

## 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 calendar year shown in section 2.2.

### 2.1.1: Dialysis treatment provision

The number of patients commencing dialysis more than doubled in 10 years from 2112 in 2001 to 4740 in 2009 and at least 4521 in 2010 giving an acceptance rate of 88 per million population in 2001 to 170 in 2009. (Data for 2010 however are preliminary since at the time of writing this report there were still many new patients yet to be notified to registry.)

The number of dialysis patients in Malaysia has tripled in 10 years from 7837 in 2001 to more than almost 23,000 in 2010 to give a prevalence rate at least 812 pmp in 2009. There were more patients notified to the registry as lost to follow-up in 2010. Further investigations are needed ascertain whether these patients had died, had been transplanted or moved to another centre.

**Table 2.1.1:** Stock and flow-Dialysis Patients 2001-2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
New Dialysis patients	2112	2373	2620	2891	3134	3669	4047	4548	4740	4521
Died	850	959	1211	1318	1513	1815	1984	2190	2578	2574
Transplanted	127	143	119	157	122	121	90	110	110	93
Lost to Follow-up	9	15	19	21	26	54	28	29	70	176
Dialysing at 31 <sup>st</sup> December	7837	9102	10399	11829	13332	15046	17022	19250	21245	22932

**Table 2.1.2:** Dialysis Treatment Rate per million population 2001-2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Acceptance rate	88	96	103	112	118	137	149	165	170	160
Prevalence rate	325	368	411	457	504	561	626	699	762	812

### 2.1.2: Geographic distribution

From Table 2.1.3, except for Sabah, Kelantan and Perlis, dialysis acceptance rates in the other states in Malaysia have exceeded 100 per million state population. At more than 200 pmp, the economically advanced states like Pulau Pinang, Melaka, Johor, Kuala Lumpur, Selangor and Negeri Sembilan have dialysis acceptance rates more than twice higher than the least developed states.

**Table 2.1.3:** Dialysis Treatment Rate by state, per million population 2001-2010

State	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pulau Pinang	122	157	143	210	196	211	216	198	234	228
Melaka	150	172	183	206	167	197	209	227	205	228
Johor	134	146	145	155	167	213	195	247	232	199
Perak	104	115	126	148	169	187	181	203	217	200
Selangor & Putrajaya	94	110	119	123	134	153	171	179	203	200
WP Kuala Lumpur	186	168	189	201	190	210	242	253	270	272
Negeri Sembilan	109	131	145	155	156	150	218	250	259	252
Kedah	63	89	105	98	110	119	134	169	154	128
Perlis	104	102	128	94	102	127	130	141	63	75
Terengganu	76	90	67	81	104	107	180	148	156	184
Pahang	53	51	68	75	90	124	117	145	136	137
Kelantan	59	61	74	64	78	78	93	85	112	83
Sarawak	66	58	62	72	71	86	105	117	121	114
Sabah & WP Labuan	35	36	43	44	43	62	65	95	89	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 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 2010. This survey also collects data on available manpower in the dialysis centres which is presented in this report for the first time.

Dialysis provision is expressed in terms of number of centres, HD machines, treatment capacity (one HD machine to 5 patients) and number of patients.

### 2.2.1: Growth in dialysis in Malaysia by state and sector

The number of dialysis centres for the whole of Malaysia increased from 230 in 2001 to 398 in 2005 and 618 in 2010 giving a rate of 10 per million population (pmp) in 2001 and 22 pmp in 2010. The increase in dialysis centres were mainly contributed by the private dialysis centres which had grown from 3 pmp in 2001 to 11 pmp in 2010. The public sector had only increased from 4 pmp in 2001 to 6 pmp in 2010 while the NGO dialysis centres had an increase from 3 pmp to 5 pmp over the same period. Most of the increases in the private dialysis centres occurred in the more economically developed west coast states of Malaysian Peninsula. (Table and Figures 2.2.1)

As can be seen from Tables 2.2.3 and 2.2.3, the proliferation of hemodialysis centres accounted for most of the increase in dialysis centres. PD centre rate remained at 1 pmp throughout the last 10 years in contrast to HD centres which had increased from 9 to 21 pmp over the same period. Of the 37 PD centres, only 9 were private centres with a total of 41 patients. Three private PD centres in Johor accounted for 35 PD patients while the other 6 centres had one patient each (Table 22.7). There were no NGO dialysis centres providing chronic PD treatment.

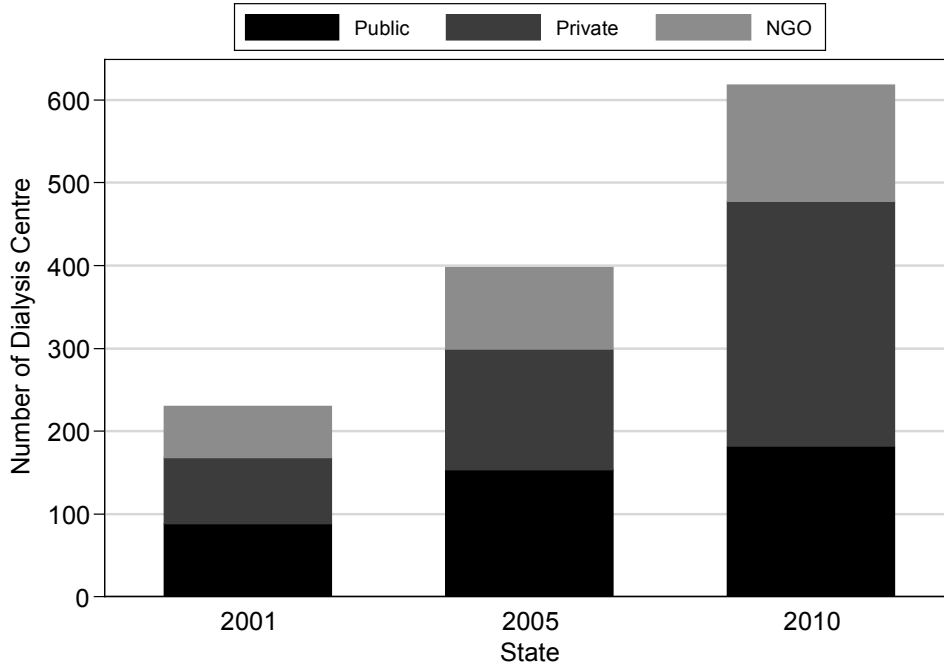
**Table 2.2.1:** Number and density of Dialysis Centres in Malaysia by State and Sector, 2001-2010

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	88	4	153	6	181	6
Malaysia	Private	80	3	145	5	297	11
Malaysia	NGO	62	3	100	4	140	5
Malaysia	Total	230	10	398	15	618	22
Perlis	Public	1	5	1	4	1	4
Perlis	Private	-	-	-	-	-	-
Perlis	NGO	-	-	1	4	1	4
Perlis	Total	1	5	2	9	2	8
Kedah	Public	9	5	10	5	11	6
Kedah	Private	7	4	12	7	21	11
Kedah	NGO	3	2	5	3	6	3
Kedah	Total	19	11	27	15	38	19
Kedah & Perlis	Public	10	5	11	5	12	5
Kedah & Perlis	Private	7	4	12	6	21	10
Kedah & Perlis	NGO	3	2	6	3	7	3
Kedah & Perlis	Total	20	10	29	14	40	18
Pulau Pinang	Public	4	3	8	5	10	6
Pulau Pinang	Private	11	8	12	8	27	17
Pulau Pinang	NGO	7	5	14	9	20	13
Pulau Pinang	Total	22	16	34	23	57	36
Perak	Public	7	3	17	7	19	8
Perak	Private	10	5	19	8	31	13
Perak	NGO	5	2	12	5	13	5
Perak	Total	22	10	48	21	63	26

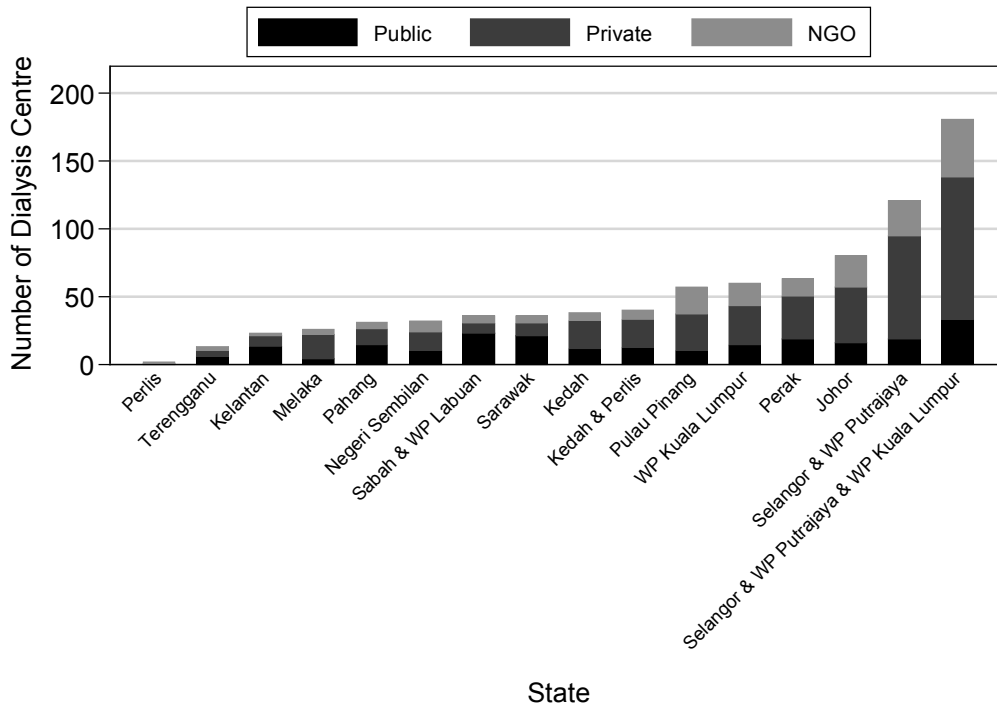
**Table 2.2.1:** Number and density of Dialysis Centres in Malaysia by State and Sector, 2001-2010 (cont'd.)

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Selangor & WP Putrajaya	Public	10	2	14	3	19	4
Selangor & WP Putrajaya	Private	16	4	33	7	76	15
Selangor & WP Putrajaya	NGO	9	2	18	4	26	5
Selangor & WP Putrajaya	Total	35	8	65	14	121	24
WP Kuala Lumpur	Public	13	9	13	8	14	8
WP Kuala Lumpur	Private	14	10	24	15	29	17
WP Kuala Lumpur	NGO	7	5	10	6	17	10
WP Kuala Lumpur	Total	34	23	47	29	60	35
Selangor & WP Putrajaya & WP KL	Public	23	4	27	4	33	5
Selangor & WP Putrajaya & WP KL	Private	30	5	57	9	105	15
Selangor & WP Putrajaya & WP KL	NGO	16	3	28	4	43	6
Selangor & WP Putrajaya & WP KL	Total	69	12	112	18	181	27
Negeri Sembilan	Public	3	3	6	6	10	1
Negeri Sembilan	Private	2	2	2	2	14	14
Negeri Sembilan	NGO	3	3	4	4	8	8
Negeri Sembilan	Total	8	9	12	13	32	32
Melaka	Public	3	5	4	6	4	5
Melaka	Private	6	9	9	12	18	23
Melaka	NGO	3	5	3	4	4	5
Melaka	Total	12	18	16	22	26	34
Johor	Public	8	3	14	4	16	5
Johor	Private	7	2	20	6	41	12
Johor	NGO	15	5	20	6	23	7
Johor	Total	30	11	54	17	80	24
Pahang	Public	4	3	10	7	14	9
Pahang	Private	1	1	2	1	12	8
Pahang	NGO	2	2	3	2	5	3
Pahang	Total	7	5	15	1	31	20
Terengganu	Public	5	5	6	6	6	6
Terengganu	Private	-	-	2	2	4	4
Terengganu	NGO	1	1	2	2	3	3
Terengganu	Total	6	7	10	10	13	12
Kelantan	Public	7	5	12	8	13	8
Kelantan	Private	1	1	3	2	8	5
Kelantan	NGO	1	1	1	1	2	1
Kelantan	Total	9	6	16	10	23	14
Sabah & WP Labuan	Public	7	3	20	6	23	7
Sabah & WP Labuan	Private	2	1	3	1	7	2
Sabah & WP Labuan	NGO	3	1	4	1	6	2
Sabah & WP Labuan	Total	12	4	27	9	36	11
Sarawak	Public	7	3	18	8	21	8
Sarawak	Private	3	1	4	2	9	4
Sarawak	NGO	3	1	3	1	6	2
Sarawak	Total	13	6	25	11	36	14

**Figure 2.2.1(a):** Number of Dialysis Centre in Malaysia by Sector, 2001-2010



**Figure 2.2.1(b):** Number of Dialysis Centre in Malaysia by State and Sector in 2010



**Table 2.2.2:** Number and density of HD centres in Malaysia by State and Sector, 2001-2010

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	71	3	134	5	153	5
Malaysia	Private	75	3	139	5	288	10
Malaysia	NGO	62	3	99	4	140	5
Malaysia	Total	208	9	372	14	581	21
Perlis	Public	1	5	1	4	1	4
Perlis	Private	-	-	-	-	-	-
Perlis	NGO	-	-	1	4	1	4
Perlis	Total	1	5	2	9	2	8
Kedah	Public	9	5	10	5	10	5
Kedah	Private	7	4	12	7	21	11
Kedah	NGO	3	2	5	3	6	3
Kedah	Total	19	11	27	15	37	19
Kedah & Perlis	Public	10	5	11	5	11	5
Kedah & Perlis	Private	7	4	12	6	21	10
Kedah & Perlis	NGO	3	2	6	3	7	3
Kedah & Perlis	Total	20	10	29	14	39	18
Pulau Pinang	Public	3	2	7	5	8	5
Pulau Pinang	Private	10	7	11	7	26	16
Pulau Pinang	NGO	7	5	14	9	20	13
Pulau Pinang	Total	20	15	32	21	54	34
Perak	Public	6	3	15	7	17	7
Perak	Private	9	4	18	8	30	12
Perak	NGO	5	2	12	5	13	5
Perak	Total	20	9	45	20	60	24
Selangor & WP Putrajaya	Public	8	2	12	3	15	3
Selangor & WP Putrajaya	Private	15	3	32	7	75	15
Selangor & WP Putrajaya	NGO	9	2	17	4	26	5
Selangor & WP Putrajaya	Total	32	7	61	13	116	23
WP Kuala Lumpur	Public	9	6	9	6	10	6
WP Kuala Lumpur	Private	14	10	24	15	29	17
WP Kuala Lumpur	NGO	7	5	10	6	17	10
WP Kuala Lumpur	Total	30	20	43	27	56	33
Selangor & WP Putrajaya & WP KL	Public	17	3	21	3	25	4
Selangor & WP Putrajaya & WP KL	Private	29	5	56	9	104	15
Selangor & WP Putrajaya & WP KL	NGO	16	3	27	4	43	6
Selangor & WP Putrajaya & WP KL	Total	62	11	104	16	172	25
Negeri Sembilan	Public	2	2	5	5	8	8
Negeri Sembilan	Private	2	2	2	2	14	14
Negeri Sembilan	NGO	3	3	4	4	8	8
Negeri Sembilan	Total	7	8	11	12	30	30
Melaka	Public	2	3	3	4	3	4
Melaka	Private	5	8	8	11	17	22
Melaka	NGO	3	5	3	4	4	5
Melaka	Total	10	15	14	19	24	31
Johor	Public	7	2	12	4	13	4
Johor	Private	7	2	19	6	38	11
Johor	NGO	15	5	20	6	23	7
Johor	Total	29	10	51	16	74	22
Pahang	Public	3	2	9	6	12	8
Pahang	Private	1	1	2	1	12	8
Pahang	NGO	2	2	3	2	5	3
Pahang	Total	6	5	14	10	29	19

**Table 2.2.2:** Number and density of HD centres in Malaysia by State and Sector, 2001-2010 (cont'd.)

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Terengganu	Public	4	4	5	5	5	5
Terengganu	Private	-	-	2	2	4	4
Terengganu	NGO	1	1	2	2	3	3
Terengganu	Total	5	5	9	9	12	11
Kelantan	Public	5	4	10	7	11	7
Kelantan	Private	1	1	3	2	8	5
Kelantan	NGO	1	1	1	1	2	1
Kelantan	Total	7	5	14	9	21	13
Sabah & WP Labuan	Public	6	2	19	6	20	6
Sabah & WP Labuan	Private	1	0	2	1	6	2
Sabah & WP Labuan	NGO	3	1	4	1	6	2
Sabah & WP Labuan	Total	10	4	25	8	32	10
Sarawak	Public	6	3	17	7	20	8
Sarawak	Private	3	1	4	2	8	3
Sarawak	NGO	3	1	3	1	6	2
Sarawak	Total	12	6	24	10	34	14

**Table 2.2.3:** Number and density of PD centres in Malaysia by State and Sector, 2001-2010

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	17	100	19	1	28	1
Malaysia	Private	5	0	6	0	9	0
Malaysia	NGO	-	-	-	-	-	-
Malaysia	Total	22	100	25	1	37	1
Perlis	Public	-	-	-	-	-	-
Perlis	Private	-	-	-	-	-	-
Perlis	NGO	-	-	-	-	-	-
Perlis	Total	-	-	-	-	-	-
Kedah	Public	-	-	-	-	1	1
Kedah	Private	-	-	-	-	-	-
Kedah	NGO	-	-	-	-	-	-
Kedah	Total	-	-	-	-	1	1
Kedah & Perlis	Public	-	-	-	-	1	0
Kedah & Perlis	Private	-	-	-	-	-	-
Kedah & Perlis	NGO	-	-	-	-	-	-
Kedah & Perlis	Total	-	-	-	-	1	0
Pulau Pinang	Public	1	1	1	1	2	1
Pulau Pinang	Private	1	1	1	1	1	1
Pulau Pinang	NGO	-	-	-	-	-	-
Pulau Pinang	Total	2	1	2	1	3	2
Perak	Public	1	0	2	1	2	1
Perak	Private	1	0	1	0	1	0
Perak	NGO	-	-	-	-	-	-
Perak	Total	2	1	3	1	3	1
Selangor & WP Putrajaya	Public	2	0	2	0	4	1
Selangor & WP Putrajaya	Private	1	0	1	0	1	0
Selangor & WP Putrajaya	NGO	-	-	-	-	-	-
Selangor & WP Putrajaya	Total	3	1	3	1	5	1
WP Kuala Lumpur	Public	4	3	4	2	4	2
WP Kuala Lumpur	Private	-	-	-	-	-	-
WP Kuala Lumpur	NGO	-	-	-	-	-	-
WP Kuala Lumpur	Total	4	0	4	2	4	0

**Table 2.2.3:** Number and density of PD centres in Malaysia by State and Sector, 2001-2010 (cont'd.)

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Selangor & WP Putrajaya & WP KL	Public	6	1	6	1	8	1
Selangor & WP Putrajaya & WP KL	Private	1	0	1	0	1	0
Selangor & WP Putrajaya & WP KL	NGO	-	-	-	-	-	-
Selangor & WP Putrajaya & WP KL	Total	7	1	7	1	9	1
Negeri Sembilan	Public	1	1	1	1	2	2
Negeri Sembilan	Private	-	-	-	-	-	-
Negeri Sembilan	NGO	-	-	-	-	-	-
Negeri Sembilan	Total	1	1	1	1	2	2
Melaka	Public	1	2	1	1	1	1
Melaka	Private	1	2	1	1	1	1
Melaka	NGO	-	-	-	-	-	-
Melaka	Total	2	3	2	3	2	3
Johor	Public	1	0	2	1	3	1
Johor	Private	-	-	1	0	3	1
Johor	NGO	-	-	-	-	-	-
Johor	Total	1	0	3	1	6	2
Pahang	Public	1	1	1	1	2	1
Pahang	Private	-	-	-	-	-	-
Pahang	NGO	-	-	-	-	-	-
Pahang	Total	1	1	1	1	2	1
Terengganu	Public	1	1	1	1	1	1
Terengganu	Private	-	-	-	-	-	-
Terengganu	NGO	-	-	-	-	-	-
Terengganu	Total	1	1	1	1	1	1
Kelantan	Public	2	1	2	1	2	1
Kelantan	Private	-	-	-	-	-	-
Kelantan	NGO	-	-	-	-	-	-
Kelantan	Total	2	1	2	1	2	1
Sabah & WP Labuan	Public	1	0	1	0	3	1
Sabah & WP Labuan	Private	1	0	1	0	1	0
Sabah & WP Labuan	NGO	-	-	-	-	-	-
Sabah & WP Labuan	Total	2	1	2	1	4	1
Sarawak	Public	1	0	1	0	1	0
Sarawak	Private	-	-	-	-	1	0
Sarawak	NGO	-	-	-	-	-	-
Sarawak	Total	1	0	1	0	2	1



The number of hemodialysis machines increase from 820 in 2001 to 2144 in 2010 giving rates of 96 and 230 haemodialysis machines pmp respectively. Not surprisingly, the increase was the most rapid in the private sector as shown in Figure 2.2.4 (a) paralleling the increase in the number of HD patients as shown in Figure 2.2.5 (a).

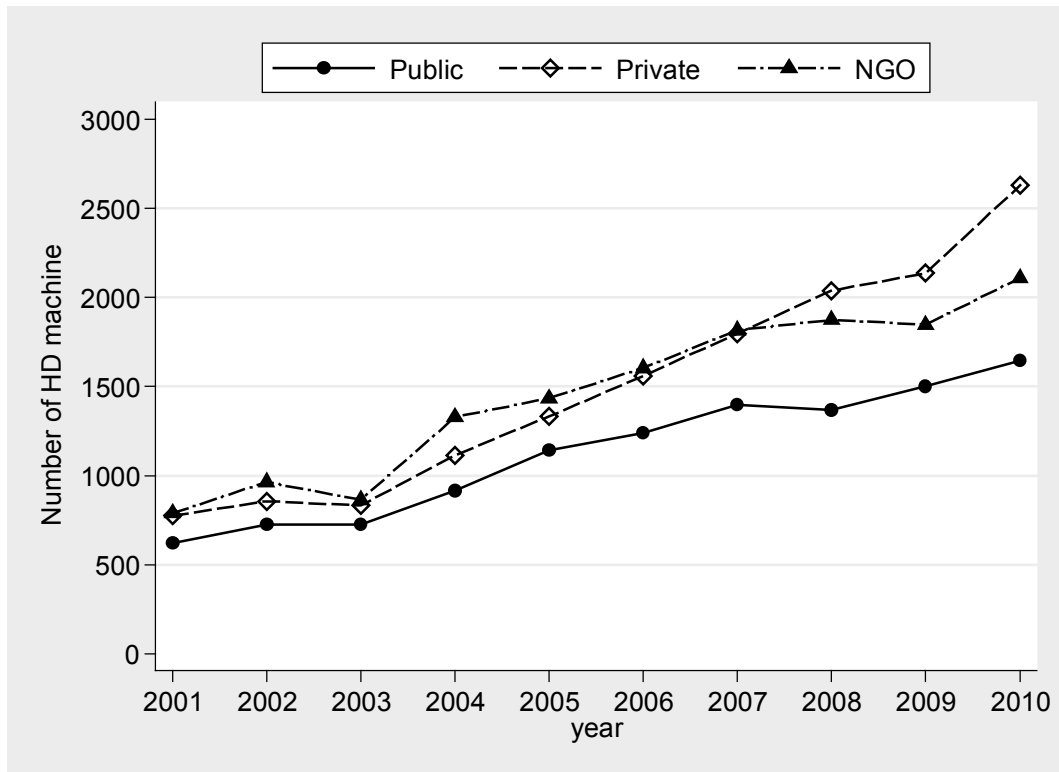
**Table 2.2.4:** Number and density of HD machines in Malaysia by State and Sector, 2001-2010

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	648	-	1174	44	1687	60
Malaysia	Private	858	27	1442	54	2665	94
Malaysia	NGO	820	36	1463	55	2144	76
Malaysia	Total	2326	34	4079	154	6496	230
Perlis	Public	15	96	25	111	32	133
Perlis	Private	-	71	-	-	-	-
Perlis	NGO	-	-	10	44	15	62
Perlis	Total	15	-!	35	155	47	196
Kedah	Public	50	71	82	45	110	56
Kedah	Private	50	29	122	66	164	83
Kedah	NGO	27	29	63	34	81	41
Kedah	Total	127	16	267	145	355	180
Kedah & Perlis	Public	65	74	107	52	142	64
Kedah & Perlis	Private	50	34	122	59	164	74
Kedah & Perlis	NGO	27	26	73	35	96	43
Kedah & Perlis	Total	142	14	302	146	402	182
Pulau Pinang	Public	49	74	57	38	93	59
Pulau Pinang	Private	150	36	182	121	276	174
Pulau Pinang	NGO	79	109	143	95	249	157
Pulau Pinang	Total	278	58	382	254	618	389
Perak	Public	62	203	126	55	171	69
Perak	Private	141	29	188	82	309	126
Perak	NGO	71	66	160	70	205	83
Perak	Total	274	33	474	206	685	278
Selangor & WP Putrajaya	Public	75	128	148	31	205	40
Selangor & WP Putrajaya	Private	151	17	302	64	669	131
Selangor & WP Putrajaya	NGO	129	35	301	64	391	77
Selangor & WP Putrajaya	Total	355	30	751	159	1265	248
WP Kuala Lumpur	Public	81	82	80	49	100	58
WP Kuala Lumpur	Private	151	55	238	147	314	182
WP Kuala Lumpur	NGO	98	103	147	91	237	138
WP Kuala Lumpur	Total	330	67	465		651	
Selangor & WP Putrajaya & WP KL	Public	156		228	36	305	45
Selangor & WP Putrajaya & WP KL	Private	302	27	540	85	983	144
Selangor & WP Putrajaya & WP KL	NGO	227	52	448	70	628	92
Selangor & WP Putrajaya & WP KL	Total	685	39	1216	191	1916	281
Negeri Sembilan	Public	23	119	43	45	78	77
Negeri Sembilan	Private	10	26	14	15	87	86
Negeri Sembilan	NGO	48	11	79	83	149	147
Negeri Sembilan	Total	81	54	136	142	314	310

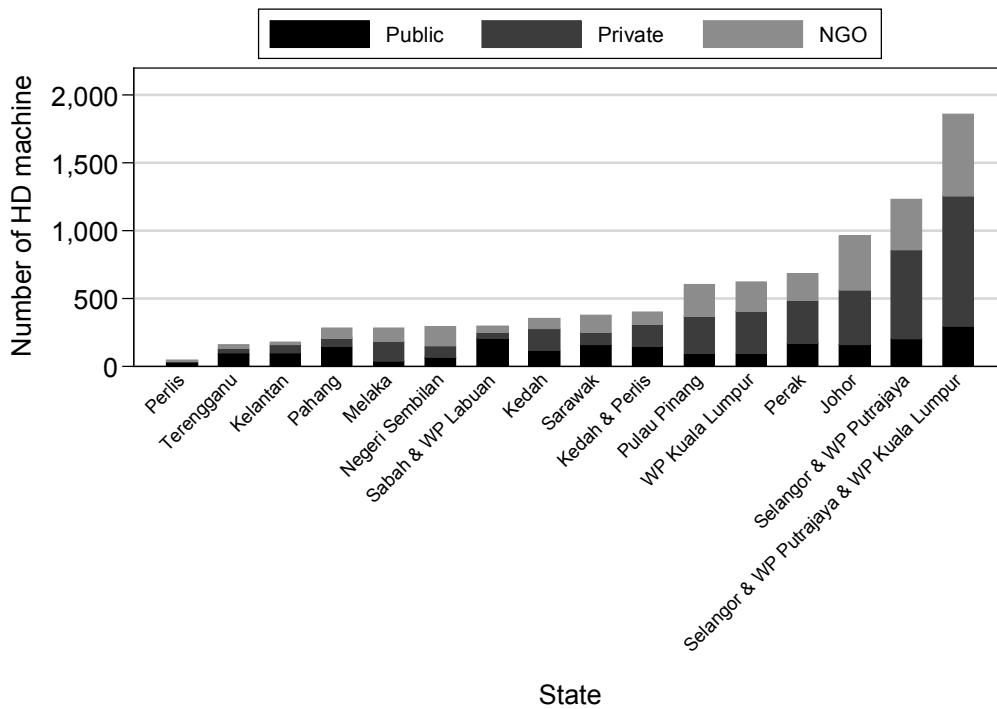
**Table 2.2.4:** Number and density of HD machines in Malaysia by State and Sector, 2001-2010 (cont'd.)

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Melaka	Public	22	91	29	40	38	49
Melaka	Private	48	33	76	105	154	200
Melaka	NGO	77	72	86	119	101	131
Melaka	Total	147	116	191	264	293	380
Johor	Public	64	221	121	39	162	49
Johor	Private	82	22	192	62	405	123
Johor	NGO	198	29	314	101	398	120
Johor	Total	344	69	627	201	965	292
Pahang	Public	26	121	93	64	142	91
Pahang	Private	8	20	16	11	67	43
Pahang	NGO	18	6	32	22	78	50
Pahang	Total	52	14	141	97	287	185
Terengganu	Public	30	39	53	54	95	90
Terengganu	Private	-	33	7	7	30	29
Terengganu	NGO	12	-	19	19	33	31
Terengganu	Total	42	13	79	80	158	150
Kelantan	Public	39	46	67	44	92	55
Kelantan	Private	24	28	40	26	62	37
Kelantan	NGO	10	17	10	7	24	14
Kelantan	Total	73	7	117	77	178	107
Sabah & WP Labuan	Public	57	52	143	45	213	64
Sabah & WP Labuan	Private	5	21	9	3	38	11
Sabah & WP Labuan	NGO	16	2	28	9	51	15
Sabah & WP Labuan	Total	78	6	180	57	302	91
Sarawak	Public	55	29	107	46	156	62
Sarawak	Private	38	26	56	24	90	36
Sarawak	NGO	37	18	71	31	132	53
Sarawak	Total	130	17	234	101	378	151

**Figure 2.2.4(a):** Number of HD machines in Malaysia by Sector from 2001-2010



**Figure 2.2.4(b):** Number of HD machines in Malaysia by State and Sector in 2010



The total number of dialysis patients increased from 7579 (314 per million population) in 2001 to 23420 (829 pmp) in 2010. The rate of rise in dialysis provision in the public and NGO sectors were almost similar – from 117 pmp for public sector and 101 pmp for NGO sector in 2001; to 252 for public and 230 pmp for NGO sector respectively in 2010. Dialysis provision in the private sector showed the steepest increase from 97 pmp in 2001 to 347 pmp in 2010.

Distribution by state showed that the economically advanced states of Malaysia have more patients in NGO and private dialysis centres whereas in the states of Sabah, Sarawak, Kelantan and Terengganu, the public sector patients accounted for at least half of the dialysis patients.

**Table 2.2.5:** Number and Prevalence Rate of Dialysis Patients (HD & PD) in Malaysia by State and Sector, 2001-2010

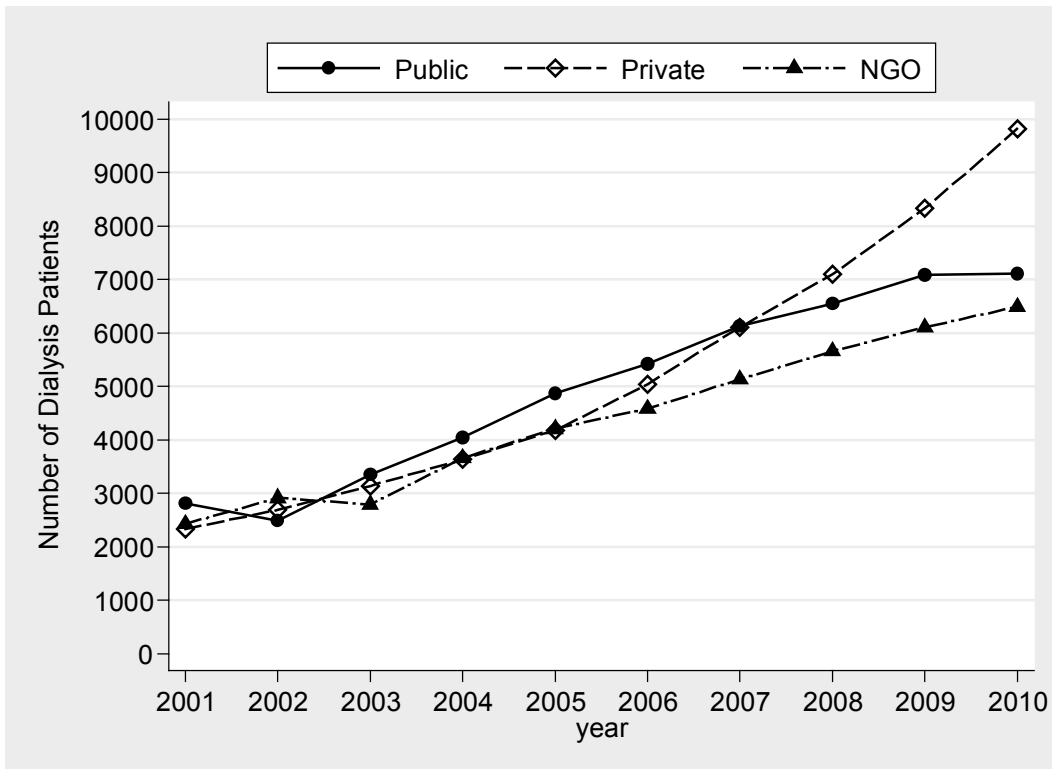
State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	2815	117	4872	184	7115	252
Malaysia	Private	2333	97	4184	158	9813	347
Malaysia	NGO	2431	101	4208	159	6492	230
Malaysia	Total	7579	314	13264	501	23420	829
Perlis	Public	50	236	88	389	86	358
Perlis	Private	-	-	-	-	-	-
Perlis	NGO	-	-	12	53	41	171
Perlis	Total	50	236	100	442	127	529
Kedah	Public	178	104	280	152	416	212
Kedah	Private	111	65	268	145	606	308
Kedah	NGO	85	50	178	97	263	134
Kedah	Total	374	218	726	394	1285	653
Kedah & Perlis	Public	228	119	368	178	502	227
Kedah & Perlis	Private	111	58	268	130	606	275
Kedah & Perlis	NGO	85	44	190	92	304	138
Kedah & Perlis	Total	424	220	826	399	1412	640
Pulau Pinang	Public	203	148	280	187	413	260
Pulau Pinang	Private	428	312	558	372	911	574
Pulau Pinang	NGO	187	136	412	274	679	428
Pulau Pinang	Total	818	596	1250	833	2003	1262
Perak	Public	235	110	356	155	511	208
Perak	Private	333	156	593	258	1278	519
Perak	NGO	213	100	410	178	634	258
Perak	Total	781	365	1359	591	2423	985
Selangor & WP Putrajaya	Public	231	54	547	115	919	180
Selangor & WP Putrajaya	Private	407	94	944	199	2302	451
Selangor & WP Putrajaya	NGO	363	84	753	159	1093	214
Selangor & WP Putrajaya	Total	1001	232	2244	474	4314	845
WP Kuala Lumpur	Public	510	348	712	440	599	348
WP Kuala Lumpur	Private	459	314	660	408	1017	590
WP Kuala Lumpur	NGO	415	284	462	285	721	419
WP Kuala Lumpur	Total	1384	946	1834	1132	2337	1357
Selangor & WP Putrajaya & WP KL	Public	741	128	1259	198	1518	222
Selangor & WP Putrajaya & WP KL	Private	866	150	1604	252	3319	486
Selangor & WP Putrajaya & WP KL	NGO	778	135	1215	191	1814	266
Selangor & WP Putrajaya & WP KL	Total	2385	413	4078	641	6651	974

**Table 2.2.5:** Number and Prevalence Rate of Dialysis Patients (HD & PD) in Malaysia by State and Sector, 2001-2010 (cont'd.)

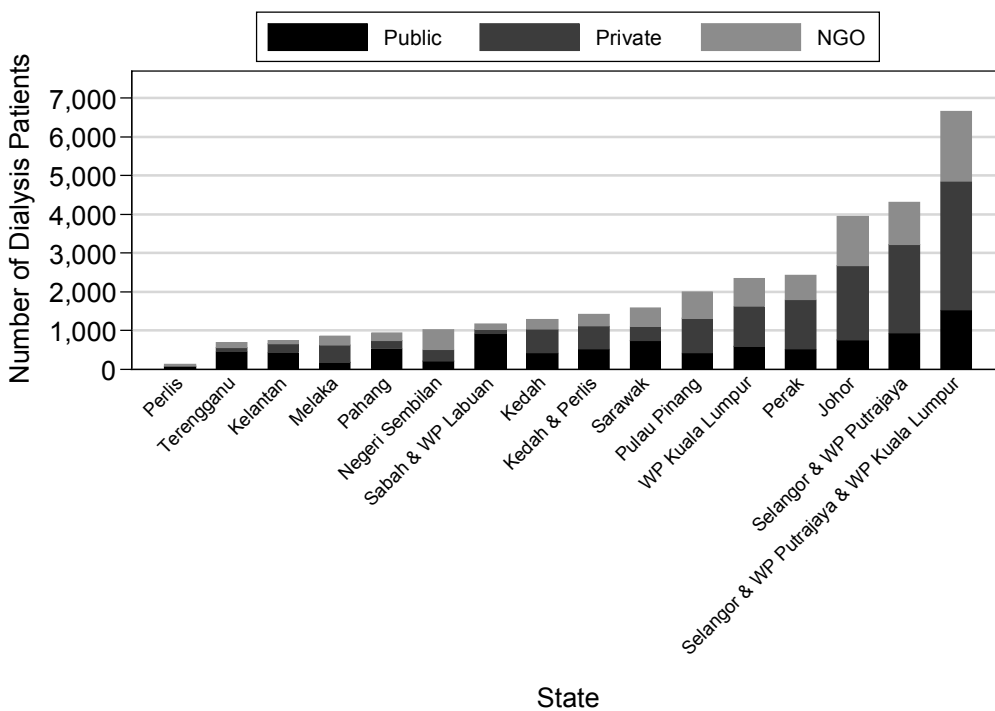
State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Negeri Sembilan	Public	146	164	222	232	207	205
Negeri Sembilan	Private	12	14	53	55	287	284
Negeri Sembilan	NGO	148	167	365	382	519	513
Negeri Sembilan	Total	306	345	640	669	1013	1001
Melaka	Public	72	108	128	177	175	227
Melaka	Private	113	170	221	306	455	590
Melaka	NGO	186	280	237	328	223	289
Melaka	Total	371	558	586	810	853	1106
Johor	Public	356	125	621	199	757	229
Johor	Private	258	91	544	175	1919	580
Johor	NGO	593	208	928	298	1268	384
Johor	Total	1207	423	2093	671	3944	1193
Pahang	Public	110	83	277	191	532	342
Pahang	Private	38	29	39	27	210	135
Pahang	NGO	46	35	75	52	202	130
Pahang	Total	194	146	391	270	944	607
Terengganu	Public	138	150	269	273	445	424
Terengganu	Private	-	-	17	17	117	111
Terengganu	NGO	32	35	48	49	125	119
Terengganu	Total	170	184	334	339	687	654
Kelantan	Public	101	72	263	172	424	254
Kelantan	Private	44	31	100	65	238	142
Kelantan	NGO	20	14	36	24	77	46
Kelantan	Total	165	118	399	261	739	442
Sabah & WP Labuan	Public	266	98	444	140	898	271
Sabah & WP Labuan	Private	4	1	13	4	119	36
Sabah & WP Labuan	NGO	30	11	74	23	146	44
Sabah & WP Labuan	Total	300	110	531	168	1163	351
Sarawak	Public	219	103	385	165	733	292
Sarawak	Private	126	59	174	75	354	141
Sarawak	NGO	113	53	218	94	501	200
Sarawak	Total	458	215	777	334	1588	634

PMP = per million population

**Figure 2.2.5(a):** Number of Dialysis Patients (HD+PD) in Malaysia by Sector from 2001-2010



**Figure 2.2.5(b):** Number of Dialysis Patients (HD&PD) in Malaysia by State and Sector in 2010



**Table 2.2.6:** Number and Prevalence Rate of Hemodialysis Patients in Malaysia by State and Sector, 2001-2010

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	2042	85	3668	139	5375	190
Malaysia	Private	2328	97	4170	157	9772	346
Malaysia	NGO	2431	101	4208	159	6492	230
Malaysia	Total	6801	282	12046	455	21639	766
Perlis	Public	50	236	88	389	86	358
Perlis	Private	-	-	-	-	-	-
Perlis	NGO	-	-	12	53	41	171
Perlis	Total	50	236	100	442	127	529
Kedah	Public	178	104	280	152	378	192
Kedah	Private	111	65	268	145	606	308
Kedah	NGO	85	50	178	97	263	134
Kedah	Total	374	218	726	394	1247	634
Kedah & Perlis	Public	228	119	368	178	464	210
Kedah & Perlis	Private	111	58	268	130	606	275
Kedah & Perlis	NGO	85	44	190	92	304	138
Kedah & Perlis	Total	424	220	826	399	1374	623
Pulau Pinang	Public	103	75	158	105	213	134
Pulau Pinang	Private	427	311	558	372	911	574
Pulau Pinang	NGO	187	136	412	274	679	428
Pulau Pinang	Total	717	523	1128	751	1803	1136
Perak	Public	192	90	314	136	419	170
Perak	Private	332	155	591	257	1278	519
Perak	NGO	213	100	410	178	634	258
Perak	Total	737	344	1315	572	2331	947
Selangor & WP Putrajaya	Public	179	41	437	92	514	101
Selangor & WP Putrajaya	Private	405	94	944	199	2301	451
Selangor & WP Putrajaya	NGO	363	84	753	159	1093	214
Selangor & WP Putrajaya	Total	947	219	2134	450	3908	766
WP Kuala Lumpur	Public	189	129	290	179	250	145
WP Kuala Lumpur	Private	459	314	660	408	1017	590
WP Kuala Lumpur	NGO	415	284	462	285	721	419
WP Kuala Lumpur	Total	1063	726	1412	872	1988	1154
Selangor & WP Putrajaya & WP KL	Public	368	64	727	114	764	112
Selangor & WP Putrajaya & WP KL	Private	864	149	1604	252	3318	486
Selangor & WP Putrajaya & WP KL	NGO	778	135	1215	191	1814	266
Selangor & WP Putrajaya & WP KL	Total	2010	348	3546	558	5896	864
Negeri Sembilan	Public	82	92	159	166	189	187
Negeri Sembilan	Private	12	14	53	55	287	284
Negeri Sembilan	NGO	148	167	365	382	519	513
Negeri Sembilan	Total	242	273	577	603	995	983
Melaka	Public	71	107	97	134	128	166
Melaka	Private	113	170	219	303	454	588
Melaka	NGO	186	280	237	328	223	289
Melaka	Total	370	556	553	765	805	1043

**Table 2.2.6:** Number and Prevalence Rate of Hemodialysis Patients in Malaysia by State and Sector, 2001-2010 (cont'd.)

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Johor	Public	252	88	438	141	612	185
Johor	Private	258	91	534	171	1884	570
Johor	NGO	593	208	928	298	1268	384
Johor	Total	1103	387	1900	610	3764	1139
Pahang	Public	102	77	240	166	452	291
Pahang	Private	38	29	39	27	210	135
Pahang	NGO	46	35	75	52	202	130
Pahang	Total	186	140	354	245	864	556
Terengganu	Public	96	104	206	209	317	302
Terengganu	Private	-	-	17	17	117	111
Terengganu	NGO	32	35	48	49	125	119
Terengganu	Total	128	139	271	275	559	532
Kelantan	Public	93	66	228	149	354	212
Kelantan	Private	44	31	100	65	238	142
Kelantan	NGO	20	14	36	24	77	46
Kelantan	Total	157	112	364	238	669	400
Sabah & WP Labuan	Public	245	90	396	125	815	246
Sabah & WP Labuan	Private	3	1	13	4	119	36
Sabah & WP Labuan	NGO	30	11	74	23	146	44
Sabah & WP Labuan	Total	278	102	483	153	1080	326
Sarawak	Public	210	99	337	145	648	259
Sarawak	Private	126	59	174	75	350	140
Sarawak	NGO	113	53	218	94	501	200
Sarawak	Total	449	211	729	313	1499	598

PMP = per million population

**Table 2.2.7:** Number and Prevalence Rate of PD Patients in Malaysia by State and Sector, 2001-2010

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	773	32	1204	45	1740	62
Malaysia	Private	5	0	14	1	41	1
Malaysia	NGO	-	-	-	-	-	-
Malaysia	Total	778	32	1218	46	1781	63
Perlis	Public	-	-	-	-	-	-
Perlis	Private	-	-	-	-	-	-
Perlis	NGO	-	-	-	-	-	-
Perlis	Total	-	-	-	-	-	-
Kedah	Public	-	-	-	-	38	19
Kedah	Private	-	-	-	-	-	-
Kedah	NGO	-	-	-	-	-	-
Kedah	Total	-	-	-	-	38	19
Kedah & Perlis	Public	-	-	-	-	38	17
Kedah & Perlis	Private	-	-	-	-	-	-
Kedah & Perlis	NGO	-	-	-	-	-	-
Kedah & Perlis	Total	-	-	-	-	38	17
Pulau Pinang	Public	100	73	122	81	200	126
Pulau Pinang	Private	1	1	-	-	-	-
Pulau Pinang	NGO	-	-	-	-	-	-
Pulau Pinang	Total	101	74	122	81	200	126



**Table 2.2.7:** Number and Prevalence Rate of PD Patients in Malaysia by State and Sector, 2001-2010 (cont'd.)

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Perak	Public	43	20	42	18	92	37
Perak	Private	1	0	2	1	-	-
Perak	NGO	-	-	-	-	-	-
Perak	Total	44	21	44	19	92	37
Selangor & WP Putrajaya	Public	52	12	110	23	405	79
Selangor & WP Putrajaya	Private	2	0	-	-	1	0
Selangor & WP Putrajaya	NGO	-	-	-	-	-	-
Selangor & WP Putrajaya	Total	54	13	110	23	406	80
WP Kuala Lumpur	Public	321	219	422	261	349	203
WP Kuala Lumpur	Private	-	-	-	-	-	-
WP Kuala Lumpur	NGO	-	-	-	-	-	-
WP Kuala Lumpur	Total	321	219	422	261	349	203
Selangor & WP Putrajaya & WP KL	Public	373	65	532	84	754	110
Selangor & WP Putrajaya & WP KL	Private	2	0	-	-	1	0
Selangor & WP Putrajaya & WP KL	NGO	-	-	-	-	-	-
Selangor & WP Putrajaya & WP KL	Total	375	65	532	84	755	111
Negeri Sembilan	Public	64	72	63	66	18	18
Negeri Sembilan	Private	-	-	-	-	-	-
Negeri Sembilan	NGO	-	-	-	-	-	-
Negeri Sembilan	Total	64	72	63	66	18	18
Melaka	Public	1	2	31	43	47	61
Melaka	Private	-	-	2	3	1	1
Melaka	NGO	-	-	-	-	-	-
Melaka	Total	1	2	33	46	48	62
Johor	Public	104	36	183	59	145	44
Johor	Private	-	-	10	3	35	11
Johor	NGO	-	-	-	-	-	-
Johor	Total	104	36	193	62	180	54
Pahang	Public	8	6	37	26	80	51
Pahang	Private	-	-	-	-	-	-
Pahang	NGO	-	-	-	-	-	-
Pahang	Total	8	6	37	26	80	51
Terengganu	Public	42	46	63	64	128	122
Terengganu	Private	-	-	-	-	-	-
Terengganu	NGO	-	-	-	-	-	-
Terengganu	Total	42	46	63	64	128	122
Kelantan	Public	8	6	35	23	70	42
Kelantan	Private	-	-	-	-	-	-
Kelantan	NGO	-	-	-	-	-	-
Kelantan	Total	8	6	35	23	70	42
Sabah & WP Labuan	Public	21	8	48	15	83	25
Sabah & WP Labuan	Private	1	0	-	-	-	-
Sabah & WP Labuan	NGO	-	-	-	-	-	-
Sabah & WP Labuan	Total	22	8	48	15	83	25
Sarawak	Public	9	4	48	21	85	34
Sarawak	Private	-	-	-	-	4	2
Sarawak	NGO	-	-	-	-	-	-
Sarawak	Total	9	4	48	21	89	36

PMP = per million population

HD capacity to patient ratio has decreased over the last 10 years. This decrease was best seen in the private sector. [Figure 2.2.8(a)] There is no obvious relationship noted between the economic status of the state and the HD capacity to patient ratio.

**Table 2.2.8:** HD Capacity to Patient Ratio among HD Centres in Malaysia by State and Sector, 2001-2010

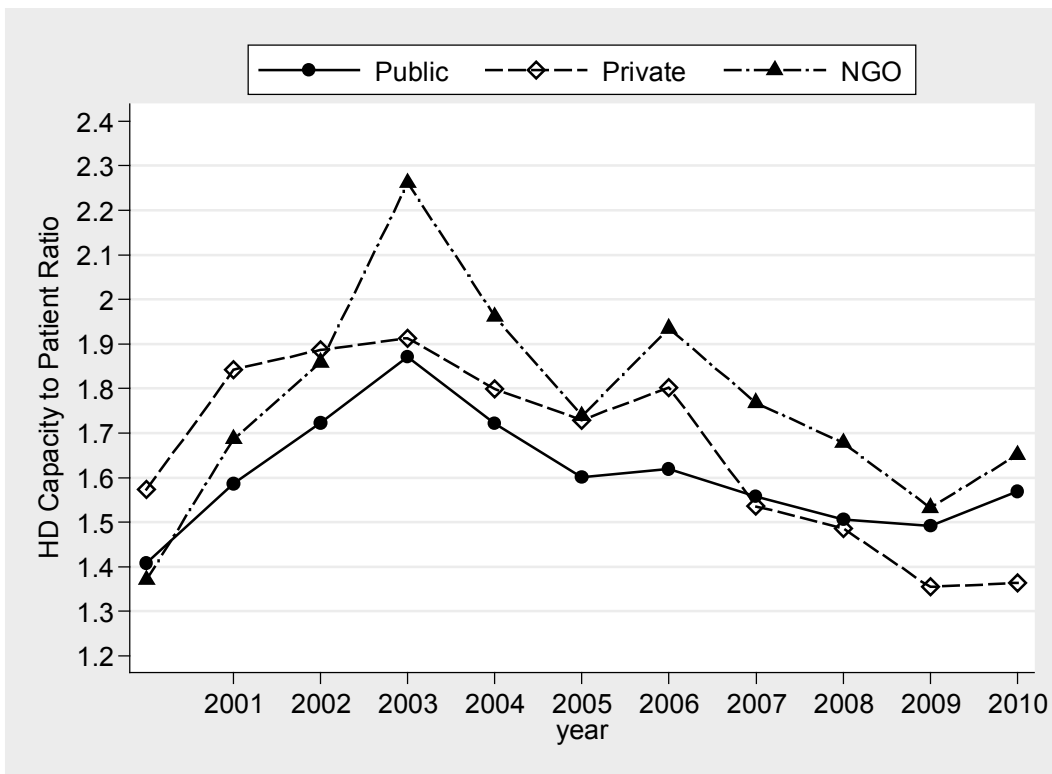
State	Sector	2001			2005			2010		
		Centre HD Capacity		HD Capacity: Patients ratio	Centre HD Capacity		HD Capacity: Patients ratio	Centre HD Capacity		HD Capacity: Patients ratio
		n (Patient)	n (Machine)		n (Patient)	n (Machine)		n (Patient)	n (Machine)	
Malaysia	Public	2042	648	1.59	3668	1174	1.6	5375	1687	1.57
Malaysia	Private	2328	858	1.84	4170	1442	1.73	9772	2665	1.36
Malaysia	NGO	2431	820	1.69	4208	1463	1.74	6492	2144	1.65
Malaysia	Total	6801	2326	1.71	12046	4079	1.69	21639	6496	1.5
Perlis	Public	50	15	1.5	88	25	1.42	86	32	1.86
Perlis	Private	-	-	-	-	-	-	-	-	-
Perlis	NGO	-	-	-	12	10	4.17	41	15	1.83
Perlis	Total	50	15	1.5	100	35	1.75	127	47	1.85
Kedah	Public	178	50	1.4	280	82	1.46	378	110	1.46
Kedah	Private	111	50	2.25	268	122	2.28	606	164	1.35
Kedah	NGO	85	27	1.59	178	63	1.77	263	81	1.54
Kedah	Total	374	127	1.7	726	267	1.84	1247	355	1.42
Kedah & Perlis	Public	228	65	1.43	368	107	1.45	464	142	1.53
Kedah & Perlis	Private	111	50	2.25	268	122	2.28	606	164	1.35
Kedah & Perlis	NGO	85	27	1.59	190	73	1.92	304	96	1.58
Kedah & Perlis	Total	424	142	1.67	826	302	1.83	1374	402	1.46
Pulau Pinang	Public	103	49	2.38	158	57	1.8	213	93	2.18
Pulau Pinang	Private	427	150	1.76	558	182	1.63	911	276	1.51
Pulau Pinang	NGO	187	79	2.11	412	143	1.74	679	249	1.83
Pulau Pinang	Total	717	278	1.94	1128	382	1.69	1803	618	1.71
Perak	Public	192	62	1.61	314	126	2.01	419	171	2.04
Perak	Private	332	141	2.12	591	188	1.59	1278	309	1.21
Perak	NGO	213	71	1.67	410	160	1.95	634	205	1.62
Perak	Total	737	274	1.86	1315	474	1.8	2331	685	1.47
Selangor & WP Putrajaya	Public	179	75	2.09	437	148	1.69	514	205	1.99
Selangor & WP Putrajaya	Private	405	151	1.86	944	302	1.6	2301	669	1.45
Selangor & WP Putrajaya	NGO	363	129	1.78	753	301	2	1093	391	1.79
Selangor & WP Putrajaya	Total	947	355	1.87	2134	751	1.76	3908	1265	1.62
WP Kuala Lumpur	Public	189	81	2.14	290	80	1.38	250	100	2
WP Kuala Lumpur	Private	459	151	1.64	660	238	1.8	1017	314	1.54
WP Kuala Lumpur	NGO	415	98	1.18	462	147	1.59	721	237	1.64
WP Kuala Lumpur	Total	1063	330	1.55	1412	465	1.65	1988	651	1.64
Selangor & WP Putrajaya & WP KL	Public	368	156	2.12	727	228	1.57	764	305	2
Selangor & WP Putrajaya & WP KL	Private	864	302	1.75	1604	540	1.68	3318	983	1.48
Selangor & WP Putrajaya & WP KL	NGO	778	227	1.46	1215	448	1.84	1814	628	1.73
Selangor & WP Putrajaya & WP KL	Total	2010	685	1.7	3546	1216	1.71	5896	1916	1.62

**Table 2.2.8:** HD Capacity to Patient Ratio among HD Centres in Malaysia by State and Sector, 2001-2010 (cont'd.)

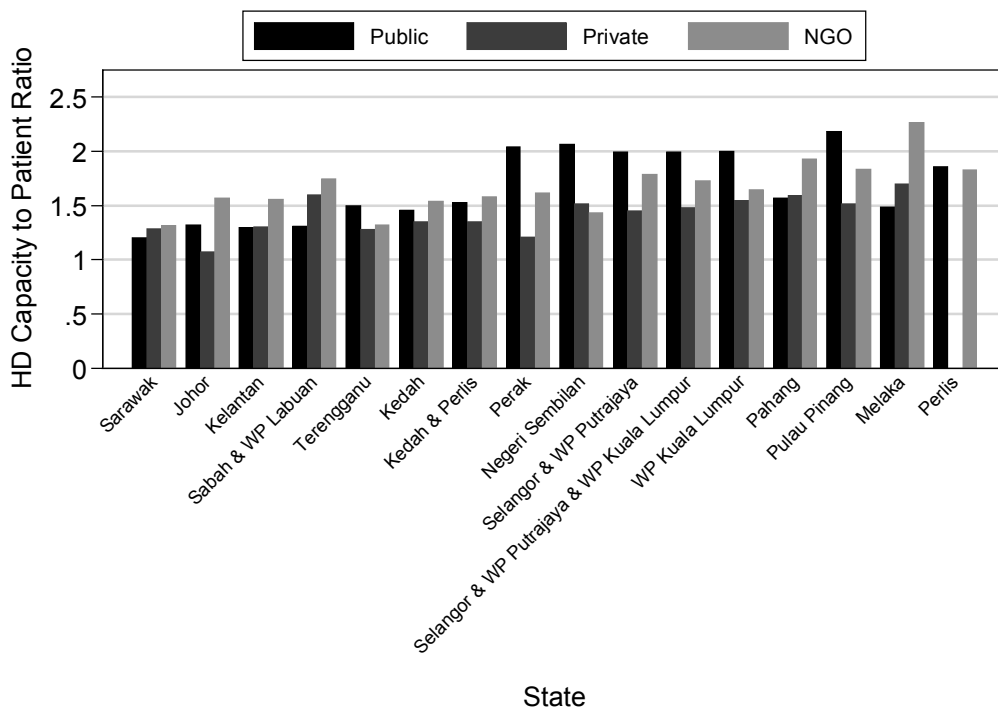
State	Sector	2001			2005			2010		
		Centre HD Capacity		HD Capacity: Patients ratio	Centre HD Capacity		HD Capacity: Patients ratio	Centre HD Capacity		HD Capacity: Patients ratio
		n (Patient)	n (Machine)		n (Patient)	n (Machine)		n (Patient)	n (Machine)	
Negeri Sembilan	Public	82	23	1.4	159	43	1.35	189	78	2.06
Negeri Sembilan	Private	12	10	4.17	53	14	1.32	287	87	1.52
Negeri Sembilan	NGO	148	48	1.62	365	79	1.08	519	149	1.44
Negeri Sembilan	Total	242	81	1.67	577	136	1.18	995	314	1.58
Melaka	Public	71	22	1.55	97	29	1.49	128	38	1.48
Melaka	Private	113	48	2.12	219	76	1.74	454	154	1.7
Melaka	NGO	186	77	2.07	237	86	1.81	223	101	2.26
Melaka	Total	370	147	1.99	553	191	1.73	805	293	1.82
Johor	Public	252	64	1.27	438	121	1.38	612	162	1.32
Johor	Private	258	82	1.59	534	192	1.8	1884	405	1.07
Johor	NGO	593	198	1.67	928	314	1.69	1268	398	1.57
Johor	Total	1103	344	1.56	1900	627	1.65	3764	965	1.28
Pahang	Public	102	26	1.27	240	93	1.94	452	142	1.57
Pahang	Private	38	8	1.05	39	16	2.05	210	67	1.6
Pahang	NGO	46	18	1.96	75	32	2.13	202	78	1.93
Pahang	Total	186	52	1.4	354	141	1.99	864	287	1.66
Terengganu	Public	96	30	1.56	206	53	1.29	317	95	1.5
Terengganu	Private	-	-	-	17	7	2.06	117	30	1.28
Terengganu	NGO	32	12	1.88	48	19	1.98	125	33	1.32
Terengganu	Total	128	42	1.64	271	79	1.46	559	158	1.41
Kelantan	Public	93	39	2.1	228	67	1.47	354	92	1.3
Kelantan	Private	44	24	2.73	100	40	2	238	62	1.3
Kelantan	NGO	20	10	2.5	36	10	1.39	77	24	1.56
Kelantan	Total	157	73	2.32	364	117	1.61	669	178	1.33
Sabah & WP Labuan	Public	245	57	1.16	396	143	1.81	815	213	1.31
Sabah & WP Labuan	Private	3	5	8.33	13	9	3.46	119	38	1.6
Sabah & WP Labuan	NGO	30	16	2.67	74	28	1.89	146	51	1.75
Sabah & WP Labuan	Total	278	78	1.4	483	180	1.86	1080	302	1.4
Sarawak	Public	210	55	1.31	337	107	1.59	648	156	1.2
Sarawak	Private	126	38	1.51	174	56	1.61	350	90	1.29
Sarawak	NGO	113	37	1.64	218	71	1.63	501	132	1.32
Sarawak	Total	449	130	1.45	729	234	1.6	1499	378	1.26

PMP = per million population

**Figure 2.2.8(a):** HD Capacity to Patient Ratio among HD Centres in Malaysia, 2001-2010



**Figure 2.2.8(b):** HD Capacity to Patient Ratio among HD Centres in Malaysia by State and sector 2010



### 2.2.2: Manpower in Dialysis Centres

The number of registered dialysis nurses/medical technicians in Malaysia increased from 966 (40 per million population) in 2001 to 2138 (76 pmp) in 2010. However, this increase was mainly seen in the public and private sector [Figure 2.2.9(a)]. Overall, the public sector had consistently higher dialysis technician/nurse to population ratio followed by the private sector. Despite its gradual improvement, the NGO sector continue to have the lowest dialysis staff to population ratio compared to the other two sectors.

In contrast to the national average, the private dialysis centres in Pulau Pinang, Perak, Selangor and Kuala Lumpur, Melaka and Johor had the highest dialysis staff to population ratio. These are the states where at least half of HD patients were found in private centres.

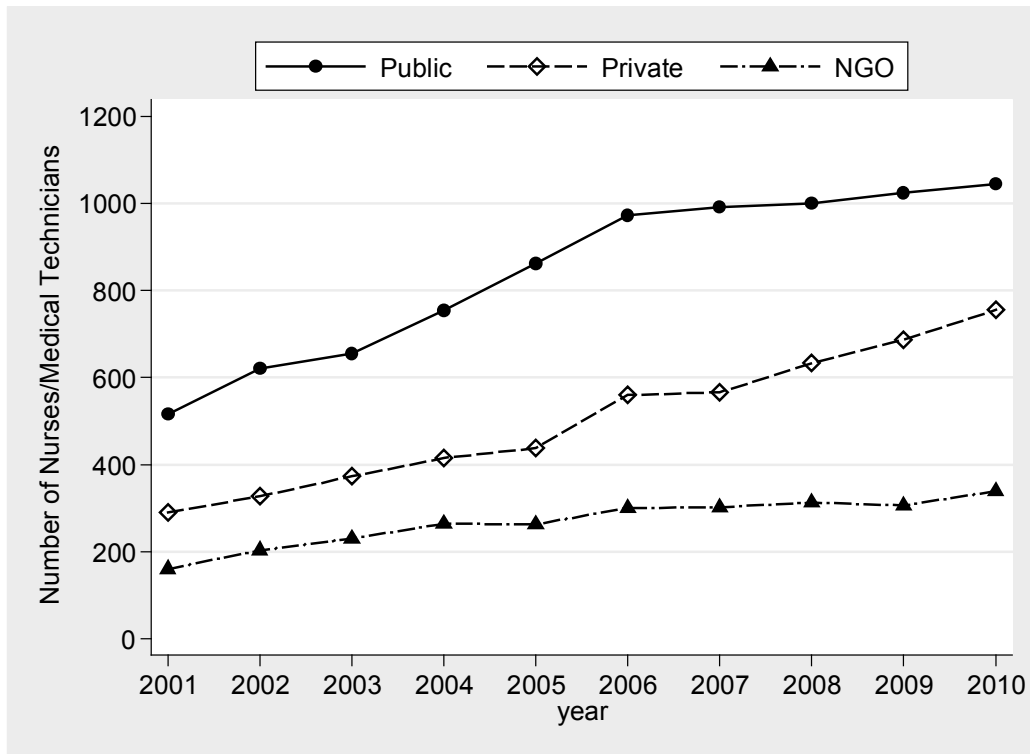
**Table 2.2.9:** Number & density of Registered Dialysis Nurses/ Medical technicians in Malaysia by State and Sector, 2001-2010

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	516	21	862	33	1044	37
Malaysia	Private	290	12	438	17	755	27
Malaysia	NGO	160	7	263	10	339	12
Malaysia	Total	966	40	1563	59	2138	76
Perlis	Public	10	47	12	53	11	46
Perlis	Private	-	-	-	-	-	-
Perlis	NGO	-	-	4	18	6	25
Perlis	Total	10	47	16	71	17	71
Kedah	Public	51	30	61	33	70	36
Kedah	Private	20	12	36	20	53	27
Kedah	NGO	8	5	12	7	13	7
Kedah	Total	79	46	109	59	136	69
Kedah & Perlis	Public	61	32	73	35	81	37
Kedah & Perlis	Private	20	10	36	17	53	24
Kedah & Perlis	NGO	8	4	16	8	19	9
Kedah & Perlis	Total	89	46	125	60	153	69
Pulau Pinang	Public	31	23	50	33	67	42
Pulau Pinang	Private	50	36	60	40	88	55
Pulau Pinang	NGO	20	15	34	23	54	34
Pulau Pinang	Total	101	74	144	96	209	132
Perak	Public	39	18	82	36	90	37
Perak	Private	33	15	42	18	59	24
Perak	NGO	10	5	16	7	23	9
Perak	Total	82	38	140	61	172	70
Selangor & WP Putrajaya	Public	61	14	86	18	115	23
Selangor & WP Putrajaya	Private	66	15	110	23	230	45
Selangor & WP Putrajaya	NGO	30	7	65	14	75	15
Selangor & WP Putrajaya	Total	157	36	261	55	420	82
WP Kuala Lumpur	Public	75	51	74	46	77	45
WP Kuala Lumpur	Private	48	33	62	38	69	40
WP Kuala Lumpur	NGO	16	11	22	14	36	21
WP Kuala Lumpur	Total	139	95	158	98	182	106
Selangor & WP Putrajaya & WP KL	Public	136	24	160	25	192	28
Selangor & WP Putrajaya & WP KL	Private	114	20	172	27	299	44
Selangor & WP Putrajaya & WP KL	NGO	46	8	87	14	111	16
Selangor & WP Putrajaya & WP KL	Total	296	51	419	66	602	88

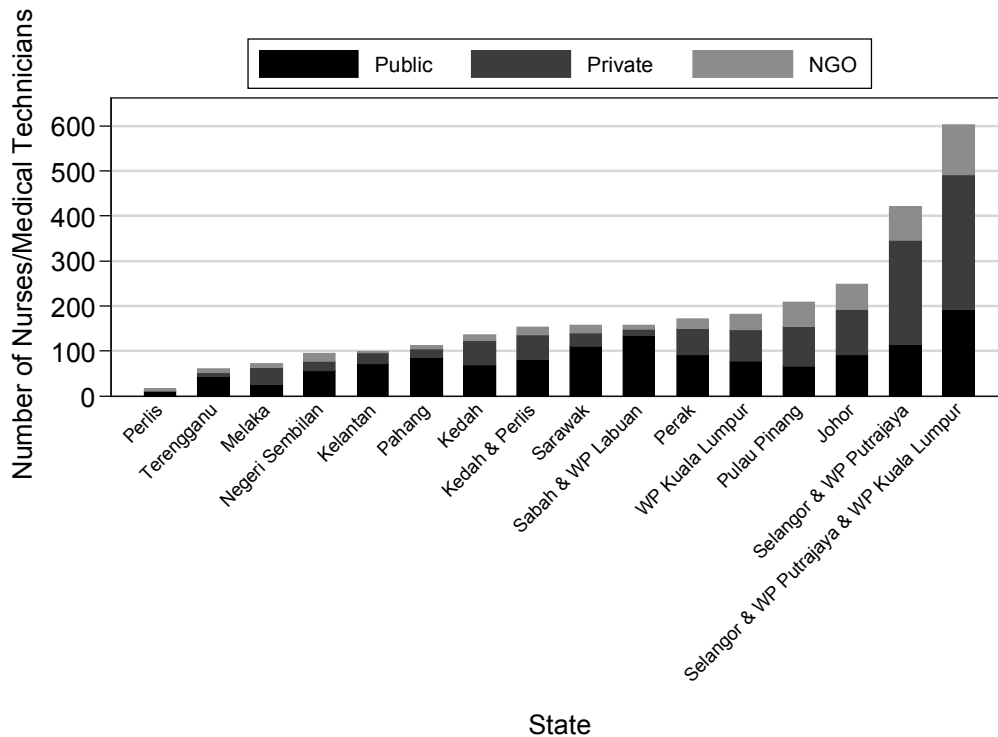
**Table 2.2.9:** Number & density of Registered Dialysis Nurses/ Medical technicians in Malaysia by State and Sector, 2001-2010 (cont'd.)

State	Sector	2001		2005		2010	
		n	pmp	n	pmp	n	pmp
Negeri Sembilan	Public	15	17	32	33	57	56
Negeri Sembilan	Private	6	7	5	5	20	20
Negeri Sembilan	NGO	8	9	13	14	18	18
Negeri Sembilan	Total	29	33	50	52	95	94
Melaka	Public	15	23	21	29	25	32
Melaka	Private	18	27	27	37	38	49
Melaka	NGO	11	17	13	18	9	12
Melaka	Total	44	66	61	84	72	93
Johor	Public	42	15	75	24	90	27
Johor	Private	25	9	52	17	102	31
Johor	NGO	34	12	50	16	56	17
Johor	Total	101	35	177	57	248	75
Pahang	Public	25	19	57	39	85	55
Pahang	Private	3	2	5	3	20	13
Pahang	NGO	4	3	7	5	7	5
Pahang	Total	32	24	69	48	112	72
Terengganu	Public	32	35	39	40	42	40
Terengganu	Private	-	-	4	4	10	10
Terengganu	NGO	3	3	5	5	9	9
Terengganu	Total	35	38	48	49	61	58
Kelantan	Public	35	25	64	42	72	43
Kelantan	Private	5	4	12	8	23	14
Kelantan	NGO	3	2	3	2	4	2
Kelantan	Total	43	31	79	52	99	59
Sabah & WP Labuan	Public	43	16	116	37	133	40
Sabah & WP Labuan	Private	5	2	8	3	14	4
Sabah & WP Labuan	NGO	5	2	8	3	11	3
Sabah & WP Labuan	Total	53	19	132	42	158	48
Sarawak	Public	42	20	93	40	110	44
Sarawak	Private	11	5	15	6	29	12
Sarawak	NGO	8	4	11	5	18	7
Sarawak	Total	61	29	119	51	157	63

**Figure 2.2.9(a):** Number of Registered Dialysis Nurses/ Medical technicians in Malaysia by Sector from 2001-2010



**Figure 2.2.9(b):** Number of Registered Dialysis Nurses/ Medical technicians in Malaysia by State and Sector in 2010



**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 genders. Since 2001, the male to female prevalent 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 very small survival advantage in female patients on dialysis.

**Table 2.3.1(a):** Dialysis Treatment Rate by Gender, per million male or female population 2001-2010

Gender	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Male	97	110	122	128	139	155	170	191	198	188
Female	88	94	95	110	111	133	143	157	163	154

**Figure 2.3.1(a) :** Dialysis Treatment Rate by Gender 2001-2010

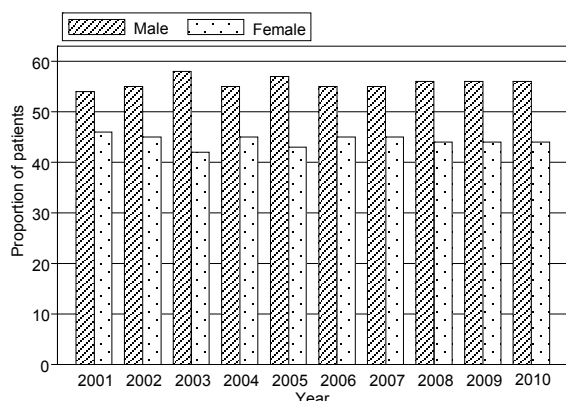


**Table 2.3.1(b):** Gender Distribution of Dialysis Patients 2001-2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
New Dialysis patients	2112	2373	2620	2891	3134	3669	4047	4548	4740	4521
% Male	54	55	58	55	57	55	55	56	56	56
% Female	46	45	42	45	43	45	45	44	44	44
Dialysing at 31 <sup>st</sup> December	7837	9102	10399	11829	13332	15046	17022	19250	21245	22932
% Male	55	55	55	55	55	55	55	55	55	55
% Female	45	45	45	45	45	45	45	45	45	45

**Figure 2.3.1(b):** Gender Distribution of Dialysis Patients 2001-2010

(i) New Dialysis patients



(ii) Dialysing patients at 31<sup>st</sup> December





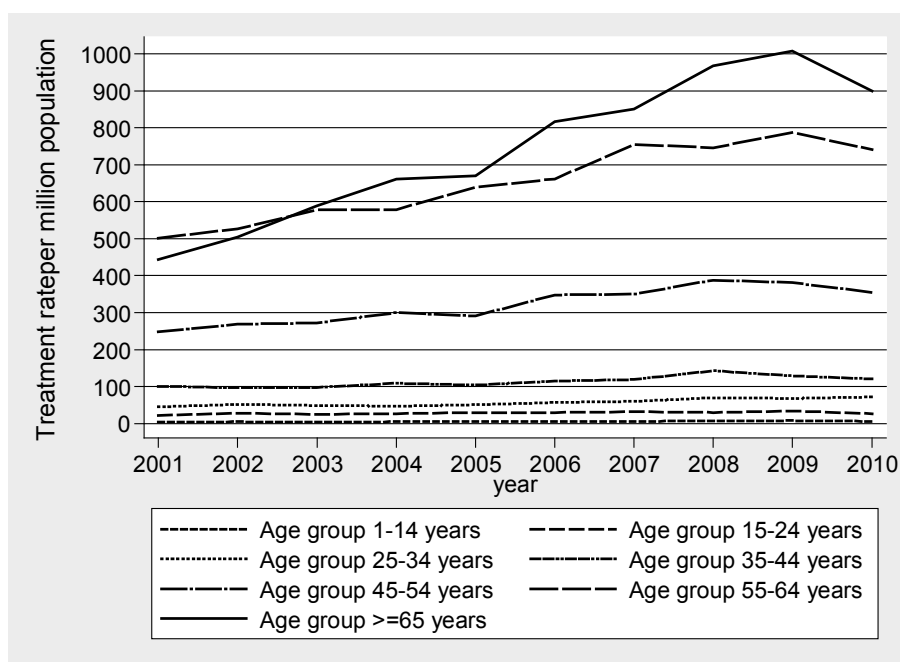
### 2.3.2: Age distribution

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 more than 1000 per million age related population in 2009 (Table 2.3.2 (a)). 55% of new dialysis patients were at least 55 years old at the onset of dialysis.

**Table 2.3.2(a):** Dialysis Treatment Rate by Age Group, per million age group population 2001-2010

Age groups (years)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
≤14	4	5	4	5	6	5	6	7	8	6
15-24	22	28	25	27	30	30	32	30	34	27
25-34	45	52	49	47	51	57	60	70	68	72
35-44	101	97	98	109	104	115	119	143	129	121
45-54	248	269	272	300	291	348	350	388	381	355
55-64	502	527	578	579	639	662	755	746	787	741
≥ 65	444	505	588	661	670	816	851	967	1007	899

**Figure 2.3.2(a):** Dialysis Treatment Rate by Age Group 2001-2010



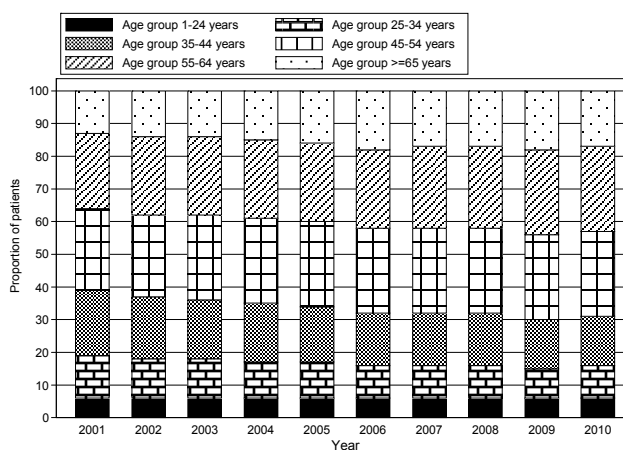
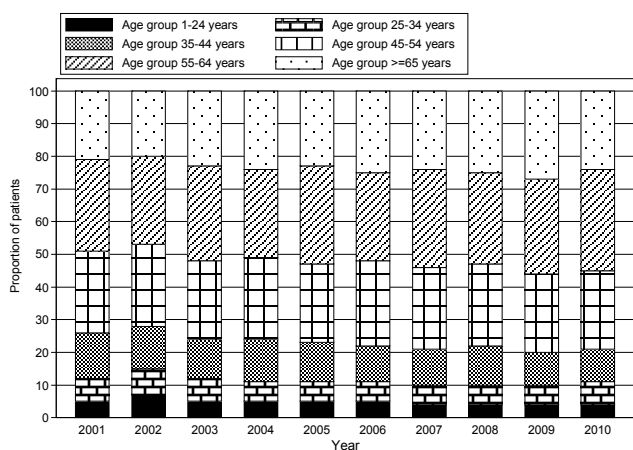
**Table 2.3.2:** Percentage Age Distribution of Dialysis Patients 2001-2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
New Dialysis patients	2112	2373	2620	2891	3134	3669	4047	4548	4740	4521
% 1-14 years	1	2	1	1	1	1	1	1	1	1
% 15-24 years	4	5	4	4	4	4	3	3	3	3
% 25-34 years	7	8	7	6	6	6	6	6	6	7
% 35-44 years	14	13	12	13	12	11	11	12	10	10
% 45-54 years	25	25	24	25	24	26	25	25	24	24
% 55-64 years	28	27	29	27	30	27	30	28	29	31
% ≥65 years	21	20	23	24	23	25	24	25	27	24
Dialysing at 31 <sup>st</sup> December	7837	9102	10399	11829	13332	15046	17022	19250	21245	22932
% 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	13	12	12	11	11	10	10	10	9	10
% 35-44 years	20	19	18	18	17	16	16	16	15	15
% 45-54 years	25	25	26	26	26	26	26	26	26	26
% 55-64 years	23	24	24	24	24	24	25	25	26	26
% ≥65 years	13	14	14	15	16	18	17	17	18	17

**Figure 2.3.2(b):** Age Distribution of New Dialysis Patients 2001-2010

(i) New Dialysis Patients

(ii) Dialysing patients at 31<sup>st</sup> December



### 2.3.3: Method and Location of dialysis

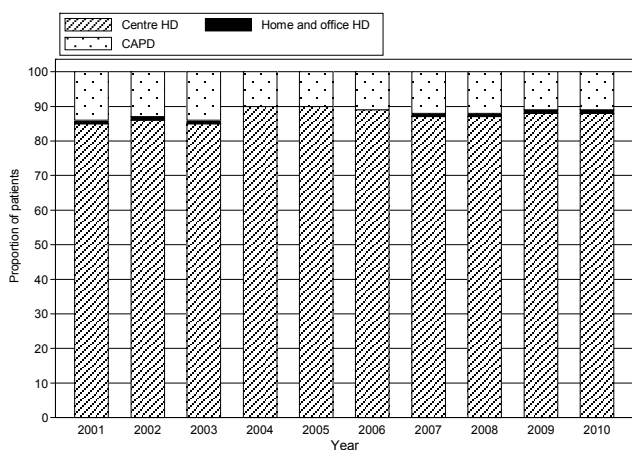
88% of new patients were accepted into centre haemodialysis program in 2009/2010. Despite the conscious effort by the Ministry of Health to utilize PD first, the proportion of new patients accepted into chronic PD program has remained about 11-12% and only accounted for 8% of prevalent dialysis patients. This is due to a small number of PD patients in the private sector and none in the NGO sector. 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 2001-2010

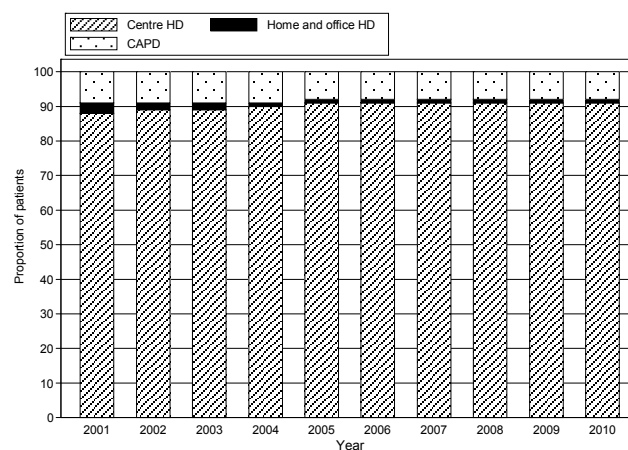
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
New Dialysis patients	2112	2373	2620	2891	3134	3669	4047	4548	4740	4521
% Centre HD	85	86	85	90	90	89	87	87	88	88
% Home and office HD	1	1	1	0	0	0	1	1	1	1
% PD	14	13	14	10	10	11	12	12	11	11
Dialysing at 31 <sup>st</sup> December	7489	8687	9943	11272	12697	14328	16217	18326	20233	21797
% Centre HD	88	89	89	90	91	91	91	91	91	91
% Home and office HD	3	2	2	1	1	1	1	1	1	1
% PD	9	9	9	9	8	8	8	8	8	8

**Figure 2.3.3:** Method and Location of Dialysis Patients 2001-2010

(i) New Dialysis Patients



(ii) Dialysing patients at 31<sup>st</sup> December



**2.3.4: Funding for Dialysis Treatment**

In Malaysia, there are multiple sources of funding for dialysis. 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 for new and existing patients. 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. Out of pocket payment ie self-funding for dialysis was about 22 to 25%. Funding from NGO bodies has declined over the years. (Table & Figure 2.3.4)

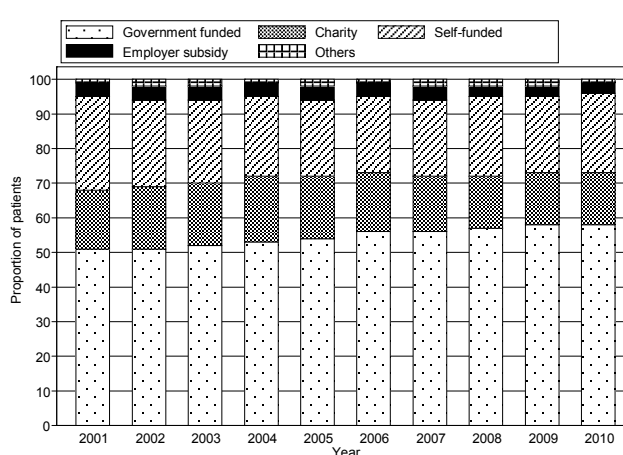
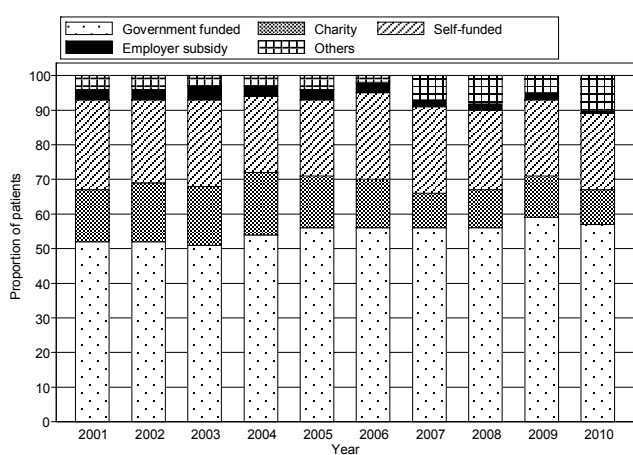
**Table 2.3.4: Funding for Dialysis Treatment 2001-2010**

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
New Dialysis patients	2112	2373	2620	2891	3134	3669	4047	4548	4740	4521
% by Government	52	52	51	54	56	56	56	56	59	57
% by Charity	15	17	17	18	15	14	10	11	12	10
% self funded	26	24	25	22	22	25	25	23	22	22
% subsidized by Employer	3	3	4	3	3	3	2	2	2	1
% Others	4	4	3	3	4	2	7	8	5	10
Dialysing at 31 <sup>st</sup> December	7489	8687	9943	11272	12697	14328	16217	18326	20233	21797
% by Government	51	51	52	53	54	56	56	57	58	58
% by Charity	17	18	18	19	18	17	16	15	15	15
% self funded	27	25	24	23	22	22	22	23	22	23
% subsidized by Employer	4	4	4	4	4	4	4	3	3	3
% Others	1	2	2	1	2	1	2	2	2	1

**Figure 2.3.4: Funding for Dialysis Treatment 2001-2010**

(i) New Dialysis Patients

(ii) Dialysing patients at 31<sup>st</sup> December



### 2.3.5: Distribution of dialysis patients by sector

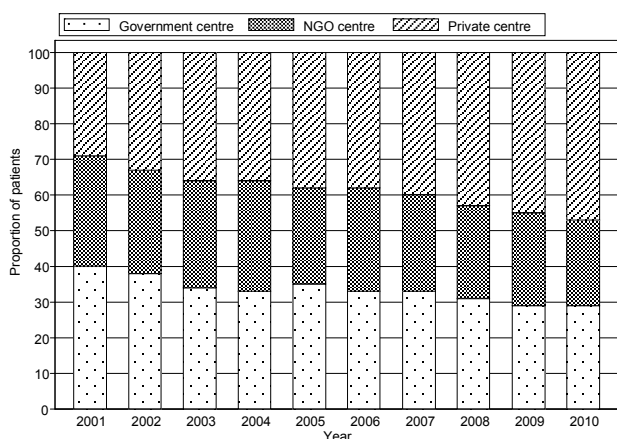
The proportion of new dialysis patients accepted into private dialysis centres continue to increase while that in MOH and NGO centres seem to show a decrease. Since 2008 the private sector is the largest provider of dialysis.

**Table 2.3.5:** Distribution of Dialysis Patients by Sector 2001-2010

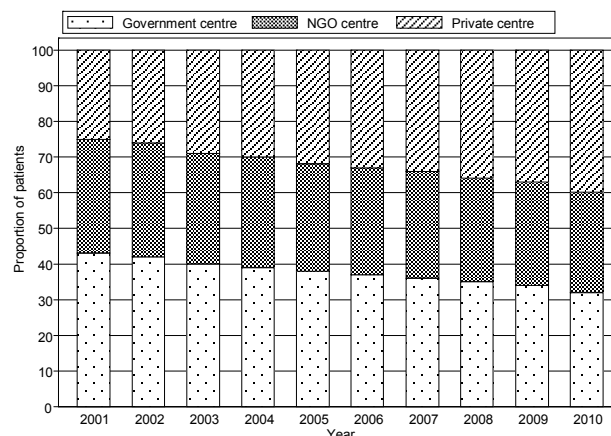
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
New Dialysis patients	2112	2373	2620	2891	3134	3669	4047	4548	4740	4521
% Government centre	40	38	34	33	35	33	33	31	29	29
% NGO centre	31	29	30	31	27	29	27	26	26	24
% Private centre	29	33	36	36	38	38	40	43	45	47
Dialysing at 31 <sup>st</sup> December	7837	9102	10399	11829	13332	15046	17022	19250	21245	22932
% Government centre	43	42	40	39	38	37	36	35	34	32
% NGO centre	32	32	31	31	30	30	30	29	29	28
% Private centre	25	26	29	30	32	33	34	36	37	40

**Figure 2.3.5:** Distribution of Dialysis Patients by Sector 2001-2010

#### (i) New Dialysis Patients



#### (ii) Dialysing patients at 31<sup>st</sup> December



## SECTION 2.4: PRIMARY RENAL DISEASE

Diabetes mellitus accounted for more than half of the primary renal disease of new dialysis patients since 2003. Glomerulonephritis was reported as the primary renal disease in only 3% of new patients. SLE on its own accounted for 1% of all new dialysis patients. The percentage of patients with unknown primary renal disease remains high despite the increase in the number of nephrologists.

**Table 2.4.1:** Primary Renal Diseases 2001-2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
New Dialysis patients	2112	2373	2620	2891	3134	3669	4047	4548	4740	4521
% Unknown cause	28	28	26	25	24	24	26	27	27	30
% Diabetes Mellitus	45	49	52	53	55	57	57	57	58	56
% GN	7	6	5	5	5	4	4	3	3	3
% SLE	2	1	1	1	1	1	1	1	1	1
% Polycystic kidney	2	1	1	1	1	1	1	1	1	1
% Obstructive Nephropathy	4	3	3	3	3	3	3	2	2	1
% Toxic Nephropathy	1	0	0	0	0	0	0	0	0	0
% Hypertension	10	9	9	10	9	8	8	8	7	8
% Others	1	3	3	2	2	2	0	1	1	0

**Figure 2.4.1:** Primary Renal Diseases for New Dialysis Patients 2001-2010

