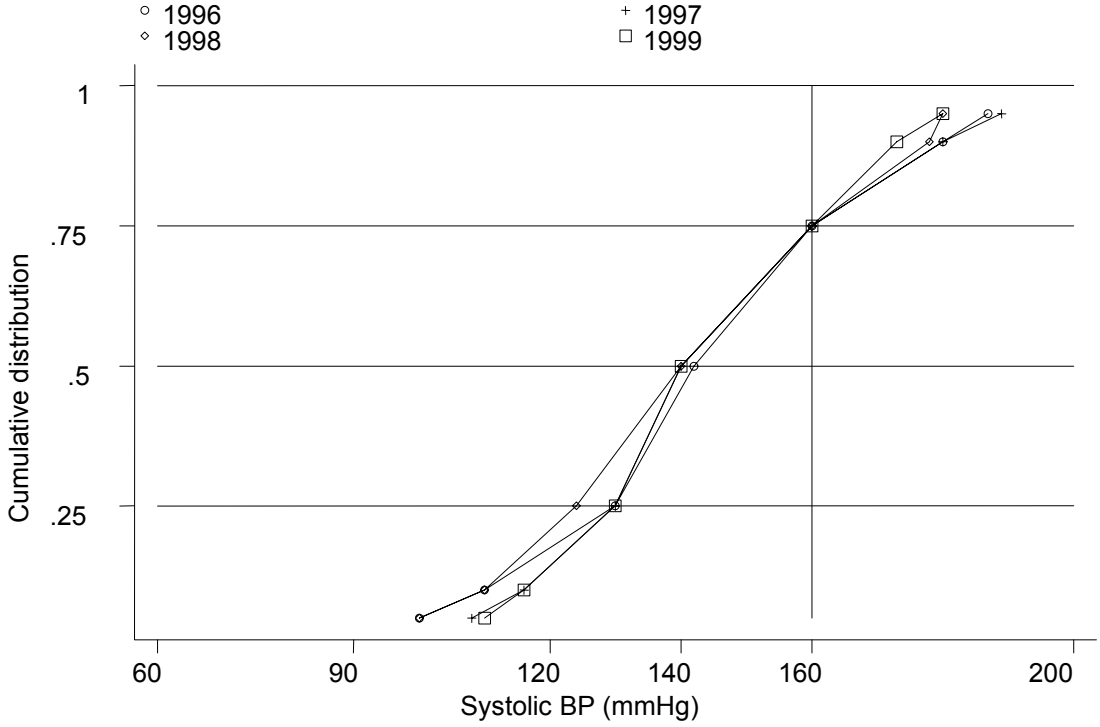
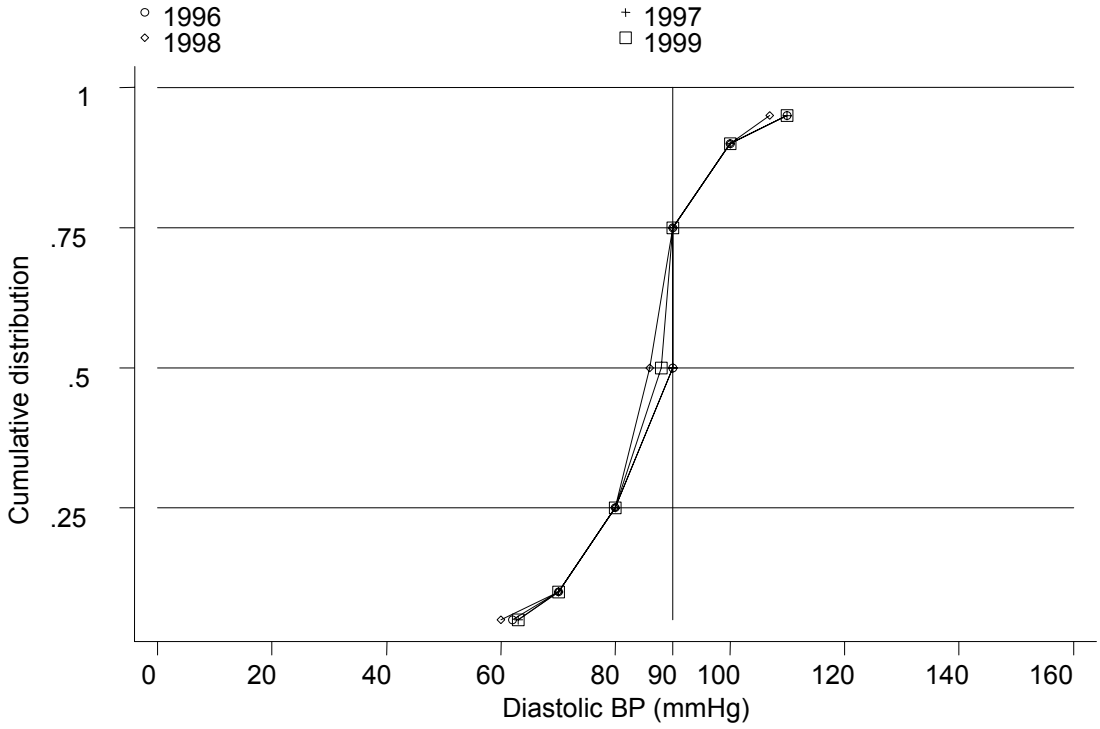


Table 4.36: Distribution of diastolic BP on anti-hypertensives, CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients < 90 mmHg
1996	292	2269	90	80	90	49
1997	390	3293	90	80	90	50
1998	456	3899	86	80	90	53
1999	478	3838	88	80	90	51

Figure 4.36: Cumulative Distribution of diastolic BP on anti-hypertensives by year



4.12 TREATMENT OF ANAEMIA, GOVERNMENT CAPD CENTRES

Table 4.37: Treatment for Anaemia, CAPD patients, Government Centres 1996 - 1999

Year	No	% on rHuEpo	% received blood transfusion	% received oral iron	% received parenteral iron
1996	371	25	8	97	1
1997	477	37	12	96	3
1998	541	44	16	96	3
1999	610	44	14	94	0

Table 4.38: Distribution of rHuEpo dose per week, CAPD patients, Government Centres 1996 - 1999

Year	1996	1997	1998	1999
No. of patients	86	170	225	259
% on 2000 u/week	28	19	25	35
% on 2-4000 u/week	63	66	56	50
% on 4-6000 u/week	0	2	6	3
% on 6-8000 u/week	7	11	12	9
% on 8-12000 u/week	2	1	1	2
% on >12000 u/week	0	0	0	0

Table 4.39: Distribution of serum Iron concentration without rHuEpo, CAPD patients, Government Centres 1996 – 1999

year	No of subjects	No of observations	median	LQ	UQ	% patients > 10 umol/l
1996	246	633	13	9.5	19	68
1997	254	627	14	10	20	75
1998	190	446	15	11	24	76
1999	202	470	15	11	26	78

Figure 4.39: Cumulative Distribution of serum Iron without rHuEpo by year

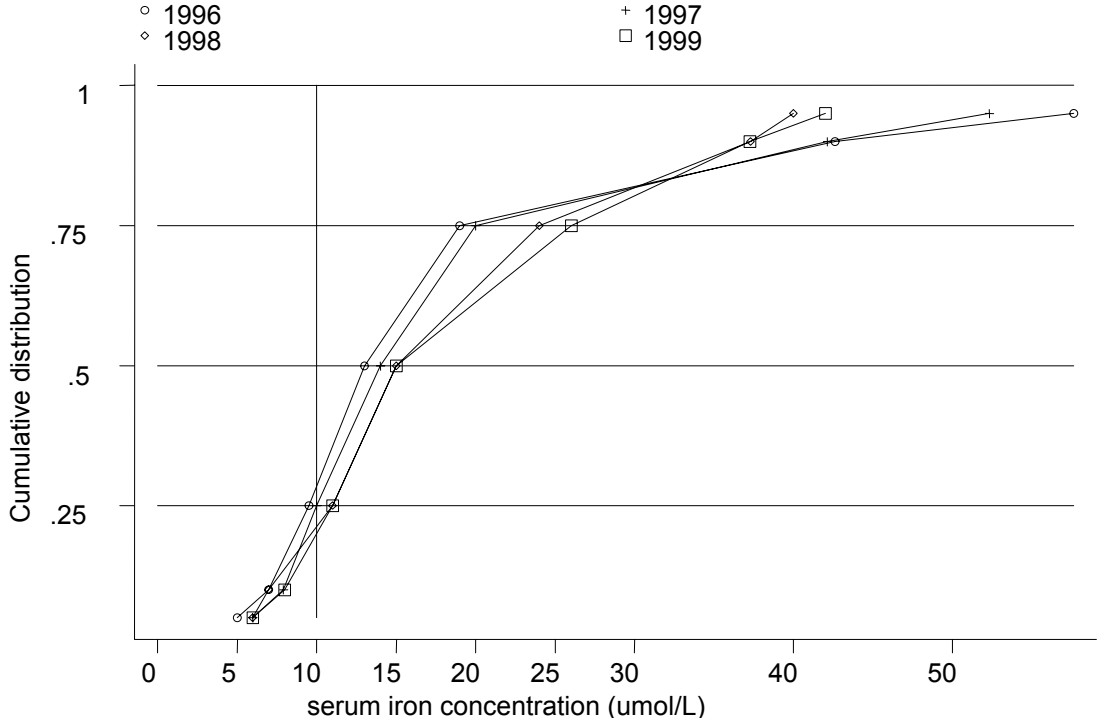


Table 4.40: Distribution of serum Iron concentration on rHuEpo, CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 10 umol/l
1996	89	277	15.1	10	31	74
1997	153	424	15	10	30.9	72
1998	113	323	16	11	30.3	79
1999	143	392	18	11	28	81

Figure 4.40:Cumulative Distribution of serum Iron concentration on rHuEpo, by year.

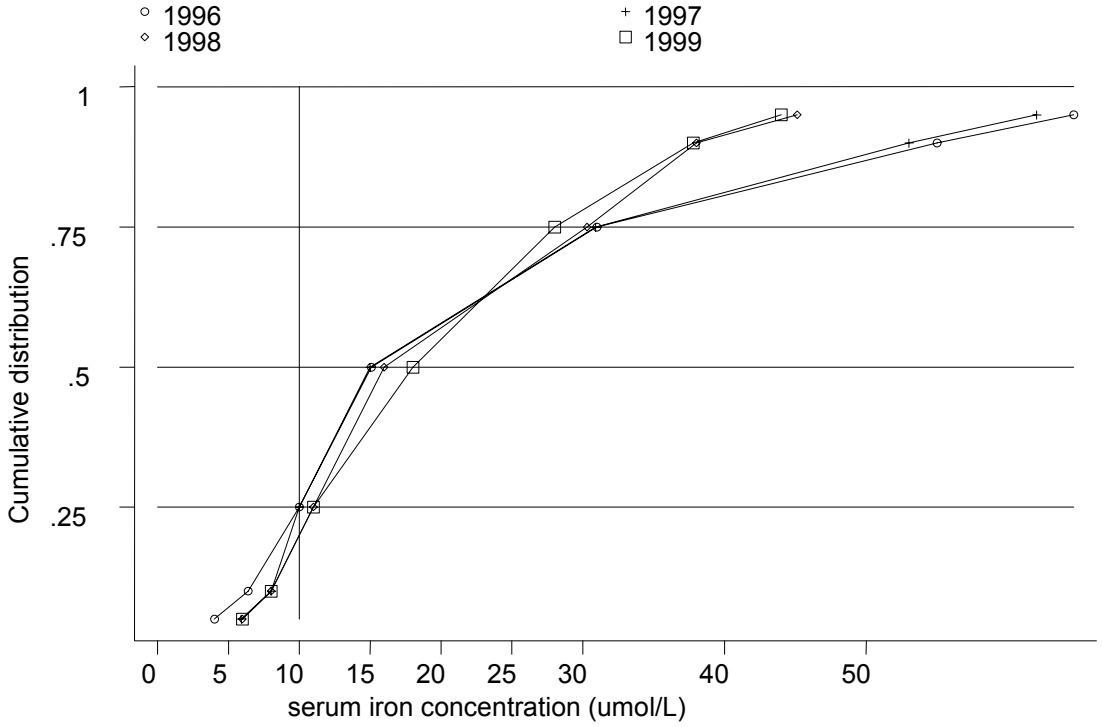


Table 4.41: Distribution of serum Transferrin Saturation without rHuEpo, CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 20%
1996	241	964	30.8	22.2	45	79
1997	246	984	33.3	21.8	47.8	80
1998	158	632	35.6	22.9	49.1	78
1999	134	536	34.2	23.3	45.1	85

Figure 4.41: Cumulative Distribution of serum Transferrin Saturation without rHuEpo by year

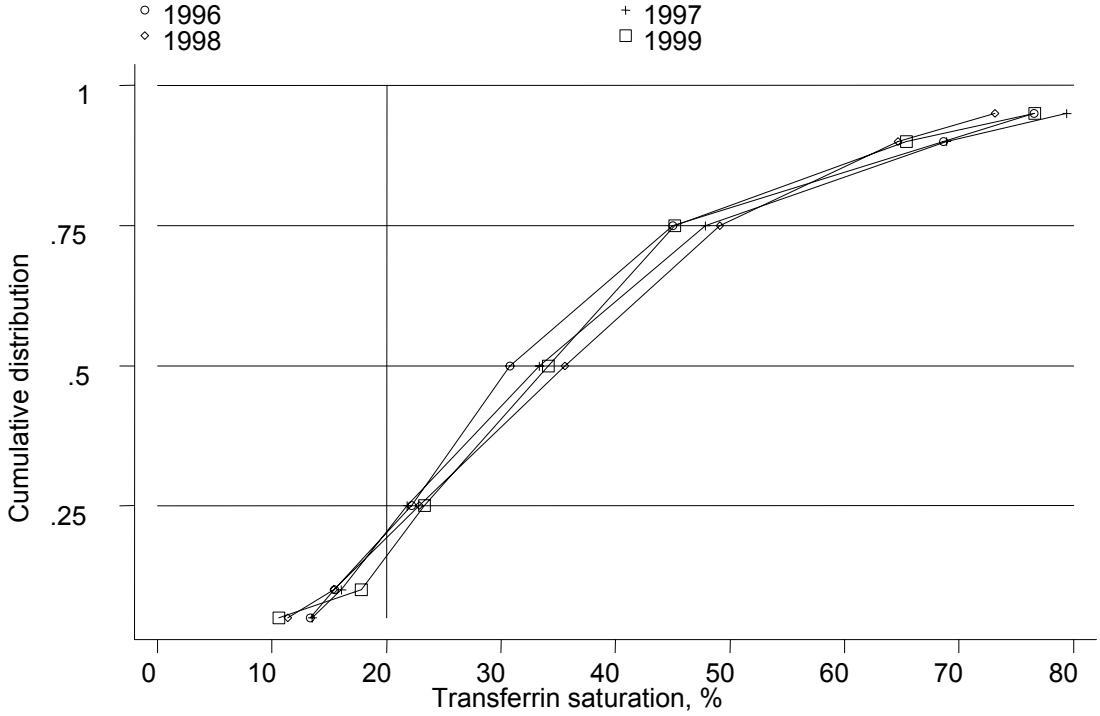


Table 4.42: Distribution of serum Transferrin Saturation on rHuEpo, CAPD patients, Government Centres 1996– 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 20%
1996	84	336	35.3	24.7	63.2	89
1997	141	564	37.1	25	61.4	86
1998	103	412	39.3	28.1	55	88
1999	92	368	37.2	25.3	48.1	85

Figure 4.42: Cumulative Distribution of serum Transferrin Saturation on rHuEpo by year

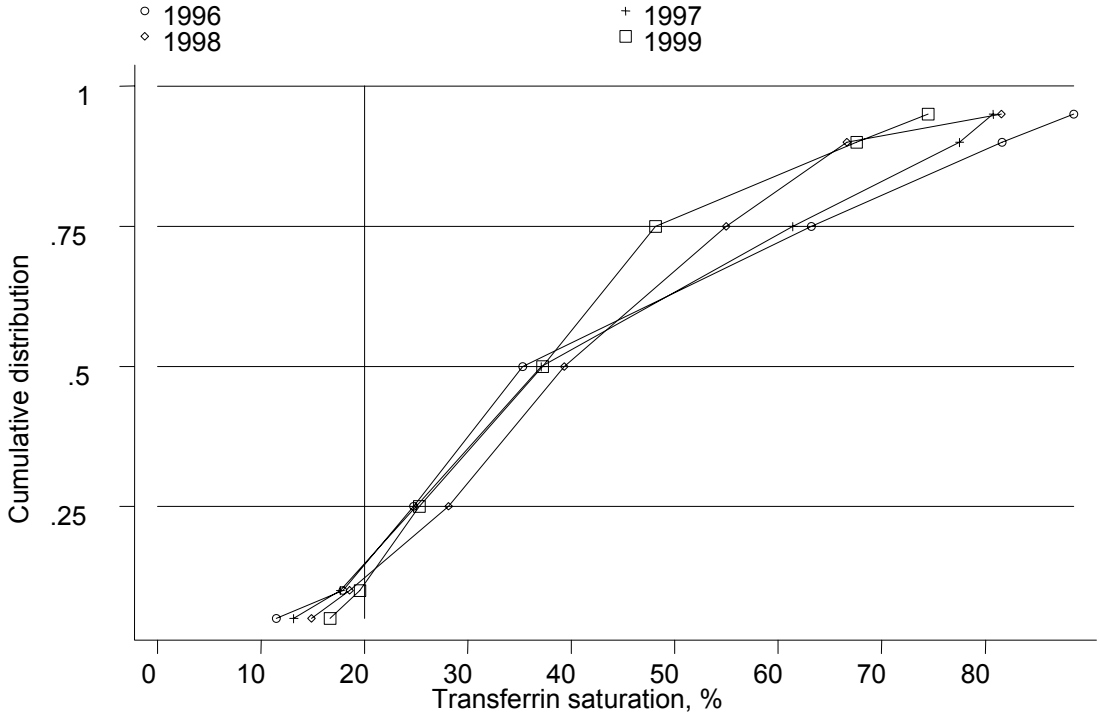


Table 4.43: Distribution of serum Ferritin without rHuEpo, CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 100 ug/l
1996	40	42	351	190	588	88
1997	133	193	407	217	749	86
1998	92	105	394	196	686	86
1999	124	154	482	259.7	729	93

Figure 4.43:Cumulative Distribution of serum Ferritin without rHuEpo by year

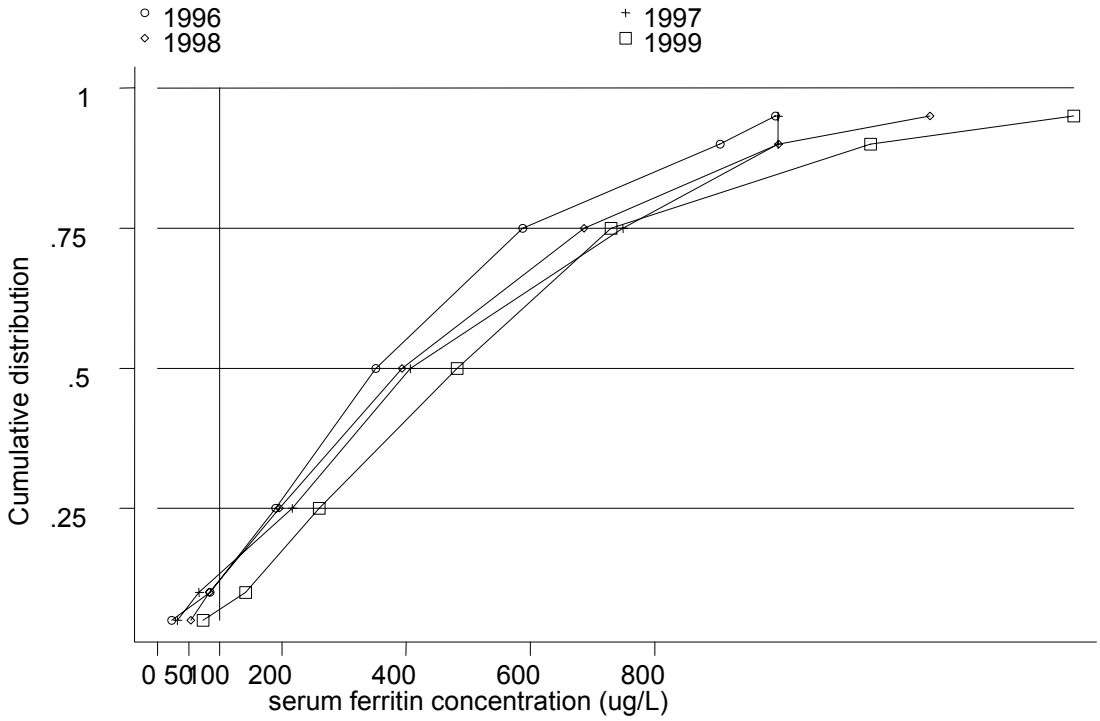


Table 4.44: Distribution of serum Ferritin concentration on rHuEpo, CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients > 100 ug/l
1996	49	73	655	383	999	95
1997	129	216	495.5	260	994	92
1998	135	185	518	246	851	92
1999	136	201	553.3	254	857.3	93

Figure 4.44: Cumulative Distribution of serum Ferritin concentration on rHuEpo, by year

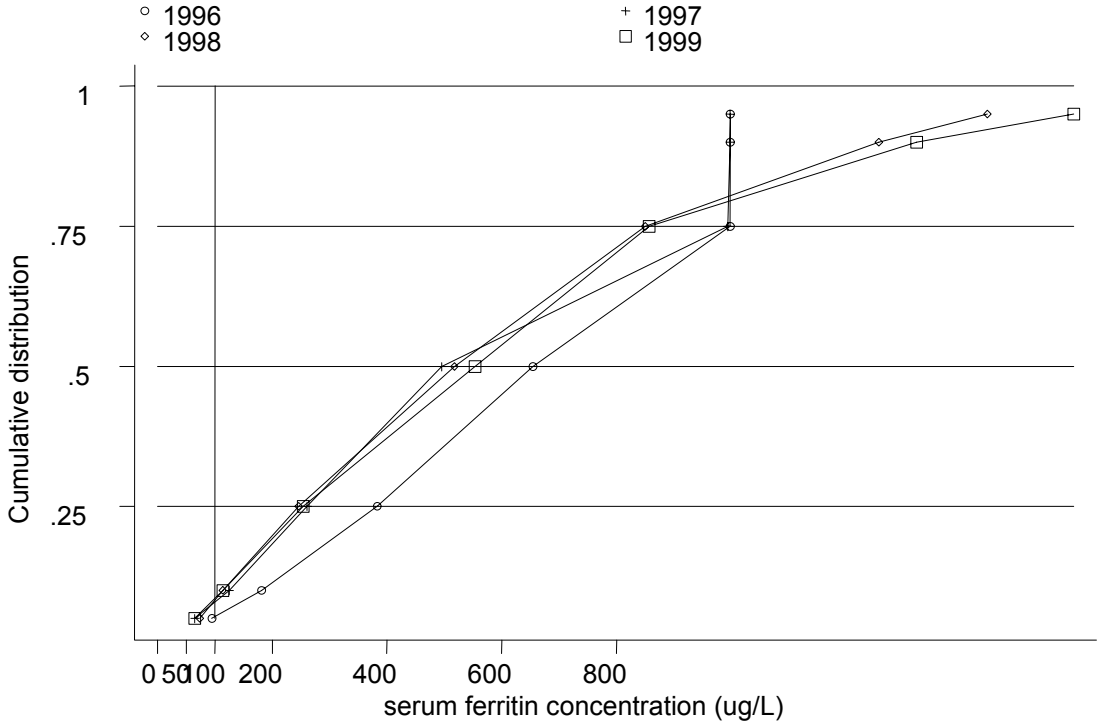


Table 4.45: Distribution of Haemoglobin concentration without rHuEpo, CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients <10 g/dl	% patients ≥10 & ≤12 g/dl	% patients >12 g/dl
1996	274	843	9.1	7.8	10.5	67	24	8
1997	298	981	9.1	8	10.4	67	26	7
1998	301	915	9.2	8	10.5	65	26	9
1999	336	967	9.4	8.3	10.7	61	32	7

Figure 4.45:Cumulative Distribution of haemoglobin concentration without rHuEpo by year

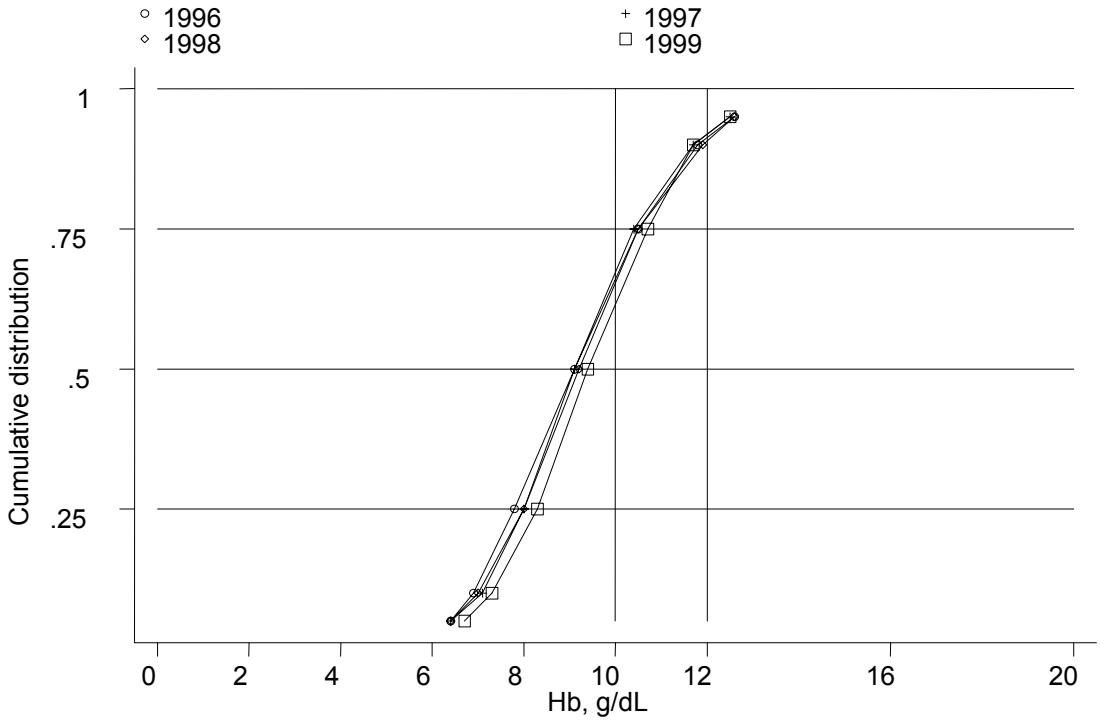
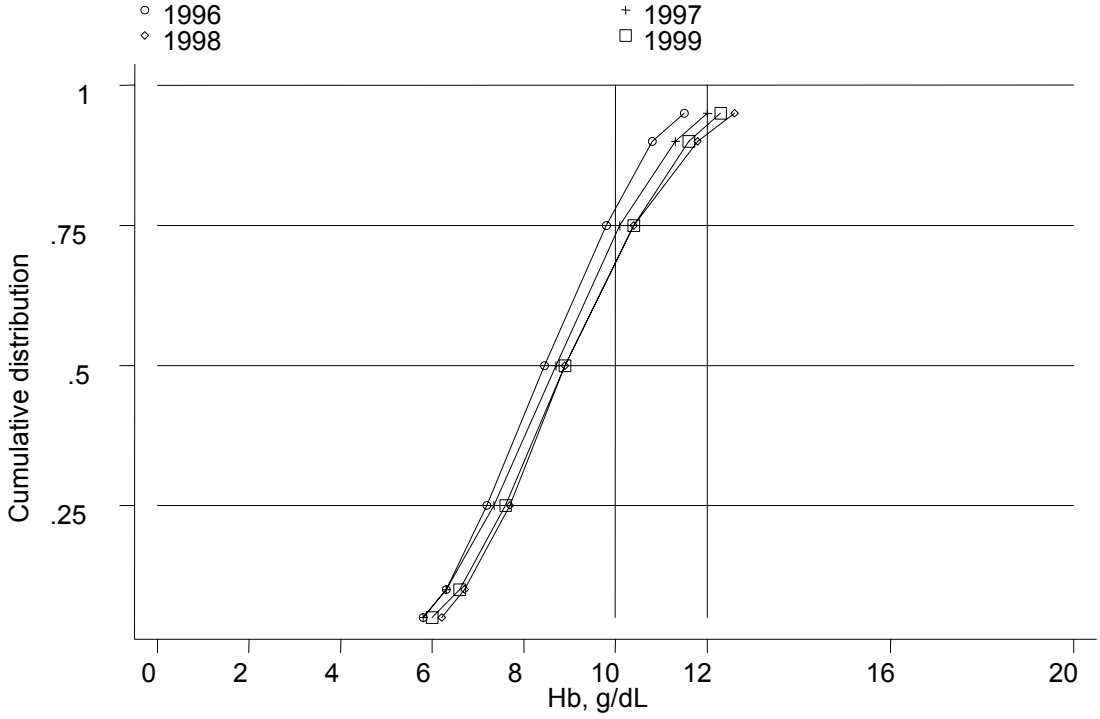


Table 4.46: Distribution of Haemoglobin concentration on rHuEpo, CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients <10 g/dl	% patients ≥10 & ≤12 g/dl	% patients >12 g/dl
1996	92	330	8.4	7.2	9.8	78	19	3
1997	175	652	8.7	7.3	10.1	73	22	5
1998	238	826	8.9	7.7	10.4	69	23	8
1999	262	906	8.9	7.6	10.4	69	25	6

Figure 4.46: Cumulative Distribution of Haemoglobin on rHuEpo, by year



4.13 NUTRITIONAL STATUS OF CAPD PATIENTS

Table 4.47: Distribution of serum Albumin concentration(g/L), CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients >40g/l
1996	360	1134	36	31	39	24
1997	472	1572	36	31	40	28
1998	536	1692	37	32	40	29
1999	597	1872	35	31	38	18

Figure 4.47: Cumulative Distribution of serum Albumin concentration by year

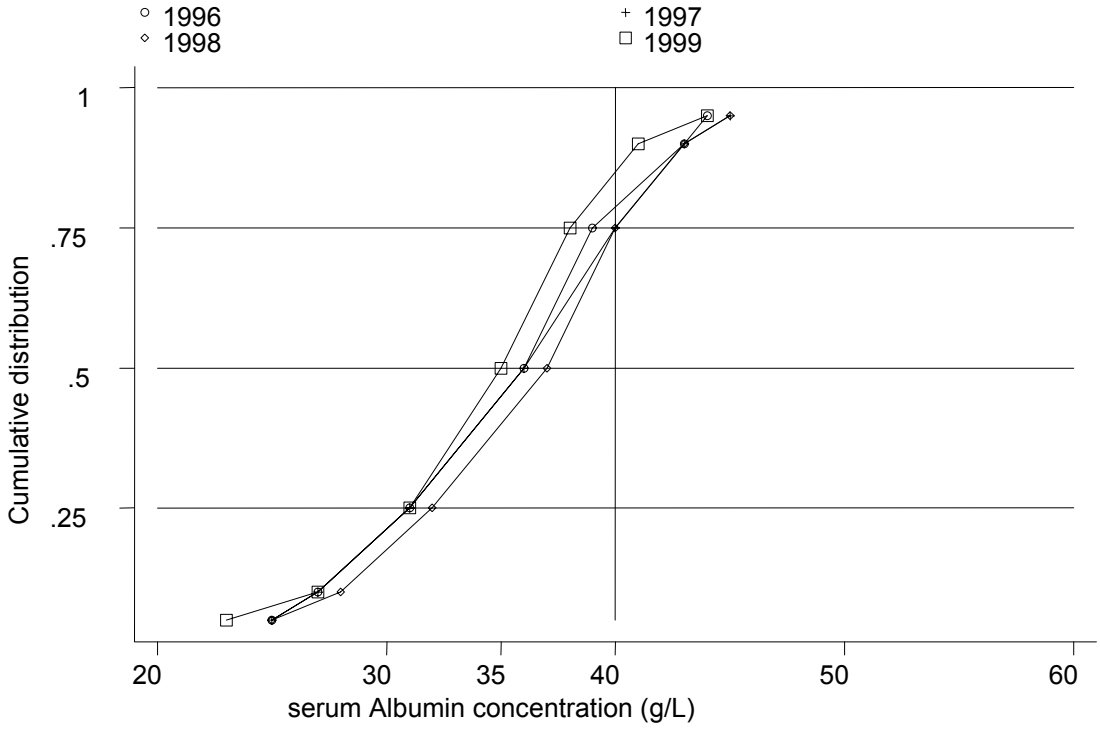
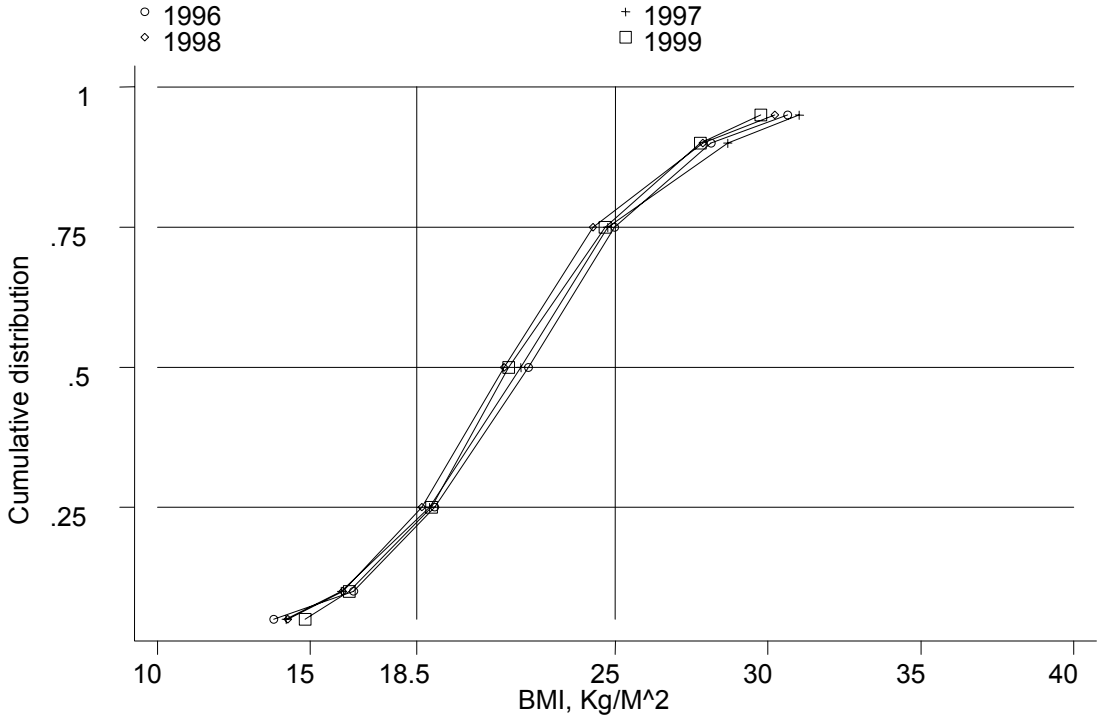


Table 4.48: Distribution of Body Mass Index
CAPD patients, Government Centres 1996 – 1999

Year	No of subjects	No of observations	median	LQ	UQ	% patients <18.5	% patients ≥18.5 & ≤25	% patients >25
1996	281	2215	22.2	19.1	25	21	54	25
1997	419	3579	21.9	18.9	24.7	22	55	24
1998	489	4243	21.4	18.7	24.3	23	55	21
1999	550	4316	21.5	19	24.7	22	56	23

Figure 4.48: Cumulative Distribution of BMI by year

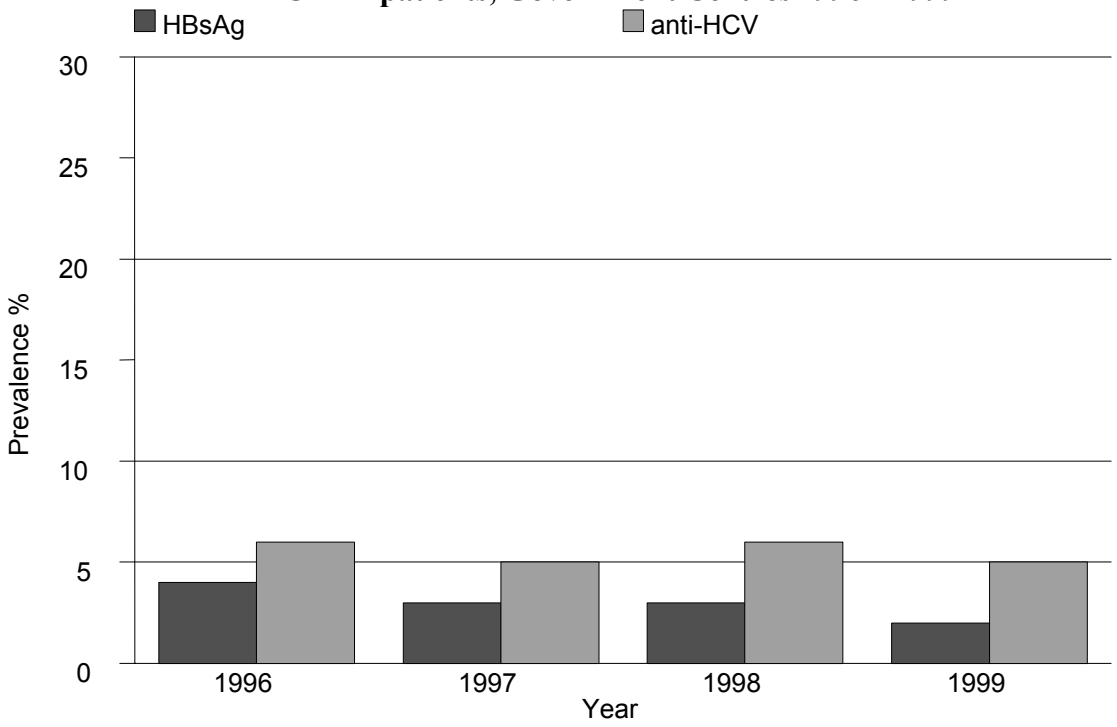


4.14 SEROLOGICAL STATUS, CAPD PATIENTS

Table 4.49: Prevalence of positive anti-HCV and HBsAg CAPD patients, Government Centres 1996 – 1999

Year	No	% HBsAg positive	% anti-HCV positive
1996	371	4	6
1997	477	3	5
1998	541	3	6
1999	610	2	5

Figure 4.49: Prevalence of positive anti-HCV and HBsAg CAPD patients, Government Centres 1996 – 1999



RENAL TRANSPLANTATION

Stock and Flow

Place and Type of Transplant

Death after Transplantation and Graft Failure

Centres of Follow-Up

Characteristics of Transplant Patients

Survival Analysis

Work related Rehabilitation and Quality of Life

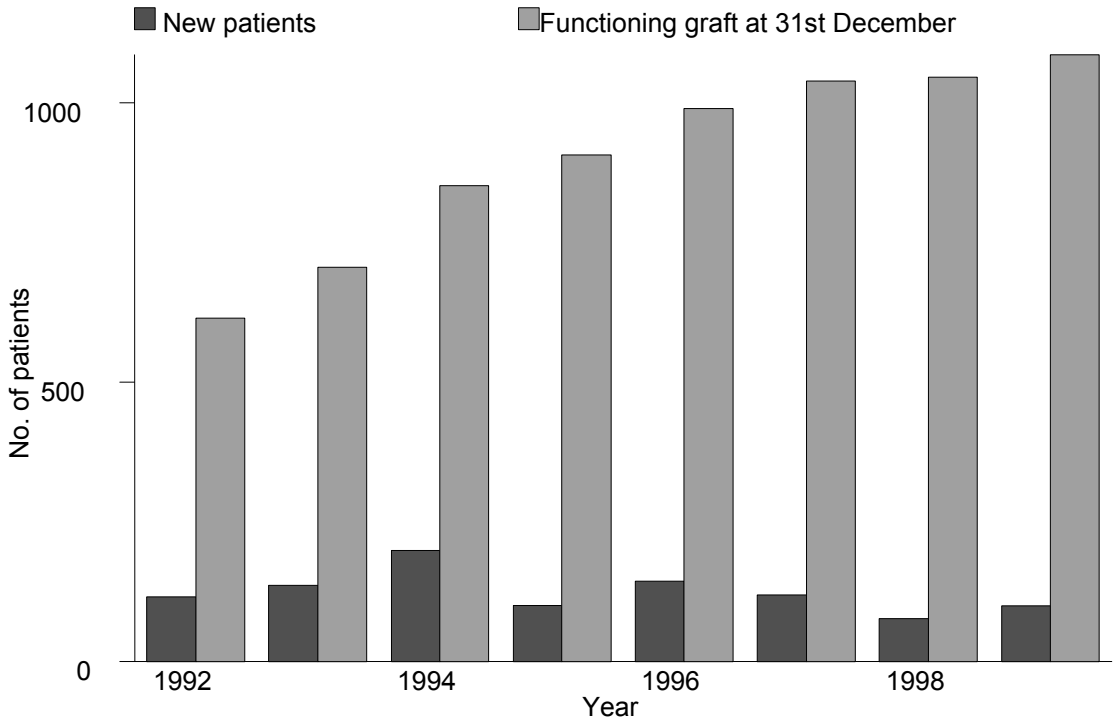
5. RENAL TRANSPLANTATION

5.1 STOCK AND FLOW

Table 5.01 Stock and Flow of Transplant Patients, 1992 - 1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
New transplant patients (No.)	115	136	199	100	144	119	77	99
Died (No.)	16	19	27	15	29	27	23	23
Returned to dialysis (No.)	19	24	21	28	28	39	44	34
Lost to Follow Up (No.)	2	2	5	2	3	4	3	2
Functioning graft at 31st December	614	705	851	906	990	1039	1046	1086

Figure 5.01: Stock and Flow Renal Transplant Patients, 1992 - 1999



5.2 PLACE AND TYPE OF RENAL TRANSPLANTS

Table 5.02: Place of Renal Transplantation, 1992- 1999

Year	1992		1993		1994		1995	
	No.	%	No.	%	No.	%	No.	%
HKL	31	27	36	26	33	17	36	36
UH	4	3	3	2	5	3	9	9
Other local	4	3	0	0	0	0	0	0
India	73	63	83	61	139	70	22	22
China	2	2	12	9	21	11	32	32
Other overseas	1	1	2	1	1	1	1	1
Total	115	100	136	100	199	100	100	100
Year	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
HKL	33	23	29	24	33	43	35	35
UH	5	3	6	5	5	6	9	9
Other local	0	0	0	0	0	0	1	1
India	5	3	7	6	3	4	5	5
China	100	69	75	63	35	45	49	49
Other overseas	1	1	2	2	1	1	0	0
Total	144	100	119	100	77	100	99	100

Table 5.03: Type of Renal Transplantation, 1992- 1999

Year	1992		1993		1994		1995	
	No.	%	No.	%	No.	%	No.	%
Commercial Cadaver	2	2	12	9	21	11	32	32
Commercial Live donor	72	63	82	60	138	69	19	19
Live donor	37	32	39	29	38	19	44	44
Cadaver	4	3	2	1	2	1	5	5
Total	115	100	136	100	199	100	100	100
Year	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
Commercial Cadaver	100	69	75	63	35	45	46	46
Commercial Live donor	4	3	7	6	3	4	3	3
Live donor	38	26	29	24	24	31	37	37
Cadaver	2	1	8	7	15	19	10	10
Total	144	100	119	100	77	100	99	100

5.3. DEATH AFTER TRANSPLANTATION AND GRAFT FAILURE

Table 5.04: Transplant Patients Death Rate and Graft Loss, 1992 - 1999

Year	1992	1993	1994	1995	1996	1997	1998	1999
No. at risk	614	660	778	879	948	1015	1043	1066
Transplant death	16	19	27	15	29	27	23	23
Transplant death rate %	3	3	3	2	3	3	2	2
Graft loss	19	24	21	28	28	39	44	34
Graft loss %	3	4	3	3	3	4	4	3
All losses	35	43	48	43	57	66	67	57
All losses rate %	6	7	6	5	6	7	6	5

Figure 5.04: Transplant Recipient Death Rate, 1992 - 1999

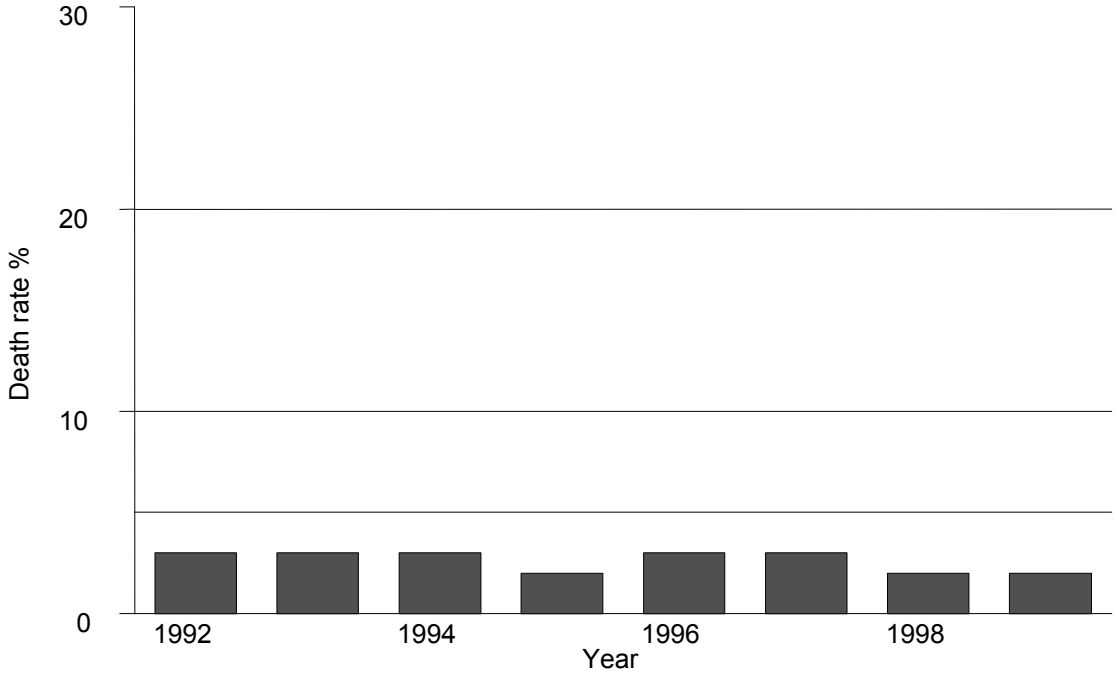


Table 5.05 Causes of Death in Transplant Recipients 1996– 1999

Year	1996		1997		1998		1999	
	No	%	No	%	No	%	No	%
Cardiovascular	4	14	3	11	3	13	2	9
Died at home	3	10	2	7	4	17	3	13
Sepsis	17	59	13	48	7	30	7	30
GIT bleeding	0	0	0	0	2	9	1	4
Cancer	2	7	0	0	3	13	3	13
Liver disease	2	7	2	7	1	4	1	4
Others	1	3	3	11	1	4	3	13
Unknown	0	0	4	15	2	9	3	13
Total no.	29	100	27	100	23	100	23	100

Table 5.06: Causes of Graft Failure, 1996 - 1999

Year	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
Rejection	13	46	20	51	22	50	22	65
Cyclosporine/ drug toxicity	0	0	0	0	0	0	0	0
Ureteric obstruction	0	0	0	0	0	0	0	0
Vascular causes(stenosis / thrombosis)	1	4	4	10	1	2	1	3
Renal disease, recurrent/de novo	2	7	1	3	1	2	0	0
Technical complication	0	0	0	0	0	0	0	0
Others	0	0	4	10	4	9	0	0
Unknown	12	43	10	26	16	36	11	32
Total no.	28	100	39	100	44	100	34	100

5.4 CENTRES OF FOLLOW-UP

Table 5.07: Distribution of Centres of Follow-up of Transplant Recipients, 1999

No	Centre	No	Percent
0	No. with functioning graft at 31st December	1086	100
1	Alor Setar Hospital	6	1
2	Ampang Puteri	1	0
3	Assunta Hospital	2	0
4	Batu Pahat Hospital	7	1
5	Bintulu Hospital	2	0
6	Damai Medical	1	0
7	Dutches of Kent Hospital	4	0
8	HTAA, Kuantan	17	2
9	Healthcare Dialysis (PJ)	11	1
10	Ipoh Hospital	36	3
11	Kangar Hospital	1	0
12	Kluang Hospital	3	0
13	Kota Bharu Hospital	1	0
14	Kuala Lumpur Hospital	326	30
15	Kuala Terengganu Hospital	5	0
16	Kuching Hospital	42	4
17	Labuan Hospital	1	0
18	Mahkota Medical	27	2
19	Melaka Hospital	19	2
20	Menon SJMC	24	2
21	Miri Hospital	16	1
22	Muar Hospital	7	1
23	Pantai Mutiara	1	0
24	Pulau Pinang Hospital	155	14
25	Queen Elizabeth Hospital	39	4
26	Renal Healthcare (KL)	2	0
27	Selangor Medical	1	0
28	Selayang Hospital	5	0
29	Seremban Hospital	28	3
30	Sibu Hospital	21	2
31	Sultanah Aminah Hospital	141	13
32	Tawakal Hospital	13	1
33	Tawau Hospital	5	0
34	Tg Ampuan Rahimah	14	1
35	Timberland Medical	29	3
36	USM Hospital	2	0
37	University Hospital	71	7

5.5 TRANSPLANT RECIPIENT CHARACTERISTICS

Table 5.08: Percentage Age Distribution of transplant recipients, 1996 – 1999

Year	1996	1997	1998	1999
New transplant patients	144	119	77	99
% 1-14 years	2	6	5	6
%15-24 years	9	17	6	11
% 25-34 years	26	24	32	27
% 35-44 years	34	31	30	31
% 45-54 years	22	18	22	17
% 55-64 years	6	3	4	7
% ≥65 years	0	2	0	0
Functioning graft at 31st December	990	1039	1046	1086
% 1-14 years	2	3	3	3
% 15-24 years	15	15	14	14
% 25-34 years	34	32	32	31
% 35-44 years	30	31	31	31
% 45-54 years	15	15	16	15
% 55-64 years	5	5	4	4
% ≥65 years	0	0	0	0

Table 5.09: Renal Transplant Recipients' Characteristics, 1996 - 1999

Year	1996	1997	1998	1999
New transplant patients	144	119	77	99
Mean age ± sd (years)	38±11	35±12	36±11	36±13
% male	56	66	57	61
% Diabetic	8	10	9	12
% HBsAg+	11	5	5	4
% Anti-HCV+	15	4	17	10

5.6 SURVIVAL ANALYSIS

Table 5.10: Transplant Patient Survival related to Year of Transplant 1994 – 1999

Year	1994			1995			1996		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	96	1	185	97	2	92	93	2	132
12	95	2	182	97	2	91	93	2	130
24	93	2	176	96	2	88	91	2	126
36	91	2	167	93	3	79	90	3	105
48	90	2	156	91	3	63			
60	89	2	110						

Year	1997			1998			1999		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	98	1	111	93	3		99	1	
12	95	2	108	93	3				
24	95	2	76						

No. = number at risk *SE = standard error*

Figure 5.10: Transplant Patient Survival by Year of Transplant 1995 – 1999

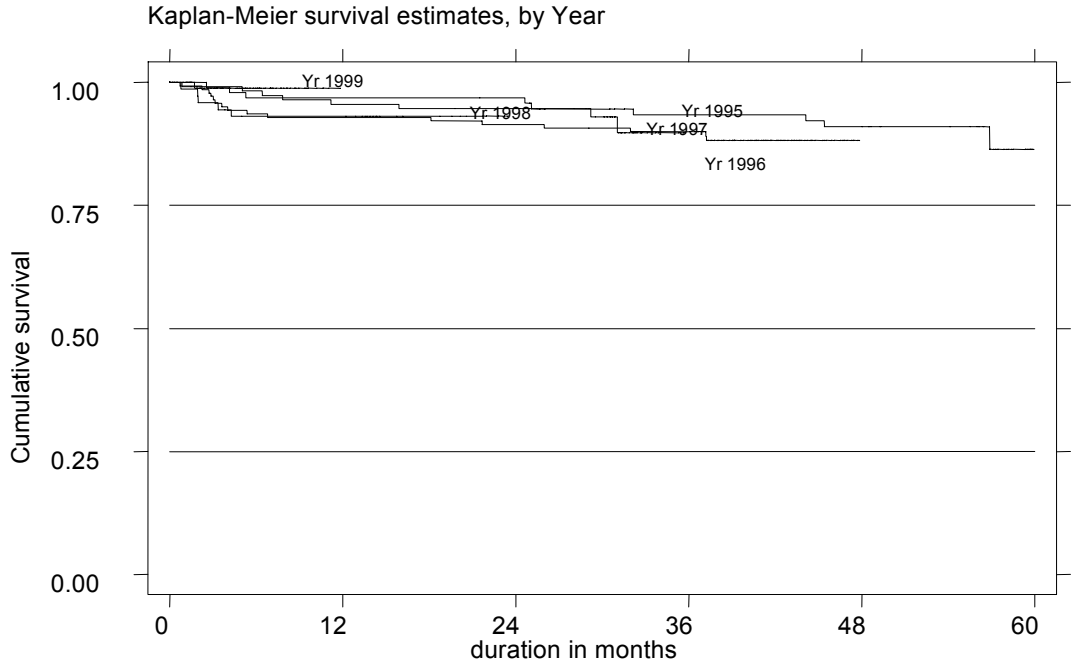


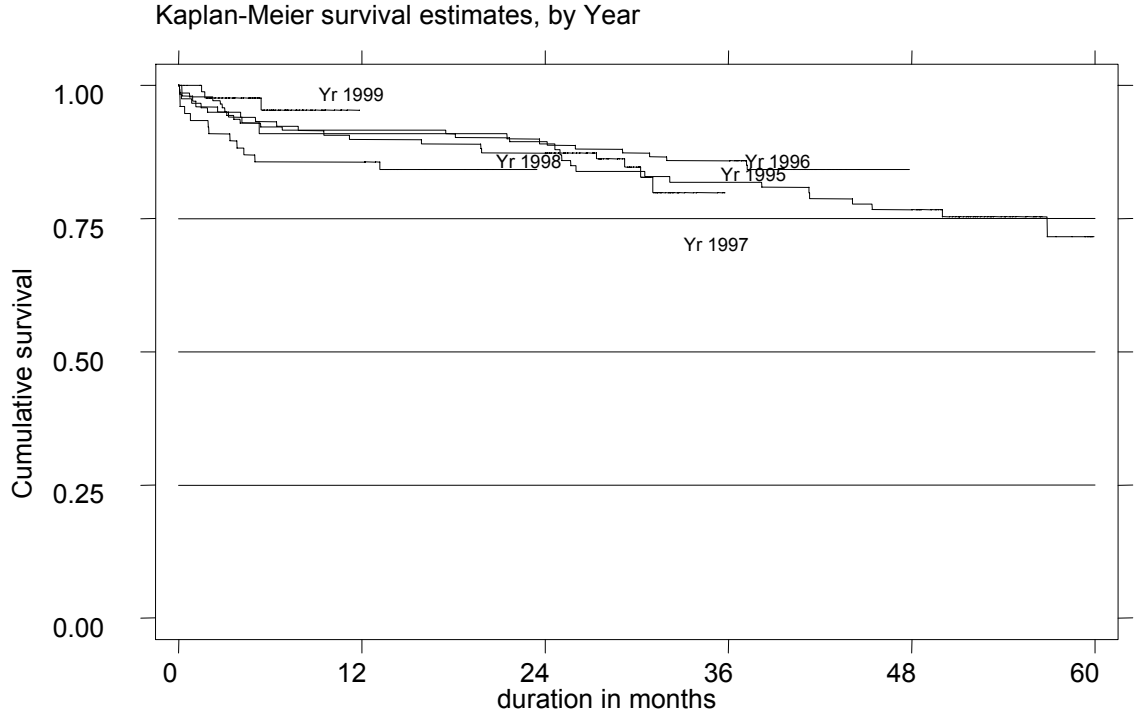
Table 5.11: Transplant Allograft Survival related to Year of Transplant 1994 – 1999

Year	1994			1995			1996		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	93	2	185	91	3	92	92	2	132
12	92	2	182	91	3	91	91	2	130
24	89	2	176	89	3	89	89	3	126
36	84	3	167	81	4	79	86	3	105
48	78	3	156	77	4	66			
60	74	3	136						

Year	1997			1998			1999		
Interval (months)	% survival	SE	No	% survival	SE	No	% survival	SE	No
6	93	2	111	86	4	66	95	3	
12	90	3	108	86	4	61			
24	87	3	90						

No. = number at risk *SE = standard error*

Figure 5.11: Transplant Allograft Survival by Year of Transplant, 1995-1999



5.7 WORK RELATED REHABILITATION AND QUALITY OF LIFE IN TRANSPLANT RECIPIENTS

Table 5.12: Work Related Rehabilitation in Transplant Recipients, 1996 - 1999

REHABILITATION STATUS	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
Full time work for pay	457	64	492	62	420	68	543	62
Part time work for pay	83	12	77	10	36	6	62	7
Able to work but unable to get a job	15	2	20	3	20	3	8	1
Able to work but not yet due to dialysis schedule	1	0	1	0	0	0	0	0
Able but disinclined to work	4	1	9	1	10	2	6	1
Home maker	94	13	128	16	94	15	175	20
Full time student	19	3	18	2	14	2	32	4
Age<15 years	0	0	5	1	3	0	3	0
Retired	11	2	14	2	10	2	32	4
Age>65 years	5	1	7	1	6	1	7	1
Unable to work due to poor health	20	3	20	3	9	1	11	1
Total	709	100	791	100	622	100	879	100

Table 5.13: Quality of Life, Transplant recipients, 1996 – 1999

QOL Index Summated Score	1996		1997		1998		1999	
	No.	%	No.	%	No.	%	No.	%
0 (Worst QOL)	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
2	2	0	0	0	0	0	0	0
3	1	0	0	0	0	0	0	0
4	4	1	2	0	1	0	0	0
5	7	1	2	0	0	0	1	0
6	10	1	10	1	5	1	4	0
7	19	3	11	1	9	2	8	1
8	40	6	18	2	11	2	5	1
9	45	6	24	3	31	5	9	1
10 (Best QOL)	588	82	728	92	532	90	853	97
Total	716	100	795	100	589	100	880	100