

CHAPTER 2

Dialysis In Malaysia

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SECTION 2.1: PROVISION OF DIALYSIS IN MALAYSIA (registry report)

Information on provision of dialysis was obtained from data on individual patients reported to the registry shown in section 2.1 as well as from the centre survey carried out at the end of each year shown in section 2.2.

2.1.1 Dialysis treatment provision

In 2005, 3054 patients commenced dialysis, giving a treatment rate of 117 per million population. There were at least 3152 patients accepted for dialysis in 2006 with corresponding treatment rate of 118 per million population. At year end 2006, a total of 14647 patients were reported to the registry as being on dialysis treatment giving a prevalence rate of 550 per million per year. Dialysis patients lost to follow-up which was negligible in the earlier years almost reached 1% in 2006.

Table 2.1.1: Stock and flow – Dialysis Patients 1997 – 2006

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
New Dialysis patients	1136	1252	1544	1840	2085	2348	2597	2858	3054	3152
Died	316	376	492	594	816	925	1153	1265	1403	1575
Transplanted	59	61	69	106	132	143	122	149	120	115
Lost to Follow-up	3	8	7	7	8	17	26	36	54	136
Dialysing at 31st December	3698	4539	5538	6691	7839	9114	10429	11855	13337	14647

Table 2.1.2: Dialysis Treatment Rate per million population 1997 – 2006

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Acceptance rate	52	56	68	78	87	96	104	112	117	118
Prevalence rate	171	205	244	285	326	372	416	463	510	550

2.1.2. Geographic distribution

The economically advantaged states of Malaysia –Pulau Pinang, Melaka, Johor, Perak, Selangor and W. Persekutuan of Kuala Lumpur, and Negeri Sembilan – continued to have high dialysis treatment rates although the rates appear to be plateauing in the last few years. In 2006, except for Sabah, Sarawak and Kelantan, the other less economically developed states have treatment provision rates touching 100 per million. Pulau Pinang continued to have the highest treatment rate at 181 and Sabah the lowest at 56 per million in 2006.

Table 2.1.3: Dialysis Treatment Rate by State, per million state population 1997 – 2006

State	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
P Pinang	85	113	124	110	126	160	145	212	197	181
Melaka	95	107	88	150	156	171	185	210	168	171
Johor	79	71	104	131	138	148	146	156	165	180
Perak n	61	64	75	105	103	114	129	144	164	162
Selangor & Kuala Lumpur	76	91	102	121	119	126	137	142	147	144
Negeri Sembilan	73	95	97	116	110	131	147	158	146	139
Kedah & Perlis	55	47	59	69	68	89	106	96	106	96
Terengganu	36	34	36	37	75	89	67	80	99	97
Pahang	46	36	47	49	52	53	66	72	90	104
Kelantan	12	15	27	31	60	62	74	64	79	72
Sarawak	46	33	44	50	67	59	62	73	72	85
Sabah	16	24	32	26	35	37	43	48	46	56

SECTION 2.2: DIALYSIS PROVISION IN MALAYSIA (Centre survey report)

Data submission of individual dialysis and transplant patients to the National Renal Registry which was entirely voluntary prior to 2006 is now made compulsory by the Private Health Care Facilities and Services Act 1996 and its Regulations 2006 which was implemented on 1st May 2006. This however only applies to private and NGO centres and data submission from centres managed by the Ministry of Health, Defence or the Universities is still voluntary.

Dialysis centre surveys have been conducted in December of each year since 1999. This annual cross-sectional survey was carried out to describe the most current level and distribution of dialysis provision for both hemodialysis and peritoneal dialysis at the end of each year. This section reports the results of the centre survey carried out in December 2006. Dialysis provision is expressed in terms of number of centres, HD machines, treatment capacity (one HD machine to 5 patients) and patients.

At the end of 2006, 412 hemodialysis centres and 31 CAPD centres provided dialysis care to 14946 patients. (Data on 14647 individual dialysis patients were reported to the Registry giving a dialysis patient ascertainment rate of almost 98%) The Ministry of Health (MOH) provided dialysis to 33.7% of patients, non-governmental organizations (NGO) 31.1% and the private sector at 32.8%. Almost all private dialysis patients received centre haemodialysis treatment compared to the MOH sector where patients on chronic peritoneal dialysis (PD) made up 24% of all dialysis patients. There were no PD patients in NGO centres. (table 2.2.1)

Of the 3 main sectors, the private sector had the largest number of dialysis centres but the NGO centres had the largest HD capacity. (fig 2.2.1 a & b) The Ministry of Health had the lowest HD treatment capacity to patient ratio at 1.47 in 2006 compared to 1.52 in 2005. The HD treatment to patient ratio had increased further in the NGO sector from 1.70 in 2005 to 1.72 in 2006. (fig 2.2.1d)

Table 2.2.1: Number of dialysis centres, HD machines and treatment capacity by sector, December 2006

Sector	HD Centre (No.)	Centre HD machines (No.)	Centre HD capacity (No.)	Centre HD patients (No.)	Centre HD capacity: patient ratio	CAPD Centre (No.)	CAPD patients (No.)	All dialysis patients (No.)
MOH	131	1133	5665	3841	1.47	20	1200	5041
NGO	111	1603	8015	4648	1.72	0	0	4648
Private (PRV)	158	1533	7665	4882	1.57	7	19	4901
University (UNI)	5	41	205	128	1.6	3	129	257
Armed Forces (AF)	7	44	220	96	2.29	1	3	99
TOTAL	412	4354	21770	13595		31	1351	14946

Figure 2.2.1(a): Distribution of dialysis centres by Sector, December 2006

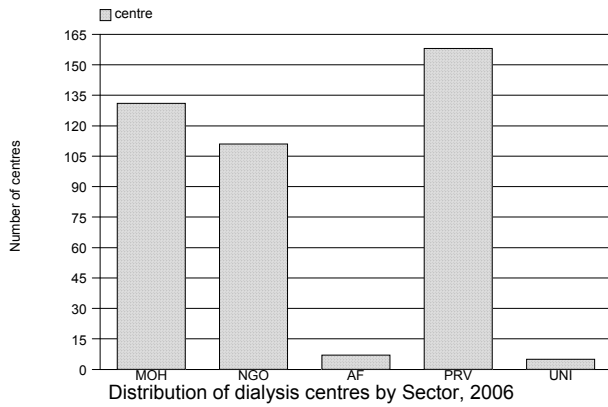


Figure 2.2.1(b): Distribution of HD capacity by Sector, December 2006

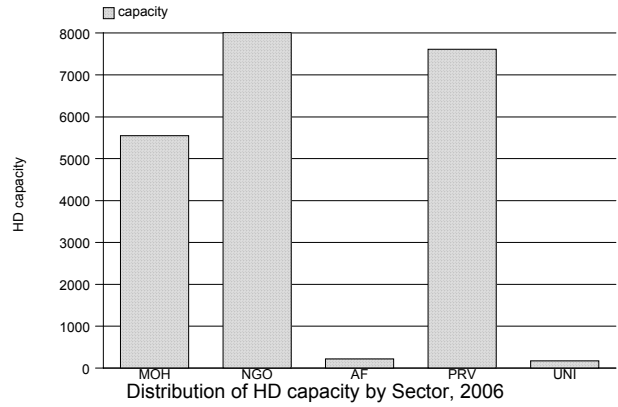


Figure 2.2.1(c): Distribution of dialysis patients by Sector, December 2006

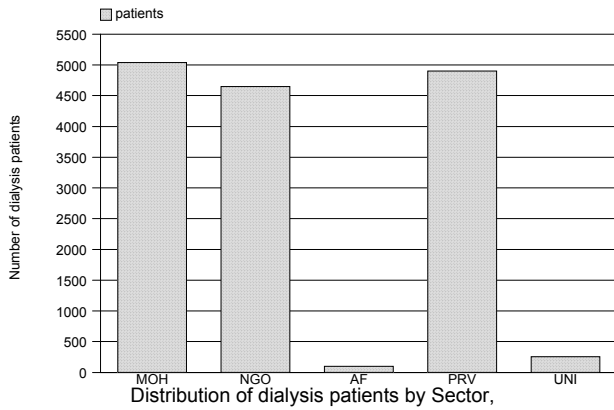
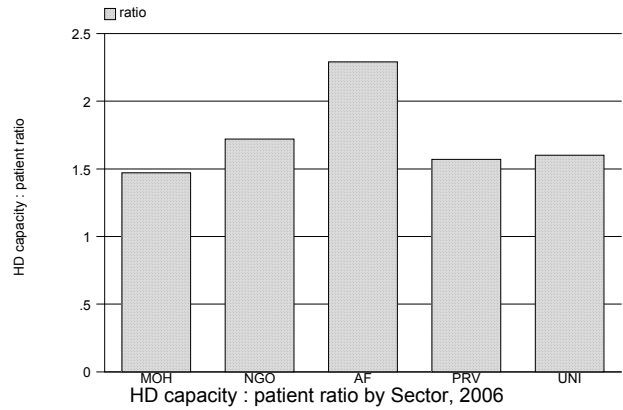


Figure 2.2.1(d): HD capacity: patient ratio by Sector, December 2006



2.2.2. Geographic distribution

The economically advantaged states except for Negeri Sembilan have centre HD machine to state population ratio above 200 per million state population compared to the economically disadvantaged states where the rate varied between 61 to 114 per million state population. At the end of 2006 dialysis treatment rates ranged from a high of 917 for Pulau Pinang to a low of 202 per million state population for Sabah. The HD capacity to patient ratio did not vary too widely between the states except for the economically disadvantaged states of Kelantan and Terengganu where the ratio was 1.21 and 1.36 respectively. (table and figures 2.2.2.). This is unlike previous years when HD capacity to patient ratio was higher in the economically disadvantaged states compared to the advanced states. The intake of patients has obviously outstripped the increase in number of new machines. These states need more HD machines and other resources to enable them to provide dialysis at rates similar to the more economically advantaged states

Table 2.2.2: Number of dialysis centres, number of HD machines and treatment capacity, HD capacity to patients ratio and number of dialysis patients by state in December 2006

State	Centre HD (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
Pulau Pinang (Pe)	36	424	284	2120	1421	1247	836	1.7	1369	917
Johor (Jo)	58	667	210	3335	1052	2332	736	1.43	2585	815
Melaka (Me)	15	189	261	945	1303	532	733	1.78	557	768
Selangor & W.Perssekutuan (SF)	118	1349	210	6745	1049	3990	621	1.69	4500	700
Perak (Pr)	47	476	208	2380	1042	1487	651	1.6	1541	675
Negeri Sembilan (Ne)	14	154	160	770	801	493	513	1.56	556	578
Kedah & Perlis (KP)	30	302	143	1510	716	904	428	1.67	929	440
Trengganu (Tr)	9	85	82	425	408	350	336	1.21	425	408
Sarawak (Sw)	28	268	114	1340	568	884	375	1.52	942	400
Pahang (Pa)	16	147	101	735	505	427	293	1.72	487	335
Kelantan (Ke)	15	105	69	525	343	386	252	1.36	433	283
Sabah (Sa)	26	188	61	940	305	563	183	1.67	622	202
Malaysia	412	4354	167	21770	833	13595	520	1.6	14946	572

Figure 2.2.2(a): Distribution of dialysis centres by State, December 2006

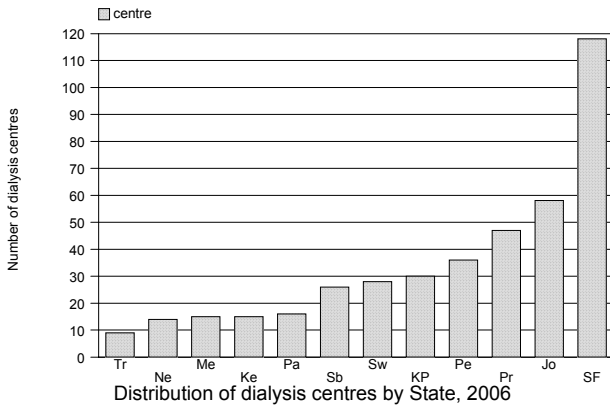


Figure 2.2.2(b): Distribution of dialysis patients by State, December 2006

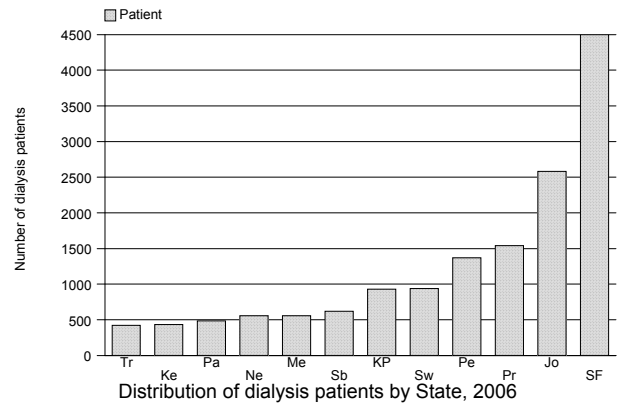


Figure 2.2.2(c): Distribution of dialysis treatment by State, December 2006

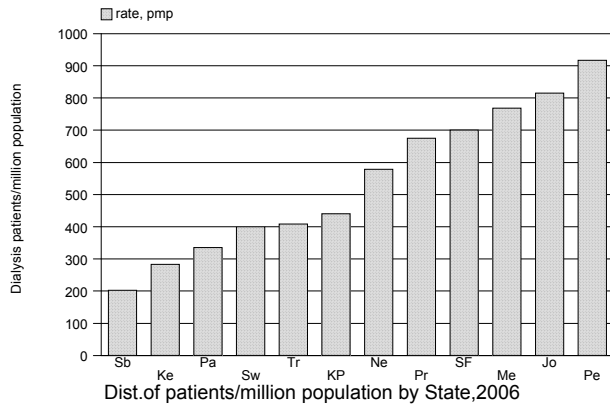
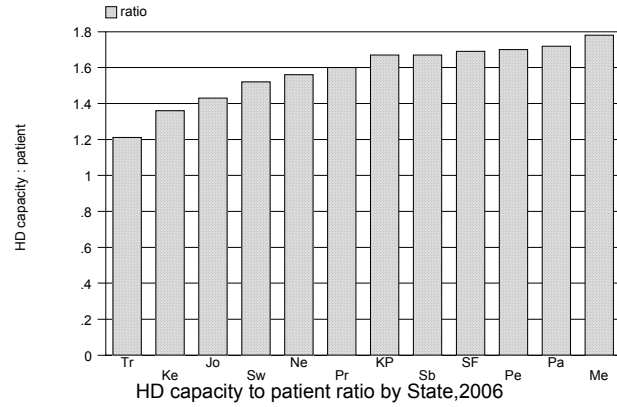


Figure 2.2.2(d): HD capacity to patient ratio by State, December 2006



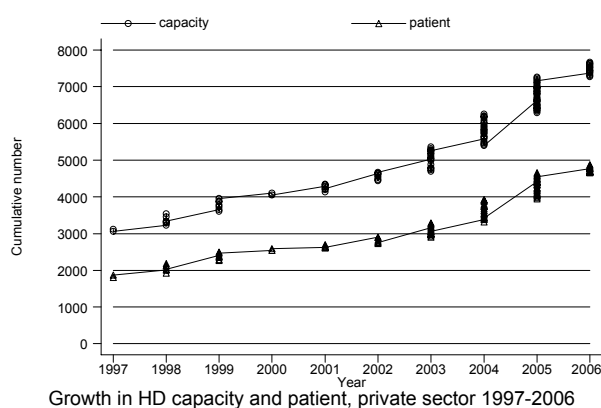
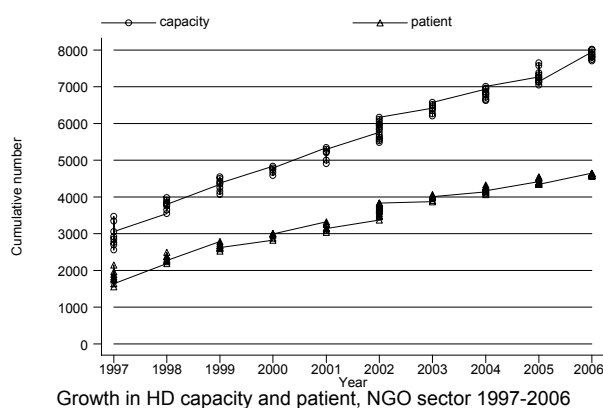
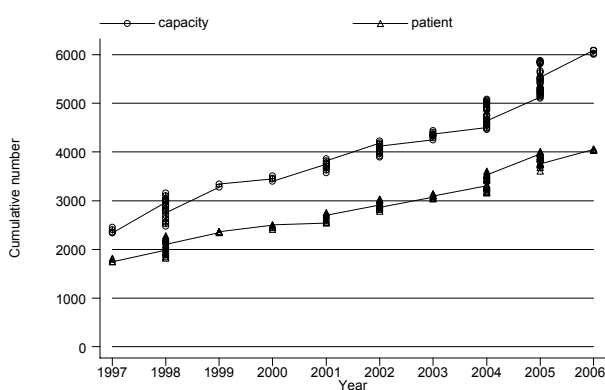
2.2.3 Growth in dialysis provision by sector

The number of HD patients more than doubled in the last 10 years in all 3 major sectors providing dialysis.(table 2.2.3). The increase in HD capacity almost paralleled that of increase in number of HD patients for MOH and the private sector but showed a divergence in the NGO sector indicating that gap between HD capacity and patient intake is widening. (figures 2.2.3a-c)

Table 2.2.3: Growth in HD capacity and HD patients in Private, NGO and MOH sectors, 1997 – 2006

Sector	Private		NGO		MOH	
	Cumulative HD capacity	Cumulative HD patients	Cumulative HD capacity	Cumulative HD patients	Cumulative HD capacity	Cumulative HD patients
1997	3115	1872	3475	2148	2460	1817
1998	3545	2188	3985	2490	3160	2281
1999	3960	2502	4545	2792	3340	2365
2000	4105	2585	4835	3012	3510	2505
2001	4345	2697	5345	3328	3865	2758
2002	4670	2902	6165	3837	4225	3036
2003	5360	3292	6570	4063	4440	3148
2004	6260	3928	7005	4324	5085	3607
2005	7260	4655	7650	4544	5880	4009
2006	7665	4882	8015	4648	6090	4065

Figure 2.2.3: Growth in HD capacity and HD patients in Private, NGO and MOH sectors, 1997 – 2006



SECTION 2.3: DISTRIBUTION OF DIALYSIS TREATMENT

2.3.1 Gender distribution

The treatment gap between men and women accepted for dialysis has remained consistent over the years, suggesting this is a true reflection of the difference in ESRD incidence between the 2 sexes rather than any conscious or unconscious bias in treatment allocation. However, figure 2.3.1(ii) shows a convergence in the proportion of prevalent male and female patients. This is probably because of the survival advantage in female patients.

Table 2.3.1(a): Dialysis Treatment Rate by Gender, per million male or female population 1997 – 2006

Gender	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Male	51	63	63	81	92	97	110	123	128	137
Female	45	50	57	61	73	89	95	96	110	110

Figure 2.3.1: Dialysis Treatment by Gender 1997 – 2006

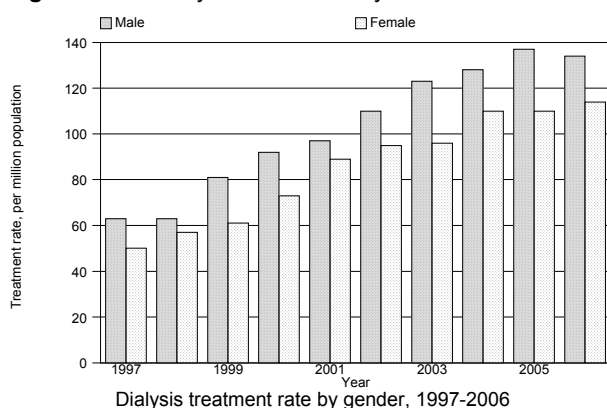


Table 2.3.1(b): Gender distribution of Dialysis Patients 1997 – 2006

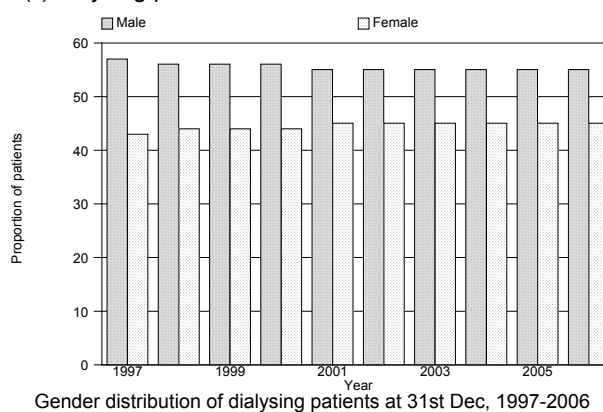
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
New Dialysis patients	1136	1252	1544	1840	2085	2348	2597	2858	3054	3152
% Male	57	53	58	57	54	55	58	55	57	55
% Female	43	47	42	43	46	45	42	45	43	45
Dialysing at 31st December	3698	4539	5538	6691	7839	9114	10429	11855	13337	14647
% Male	57	56	56	56	55	55	55	55	55	55
% Female	43	44	44	44	45	45	45	45	45	45

Figure 2.3.1(b): Gender Distribution of Dialysis patients 1997 – 2006

(i) New Dialysis patients



(ii) Dialysing patients at 31st December



2.3.2 Age distribution

Except for those aged 55 years or older which continued to register increase in treatment rates, dialysis treatment rates in the other age groups have plateaued in the last few years, suggesting that almost all patients with ESRD in those age groups who were in need of dialysis were able to access treatment. The treatment rate for patients 65 years and older had exceeded 700 per million in 2006. 53% of new dialysis patients were at least 55 years old.

Table 2.3.2(a): Dialysis Treatment Rate by Age Group, per million age group population 1997 – 2006

Age groups (years)	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1-14	3	3	3	4	4	5	4	5	5	5
15-24	15	15	16	18	22	28	26	27	30	26
25-34	39	41	42	46	47	55	51	51	56	53
35-44	80	81	85	98	103	100	102	114	110	104
45-54	166	173	225	249	252	275	278	308	293	313
55-64	291	313	301	432	508	534	586	588	641	595
>=65	213	228	301	347	438	501	584	651	652	710

Figure 2.3.2(a): Dialysis Treatment Rate by Age Group 1997 - 2006

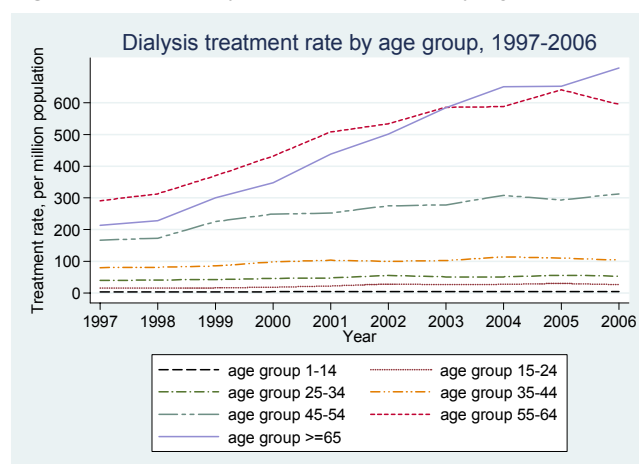
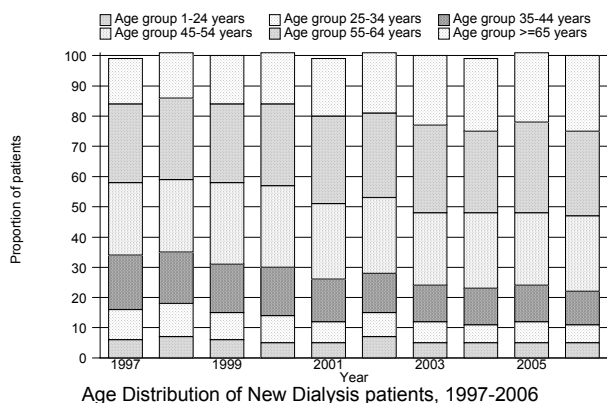


Table 2.3.2(b): Percentage Age Distribution of Dialysis Patients 1997 – 2006

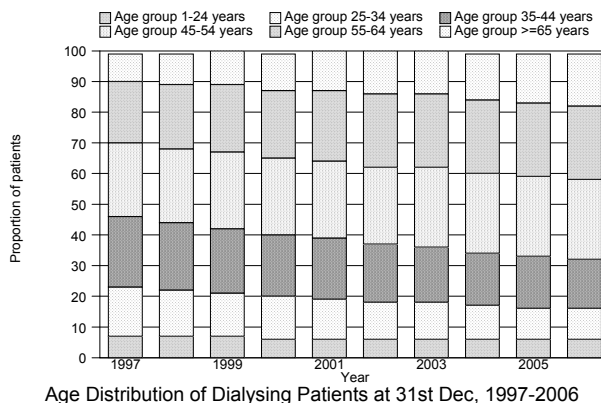
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
New Dialysis patients	1136	1252	1544	1840	2085	2348	2597	2858	3054	3152
% 1-14 years	1	2	2	1	1	2	1	1	1	1
% 15-24 years	5	5	4	4	4	5	4	4	4	4
% 25-34 years	10	11	9	9	7	8	7	6	7	6
% 35-44 years	18	17	16	16	14	13	12	12	12	11
% 45-54 years	24	24	27	27	25	25	24	25	24	25
% 55-64 years	26	27	26	27	29	28	29	27	30	28
% >=65 years	15	15	16	17	19	20	23	24	23	25
Dialysing at 31st December	3698	4539	5538	6691	7839	9114	10429	11855	13337	14647
% 1-14 years	2	2	2	1	1	1	1	1	1	1
% 15-24 years	5	5	5	5	5	5	5	5	5	5
% 25-34 years	16	15	14	14	13	12	12	11	10	10
% 35-44 years	23	22	21	20	20	19	18	17	17	16
% 45-54 years	24	24	25	25	25	25	26	26	26	26
% 55-64 years	20	21	22	22	23	24	24	24	25	24
% >=65 years	9	10	11	12	13	14	14	15	16	17

Figure 2.3.2(b): Age Distribution of New Dialysis patients 1997 – 2006

(i) New Dialysis patients



(ii) Dialysing patients at 31st December



2.3.3 Method and Location of dialysis

87% of new patients were accepted into centre haemodialysis in 2006. Home/office HD which accounted for a significant proportion of patients in the earlier years of dialysis therapy has died a natural death. Perhaps the future will see home HD being re-introduced as diurnal or nocturnal HD as practiced by the more wealthy nations. Chronic PD accounted for about 12% of new dialysis patients but only 10% of prevalent dialysis patients in 2006. (table & fig 2.3.3)

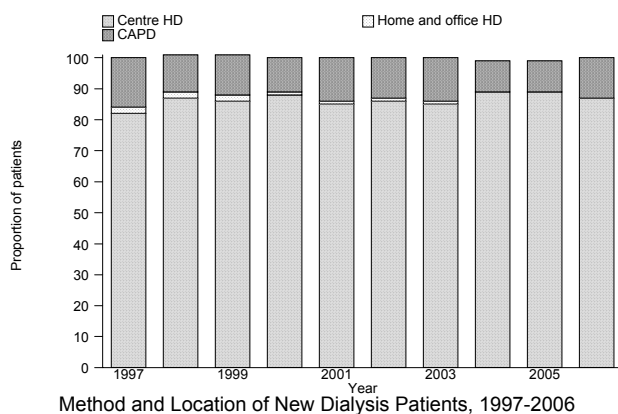
Table 2.3.3: Method and Location of Dialysis 1997 – 2006

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
New Dialysis patients	1136	1252	1544	1840	2085	2348	2597	2858	3054	3152
% Centre HD	82	87	86	88	85	86	85	89	89	87
% Home and office HD	2	2	2	1	1	1	1	0	0	0
% CAPD	16	12	13	11	14	13	14	10	10	12
Dialysing at 31st December	3181	3908	4785	5817	6869	8072	9243	10477	11739	12566
% Centre HD	85	87	88	89	89	88	87	88	89	89
% Home and office HD	1	1	1	1	1	1	1	1	1	1
% CAPD	14	12	11	10	10	11	11	11	10	10

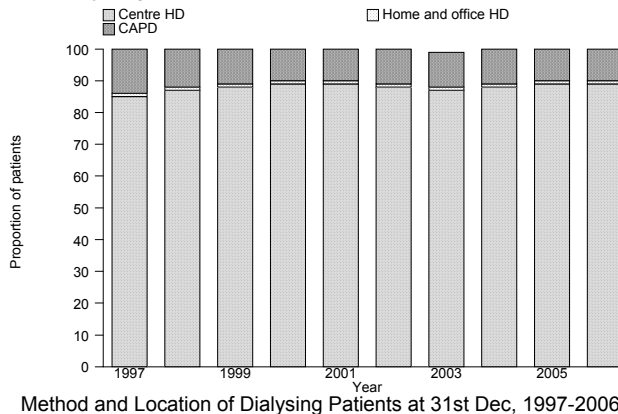
* Analysis of Dialysing at 31st December is analyzed base on patient annual return

Figure 2.3.3: Method and Location of Dialysis Patients 1997– 2006

(a) New Dialysis patients



(b) Dialysing patients at 31st December



2.3.4 Funding for Dialysis Treatment

Funding for dialysis treatment in Malaysia is a complicated process. A patient may need to obtain funds from multiple sources for his dialysis treatment. In the initial years of the registry, data for funding for dialysis treatment were mainly from the initial notification of the patient. In 2006, data on funding was included in the annual returns.

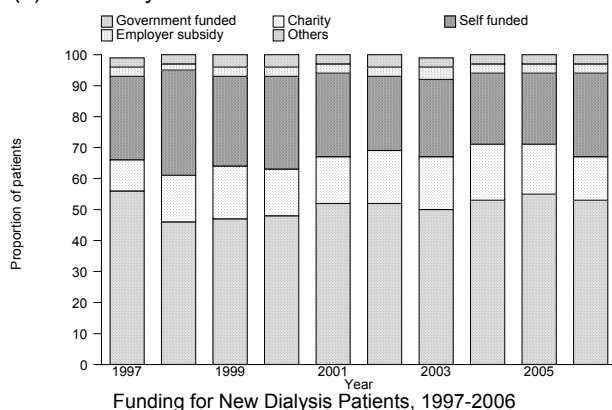
The government continues to be the main payer for dialysis therapy. A quarter of patients paid for their dialysis treatment. The proportion of new patients funded by charity organizations ranged between 14-18% over the last 10 years. (table & fig 2.3.4)

Table 2.3.4: Funding for Dialysis Treatment 1997 – 2006

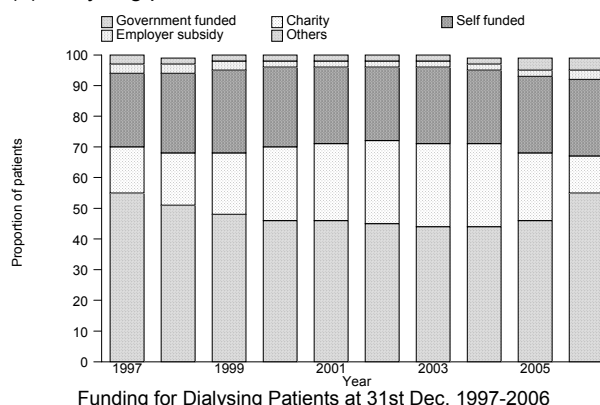
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
New Dialysis patients	1136	1252	1544	1840	2085	2348	2597	2858	3054	3152
% by Government	56	46	47	48	52	52	50	53	55	53
% by Charity	10	15	17	15	15	17	17	18	16	14
% self funded	27	34	29	30	27	24	25	23	23	27
% subsidized by Employer	3	2	3	3	3	3	4	3	3	3
% Others	3	3	4	4	3	4	3	3	3	3
Dialysing at 31st December	3389	4194	5151	6246	7305	8497	9766	11136	12693	14062
% by Government	55	51	48	46	46	45	44	44	46	55
% by Charity	15	17	20	24	25	27	27	27	22	12
% self funded	24	26	27	26	25	24	25	24	25	25
% subsidized by Employer	3	3	3	2	2	2	2	2	2	3
% Others	3	2	2	2	2	2	2	2	4	4

Figure 2.3.4: Funding for Dialysis Treatment 1997 – 2006

(a) New Dialysis Patients



(b) Dialysing patients at 31st December



2.3.5 Distribution of dialysis patients by sector

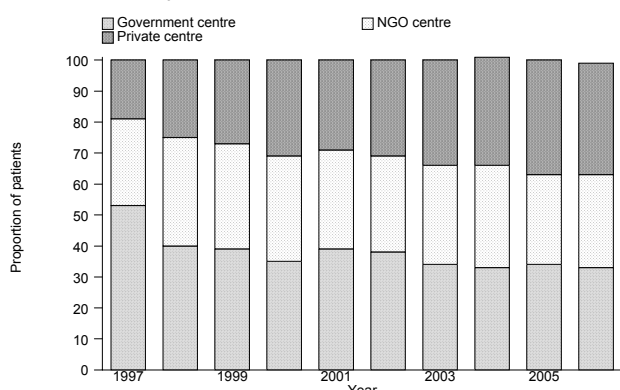
The MOH continued to provide dialysis treatment to one third of new patients, the private sector 36% and the NGO sector 31% in 2006. There was a steady reduction in the proportion of prevalent patients in the MOH from 56% in 1997 to 37% in 2006 with a corresponding increase in the private sector. The proportion of prevalent patients in the NGO sector has remained fairly constant over the years at about 32-33%.

Table 2.3.5: Distribution of Dialysis Patients by Sector 1997 – 2006

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
New Dialysis patients	1136	1252	1544	1840	2085	2348	2597	2858	3054	3151
% Government centre	53	40	39	35	39	38	34	33	34	33
% NGO centre	28	35	34	34	32	31	32	33	29	31
% Private centre	19	25	27	31	29	31	34	35	37	36
Dialysing at 31st December	3698	4539	5538	6691	7839	9114	10429	11855	13337	14646
% Government centre	56	51	46	43	42	41	40	38	37	37
% NGO centre	26	29	31	32	33	33	33	33	32	32
% Private centre	18	20	23	25	25	26	27	29	30	31

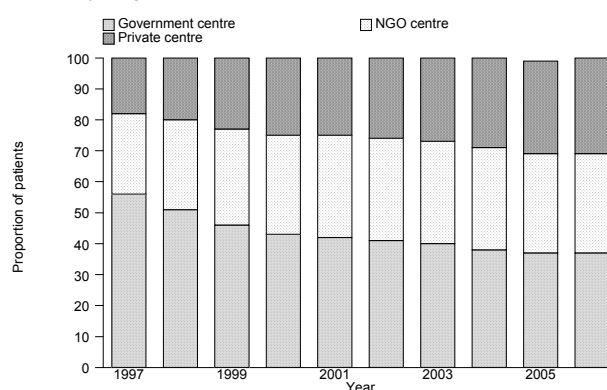
Figure 2.3.5: Distribution of Dialysis Patients by Sector 1997 – 2006

(a) New Dialysis Patients



Distribution of New Dialysis Patients by sector, 1997-2006

(b) Dialysing patients at 31st December



Distribution of Dialysing Patients at 31st Dec by sector, 1997-2006

SECTION 2.4: PRIMARY RENAL DISEASE

Diabetes mellitus continues to be the commonest cause of ESRD and the proportion unfortunately has continued to increase and accounted for 57% of new ESRD in 2006. Hypertension was the second commonest known cause of ESRD at about 6%. The proportion of patients with unknown primary renal disease has slowly decreased and was 27% in 2006. Glomerulonephritis as a cause of ESRD has decreased from 13% in 1997 to only 3% in 2006. Systemic lupus erythematosus (SLE) continue to contribute 1% of new ESRD patients.

Table 2.4.1: Primary Renal Disease 1997 – 2006

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
New Dialysis patients	1136	1252	1544	1840	2085	2348	2597	2858	3054	3152
% Unknown cause	33	32	29	28	30	30	28	28	26	27
% Diabetes Mellitus	36	41	41	45	46	50	53	54	55	57
% GN	13	10	10	9	6	6	5	4	5	3
% SLE	1	1	2	2	1	1	1	1	1	1
% Polycystic kidney	2	1	1	1	2	1	1	1	1	1
% Obstructive Nephropathy	5	5	4	3	3	3	3	2	2	2
% Toxic Nephropathy	0	0	1	0	1	0	0	0	0	0
% Hypertension	9	8	11	12	9	7	7	7	7	6
% Others	1	1	1	1	1	1	1	1	1	1

Figure 2.4.1: Primary Renal Disease for New Dialysis Patients 1997 – 2006

