

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 2007, 3874 patients commenced dialysis, giving an incidence rate of 143 per million population. In 2007, just over 17000 patients were reported to the registry as being on dialysis treatment giving a prevalence rate of 626 per million per year. By year end 2008, almost 19000 patients were on dialysis. The proportion of dialysis patients lost to follow-up remained very low at less than 1%.

Table 2.1.1: Stock and flow-Dialysis Patients 1999-2008

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
New Dialysis patients	1559	1854	2100	2350	2605	2880	3115	3614	3874	3836
Died	493	597	816	929	1161	1278	1430	1696	1780	1803
Transplanted	69	106	130	145	121	154	122	121	86	100
Lost to Follow-up	6	8	8	18	25	26	48	128	87	62
Dialysing at 31st Dec	5542	6694	7847	9119	10438	11884	13403	15084	17015	18856

Table 2.1.2: Dialysis Treatment Rate per million population 1999-2008

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Acceptance rate	69	79	87	96	104	113	119	136	143	138
Prevalence rate	244	285	327	372	417	465	513	566	626	680

2.1.2. Geographic distribution

Except for Sabah and Kelantan, all the other states have treatment rates of more than 100 per million state population since 2007. With the growth in dialysis provision shown by Kelantan over the last few years, it may well exceed treatment rate of 100 per million in 2008. (Data for 2008 is preliminary as at the time of writing of this report, many patients have yet to be notified to the registry).

However, Pulau Pinang, Melaka, Johor, Kuala Lumpur and Negeri Sembilan – the highest dialysis provision states have incident rates of 200 or more per million state population.

Table 2.1.3: Dialysis Treatment Rate by state, per million population 1999-2008

State	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Pulau Pinang	124	110	125	158	145	213	201	214	215	157
Melaka	88	150	156	175	186	210	170	199	208	215
Johor	104	131	138	147	147	156	170	209	187	211
Perak	76	105	103	116	129	147	170	185	174	168
Selangor & Putrajaya	93	84	94	111	120	123	134	150	160	150
WP Kuala Lumpur	122	158	188	172	193	208	200	218	243	230
Negeri Sembilan	97	116	110	133	147	157	154	149	212	201
Kedah	60	66	63	88	103	98	108	115	110	143
Perlis	49	72	104	103	128	95	102	127	129	68
Terengganu	36	37	76	90	66	80	100	104	170	122
Pahang	48	49	52	52	68	74	88	122	109	108
Kelantan	27	31	61	61	74	66	80	80	95	71
Sarawak	44	50	67	59	62	73	73	86	105	107
Sabah & WP Labuan	31	26	35	37	44	49	46	64	71	79

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

Data submission of individual dialysis and transplant patients to the National Renal Registry was entirely voluntary prior to 2006. Since then, with the implementation of the Private Health Care Facilities and Services Act 1998 and its Regulations in 2006, submission of data from private and Non-governmental organization (NGO) centres has been made compulsory. However, enforcement of this Act is still in the preliminary stages. In contrast, data submission from centres managed by the Ministry of Health, Ministry of 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 2007. Dialysis provision is expressed in terms of number of centres, HD machines, treatment capacity (one HD machine to 5 patients) and patients.

In December 2008, 484 hemodialysis centres and 31 peritoneal dialysis (PD) centres provided dialysis care to 19221 patients. (Data on 18856 individual dialysis patients were reported to the Registry giving a dialysis patient ascertainment rate of 98%). The Ministry of Health (MOH) provided dialysis to 32.4% of patients, non-governmental organizations (NGO) 29.9% and the private sector at 36.3%. Almost all private patients received centre haemodialysis treatment compared to the MOH sector where patients on PD comprised 26% of all dialysis patients. There were no PD patients in the NGO centres. (table 2.2.1)

Of the 3 main sectors providing HD treatment, the private sector had the largest number of dialysis centres, treatment capacity and patients. NGO centres was a close second. The Ministry of Health had the lowest HD treatment capacity to patient ratio at 1.39 in 2008. The HD capacity to patient ratio has decreased in the NGO sector from 1.98 in 2007 to 1.64 in 2008.

Table 2.2.1 : Number of dialysis centres, HD machines and treatment capacity by sector, December 2008

Sector	HD centre (No.)	Centre HD machines (No.)	Centre HD capacity (No.)	Centre HD patients (No.)	Centre HD capacity: patients ratio	PD centre (No.)	PD patients (No.)	All Dialysis patients (No.)	All Dialysis patients (%)
MOH	136	1269	6345	4573	1.39	22	1654	6227	32.4%
NGO	126	1893	9465	5756	1.64	0	0	5756	29.9%
Private(PRV)	210	2001	10005	6941	1.44	5	29	6970	36.3%
University(UNI)	6	50	250	119	2.1	3	57	176	0.9%
Armed Force(AF)	7	42	210	88	2.39	1	4	92	0.5%
TOTAL	485	5255	26275	17477		31	1744	19221	100%.

Figure 2.2.1(a): Distribution of dialysis centres by Sector, December 2008

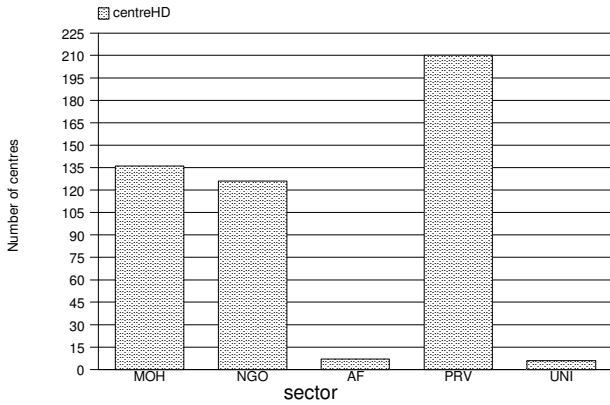


Figure 2.2.1(b): Distribution of HD capacity by Sector, December 2008

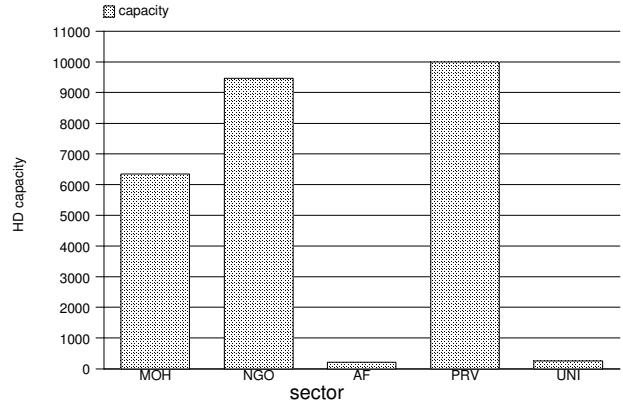


Figure 2.2.1(c): Distribution of dialysis patients by Sector, December 2008

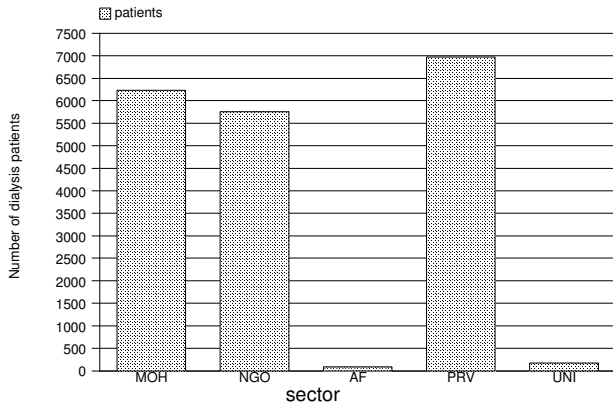
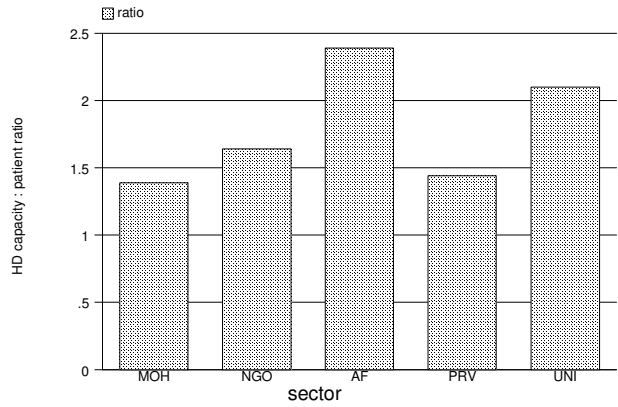


Figure 2.2.1(d): HD capacity: patient ratio by Sector, December 2008



2.2.2. Geographic distribution (centre survey)

The economically advantaged states of Pulau Pinang, Melaka, Johor, Perak, Selangor, WP Kuala Lumpur and Negeri Sembilan had centre HD capacity rates and dialysis treatment rates above the national rate. There was a 5-fold difference in prevalence rates between the states with the highest provision i.e. Kuala Lumpur and Pulau Pinang, and the state with the lowest treatment rate (Sabah). (table 2.2.2). Unlike in previous years, the HD capacity to patient ratio did not vary too widely between the different states. PD prevalence rates however did not correlate as closely to the economic status of the state. Pulau Pinang, Kuala Lumpur and Terengganu had PD prevalence rates exceeding 100 per million state population. Perak had PD rate of 34 per million state population.

Table 2.2.2 : Number of dialysis centers, number of HD machines and treatment capacity, HD capacity to patients ratio and number of dialysis patients by state in December 2008

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	Centre PD (No.)	Centre PD patients (No.)	Centre PD patients pmp	All Dialysis patients (No.)	Dialysis treatment rate pmp
WP Kuala Lumpur	44	571	350	2855	1752	1726	1059	1.65	4	297	182	2023	1242
Pulau Pinang	42	505	326	2525	1632	1468	949	1.72	2	191	123	1659	1073
Melaka	21	235	312	1175	1559	684	908	1.72	2	40	53	724	961
Johor	66	747	226	3735	1128	2816	850	1.33	5	249	75	3065	925
Negeri Sembilan	20	221	222	1105	1110	797	801	1.39	2	83	83	880	884
Perak	54	568	242	2840	1208	1956	832	1.45	2	80	34	2036	866
Selangor & WP Putrajaya	91	1064	210	5320	1049	3343	659	1.59	4	346	68	3689	727
Perlis	2	36	152	180	762	138	584	1.3				138	584
Kedah	33	309	158	1545	789	1079	551	1.43	1	38	19	1117	570
Sarawak	31	323	132	1615	658	1169	477	1.38	1	77	31	1246	508
Terengganu	11	120	110	600	548	434	397	1.38	1	113	103	547	500
Pahang	22	184	122	920	608	536	354	1.72	2	97	64	633	418
Kelantan	18	151	95	755	473	538	337	1.4	2	68	43	606	380
Sabah & WP Labuan	30	221	69	1105	343	793	246	1.39	3	65	20	858	267
Malaysia	485	5255	190	26275	948	17477	630	1.5	31	1744	63	19221	693

Figure 2.2.2(a): Distribution of hemodialysis centres by State, 2008

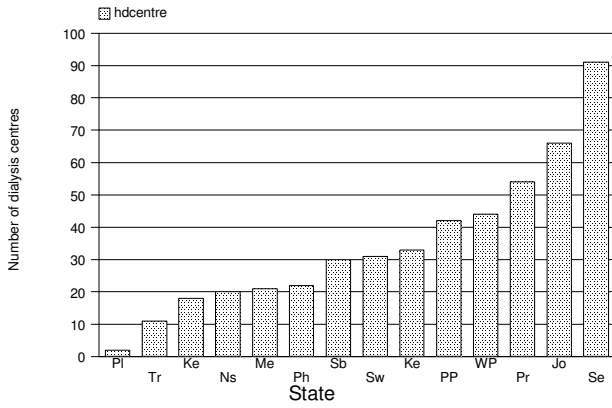


Figure 2.2.2(b): Distribution of dialysis patients by State, 2008

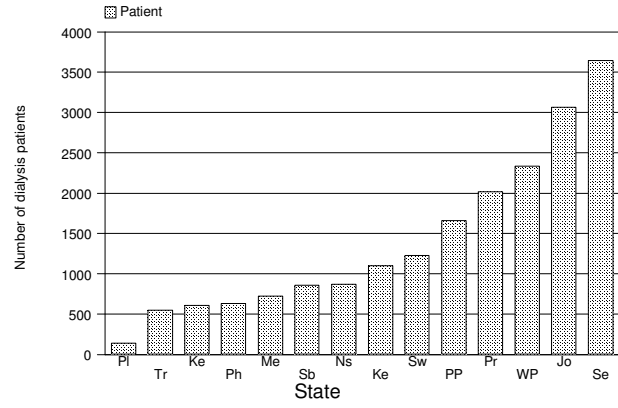


Figure 2.2.2(c): Distribution of patients/million population by State, 2008

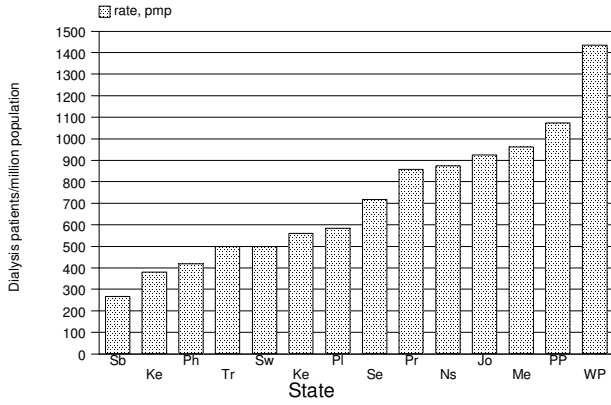
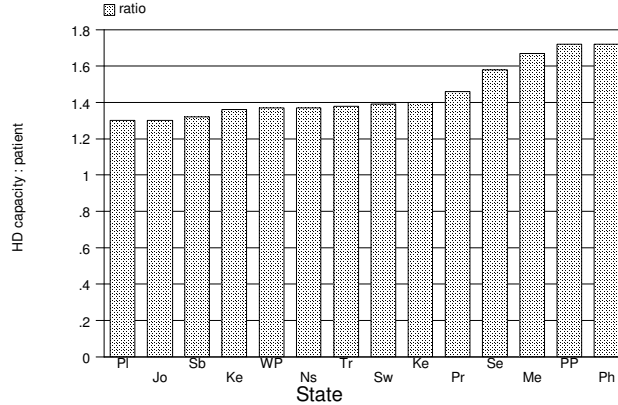


Figure 2.2.2(d): HD capacity to patient ratio by State, 2008



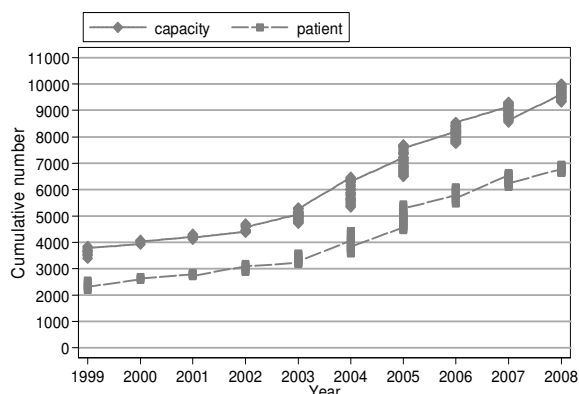
2.2.3 Growth in dialysis provision by sector

The number of patients on HD continued to increase in the private sector. In the NGO and MOH sector the growth has been minimal over the last few years. (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 was widening. (figures 2.2.3a-c)

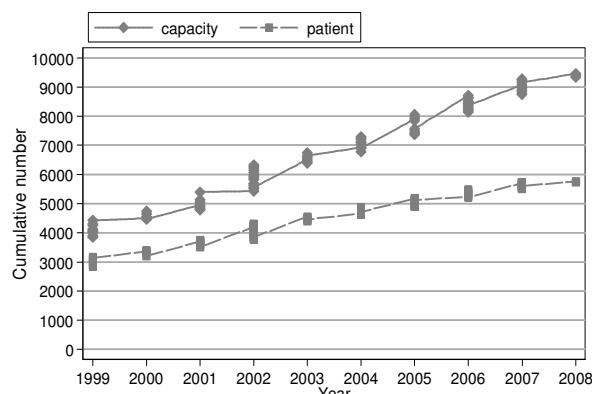
Table 2.2.3: Growth in HD capacity and HD patients in Private, NGO and MOH sectors, 1999-2008

Sector	Private		NGO		MOH	
	Cumulative HD capacity	Cumulative HD patients	Cumulative HD capacity	Cumulative HD patients	Cumulative HD capacity	Cumulative HD patients
1999	3845	2538	4420	3169	3665	2504
2000	4075	2670	4735	3405	3850	2652
2001	4305	2827	5400	3748	4230	2939
2002	4690	3175	6330	4303	4650	3292
2003	5295	3570	6745	4561	4875	3448
2004	6460	4418	7290	4872	5585	4049
2005	7700	5429	8055	5180	6485	4615
2006	8545	6083	8715	5485	6735	4743
2007	9305	6623	9280	5734	6765	4773
2008	10005	6941	9465	5756	6805	4780

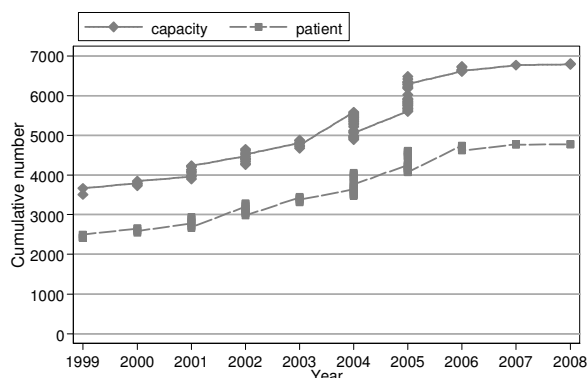
Figure 2.2.3: Growth in HD capacity and HD patients in Private, NGO and MOH sectors, 1999-2008



Growth in HD capacity and patient, private sector 1999-2008



Growth in HD capacity and patient, NGO sector 1999-2008



Growth in HD capacity and patient, MOH sector 1999-2008

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. Since 2001, the proportion between prevalent male and female patients has remained the same unlike in the earlier years when a convergence was seen. It was initially thought that the survival advantage in female patients resulted in this convergence in prevalent patients. This survival advantage was still demonstrated in our dialysis patients (refer chapter 4, table 4.4.1). However the higher proportion of males in the incident patients compared to prevalent patients could still account for this difference.

Table 2.3.1(a) : Dialysis Treatment Rate by Gender, per million male or female population 1999-2008

Gender	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Male	81	92	97	111	123	129	140	154	163	159
Female	61	73	89	95	96	111	112	132	137	133

Figure 2.3.1(a) : Dialysis Treatment Rate by Gender 1999-2008

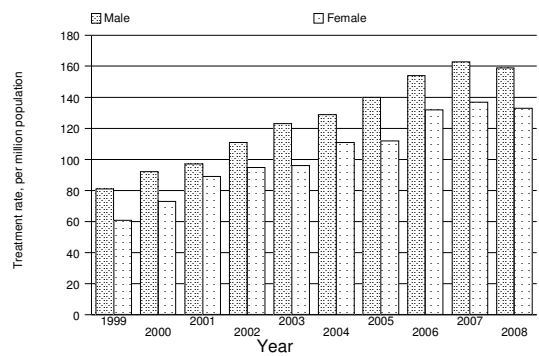
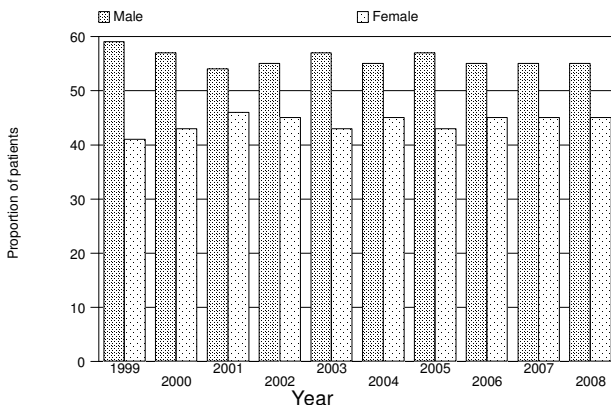


Table 2.3.1(b): Gender Distribution of Dialysis Patients 1999-2008

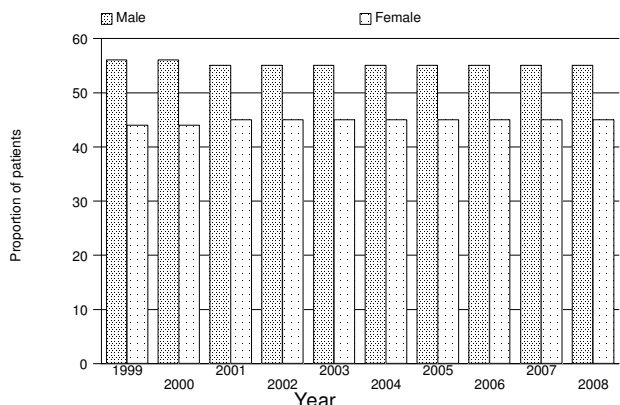
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
New Dialysis patients	1559	1854	2100	2350	2605	2880	3115	3614	3874	3836
% Male	59	57	54	55	57	55	57	55	55	55
% Female	41	43	46	45	43	45	43	45	45	45
Dialysing at 31st December	5542	6694	7847	9119	10438	11884	13403	15084	17015	18856
% Male	56	56	55	55	55	55	55	55	55	55
% Female	44	44	45	45	45	45	45	45	45	45

Figure 2.3.1(b): Gender Distribution of Dialysis Patients 1999-2008

(i) New Dialysis patients



(ii) Dialysing patients at 31st December



2.3.2 Age distribution

New dialysis treatment rates in the age-groups less than 55 years have remained unchanged 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 55 years and older have continued to increase. The most rapid increase in treatment rate is seen in those 65 years. The treatment rate for this group was more than 800 per age group population since 2006.

Table 2.3.2 (a): Dialysis Treatment Rate by Age Group, per million age group population 1999-2008

Age groups (years)	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
≤14	4	4	4	5	4	5	5	5	5	5
15-24	16	18	22	29	26	28	30	31	31	27
25-34	43	47	47	55	52	51	56	60	63	65
35-44	85	98	103	100	103	116	112	124	123	132
45-54	226	249	252	275	280	310	303	360	356	339
55-64	369	432	508	535	587	593	653	674	747	655
≥ 65	301	347	439	502	585	654	663	804	820	822

Figure 2.3.2 (a): Dialysis Treatment Rate by Age Group 1999-2008

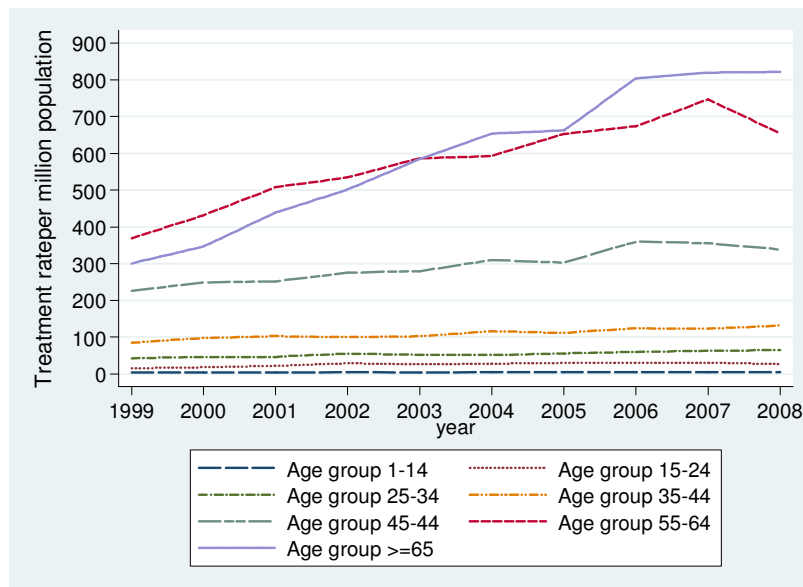
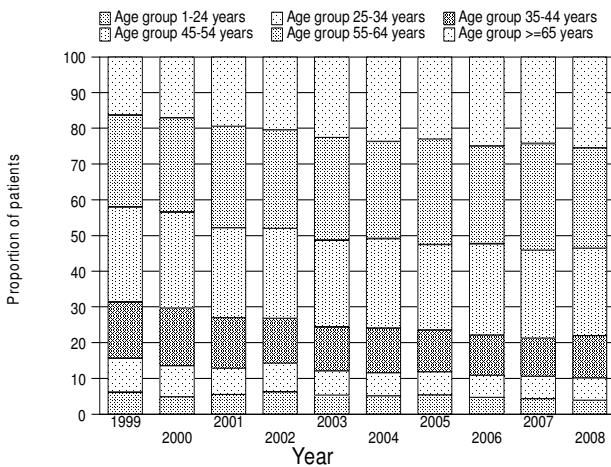


Table 2.3.2(b) : Percentage Age Distribution of Dialysis Patients 1999-2008

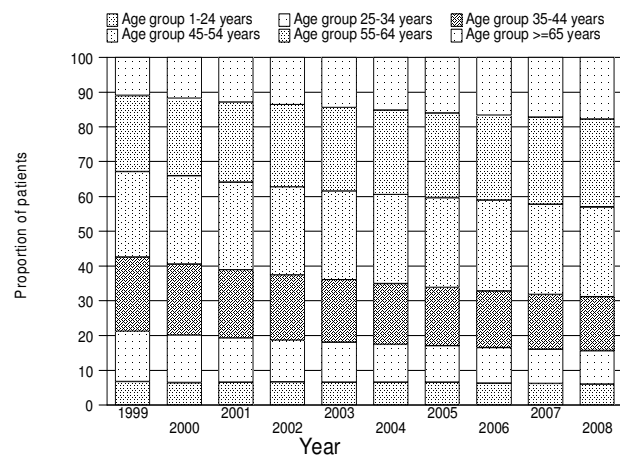
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
New Dialysis patients	1559	1854	2100	2350	2605	2880	3115	3614	3874	3836
% 1-14 years	2	1	1	2	1	1	1	1	1	1
% 15-24 years	4	4	4	5	4	4	4	4	3	3
% 25-34 years	10	9	7	8	7	6	6	6	6	6
% 35-44 years	16	16	14	13	12	12	12	11	11	12
% 45-54 years	27	27	25	25	24	25	24	26	25	24
% 55-64 years	26	26	28	28	29	27	30	27	30	28
% >=65 years	16	17	19	20	23	24	23	25	24	26
Dialysing at 31st December	5542	6694	7847	9119	10438	11884	13403	15084	17015	18856
% 1-14 years	2	1	1	1	1	1	1	1	1	1
% 15-24 years	5	5	5	5	5	5	5	5	5	5
% 25-34 years	14	14	13	12	12	11	10	10	10	10
% 35-44 years	21	20	20	19	18	17	17	16	16	15
% 45-54 years	25	25	25	25	26	26	26	26	26	26
% 55-64 years	22	22	23	24	24	24	24	24	25	25
% >=65 years	11	12	13	14	14	15	16	17	17	18

Figure 2.3.2 (b): Age Distribution of Dialysis Patients 1999-2008

(i) New Dialysis patients



(ii) Dialysing patients at 31st December



2.3.3 Method and Location of dialysis

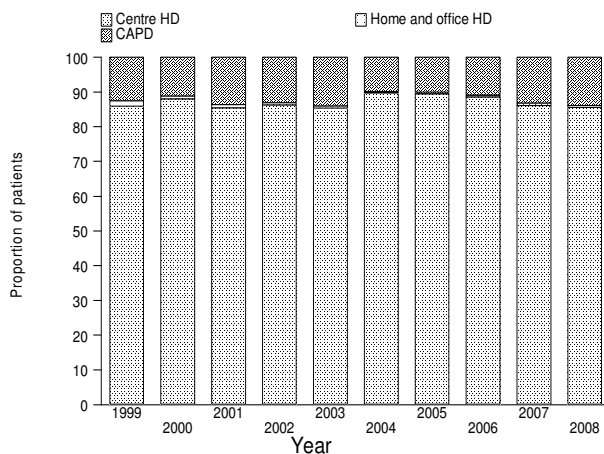
86% of new patients were accepted into centre haemodialysis in 2007 and 2008. With the conscious effort by the MOH to place PD first, the proportion of new patients accepted onto chronic PD program has shown a small increase over the last few years. However, PD only accounted for 8% of prevalent dialysis patients in 2007. There were still a handful of new patients accepted into the home and office HD programme. (table & figure 2.3.5)

Table 2.3.3: Method and Location of Dialysis Patients 1999-2008

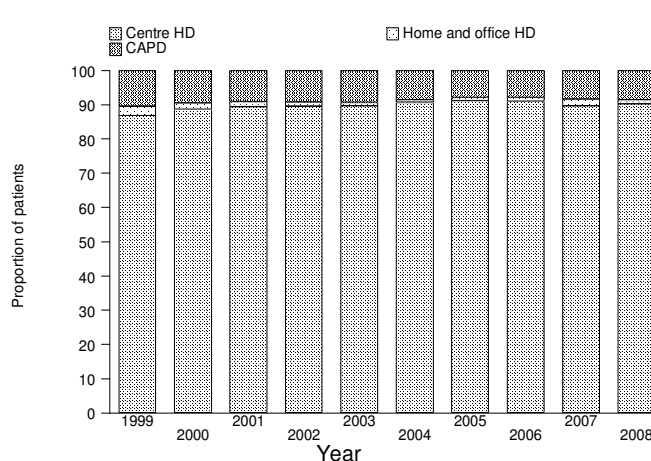
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
New Dialysis patients	1559	1854	2100	2350	2605	2880	3115	3614	3874	3836
% Centre HD	86	88	85	86	85	90	89	89	86	86
% Home and office HD	2	1	1	1	1	0	0	0	1	1
% PD	13	11	14	13	14	10	10	11	13	14
Dialysing at 31st December	5317	6420	7493	8677	9942	11290	12733	14336	16181	17924
% Centre HD	87	89	89	90	90	91	91	91	90	90
% Home and office HD	3	2	1	1	1	1	1	1	2	1
% PD	10	9	9	9	9	8	8	8	8	9

Figure 2.3.3: Method and Location of Dialysis Patients 1999-2008

(i) New Dialysis Patients



(ii) Dialysing patients at 31st December



2.3.4 Funding for Dialysis Treatment

Funding for dialysis in Malaysia may be from multiple payers. In the initial years of the registry, data for funding of dialysis treatment were obtained mainly from the initial notification of the patient. In 2006, data on funding was included in the annual returns as it was noted that funding for dialysis treatment in an individual patient can change with time.

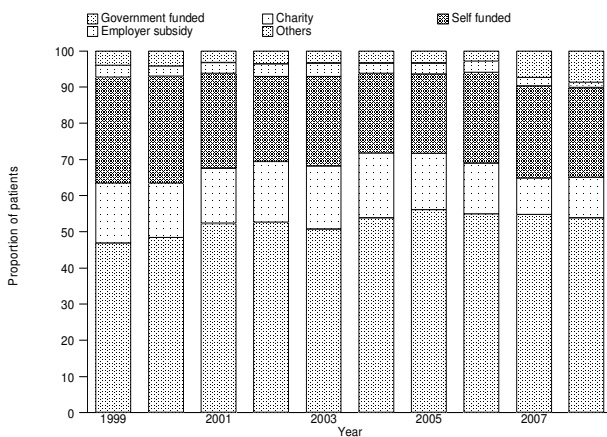
The government continues to be the main payer for dialysis therapy. These funds are channeled not only to the government dialysis centres but also as subsidies to NGO centres and payment of dialysis treatment for civil servants and their dependents in private centres. A quarter of patients paid for their dialysis treatment initially however only 15% of prevalent patients paid for their dialysis treatment. Funding from NGO bodies accounted for between 10-26% over the last 10 years. (table & figure 2.3.4)

Table 2.3.4: Funding for Dialysis Treatment 1999-2008

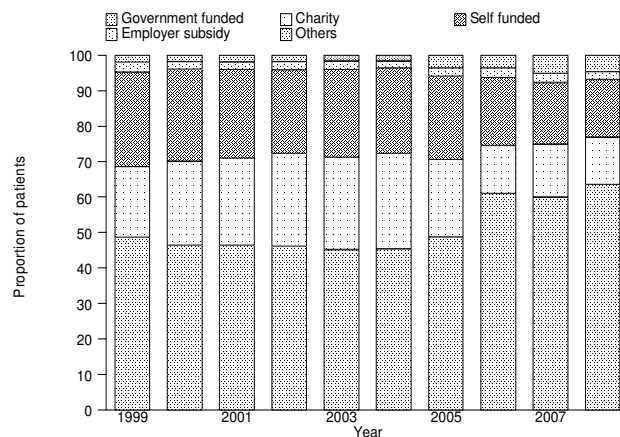
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
New Dialysis patients	1559	1854	2100	2350	2605	2880	3115	3614	3874	3836
% by Government	47	48	52	53	51	54	56	55	55	54
% by Charity	17	15	15	17	17	18	16	14	10	11
% self funded	29	30	26	24	25	22	22	25	25	25
% subsidized by Employer	3	3	3	3	4	3	3	3	2	1
% Others	4	4	3	4	3	3	3	3	7	9
Dialysing at 31st December	5318	6420	7493	8677	10206	11744	13505	15565	17646	19555
% by Government	49	46	46	46	44	44	46	56	55	58
% by Charity	20	24	25	26	25	26	21	13	14	12
% self funded	27	26	25	24	24	23	22	18	16	15
% subsidized by Employer	3	2	2	2	2	2	2	3	3	2
% Others	2	2	2	2	2	2	3	3	5	4

Figure 2.3.4: Funding for Dialysis Treatment 1999-2008

(i) New Dialysis Patients



(ii) Dialysing patients at 31st December



2.3.5 Distribution of dialysis patients by sector

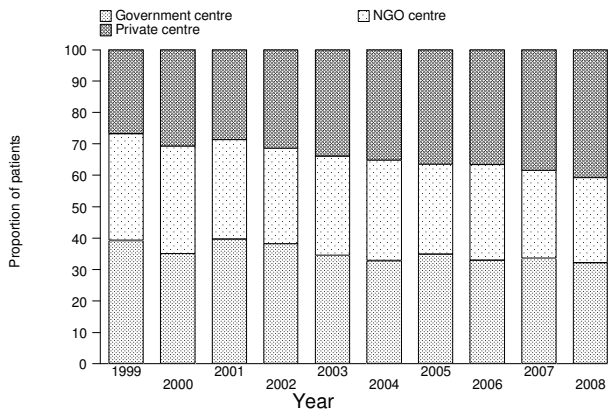
The proportion of incident and prevalent dialysis patients in private centres continue to increase particularly in incident patients with a corresponding decrease in government centres. However, 36% of patients were in government centres, 33% in private centres and NGO centres 31%.

Table 2.3.5: Distribution of Dialysis Patients by Sector 1999-2008

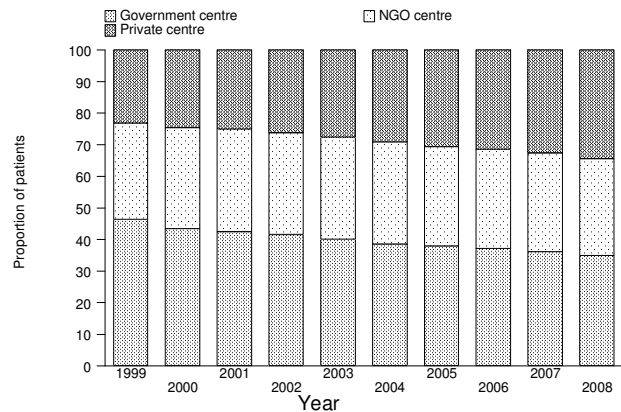
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
New Dialysis patients	1559	1854	2100	2350	2605	2880	3115	3614	3874	3836
% Government centre	39	35	40	38	34	33	35	33	34	32
% NGO centre	34	34	32	30	32	32	29	30	28	27
% Private centre	27	31	29	31	34	35	37	37	38	41
Dialysing at 31st December	5540	6692	7845	9118	10437	11883	13402	15084	17015	18856
% Government centre	46	43	42	42	40	39	38	37	36	35
% NGO centre	30	32	33	32	32	32	31	31	31	31
% Private centre	23	25	25	26	28	29	31	31	33	34

Figure 2.3.5: Distribution of Dialysis Patients by Sector 1999-2008

(i) New Dialysis Patients



(ii) Dialysing patients at 31st December



SECTION 2.4: PRIMARY RENAL DISEASE

Diabetes mellitus continues to be the commonest cause of ESRD and has been the cause of at least half of new dialysis patients since 2002. The 3rd National Health and Morbidity Survey, Malaysia 2006 showed that the prevalence of diabetes mellitus has risen to 14.9% from 8.3% ten years earlier. Hence it would be anticipated that diabetic nephropathy would still account for the majority of ESRD for many years to come unless concerted efforts are taken to combat this epidemic at all levels. Hypertension was the second commonest known cause of ESRD at about 7%. Glomerulonephritis as a cause of ESRD has decreased from 10% in 1999 to only 4% in 2007. Systemic lupus erythematosus (SLE) continued to contribute 1% of new ESRD patients.

Table 2.4.1: Primary Renal Diseases New Dialysis Patients 1999-2008

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
New Dialysis patients	1559	1854	2100	2350	2605	2880	3115	3614	3874	3836
% Unknown cause	29	27	30	30	27	27	25	24	26	30
% Diabetes Mellitus	40	45	46	50	53	54	56	58	58	55
% GN	10	9	6	6	5	4	5	4	4	3
% SLE	2	2	1	1	1	1	1	1	1	1
% Polycystic kidney	1	1	2	1	1	1	1	1	1	1
% Obstructive Nephropathy	4	3	3	3	3	3	3	3	3	2
% Toxic Nephropathy	1	0	1	0	0	0	0	0	0	0
% Hypertension	11	12	9	7	7	8	8	7	7	7
% Others	2	1	1	1	1	1	1	1	1	1

Figure 2.4.1: Primary Renal Diseases for New Dialysis Patients 1999-2008

