

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 Sections 2.1, 2.3 and 2.4 as well as from the centre survey carried out at the end of each calendar year shown in Section 2.2.

2.1.1 Dialysis treatment provision

The number of patients commencing dialysis was 4468 in 2008 giving an incidence rate of 161 per million population. The number of dialysis patients in Malaysia has tripled in 10 years from 6689 in 2000 to more than 20,000 in 2009 to give a prevalence rate at least 747 in 2009. The number transplanted remained around a hundred in the last 5 years.

Table 2.1.1: Stock and flow-Dialysis Patients 2000-2009

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
New Dialysis patients	1855	2112	2362	2609	2892	3132	3656	4015	4468	4146
Died	602	821	933	1169	1287	1467	1752	1890	2054	2172
Transplanted	106	130	145	121	156	123	121	91	112	103
Lost to Follow-up	8	9	18	22	24	29	64	39	47	93
Dialysing at 31 st Dec.	6689	7837	9108	10423	11873	13393	15125	17133	19381	21159

Table 2.1.2: Dialysis Treatment Rate per million population 2000-2009

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Acceptance rate	79	88	96	104	113	120	137	148	161	146
Prevalence rate	285	326	371	416	464	513	568	631	699	747

2.1.2. Geographic distribution

From table 2.1.3, it appears that dialysis treatment rates in almost if not all states in Malaysia have now exceeded 100 per million state population. However, the economically advanced states like Pulau Pinang, Melaka, Johor, Kuala Lumpur and Negeri Sembilan –have double the incident rates of the least developed states.

Table 2.1.3: Dialysis Treatment Rate by state, per million population 2000-2009

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Pulau Pinang	110	125	158	145	215	201	215	219	198	213
Melaka	150	156	175	186	210	170	199	208	226	179
Johor	132	138	147	147	156	169	213	192	240	200
Perak	105	103	116	129	147	172	190	184	205	194
Selangor & Putrajaya	84	94	111	120	124	135	152	166	174	171
WP Kuala Lumpur	158	188	172	194	209	200	218	251	256	234
Negeri Sembilan	116	110	133	147	157	157	149	218	243	235
Kedah	66	63	88	103	98	108	117	127	152	119
Perlis	72	104	103	128	95	107	127	129	140	54
Terengganu	37	76	90	66	80	100	104	170	138	132
Pahang	49	53	52	68	76	91	125	117	143	113
Kelantan	31	61	61	74	66	80	80	95	85	106
Sarawak	50	67	59	63	73	73	86	106	116	113
Sabah & WP Labuan	26	35	37	44	49	46	64	71	97	81

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

Prior to 2006, data submission of individual dialysis and transplant patients to the National Renal Registry was entirely voluntary. Since then, with the implementation of the Private Health Care Facilities and Services Act 1996 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 2009. Dialysis provision is expressed in terms of number of centres, HD machines, treatment capacity (one HD machine to 5 patients) and patients.

The number of haemodialysis (HD) centres increased from 484 in 2008 to 538 in 2009, peritoneal dialysis (PD) centres increased from 31 to 36 in the same period. 19607 patients were reported to be on HD, and 1936 on PD giving a total of 21543 dialysis patients at year end 2009. The Ministry of Health (MOH) provided dialysis to 31.3% of patients, non-governmental organizations (NGO) 28.29% and the private sector 38.8%. 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 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 but the lowest HD treatment capacity to patient ratio at 1.29 in 2009.

Table 2.2.1 : Number of dialysis centres, HD machines and treatment capacity by sector, December 2009

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.)
MOH	136	1401	7005	4994	1.4	23	1742	6736
NGO	130	1830	9150	6084	1.5			6084
Private (PRV)	257	2137	10685	8303	1.29	9	53	8356
University (UNI)	7	59	295	126	2.34	3	134	260
Armed Force (AF)	8	47	235	100	2.35	1	7	107
TOTAL	538	5474	27370	19607	8.88	36	1936	21543

Figure 2.2.1(a): Distribution of dialysis centres by Sector, December 2009

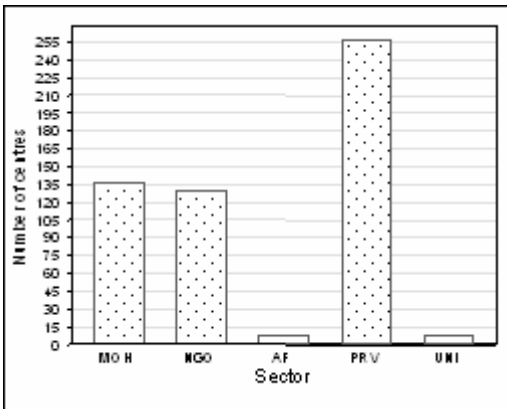


Figure 2.2.1(b): Distribution of HD capacity by Sector, December 2009

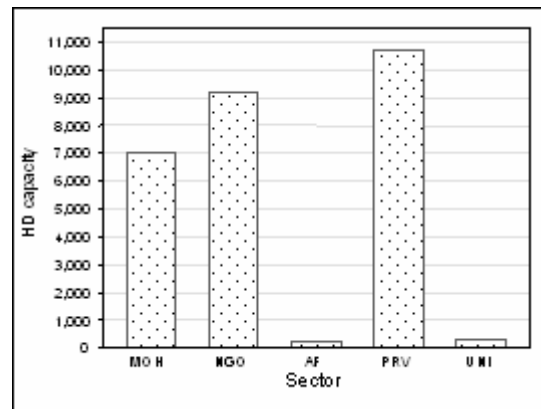


Figure 2.2.1(c): Distribution of dialysis patients by Sector, December 2009

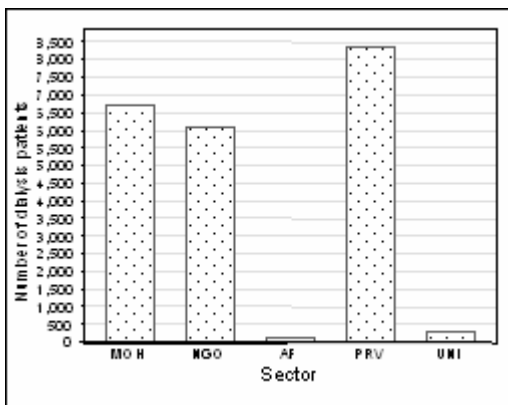
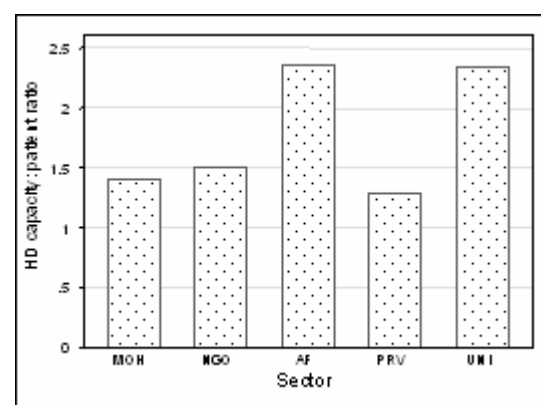


Figure 2.2.1(d): HD capacity: patient ratio by Sector, December 2009



2.2.2 Geographic distribution (centre survey)

The economically advantaged states of Pulau Pinang, Melaka, Johor, Perak, WP Kuala Lumpur and Negeri Sembilan had centre HD capacity rates and dialysis treatment rates above the national rate of 777 per million population. There was a 4-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. Although there was also a wide variation between PD prevalence rate by state, there was no obvious correlation with the economic status of the state.

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 2009

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	52	565	341	2825	1707	1934	1169	1.46	4	402	243	2336	1411
Pulau Pinang	46	505	320	2525	1601	1630	1033	1.55	2	174	110	1804	1144
Johor	72	840	248	4200	1241	3334	985	1.26	5	259	77	3593	1061
Melaka	22	218	283	1090	1417	750	975	1.45	2	43	56	793	1031
Negeri Sembilan	25	253	250	1265	1248	909	897	1.39	2	69	68	978	965
Perak	58	585	244	2925	1222	2140	894	1.37	3	70	29	2210	923
Selangor & Putrajaya	104	1071	207	5355	1034	3584	692	1.49	5	440	85	4024	777
Perlis	2	35	145	175	727	141	586	1.24				141	586
Kedah	34	308	154	1540	770	1116	558	1.38	1	43	22	1159	580
Sarawak	32	313	125	1565	625	1312	524	1.19	3	91	36	1403	560
Pahang	28	254	165	1270	823	752	487	1.69	2	89	58	841	545
Terengganu	10	112	100	560	500	450	401	1.24	1	126	112	576	514
Kelantan	21	144	88	720	441	609	373	1.18	2	68	42	677	414
Sabah & WP Labuan	32	271	82	1355	412	946	288	1.43	4	62	19	1008	306
Malaysia	538	5474	197	27370	987	19607	707	1.4	36	1936	70	21543	777

Figure 2.2.2(a): Distribution of hemodialysis centres by State, 2009

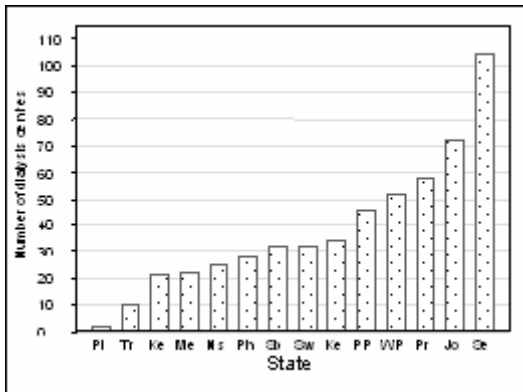


Figure 2.2.2(b): Distribution of dialysis patients by State, 2009

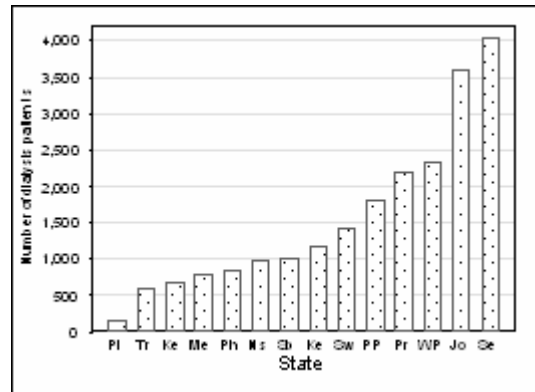


Figure 2.2.2(c): Distribution of patients/million population by State, 2009

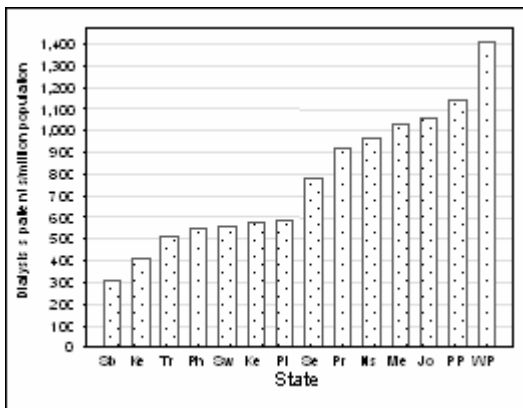
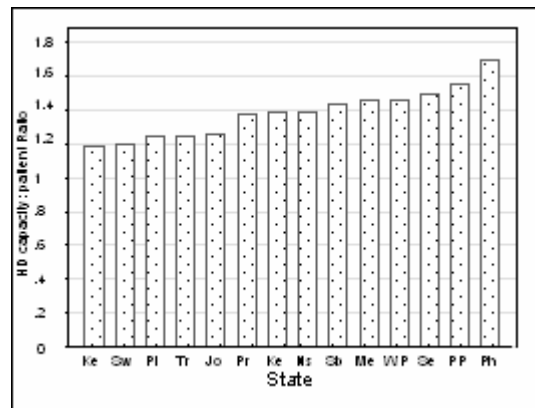


Figure 2.2.2(d): HD capacity to patient ratio by State, 2009



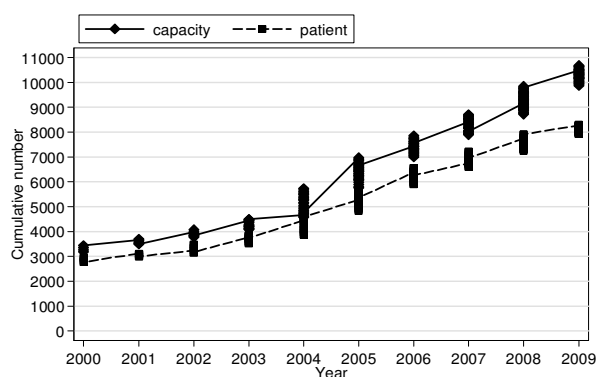
2.2.3 Growth in dialysis provision by sector

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.

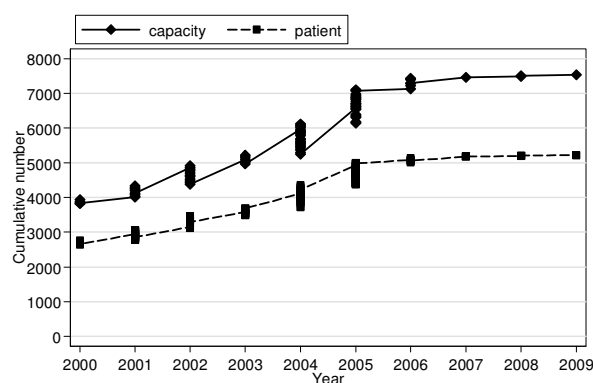
Table 2.2.3: Growth in HD and HD patients in Private, NGO and MOH sectors, 2000-2009

Sector	Private		NGO		MOH	
	Cumulative HD capacity	Cumulative HD patients	Cumulative HD capacity	Cumulative HD patients	Cumulative HD capacity	Cumulative HD patients
2000	3440	2950	4620	3430	3940	2761
2001	3690	3108	4965	3693	4340	3059
2002	4070	3474	5830	4222	4910	3468
2003	4490	3859	6260	4523	5220	3689
2004	5730	4786	6760	4841	6115	4353
2005	6970	5856	7470	5168	7110	4999
2006	7855	6554	8080	5514	7430	5134
2007	8700	7223	8635	5841	7460	5184
2008	9840	7914	8960	6028	7500	5204
2009	10685	8303	9150	6024	7535	5220

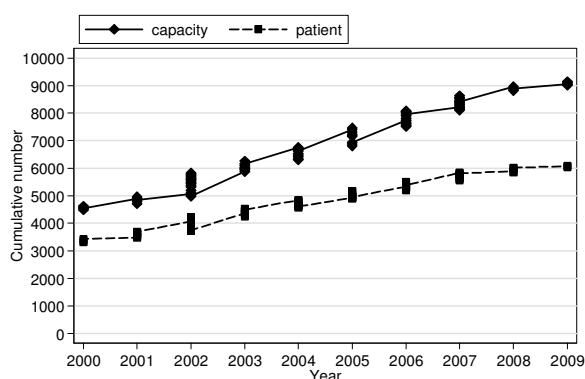
Figure 2.2.3: Growth in HD and HD patients in Private, NGO and MOH sectors, 2000-2009



Growth in HD capacity and patient, private sector 2000-2009



Growth in HD capacity and patient, MOH sector 2000-2009



Growth in HD capacity and patient, NGO sector 2000-2009

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 gender. Since 2001, the male to female dialysis patients remained the same at 55 to 45% respectively. However the ratio between males and females was slightly higher in the incident patients compared to prevalent patients suggesting a small survival advantage in female patients on dialysis.

Table 2.3.1(a) : Dialysis Treatment Rate by Gender, per million male or female population 2000-2009

Gender	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Male	92	97	111	123	130	141	156	169	187	171
Female	73	89	95	96	111	112	133	142	153	140

Figure 2.3.1(a) : Dialysis Treatment Rate by Gender 2000-2009

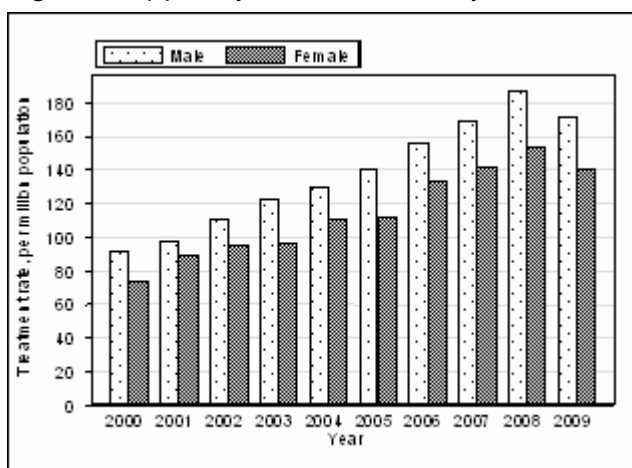
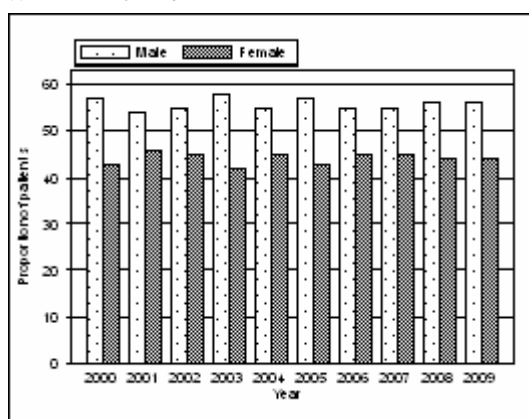


Table 2.3.1(b): Gender Distribution of Dialysis Patients 2000-2009

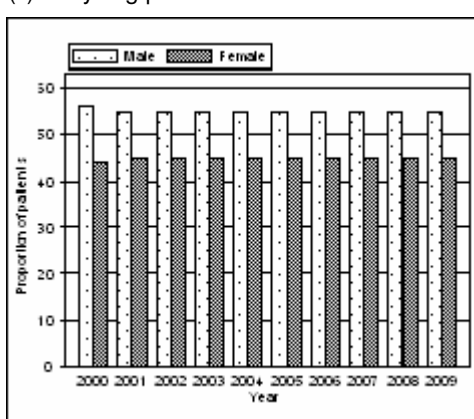
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
New Dialysis patients	1855	2112	2362	2609	2892	3132	3656	4015	4468	4146
% Male	57	54	55	58	55	57	55	55	56	56
% Female	43	46	45	42	45	43	45	45	44	44
Dialysing at 31 st December	6689	7837	9108	10423	11873	13393	15125	17133	19381	21159
% Male	56	55	55	55	55	55	55	55	55	55
% Female	44	45	45	45	45	45	45	45	45	45

Figure 2.3.1(b): Gender Distribution of Dialysis Patients 2000-2009

(i) New Dialysis patients



(ii) Dialysing patients at 31st December



2.3.2 Age distribution

New dialysis treatment rates in the younger 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 65 years and older have continued to show rapid increase to almost 1000 per million age related population in 2008. (Table 2.3.2 a) More than half 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 2000-2009

Age groups (years)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
≤14	4	4	5	4	5	5	5	5	6	6
15-24	18	22	29	26	28	30	31	32	30	31
25-34	47	47	55	52	51	56	61	64	74	65
35-44	98	104	100	103	117	113	126	128	154	125
45-54	249	252	275	279	312	305	366	368	403	350
55-64	433	508	535	589	594	658	682	777	759	713
≥ 65	347	439	502	585	658	665	814	848	959	876

Figure 2.3.2 (a): Dialysis Treatment Rate by Age Group 2000-2009

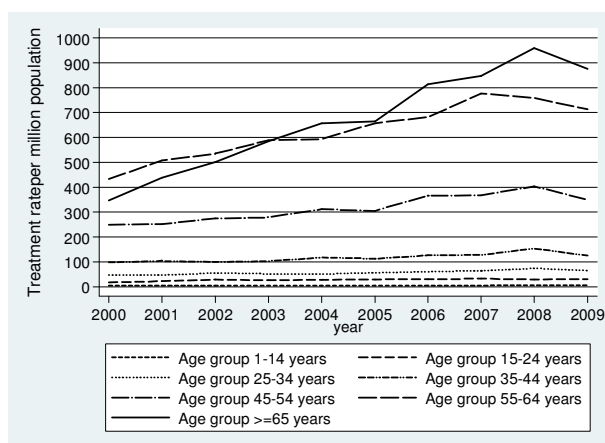
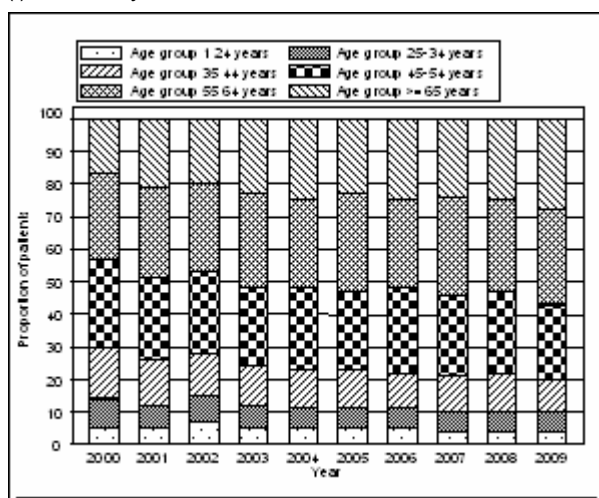


Table 2.3.2 (b) : Percentage Age Distribution of Dialysis Patients 2000-2009

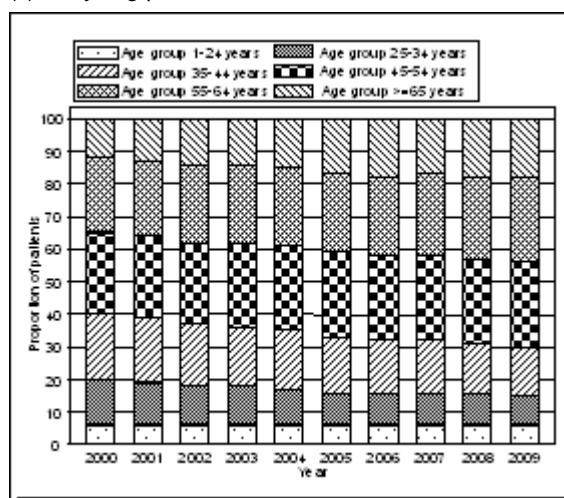
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
New Dialysis patients	1855	2112	2362	2609	2892	3132	3656	4015	4468	4146
% 1-14 years	1	1	2	1	1	1	1	1	1	1
% 15-24 years	4	4	5	4	4	4	4	3	3	3
% 25-34 years	9	7	8	7	6	6	6	6	6	6
% 35-44 years	16	14	13	12	12	12	11	11	12	10
% 45-54 years	27	25	25	24	25	24	26	25	25	23
% 55-64 years	26	28	27	29	27	30	27	30	28	29
% ≥65 years	17	21	20	23	25	23	25	24	25	28
Dialysing at 31 st December	6689	7837	9108	10423	11873	13393	15125	17133	19381	21159
% 1-14 years	1	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	13	12	12	11	10	10	10	10	9
% 35-44 years	20	20	19	18	18	17	16	16	15	15
% 45-54 years	25	25	25	26	26	26	26	26	26	26
% 55-64 years	23	23	24	24	24	24	24	25	25	26
% ≥65 years	12	13	14	14	15	17	18	17	18	18

Figure 2.3.2 (b): Age Distribution of New Dialysis Patients 2000-2009

(i) New Dialysis Patients



(ii) Dialysing patients at 31st December



2.3.3 Method and Location of dialysis

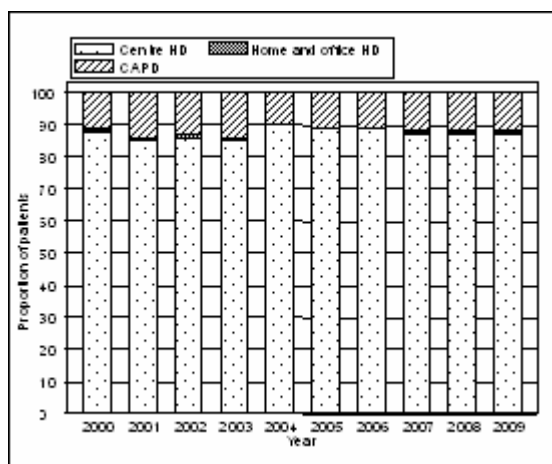
87% of new patients were accepted into centre haemodialysis in 2008 and 2009. Despite the conscious effort by the MOH to place PD first, the proportion of new patients accepted onto chronic PD program has remained about 12% and only accounted for 8% of prevalent dialysis patients. This is because the private sector was the largest provider of dialysis accepting more than 40% since 2008. There were still a handful of new patients accepted into the home and office HD programme. (Table and Figure 2.3.5)

Table 2.3.3: Method and Location of Dialysis Patients 2000-2009

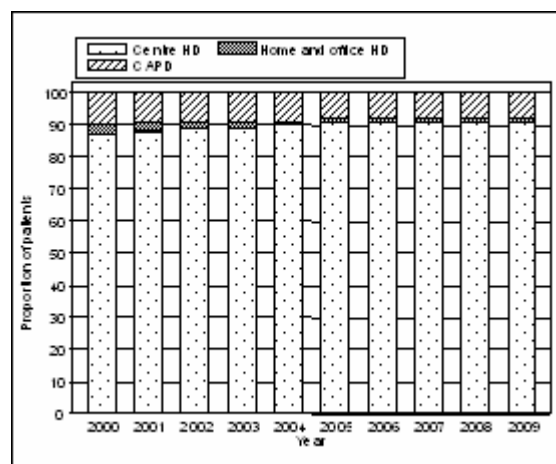
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
New Dialysis patients	1855	2112	2362	2609	2892	3132	3656	4015	4468	4146
% Centre HD	88	85	86	85	90	89	89	87	87	87
% Home and office HD	1	1	1	1	0	0	0	1	1	1
% PD	11	14	13	14	10	11	11	12	12	12
Dialysing at 31 st December	6413	7492	8687	9950	11302	12743	14393	16310	18433	20118
% Centre HD	87	88	89	89	90	91	91	91	91	91
% Home and office HD	3	3	2	2	1	1	1	1	1	1
% PD	10	9	9	9	9	8	8	8	8	8

Figure 2.3.3: Method and Location of Dialysis Patients 2000-2009

(i) New Dialysis Patients



(ii) Dialysing patients at 31st December



2.3.4 Funding for Dialysis Treatment

In Malaysia, funding for dialysis may be from multiple sources. 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.

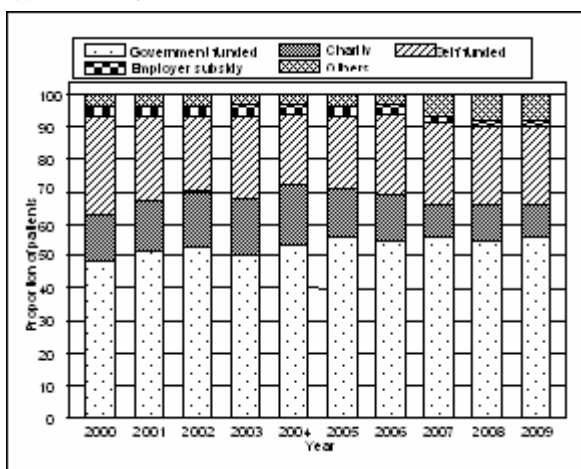
The government continues to be the main payer for dialysis therapy. These funds are channeled not only to the government dialysis centres but also as subsidies to NGO centres and payment of dialysis treatment for civil servants and their dependents in private centres. About a quarter of patients paid for their dialysis. Funding from NGO bodies has declined over the years. (Table and Figure 2.3.4)

Table 2.3.4: Funding for Dialysis Treatment 2000-2009

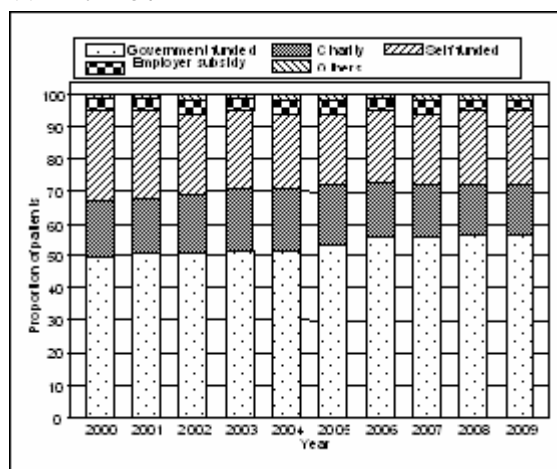
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
New Dialysis patients	1855	2112	2362	2609	2892	3132	3656	4015	4468	4146
% by Government	48	52	53	51	54	56	55	56	55	56
% by Charity	15	15	17	17	18	15	14	10	11	10
% self funded	30	26	23	25	22	22	25	25	24	24
% subsidized by Employer	3	3	3	4	3	3	3	2	2	2
% Others	4	4	4	3	3	4	3	7	8	8
Dialysing at 31 st December	6413	7492	8687	9950	11302	12743	14393	16310	18433	20118
% by Government	50	51	51	52	52	54	56	56	57	57
% by Charity	17	17	18	19	19	18	17	16	15	15
% self funded	28	27	25	24	23	22	22	22	23	23
% subsidized by Employer	4	4	4	4	4	4	4	4	3	3
% Others	1	1	2	1	2	2	1	2	2	2

Figure 2.3.4: Funding for Dialysis Treatment 2000-2009

(i) New Dialysis Patients



(ii) Dialysing patients at 31st December



2.3.5 Distribution of dialysis patients by sector

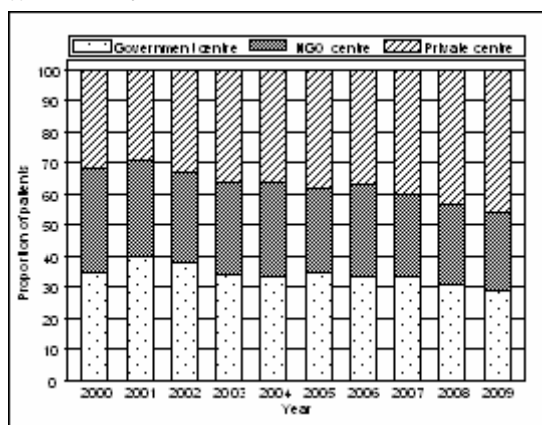
The proportion of incident dialysis patients in private centres continue to increase while that in MOH and NGO centres seem to show a decrease. In 2009 the private sector overtook the government sector as the largest provider of dialysis.

Table 2.3.5: Distribution of Dialysis Patients by Sector 2000-2009

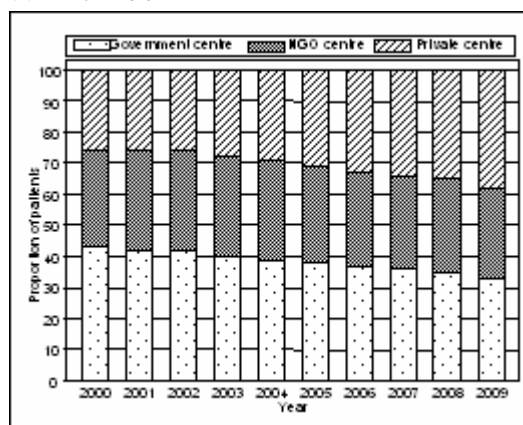
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
New Dialysis patients	1855	2112	2362	2609	2892	3132	3656	4015	4468	4146
% Government centre	35	40	38	34	33	35	33	33	31	29
% NGO centre	33	31	29	30	31	27	30	27	26	25
% Private centre	32	29	33	36	36	38	37	40	43	46
Dialysing at 31 st December	6689	7837	9108	10423	11873	13393	15125	17133	19381	21159
% Government centre	43	42	42	40	39	38	37	36	35	33
% NGO centre	31	32	32	32	32	31	30	30	30	29
% Private centre	26	26	26	28	29	31	33	34	35	38

Figure 2.3.5: Distribution of Dialysis Patients by Sector 2000-2009

(i) New Dialysis Patients



(ii) Dialysing patients at 31st December



SECTION 2.4: PRIMARY RENAL DISEASE

More and more new dialysis patients were reported to have diabetes mellitus accounting for more than half of all 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. The percentage of patients with unknown primary renal disease has not reduced in the last 10 years despite the increase in the number of nephrologists.

Table 2.4.1: Primary Renal Diseases 2000-2009

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
New Dialysis patients	1855	2112	2362	2609	2892	3132	3656	4015	4468	4146
% Unknown cause	27	30	30	27	26	25	24	26	27	27
% Diabetes Mellitus	44	45	49	52	53	55	57	57	57	58
% GN	9	7	6	5	4	5	4	4	3	3
% SLE	2	1	1	1	1	1	1	1	1	1
% Polycystic kidney	1	2	1	1	1	1	1	1	1	1
% Obstructive Nephropathy	3	3	3	3	3	3	3	3	2	2
% Toxic Nephropathy	0	1	0	0	0	0	0	0	0	0
% Hypertension	13	10	7	9	9	8	8	8	8	8
% Others	1	1	3	2	3	2	2	0	1	0

Figure 2.4.1: Primary Renal Diseases for New Dialysis Patients 2000-2009

