

**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**

In 2011, 5201 new cases were reported representing an acceptance rate of 182 per million population (Tables 2.1.1 & 2.1.2). The number of dialysis patients increased to 25,688 in 2011 or a prevalence rate of 900 per million population (Tables 2.1.1 & 2.1.2). (Data for 2011 are preliminary since at the time of writing this report there were still many new patients yet to be notified to registry.)

Over the last 10 years, the acceptance rate has increased by almost two-fold and prevalence rate by nearly 2.5 fold. However over the last 5 years the year-on-year percentage rise has decreased for both acceptance rate (16% in 2006 to 4.5% in 2010) and prevalence rate (11% in 2006 and 8.5% in 2010).

**Table 2.1.1:** Stock and flow-Dialysis Patients 2002-2011

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
New Dialysis patients	2375	2627	2894	3137	3672	4064	4590	4864	5153	5201
Died	961	1214	1320	1516	1820	1986	2190	2589	2831	2811
Transplanted	143	119	158	123	121	90	111	111	103	96
Lost to Follow-up	15	15	16	19	41	21	23	53	126	143
Dialysing at 31 <sup>st</sup> December	9107	10404	11831	13337	15054	17049	19324	21446	23552	25688
Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Acceptance rate	96	104	112	118	137	149	167	174	182	182
Prevalence rate	368	411	457	504	561	627	702	769	834	900

**2.1.2 Geographic distribution**

The dialysis treatment rate exceeded 100 per million population for all states in Malaysia except Sabah. Seven economically advantaged states exceeded a dialysis treatment rate of 200 per million population. In 2010, Kuala Lumpur for the first time exceeded a dialysis treatment rate of 300 per million population (Table 2.1.3).

State	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Pulau Pinang	157	143	211	196	211	217	200	245	259	264
Melaka	173	183	206	167	197	209	230	206	242	261
Johor	146	145	155	168	214	198	254	244	235	254
Perak	115	127	148	169	187	181	205	221	237	219
Selangor & Putrajaya	110	118	124	135	155	173	181	205	225	234
WP Kuala Lumpur	168	190	201	192	211	242	254	275	301	258
Negeri Sembilan	131	145	155	157	151	218	251	269	276	269
Kedah	89	105	98	111	119	134	173	159	155	160
Perlis	102	128	94	102	127	130	141	122	137	144
Terengganu	91	67	81	104	107	180	148	156	193	177
Pahang	51	68	75	90	124	118	146	142	172	147
Kelantan	61	74	65	78	78	94	85	112	99	112
Sarawak	59	62	73	72	86	106	118	122	118	125
Sabah & WP Labuan	37	43	47	44	62	68	96	94	94	88

## 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 haemodialysis and peritoneal dialysis at the end of each year. This section reports the results of the centre survey carried out in December 2011. This survey also collects data on available manpower in the dialysis centres. 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 256 in 2002 to 447 in 2006 and 678 in 2011 giving a rate of 10 per million population (pmp) in 2002 and 24 pmp in 2011. The increase in dialysis centres were mainly contributed by the private dialysis centres which had quadrupled from 3 pmp in 2002 to 12 pmp in 2011. NGO centres had increased from 3 pmp in 2002 to 5 pmp in 2011. In contrast, the rate of growth was lowest in the public sector increasing from 4 pmp in 2002 to 6 pmp in 2006 and has remained at 6 pmp in 2011. Most of the increases in the private dialysis centres occurred in the more economically developed west coast states of Malaysian Peninsula. Public sectors still provides most of the dialysis centres in the economically disadvantage states (Table and Figures 2.2.1)

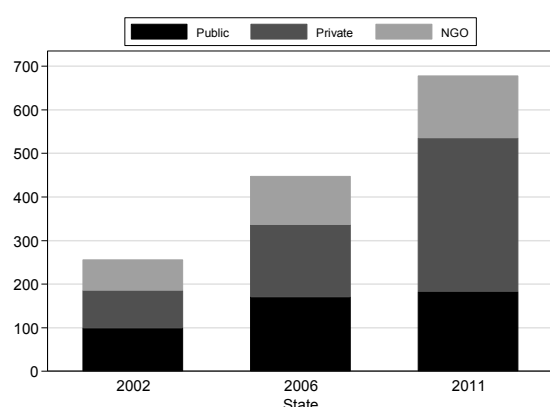
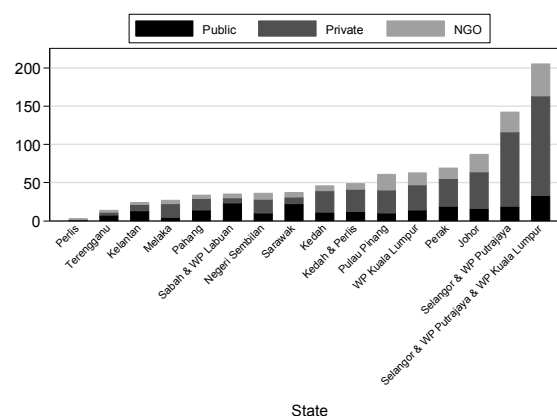
The proliferation of haemodialysis centres accounted for most of the increase in dialysis centres. PD centre rate remained at 1 pmp throughout the last 10 years while HD centres which had increased from 9 to 22 pmp over the same period. Of the 39 PD centres, 11 (28%) were private centre. There were no NGO PD centres. (Table 2.2.3)

**Table 2.2.1:** Number and density of Dialysis Centres in Malaysia by State and Sector, Year 2002 to 2011

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	99	4	170	6	183	6
Malaysia	Private	86	3	166	6	352	12
Malaysia	NGO	71	3	111	4	143	5
Malaysia	Total	256	10	447	17	678	24
Perlis	Public	1	5	1	4	1	4
Perlis	Private	-	-	-	-	1	4
Perlis	NGO	-	-	1	4	1	4
Perlis	Total	1	5	2	9	3	12
Kedah	Public	10	6	11	6	11	6
Kedah	Private	8	5	12	6	28	14
Kedah	NGO	4	2	6	3	7	4
Kedah	Total	22	13	29	16	46	23
Kedah & Perlis	Public	11	6	12	6	12	5
Kedah & Perlis	Private	8	4	12	6	29	13
Kedah & Perlis	NGO	4	2	7	3	8	4
Kedah & Perlis	Total	23	12	31	15	49	22
Pulau Pinang	Public	6	4	10	7	10	6
Pulau Pinang	Private	11	8	12	8	30	19
Pulau Pinang	NGO	10	7	16	11	21	13
Pulau Pinang	Total	27	19	38	25	61	38

**Table 2.2.1:** Number and density of Dialysis Centres in Malaysia by State and Sector, Year 2002 to 2011  
(cont)

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
Perak	Public	8	4	19	8	19	8
Perak	Private	11	5	20	9	36	14
Perak	NGO	7	3	12	5	14	6
Perak	Total	26	12	51	22	69	28
Selangor & WP Putrajaya	Public	10	2	17	4	19	4
Selangor & WP Putrajaya	Private	16	4	44	9	97	19
Selangor & WP Putrajaya	NGO	10	2	19	4	26	5
Selangor & WP Putrajaya	Total	36	8	80	17	142	28
WP Kuala Lumpur	Public	13	9	14	9	14	8
WP Kuala Lumpur	Private	16	11	23	14	33	19
WP Kuala Lumpur	NGO	8	5	12	7	16	9
WP Kuala Lumpur	Total	37	25	49	30	63	36
Selangor & WP Putrajaya & WP KL	Public	23	4	31	5	33	5
Selangor & WP Putrajaya & WP KL	Private	32	5	67	10	130	19
Selangor & WP Putrajaya & WP KL	NGO	18	3	31	5	42	6
Selangor & WP Putrajaya & WP KL	Total	73	12	129	20	205	30
Negeri Sembilan	Public	4	4	8	8	10	10
Negeri Sembilan	Private	2	2	5	5	18	18
Negeri Sembilan	NGO	3	3	5	5	8	8
Negeri Sembilan	Total	9	10	18	19	36	35
Melaka	Public	3	4	4	5	4	5
Melaka	Private	5	7	10	14	18	23
Melaka	NGO	3	4	3	4	5	6
Melaka	Total	11	16	17	23	27	35
Johor	Public	9	3	16	5	16	5
Johor	Private	9	3	25	8	48	14
Johor	NGO	16	5	21	7	23	7
Johor	Total	34	12	62	20	87	26
Pahang	Public	5	4	12	8	14	9
Pahang	Private	1	1	2	1	15	10
Pahang	NGO	2	1	4	3	5	3
Pahang	Total	8	6	18	12	34	22
Terengganu	Public	5	5	6	6	7	7
Terengganu	Private	-	-	2	2	4	4
Terengganu	NGO	1	1	2	2	3	3
Terengganu	Total	6	6	10	10	14	13
Kelantan	Public	8	6	12	8	13	8
Kelantan	Private	2	1	4	3	8	5
Kelantan	NGO	1	1	2	1	3	2
Kelantan	Total	11	8	18	12	24	14
Sabah & WP Labuan	Public	8	3	20	6	23	7
Sabah & WP Labuan	Private	2	1	2	1	7	2
Sabah & WP Labuan	NGO	3	1	4	1	5	2
Sabah & WP Labuan	Total	13	5	26	8	35	11
Sarawak	Public	9	4	20	8	22	9
Sarawak	Private	3	1	5	2	9	4
Sarawak	NGO	3	1	4	2	6	2
Sarawak	Total	15	7	29	12	37	15

**Figure 2.2.1(a):** Number of Dialysis Centre in Malaysia by Sector, 2002 to 2011**Figure 2.2.1(b):** Number of Dialysis Centre in Malaysia by State and Sector in 2011**Table 2.2.2:** Number and density of HD centres in Malaysia by State and Sector, 2002-2011

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	82	3	145	5	155	5
Malaysia	Private	81	3	162	6	341	12
Malaysia	NGO	70	3	111	4	143	5
Malaysia	Total	233	9	418	16	639	22
Perlis	Public	1	5	1	4	1	4
Perlis	Private	-	-	-	-	1	4
Perlis	NGO	-	-	1	4	1	4
Perlis	Total	1	5	2	9	3	12
Kedah	Public	10	6	10	5	10	5
Kedah	Private	8	5	12	6	28	14
Kedah	NGO	4	2	6	3	7	4
Kedah	Total	22	13	28	15	45	23
Kedah & Perlis	Public	11	6	11	5	11	5
Kedah & Perlis	Private	8	4	12	6	29	13
Kedah & Perlis	NGO	4	2	7	3	8	4
Kedah & Perlis	Total	23	12	30	14	48	21
Pulau Pinang	Public	5	4	8	5	8	5
Pulau Pinang	Private	10	7	12	8	29	18
Pulau Pinang	NGO	10	7	16	11	21	13
Pulau Pinang	Total	25	18	36	24	58	36
Perak	Public	7	3	17	7	17	7
Perak	Private	10	5	19	8	35	14
Perak	NGO	7	3	12	5	14	6
Perak	Total	24	11	48	21	66	26
Selangor & WP Putrajaya	Public	8	2	14	3	15	3
Selangor & WP Putrajaya	Private	15	3	43	9	96	19
Selangor & WP Putrajaya	NGO	9	2	19	4	26	5
Selangor & WP Putrajaya	Total	32	7	76	16	137	27
WP Kuala Lumpur	Public	9	6	10	6	10	6
WP Kuala Lumpur	Private	15	10	23	14	31	18
WP Kuala Lumpur	NGO	8	5	12	7	16	9
WP Kuala Lumpur	Total	32	21	45	27	57	33

**Table 2.2.2:** Number and density of HD centres in Malaysia by State and Sector, 2002-2011 (*cont*)

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
Selangor & WP Putrajaya & WP KL	Public	17	3	24	4	25	4
Selangor & WP Putrajaya & WP KL	Private	30	5	66	10	127	18
Selangor & WP Putrajaya & WP KL	NGO	17	3	31	5	42	6
Selangor & WP Putrajaya & WP KL	Total	64	11	121	19	194	28
Negeri Sembilan	Public	3	3	6	6	8	8
Negeri Sembilan	Private	2	2	5	5	18	18
Negeri Sembilan	NGO	3	3	5	5	8	8
Negeri Sembilan	Total	8	9	16	17	34	33
Melaka	Public	2	3	3	4	3	4
Melaka	Private	5	7	9	12	17	22
Melaka	NGO	3	4	3	4	5	6
Melaka	Total	10	15	15	20	25	32
Johor	Public	8	3	13	4	13	4
Johor	Private	9	3	24	8	45	13
Johor	NGO	16	5	21	7	23	7
Johor	Total	33	11	58	18	81	24
Pahang	Public	4	3	10	7	12	8
Pahang	Private	1	1	2	1	15	10
Pahang	NGO	2	1	4	3	5	3
Pahang	Total	7	5	16	11	32	21
Terengganu	Public	4	4	5	5	6	6
Terengganu	Private	-	-	2	2	4	4
Terengganu	NGO	1	1	2	2	3	3
Terengganu	Total	5	5	9	9	13	12
Kelantan	Public	6	4	10	6	11	6
Kelantan	Private	2	1	4	3	8	5
Kelantan	NGO	1	1	2	1	3	2
Kelantan	Total	9	6	16	10	22	13
Sabah & WP Labuan	Public	7	2	19	6	20	6
Sabah & WP Labuan	Private	1	0	2	1	6	2
Sabah & WP Labuan	NGO	3	1	4	1	5	2
Sabah & WP Labuan	Total	11	4	25	8	31	10
Sarawak	Public	8	4	19	8	21	8
Sarawak	Private	3	1	5	2	8	3
Sarawak	NGO	3	1	4	2	6	2
Sarawak	Total	14	6	28	12	35	14

**Table 2.2.3:** Number and density of PD centres in Malaysia by State and Sector, 2002-2011

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	17	1	25	1	28	1
Malaysia	Private	5	0	4	0	11	0
Malaysia	NGO	-	-	-	-	-	-
Malaysia	Total	22	1	29	1	39	1
Perlis	Public	-	-	-	-	-	-
Perlis	Private	-	-	-	-	-	-
Perlis	NGO	-	-	-	-	-	-
Perlis	Total	-	-	-	-	-	-
Kedah	Public	-	-	1	1	1	1
Kedah	Private	-	-	-	-	-	-
Kedah	NGO	-	-	-	-	-	-
Kedah	Total	-	-	1	1	1	1
Kedah & Perlis	Public	-	-	1	0	1	0
Kedah & Perlis	Private	-	-	-	-	-	-
Kedah & Perlis	NGO	-	-	-	-	-	-
Kedah & Perlis	Total	-	-	1	0	1	0
Pulau Pinang	Public	1	1	2	1	2	1
Pulau Pinang	Private	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	3	1	4	1
Selangor & WP Putrajaya	Private	1	0	1	0	1	0
Selangor & WP Putrajaya	NGO	-	-	-	-	-	-
Selangor & WP Putrajaya	Total	3	1	4	1	5	1
WP Kuala Lumpur	Public	4	3	4	2	4	2
WP Kuala Lumpur	Private	1	1	-	-	2	1
WP Kuala Lumpur	NGO	-	-	-	-	-	-
WP Kuala Lumpur	Total	5	3	4	2	6	3
Selangor & WP Putrajaya & WP KL	Public	6	1	7	1	8	1
Selangor & WP Putrajaya & WP KL	Private	2	0	1	0	3	0
Selangor & WP Putrajaya & WP KL	NGO	-	-	-	-	-	-
Selangor & WP Putrajaya & WP KL	Total	8	1	8	1	11	2
Negeri Sembilan	Public	1	1	2	2	2	2
Negeri Sembilan	Private	-	-	-	-	-	-
Negeri Sembilan	NGO	-	-	-	-	-	-
Negeri Sembilan	Total	1	1	2	2	2	2
Melaka	Public	1	1	1	1	1	1
Melaka	Private	-	-	1	1	1	1
Melaka	NGO	-	-	-	-	-	-
Melaka	Total	1	1	2	3	2	3

**Table 2.2.3:** Number and density of PD centres in Malaysia by State and Sector, 2002-2011 (*cont*)

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
Johor	Public	1	0	3	1	3	1
Johor	Private	-	-	1	0	3	1
Johor	NGO	-	-	-	-	-	-
Johor	Total	1	0	4	1	6	2
Pahang	Public	1	1	2	1	2	1
Pahang	Private	-	-	-	-	-	-
Pahang	NGO	-	-	-	-	-	-
Pahang	Total	1	1	2	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
Sabah & WP Labuan	NGO	-	-	-	-	-	-
Sabah & WP Labuan	Total	2	1	1	0	4	1
Sarawak	Public	1	0	1	0	1	0
Sarawak	Private	-	-	-	-	1	0
Sarawak	NGO	-	-	-	-	-	-
Sarawak	Total	1	0	1	0	2	1



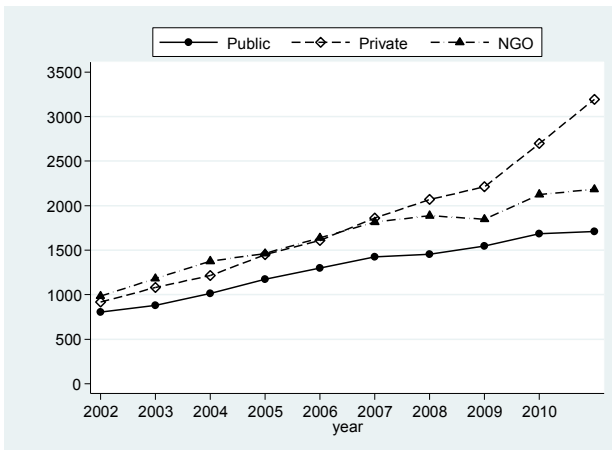
**Table 2.2.4:** Number and density of HD machines in Malaysia by State and Sector, 2002-2011

State	Sector	2002		2006		2011	
		n	pmp	n	pmp	n	Pmp
Malaysia	Public	803	32	1301	48	1711	60
Malaysia	Private	917	37	1611	60	3194	112
Malaysia	NGO	985	40	1638	61	2183	77
Malaysia	Total	2705	109	4550	170	7088	249
Perlis	Public	20	93	24	105	25	103
Perlis	Private	-	-	-	-	9	37
Perlis	NGO	-	-	15	66	16	66
Perlis	Total	20	93	39	171	50	206
Kedah	Public	61	35	88	47	111	56
Kedah	Private	51	29	120	64	212	107
Kedah	NGO	34	19	75	40	92	46
Kedah	Total	146	84	283	151	415	209
Kedah & Perlis	Public	81	41	112	53	136	61
Kedah & Perlis	Private	51	26	120	57	221	99
Kedah & Perlis	NGO	34	17	90	43	108	48
Kedah & Perlis	Total	166	85	322	154	465	208
Pulau Pinang	Public	64	46	75	49	76	47
Pulau Pinang	Private	149	106	186	122	315	195
Pulau Pinang	NGO	105	75	167	110	264	164
Pulau Pinang	Total	318	226	428	281	655	406
Perak	Public	82	38	143	61	186	75
Perak	Private	139	64	210	90	416	167
Perak	NGO	127	58	178	76	212	85
Perak	Total	348	159	531	228	814	326
Selangor & WP Putrajaya	Public	91	21	185	38	171	33
Selangor & WP Putrajaya	Private	163	37	384	80	847	164
Selangor & WP Putrajaya	NGO	152	34	313	65	397	77
Selangor & WP Putrajaya	Total	406	92	882	183	1415	274
WP Kuala Lumpur	Public	89	59	92	56	104	60
WP Kuala Lumpur	Private	170	113	242	147	295	170
WP Kuala Lumpur	NGO	106	70	173	105	238	137
WP Kuala Lumpur	Total	365	243	507	309	637	367
Selangor & WP Putrajaya & WP KL	Public	180	30	277	43	275	40
Selangor & WP Putrajaya & WP KL	Private	333	56	626	97	1142	165
Selangor & WP Putrajaya & WP KL	NGO	258	44	486	75	635	92
Selangor & WP Putrajaya & WP KL	Total	771	130	1389	215	2052	297
Negeri Sembilan	Public	30	33	48	50	74	72
Negeri Sembilan	Private	18	20	34	35	121	118
Negeri Sembilan	NGO	57	63	93	96	152	149
Negeri Sembilan	Total	105	116	175	181	347	339
Melaka	Public	20	29	29	40	41	53
Melaka	Private	47	69	88	120	173	222
Melaka	NGO	74	109	83	113	77	99
Melaka	Total	141	207	200	273	291	373
Johor	Public	78	27	128	41	167	50
Johor	Private	96	33	211	67	476	143
Johor	NGO	228	78	338	107	399	120
Johor	Total	402	138	677	214	1042	312

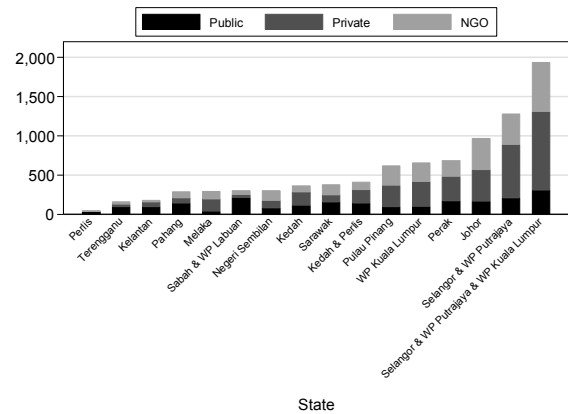
**Table 2.2.4:** Number and density of HD machines in Malaysia by State and Sector, 2002-2011 (cont)

State	Sector	2002		2006		2011	
		n	pmp	n	pmp	n	Pmp
Pahang	Public	41	30	95	65	144	93
Pahang	Private	9	7	16	11	96	62
Pahang	NGO	18	13	46	31	74	48
Pahang	Total	68	50	157	107	314	202
Terengganu	Public	44	47	56	56	93	87
Terengganu	Private	-	-	10	10	35	33
Terengganu	NGO	11	12	19	19	34	32
Terengganu	Total	55	59	85	85	162	152
Kelantan	Public	42	29	68	44	112	66
Kelantan	Private	28	20	42	27	70	41
Kelantan	NGO	10	7	20	13	31	18
Kelantan	Total	80	56	130	84	213	125
Sabah & WP Labuan	Public	77	27	146	46	217	67
Sabah & WP Labuan	Private	5	2	10	3	41	13
Sabah & WP Labuan	NGO	23	8	32	10	57	18
Sabah & WP Labuan	Total	105	37	188	59	315	98
Sarawak	Public	64	29	124	52	190	75
Sarawak	Private	42	19	58	25	88	35
Sarawak	NGO	40	18	86	36	140	55
Sarawak	Total	146	67	268	113	418	165

**Figure 2.2.4(a):** Number of HD machines in Malaysia by Sector from Year 2002 to 2011



**Figure 2.2.4(b):** Number of HD machines in Malaysia by State and Sector in Year 2011



Over the last 10 years, the total number of patients had increased from 9,034 (365 per million population) in 2002 to 26,159 (919 per million population) in 2011. The increase has been the steepest in the private sector. The number of patients in the private sector had increased 4 fold compared to about 2 fold in the public and NGO sectors over the same time period. The proportion of patients dialysing in private centres had increased from 30% in 2002 to 43% in 2011. Public sector provision was 31% and NGO centres 26% in 2011 (Table 2.2.5).

In contrast to the economically advantaged states where most of the patients were dialysing in the private sector, the public sector provided dialysis to most patients in the economically disadvantage states. The NGO sector also provided proportionately dialysis treatment to more patients in the economically advantaged states (Table 2.2.5).

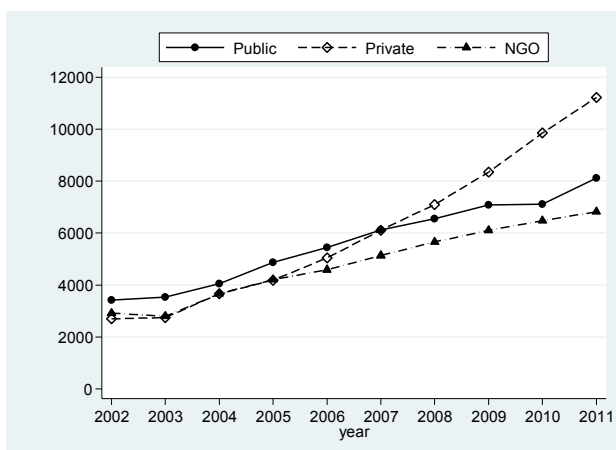
**Table 2.2.5:** Number and Prevalence Rate of Dialysis Patients (HD & PD) in Malaysia by State and Sector, 2002-2011

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	N	pmp	n	pmp
Malaysia	Public	3416	138	5441	203	8114	285
Malaysia	Private	2699	109	5044	188	11224	394
Malaysia	NGO	2919	118	4587	171	6821	240
Malaysia	Total	9034	365	15072	562	26159	919
Perlis	Public	60	278	95	416	93	383
Perlis	Private	-	-	-	-	26	107
Perlis	NGO	-	-	18	79	44	181
Perlis	Total	60	278	113	494	163	671
Kedah	Public	221	127	344	184	466	234
Kedah	Private	120	69	318	170	801	403
Kedah	NGO	100	57	192	103	295	148
Kedah	Total	441	253	854	457	1562	785
Kedah & Perlis	Public	281	143	439	209	559	250
Kedah & Perlis	Private	120	61	318	152	827	370
Kedah & Perlis	NGO	100	51	210	100	339	152
Kedah & Perlis	Total	501	255	967	461	1725	772
Pulau Pinang	Public	213	152	307	202	433	269
Pulau Pinang	Private	449	319	577	379	1099	682
Pulau Pinang	NGO	229	163	485	319	706	438
Pulau Pinang	Total	891	634	1369	899	2238	1389
Perak	Public	250	115	421	181	703	282
Perak	Private	410	188	639	274	1477	592
Perak	NGO	361	165	481	206	639	256
Perak	Total	1021	468	1541	661	2819	1131
Selangor & WP Putrajaya	Public	399	90	654	136	1054	204
Selangor & WP Putrajaya	Private	463	105	1249	259	2659	515
Selangor & WP Putrajaya	NGO	426	96	785	163	1189	230
Selangor & WP Putrajaya	Total	1288	291	2688	558	4902	949
WP Kuala Lumpur	Public	598	397	642	391	659	379
WP Kuala Lumpur	Private	546	363	675	411	1037	597
WP Kuala Lumpur	NGO	381	253	540	329	744	428
WP Kuala Lumpur	Total	1525	1013	1857	1131	2440	1404
Selangor & WP Putrajaya & WP KL	Public	997	168	1296	201	1713	248
Selangor & WP Putrajaya & WP KL	Private	1009	170	1924	298	3696	536
Selangor & WP Putrajaya & WP KL	NGO	807	136	1325	205	1933	280
Selangor & WP Putrajaya & WP KL	Total	2813	475	4545	704	7342	1064

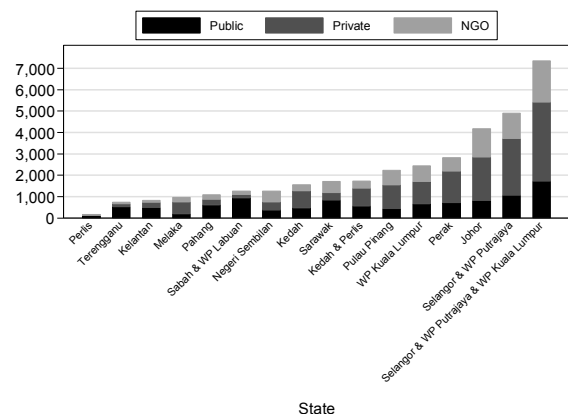
**Table 2.2.5:** Number and Prevalence Rate of Dialysis Patients (HD & PD) in Malaysia by State and Sector, 2002-2011 (cont)

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	N	pmp	n	pmp
Negeri Sembilan	Public	157	173	223	231	360	352
Negeri Sembilan	Private	8	9	79	82	381	373
Negeri Sembilan	NGO	181	200	268	277	528	516
Negeri Sembilan	Total	346	382	570	589	1269	1241
Melaka	Public	81	119	119	162	187	240
Melaka	Private	156	229	218	298	546	699
Melaka	NGO	222	326	220	300	227	291
Melaka	Total	459	675	557	760	960	1230
Johor	Public	443	152	764	242	805	241
Johor	Private	333	114	843	267	2035	610
Johor	NGO	707	242	978	310	1341	402
Johor	Total	1483	508	2585	819	4181	1253
Pahang	Public	148	109	358	245	598	386
Pahang	Private	36	26	34	23	268	173
Pahang	NGO	37	27	112	76	219	141
Pahang	Total	221	162	504	344	1085	699
Terengganu	Public	169	180	280	281	520	489
Terengganu	Private	-	-	94	94	131	123
Terengganu	NGO	36	38	51	51	98	92
Terengganu	Total	205	219	425	426	749	704
Kelantan	Public	136	95	273	176	480	282
Kelantan	Private	60	42	124	80	252	148
Kelantan	NGO	23	16	48	31	88	52
Kelantan	Total	219	153	445	286	820	481
Sabah & WP Labuan	Public	268	95	517	162	931	289
Sabah & WP Labuan	Private	3	1	30	9	162	50
Sabah & WP Labuan	NGO	50	18	75	24	160	50
Sabah & WP Labuan	Total	321	113	622	195	1253	389
Sarawak	Public	273	125	444	188	825	325
Sarawak	Private	115	53	164	69	350	138
Sarawak	NGO	166	76	334	141	543	214
Sarawak	Total	554	254	942	399	1718	676

**Figure 2.2.5(a):** Number of Dialysis Patient (HD+PD) in Malaysia by Sector from 2002-2011



**Figure 2.2.5(b):** Number of Dialysis Patient (HD+PD) in Malaysia by State and Sector in 2011



**Table 2.2.6:** Number and Prevalence Rate of Hemodialysis Patients in Malaysia by State and Sector, 2002-2011

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	2493	101	4105	153	6113	215
Malaysia	Private	2693	109	5018	187	11171	393
Malaysia	NGO	2916	118	4587	171	6821	240
Malaysia	Total	8102	328	13710	511	24105	847
Perlis	Public	60	278	95	416	93	383
Perlis	Private	-	-	-	-	26	107
Perlis	NGO	-	-	18	79	44	181
Perlis	Total	60	278	113	494	163	671
Kedah	Public	221	127	319	171	405	204
Kedah	Private	120	69	318	170	801	403
Kedah	NGO	100	57	192	103	295	148
Kedah	Total	441	253	829	444	1501	754
Kedah & Perlis	Public	281	143	414	197	498	223
Kedah & Perlis	Private	120	61	318	152	827	370
Kedah & Perlis	NGO	100	51	210	100	339	152
Kedah & Perlis	Total	501	255	942	449	1664	745
Pulau Pinang	Public	118	84	185	122	226	140
Pulau Pinang	Private	446	317	577	379	1098	681
Pulau Pinang	NGO	229	163	485	319	706	438
Pulau Pinang	Total	793	564	1247	819	2030	1260
Perak	Public	206	94	368	158	627	251
Perak	Private	410	188	638	274	1477	592
Perak	NGO	361	165	481	206	639	256
Perak	Total	977	448	1487	638	2743	1100
Selangor & WP Putrajaya	Public	327	74	504	105	550	107
Selangor & WP Putrajaya	Private	462	105	1242	258	2652	514
Selangor & WP Putrajaya	NGO	423	96	785	163	1189	230
Selangor & WP Putrajaya	Total	1212	274	2531	526	4391	851
WP Kuala Lumpur	Public	241	160	282	172	287	165
WP Kuala Lumpur	Private	545	362	675	411	1026	590
WP Kuala Lumpur	NGO	381	253	540	329	744	428
WP Kuala Lumpur	Total	1167	775	1497	912	2057	1184
Selangor & WP Putrajaya & WP KL	Public	568	96	786	122	837	121
Selangor & WP Putrajaya & WP KL	Private	1007	170	1917	297	3678	533
Selangor & WP Putrajaya & WP KL	NGO	804	136	1325	205	1933	280
Selangor & WP Putrajaya & WP KL	Total	2379	401	4028	624	6448	934
Negeri Sembilan	Public	87	96	160	165	248	243
Negeri Sembilan	Private	8	9	79	82	381	373
Negeri Sembilan	NGO	181	200	268	277	528	516
Negeri Sembilan	Total	276	305	507	524	1157	1132
Melaka	Public	77	113	95	130	127	163
Melaka	Private	156	229	217	296	546	699
Melaka	NGO	222	326	220	300	227	291
Melaka	Total	455	669	532	726	900	1153
Johor	Public	303	104	524	166	665	199
Johor	Private	333	114	826	262	2005	601
Johor	NGO	707	242	978	310	1341	402
Johor	Total	1343	460	2328	738	4011	1202
Pahang	Public	133	98	298	204	516	333
Pahang	Private	36	26	34	23	268	173
Pahang	NGO	37	27	112	76	219	141
Pahang	Total	206	151	444	303	1003	647

**Table 2.2.6:** Number and Prevalence Rate of Hemodialysis Patients in Malaysia by State and Sector, 2002-2011 (*cont*)

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
Terengganu	Public	122	130	205	206	379	356
Terengganu	Private	-	-	94	94	131	123
Terengganu	NGO	36	38	51	51	98	92
Terengganu	Total	158	168	350	351	608	571
Kelantan	Public	116	81	226	145	407	239
Kelantan	Private	60	42	124	80	252	148
Kelantan	NGO	23	16	48	31	88	52
Kelantan	Total	199	139	398	256	747	439
Sabah & WP Labuan	Public	235	83	458	144	846	263
Sabah & WP Labuan	Private	2	1	30	9	162	50
Sabah & WP Labuan	NGO	50	18	75	24	160	50
Sabah & WP Labuan	Total	287	101	563	177	1168	363
Sarawak	Public	247	113	386	163	737	290
Sarawak	Private	115	53	164	69	346	136
Sarawak	NGO	166	76	334	141	543	214
Sarawak	Total	528	242	884	374	1626	640

**Table 2.2.7:** Number and Prevalence Rate of PD Patients in Malaysia by State and Sector, 2002-2011

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	923	37	1336	50	2001	70
Malaysia	Private	6	0	26	1	53	2
Malaysia	NGO	-	-	-	-	-	-
Malaysia	Total	929	38	1362	51	2054	72
Perlis	Public	-	-	-	-	-	-
Perlis	Private	-	-	-	-	-	-
Perlis	NGO	-	-	-	-	-	-
Perlis	Total	-	-	-	-	-	-
Kedah	Public	-	-	25	13	61	31
Kedah	Private	-	-	-	-	-	-
Kedah	NGO	-	-	-	-	-	-
Kedah	Total	-	-	25	13	61	31
Kedah & Perlis	Public	-	-	25	12	61	27
Kedah & Perlis	Private	-	-	-	-	-	-
Kedah & Perlis	NGO	-	-	-	-	-	-
Kedah & Perlis	Total	-	-	25	12	61	27
Pulau Pinang	Public	95	68	122	80	207	128
Pulau Pinang	Private	3	2	-	-	1	1
Pulau Pinang	NGO	-	-	-	-	-	-
Pulau Pinang	Total	98	70	122	80	208	129
Perak	Public	44	20	53	23	76	30
Perak	Private	-	-	1	0	-	-
Perak	NGO	-	-	-	-	-	-
Perak	Total	44	20	54	23	76	30
Selangor & WP Putrajaya	Public	72	16	150	31	504	98
Selangor & WP Putrajaya	Private	1	0	7	1	7	1
Selangor & WP Putrajaya	NGO	-	-	-	-	-	-
Selangor & WP Putrajaya	Total	73	17	157	33	511	99

Table 2.2.7: Number and Prevalence Rate of PD Patients in Malaysia by State and Sector, 2002-2011 (cont)

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
WP Kuala Lumpur	Public	357	237	360	219	372	214
WP Kuala Lumpur	Private	1	1	-	-	11	6
WP Kuala Lumpur	NGO	-	-	-	-	-	-
WP Kuala Lumpur	Total	358	238	360	219	383	220
Selangor & WP Putrajaya & WP KL	Public	429	72	510	79	876	127
Selangor & WP Putrajaya & WP KL	Private	2	0	7	1	18	3
Selangor & WP Putrajaya & WP KL	NGO	-	-	-	-	-	-
Selangor & WP Putrajaya & WP KL	Total	431	73	517	80	894	130
Negeri Sembilan	Public	70	77	63	65	112	110
Negeri Sembilan	Private	-	-	-	-	-	-
Negeri Sembilan	NGO	-	-	-	-	-	-
Negeri Sembilan	Total	70	77	63	65	112	110
Melaka	Public	4	6	24	33	60	77
Melaka	Private	-	-	1	1	-	-
Melaka	NGO	-	-	-	-	-	-
Melaka	Total	4	6	25	34	60	77
Johor	Public	140	48	240	76	140	42
Johor	Private	-	-	17	5	30	9
Johor	NGO	-	-	-	-	-	-
Johor	Total	140	48	257	81	170	51
Pahang	Public	15	11	60	41	82	53
Pahang	Private	-	-	-	-	-	-
Pahang	NGO	-	-	-	-	-	-
Pahang	Total	15	11	60	41	82	53
Terengganu	Public	47	50	75	75	141	133
Terengganu	Private	-	-	-	-	-	-
Terengganu	NGO	-	-	-	-	-	-
Terengganu	Total	47	50	75	75	141	133
Kelantan	Public	20	14	47	30	73	43
Kelantan	Private	-	-	-	-	-	-
Kelantan	NGO	-	-	-	-	-	-
Kelantan	Total	20	14	47	30	73	43
Sabah & WP Labuan	Public	33	12	59	18	85	26
Sabah & WP Labuan	Private	1	0	-	-	-	-
Sabah & WP Labuan	NGO	-	-	-	-	-	-
Sabah & WP Labuan	Total	34	12	59	18	85	26
Sarawak	Public	26	12	58	25	88	35
Sarawak	Private	-	-	-	-	4	2
Sarawak	NGO	-	-	-	-	-	-
Sarawak	Total	26	12	58	25	92	36

Utilisation of available HD capacity is reflected by HD capacity to patient ratio with better utilisation showing a lower ratio. HD capacity to patient ratio has decreased over the last 10 years with the private showing the best improvement. The public sector had the lowest ratio followed by private sector and NGO. There was slightly better utilisation of HD capacity in economically disadvantaged states compared with the economically advantaged states in 2011. [Table 2.2.8 and Figure 2.2.8(a)]

**Table 2.2.8:** HD Capacity to Patient Ratio among HD Centres in Malaysia by State and Sector, 2002-2011

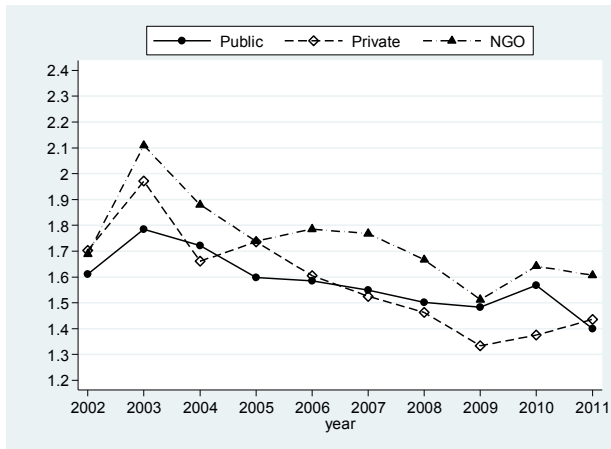
State	Sector	Year 2002			Year 2006			Year 2011		
		Centre HD Capacity		HD Capacity: Patients ratio	Centre HD Capacity		HD Capacity: Patients ratio	Centre HD Capacity		HD Capacity: Patients ratio
		n (Patient)	n (Machine)		n (Patient)	n (Machine)		n (Patient)	n (Machine)	
Malaysia	Public	2493	803	1.61	4105	1301	1.58	6113	1711	1.4
Malaysia	Private	2693	917	1.7	5018	1611	1.61	11171	3208	1.44
Malaysia	NGO	2916	985	1.69	4587	1638	1.79	6821	2192	1.61
Malaysia	Total	8102	2705	1.67	13710	4550	1.66	24105	7111	1.48
Perlis	Public	60	20	1.67	95	24	1.26	93	25	1.34
Perlis	Private	-	-	-	-	-	-	26	9	1.73
Perlis	NGO	-	-	-	18	15	4.17	44	16	1.82
Perlis	Total	60	20	1.67	113	39	1.73	163	50	1.53
Kedah	Public	221	61	1.38	319	88	1.38	405	111	1.37
Kedah	Private	120	51	2.13	318	120	1.89	801	214	1.34
Kedah	NGO	100	34	1.7	192	75	1.95	295	92	1.56
Kedah	Total	441	146	1.66	829	283	1.71	1501	417	1.39
Kedah & Perlis	Public	281	81	1.44	414	112	1.35	498	136	1.37
Kedah & Perlis	Private	120	51	2.13	318	120	1.89	827	223	1.35
Kedah & Perlis	NGO	100	34	1.7	210	90	2.14	339	108	1.59
Kedah & Perlis	Total	501	166	1.66	942	322	1.71	1664	467	1.4
Pulau Pinang	Public	118	64	2.71	185	75	2.03	226	76	1.68
Pulau Pinang	Private	446	149	1.67	577	186	1.61	1098	315	1.43
Pulau Pinang	NGO	229	105	2.29	485	167	1.72	706	264	1.87
Pulau Pinang	Total	793	318	2.01	1247	428	1.72	2030	655	1.61
Perak	Public	206	82	1.99	368	143	1.94	627	186	1.48
Perak	Private	410	139	1.7	638	210	1.65	1477	414	1.4
Perak	NGO	361	127	1.76	481	178	1.85	639	211	1.65
Perak	Total	977	348	1.78	1487	531	1.79	2743	811	1.48
Selangor & WP Putrajaya	Public	327	91	1.39	504	185	1.84	550	171	1.55
Selangor & WP Putrajaya	Private	462	163	1.76	1242	384	1.55	2652	851	1.6
Selangor & WP Putrajaya	NGO	423	152	1.8	785	313	1.99	1189	406	1.71
Selangor & WP Putrajaya	Total	1212	406	1.67	2531	882	1.74	4391	1428	1.63
WP Kuala Lumpur	Public	241	89	1.85	282	92	1.63	287	104	1.81
WP Kuala Lumpur	Private	545	170	1.56	675	242	1.79	1026	295	1.44
WP Kuala Lumpur	NGO	381	106	1.39	540	173	1.6	744	240	1.61
WP Kuala Lumpur	Total	1167	365	1.56	1497	507	1.69	2057	639	1.55



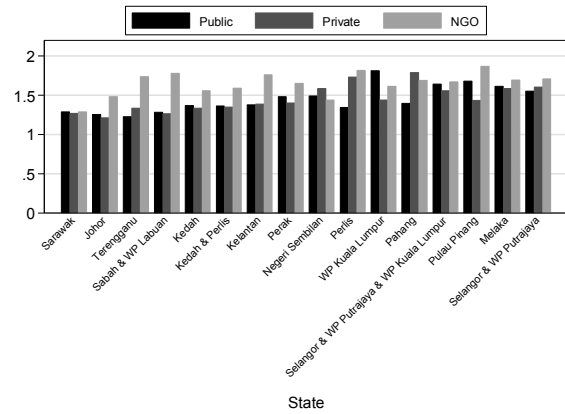
**Table 2.2.8:** HD Capacity to Patient Ratio among HD Centres in Malaysia by State and Sector, 2002-2011 (cont)

State	Sector	Year 2002			Year 2006			Year 2011		
		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)	
Selangor & WP Putrajaya & WP KL	Public	568	180	1.58	786	277	1.76	837	275	1.64
Selangor & WP Putrajaya & WP KL	Private	1007	333	1.65	1917	626	1.63	3678	1146	1.56
Selangor & WP Putrajaya & WP KL	NGO	804	258	1.6	1325	486	1.83	1933	646	1.67
Selangor & WP Putrajaya & WP KL	Total	2379	771	1.62	4028	1389	1.72	6448	2067	1.6
Negeri Sembilan	Public	87	30	1.72	160	48	1.5	248	74	1.49
Negeri Sembilan	Private	8	18	11.25	79	34	2.15	381	121	1.59
Negeri Sembilan	NGO	181	57	1.57	268	93	1.74	528	152	1.44
Negeri Sembilan	Total	276	105	1.9	507	175	1.73	1157	347	1.5
Melaka	Public	77	20	1.3	95	29	1.53	127	41	1.61
Melaka	Private	156	47	1.51	217	88	2.03	546	173	1.58
Melaka	NGO	222	74	1.67	220	83	1.89	227	77	1.7
Melaka	Total	455	141	1.55	532	200	1.88	900	291	1.62
Johor	Public	303	78	1.29	524	128	1.22	665	167	1.26
Johor	Private	333	96	1.44	826	211	1.28	2005	486	1.21
Johor	NGO	707	228	1.61	978	338	1.73	1341	398	1.48
Johor	Total	1343	402	1.5	2328	677	1.45	4011	1051	1.31
Pahang	Public	133	41	1.54	298	95	1.59	516	144	1.4
Pahang	Private	36	9	1.25	34	16	2.35	268	96	1.79
Pahang	NGO	37	18	2.43	112	46	2.05	219	74	1.69
Pahang	Total	206	68	1.65	444	157	1.77	1003	314	1.57
Terengganu	Public	122	44	1.8	205	56	1.37	379	93	1.23
Terengganu	Private	-	-	-	94	10	0.53	131	35	1.34
Terengganu	NGO	36	11	1.53	51	19	1.86	98	34	1.73
Terengganu	Total	158	55	1.74	350	85	1.21	608	162	1.33
Kelantan	Public	116	42	1.81	226	68	1.5	407	112	1.38
Kelantan	Private	60	28	2.33	124	42	1.69	252	70	1.39
Kelantan	NGO	23	10	2.17	48	20	2.08	88	31	1.76
Kelantan	Total	199	80	2.01	398	130	1.63	747	213	1.43
Sabah & WP Labuan	Public	235	77	1.64	458	146	1.59	846	217	1.28
Sabah & WP Labuan	Private	2	5	12.5	30	10	1.67	162	41	1.27
Sabah & WP Labuan	NGO	50	23	2.3	75	32	2.13	160	57	1.78
Sabah & WP Labuan	Total	287	105	1.83	563	188	1.67	1168	315	1.35
Sarawak	Public	247	64	1.3	386	124	1.61	737	190	1.29
Sarawak	Private	115	42	1.83	164	58	1.77	346	88	1.27
Sarawak	NGO	166	40	1.2	334	86	1.29	543	140	1.29
Sarawak	Total	528	146	1.38	884	268	1.52	1626	418	1.29

**Figure 2.2.8(a):** HD Capacity to Patient Ratio among HD Centres in Malaysia by State and Sector, 2002-2011



**Figure 2.2.8(b):** HD Capacity to Patient Ratio among HD Centres in Malaysia by State and sector, 2011



**2.2.2 Manpower in Dialysis Centres**

The number of registered dialysis nurses/medical technicians in Malaysia increased from 898 (36 per million population) in 2002 to 1,765 (62 pmp) in 2011. However, this increase was mainly seen in the public and private sector [Table 2.2.9 and 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 2011, the highest density of certified staff was recorded in Negeri Sembilan, Kuala Lumpur and Pulau Pinang. Public sector had the highest density of staff in all states except Selangor, Kuala Lumpur and Johor where private centres had more staff (Table 2.2.9).

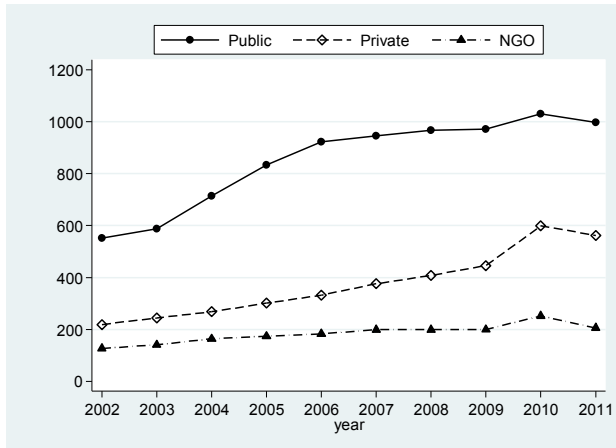
**Table 2.2.9:** Number & density of Certified Dialysis Nurses/ Medical technicians in Malaysia by State and Sector, 2002-2011

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
Malaysia	Public	552	22	923	34	997	35
Malaysia	Private	219	9	332	12	562	20
Malaysia	NGO	127	5	183	7	206	7
Malaysia	Total	898	36	1438	54	1765	62
Perlis	Public	10	46	10	44	12	49
Perlis	Private	-	-	-	-	1	4
Perlis	NGO	-	-	3	13	2	8
Perlis	Total	10	46	13	57	15	62
Kedah	Public	55	31	62	33	68	34
Kedah	Private	16	9	27	14	38	19
Kedah	NGO	6	3	9	5	15	8
Kedah	Total	77	44	98	52	121	61
Kedah & Perlis	Public	65	33	72	34	80	36
Kedah & Perlis	Private	16	8	27	13	39	17
Kedah & Perlis	NGO	6	3	12	6	17	8
Kedah & Perlis	Total	87	44	111	53	136	61
Pulau Pinang	Public	38	27	55	36	67	42
Pulau Pinang	Private	39	28	43	28	59	37
Pulau Pinang	NGO	16	11	20	13	17	11
Pulau Pinang	Total	93	66	118	77	143	89

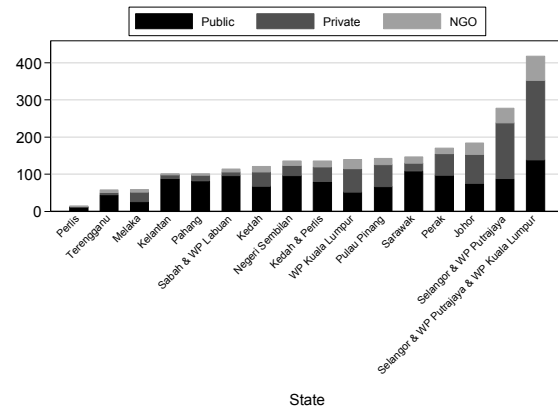
**Table 2.2.9:** Number & density of Certified Dialysis Nurses/ Medical technicians in Malaysia by State and Sector, 2002-2011

State	Sector	Year 2002		Year 2006		Year 2011	
		n	pmp	n	pmp	n	pmp
Perak	Public	47	22	95	41	97	39
Perak	Private	24	11	32	14	57	23
Perak	NGO	11	5	14	6	16	6
Perak	Total	82	38	141	60	170	68
Selangor & WP Putrajaya	Public	54	12	91	19	87	17
Selangor & WP Putrajaya	Private	45	10	89	18	151	29
Selangor & WP Putrajaya	NGO	23	5	40	8	39	8
Selangor & WP Putrajaya	Total	122	28	220	46	277	54
WP Kuala Lumpur	Public	65	43	71	43	52	30
WP Kuala Lumpur	Private	39	26	46	28	62	36
WP Kuala Lumpur	NGO	15	10	18	11	26	15
WP Kuala Lumpur	Total	119	79	135	82	140	81
Selangor & WP Putrajaya & WP KL	Public	119	20	162	25	139	20
Selangor & WP Putrajaya & WP KL	Private	84	14	135	21	213	31
Selangor & WP Putrajaya & WP KL	NGO	38	6	58	9	65	9
Selangor & WP Putrajaya & WP KL	Total	241	41	355	55	417	60
Negeri Sembilan	Public	31	34	61	63	96	94
Negeri Sembilan	Private	5	6	7	7	27	26
Negeri Sembilan	NGO	9	10	14	14	13	13
Negeri Sembilan	Total	45	50	82	85	136	133
Melaka	Public	13	19	18	25	26	33
Melaka	Private	13	19	21	29	26	33
Melaka	NGO	10	15	10	14	7	9
Melaka	Total	36	53	49	67	59	76
Johor	Public	47	16	81	26	75	22
Johor	Private	19	7	36	11	77	23
Johor	NGO	24	8	32	10	32	10
Johor	Total	90	31	149	47	184	55
Pahang	Public	30	22	68	46	82	53
Pahang	Private	2	1	3	2	15	10
Pahang	NGO	2	1	5	3	4	3
Pahang	Total	34	25	76	52	101	65
Terengganu	Public	28	30	37	37	44	41
Terengganu	Private	-	-	4	4	6	6
Terengganu	NGO	2	2	3	3	8	8
Terengganu	Total	30	32	44	44	58	55
Kelantan	Public	40	28	65	42	87	51
Kelantan	Private	7	5	11	7	11	6
Kelantan	NGO	2	1	3	2	3	2
Kelantan	Total	49	34	79	51	101	59
Sabah & WP Labuan	Public	47	17	106	33	96	30
Sabah & WP Labuan	Private	1	0	2	1	10	3
Sabah & WP Labuan	NGO	2	1	3	1	8	2
Sabah & WP Labuan	Total	50	18	111	35	114	35
Sarawak	Public	47	22	103	44	108	43
Sarawak	Private	9	4	11	5	22	9
Sarawak	NGO	5	2	9	4	16	6
Sarawak	Total	61	28	123	52	146	57

**Figure 2.2.9(a):** Number of Certified Dialysis Nurses/ Medical technicians in Malaysia by Sector, 2002-2011



**Figure 2.2.9(b):** Number of Certified Dialysis Nurses/ Medical technicians in Malaysia by State and Sector, 2011



**SECTION 2.3: DISTRIBUTION OF DIALYSIS TREATMENT**

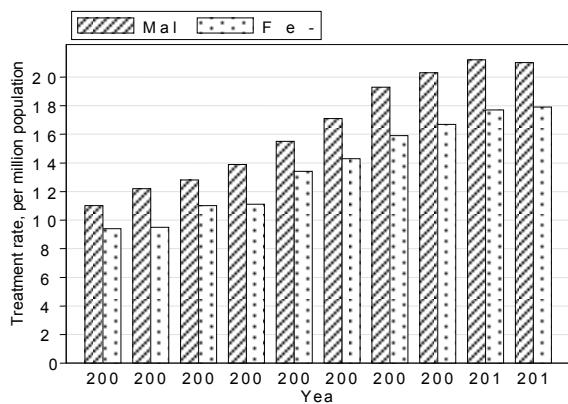
**2.3.1 Gender distribution**

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. Over the last 10 years, the male to female prevalent dialysis patients had remained the same at 55 to 45% respectively.

**Table 2.3.1(a) :** Dialysis Treatment Rate by Gender, per million male or female population 2002-2011

Gender	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Male	110	122	128	139	155	171	193	203	212	210
Female	94	95	110	111	134	143	159	167	177	179

**Figure 2.3.1(a):** Dialysis Treatment Rate by Gender 2002-2011

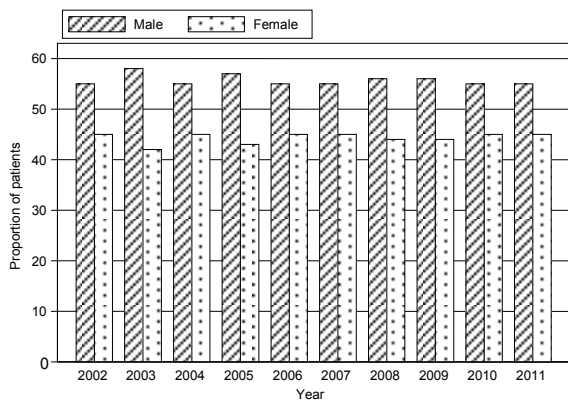


**Table 2.3.1(b):** Gender Distribution of Dialysis Patients 2002-2011

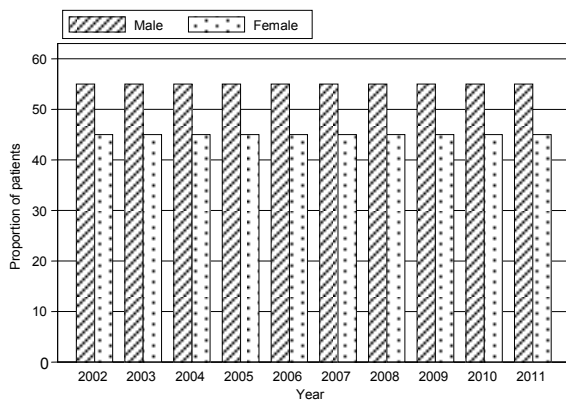
Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
New Dialysis patients	2375	2627	2894	3137	3672	4064	4590	4864	5153	5201
% Male	55	58	55	57	55	55	56	56	55	55
% Female	45	42	45	43	45	45	44	44	45	45
Dialysing at 31 <sup>st</sup> December	9107	10404	11831	13337	15054	17049	19324	21446	23552	25688
% 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 2002-2011

i. New Dialysis patients



ii. Dialysing patients at 31<sup>st</sup> December



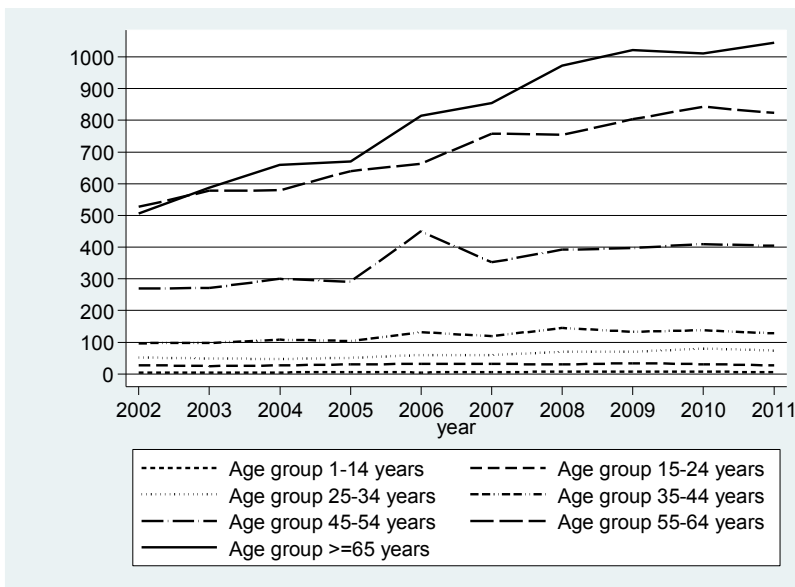
**2.3.2: Age distribution**

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 1044 per million age related population in 2011 (Table 2.3.2 (a)). 58% 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 2002-2011

Age groups (years)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
≤14	5	4	5	6	5	6	7	8	7	6
15-24	28	25	27	30	32	32	30	34	31	27
25-34	52	49	47	51	60	60	70	70	80	74
35-44	97	98	108	104	132	119	145	133	138	128
45-54	270	271	300	291	450	352	392	397	410	404
55-64	527	578	579	640	663	758	754	803	843	823
≥ 65	506	588	660	670	815	854	972	1022	1011	1044

**Figure 2.3.2 (a):** Dialysis Treatment Rate by Age Group 2002-2011

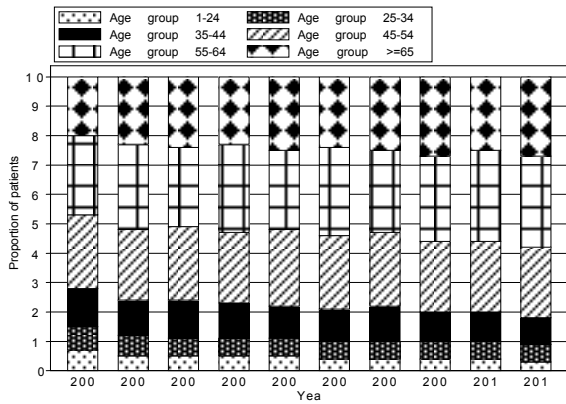


**Table 2.3.2:** Percentage Age Distribution of Dialysis Patients 2002-2011

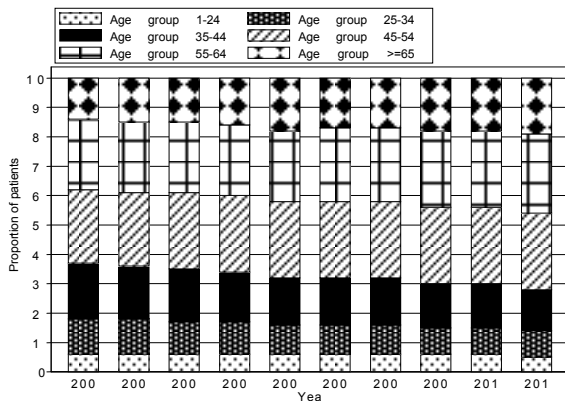
Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
New Dialysis patients	2375	2627	2894	3137	3672	4064	4590	4864	5153	5201
% 1-14 years	2	1	1	1	1	1	1	1	1	1
% 15-24 years	5	4	4	4	4	3	3	3	3	2
% 25-34 years	8	7	6	6	6	6	6	6	6	6
% 35-44 years	13	12	13	12	11	11	12	10	10	9
% 45-54 years	25	24	25	24	26	25	25	24	24	24
% 55-64 years	27	29	27	30	27	30	28	29	31	31
% ≥65 years	20	23	24	23	25	24	25	27	25	27
Dialysing at 31 <sup>st</sup> December	9107	10404	11831	13337	15054	17049	19324	21446	23552	25688
% 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	4
% 25-34 years	12	12	11	11	10	10	10	9	9	9
% 35-44 years	19	18	18	17	16	16	16	15	15	14
% 45-54 years	25	25	26	26	26	26	26	26	26	26
% 55-64 years	24	24	24	24	24	25	25	26	26	27
% ≥65 years	14	15	15	16	18	17	17	18	18	19

**Figure 2.3.2 (b):** Age Distribution of New Dialysis Patients 2002-2011

i. New Dialysis Patients



ii. Dialysing patients at 31<sup>st</sup> December



**2.3.3 Method and Location of dialysis**

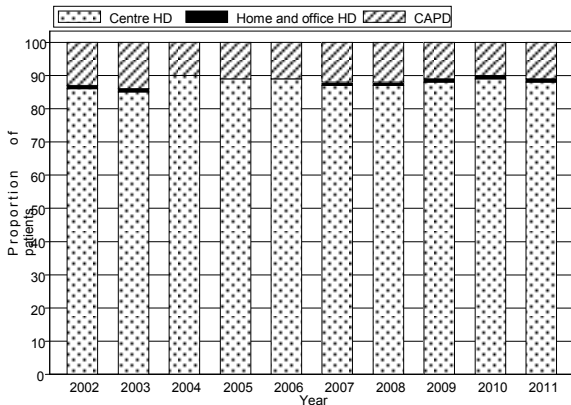
88% of new patients were accepted into centre haemodialysis program in 2011. The proportion of new patients accepted into chronic PD program has remained static about 10-12% over the last few years and only accounted for 8% of prevalent dialysis patients. This is due to a small number of PD patients 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 2002-2011

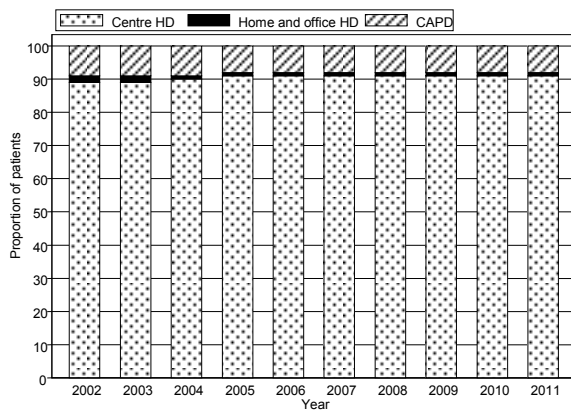
Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
New Dialysis patients	2375	2627	2894	3137	3672	4064	4590	4864	5153	5201
% Centre HD	86	85	90	89	89	87	87	88	89	88
% Home and office HD	1	1	0	0	0	1	1	1	1	1
% PD	13	14	10	11	11	12	12	11	10	11
Dialysing at 31 <sup>st</sup> December	8689	9954	11285	12712	14344	16252	18407	20437	22395	24387
% Centre HD	89	89	90	91	91	91	91	91	91	91
% Home and office HD	2	2	1	1	1	1	1	1	1	1
% PD	9	9	9	8	8	8	8	8	8	8

**Figure 2.3.3:** Method and Location of Dialysis Patients 2002-2011

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.

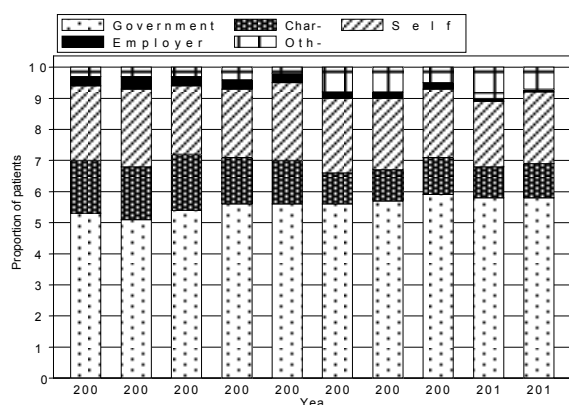
The government continues to be the main payer for dialysis therapy for new and existing patients. These funds are channeled not only to the government dialysis centres but also as subsidies to NGO centres and payment of dialysis treatment for civil servants and their dependents in private centres. Out of pocket payment i.e. self-funding for dialysis was about 22 to 23%. Funding from NGO bodies has declined over the years. (Table & Figure 2.3.4)

**Table 2.3.4:** Funding for Dialysis Treatment 2002-2011

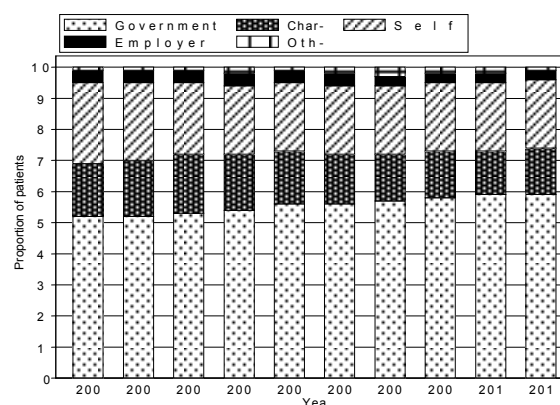
Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
New Dialysis patients	2375	2627	2894	3137	3672	4064	4590	4864	5153	5201
% by Government	53	51	54	56	56	56	57	59	58	58
% by Charity	17	17	18	15	14	10	10	12	10	11
% self funded	24	25	22	22	25	24	23	22	21	23
% subsidized by Employer	3	4	3	3	3	2	2	2	1	1
% Others	3	3	3	4	2	8	8	5	10	7
Dialysing at 31 <sup>st</sup> December	8689	9954	11285	12712	14344	16252	18407	20437	22395	24387
% by Government	52	52	53	54	56	56	57	58	59	59
% by Charity	17	18	19	18	17	16	15	15	14	15
% self funded	26	25	23	22	22	22	22	22	22	22
% subsidized by Employer	4	4	4	4	4	4	3	3	3	3
% Others	1	1	1	2	1	2	3	2	2	1

**Figure 2.3.4:** Funding for Dialysis Treatment 2002-2011

i. New Dialysis Patients



ii. Dialysing patients at 31<sup>st</sup> December



**2.3.5 Distribution of dialysis patients by sector**

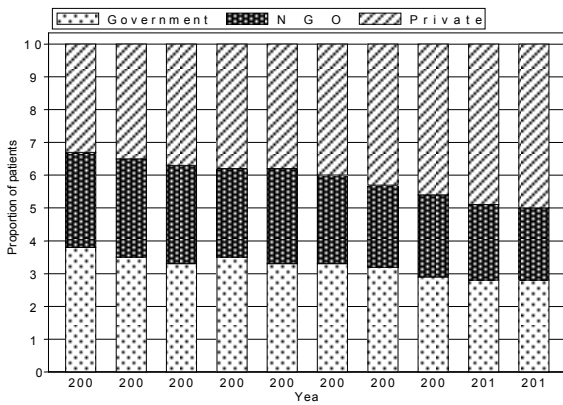
The proportion of new dialysis patients accepted into private dialysis centres continue to increase while that in MOH and NGO centres seem to show a decrease. Since 2008 the private sector is the largest provider of dialysis. In 2011, the private sector provided dialysis to half of new patients and 42% of prevalent patients.

**Table 2.3.5:** Distribution of Dialysis Patients by Sector 2002-2011

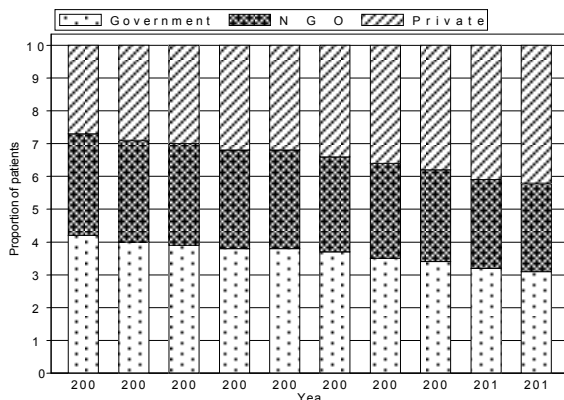
Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
New Dialysis patients	2375	2627	2894	3137	3672	4064	4590	4864	5153	5201
% Government centre	38	35	33	35	33	33	32	29	28	28
% NGO centre	29	30	30	27	29	27	25	25	23	22
% Private centre	33	35	37	38	38	40	43	46	49	50
Dialysing at 31 <sup>st</sup> December	9107	10404	11831	13337	15054	17049	19324	21446	23552	25688
% Government centre	42	40	39	38	38	37	35	34	32	31
% NGO centre	31	31	31	30	30	29	29	28	27	27
% Private centre	27	29	30	32	32	34	36	38	41	42

**Figure 2.3.5:** Distribution of Dialysis Patients by Sector 2002-2011

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. In 2011, 56% of new patients had diabetes mellitus as the primary renal disease. Hypertension was the primary renal disease in 6% of new patients. 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 requiring further studies despite the increase in the number of nephrologists.

**Table 2.4.1:** Primary Renal Diseases 2002-2011

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
New Dialysis patients	2375	2627	2894	3137	3672	4064	4590	4864	5153	5201
% Unknown cause	28	26	25	24	24	26	27	28	29	31
% Diabetes Mellitus	49	52	53	55	57	57	57	58	57	56
% Glomerulonephritis	6	5	5	5	4	4	3	3	3	2
% SLE	1	1	1	1	1	1	1	1	1	1
% Polycystic kidney	1	1	1	1	1	1	1	1	1	1
% Obstructive Nephropathy	3	3	3	3	3	3	2	2	1	1
% Toxic Nephropathy	0	0	0	0	0	0	0	0	0	0
% Hypertension	9	9	10	9	8	8	8	7	8	6
% Others	3	3	2	2	2	0	1	0	0	2

**Figure 2.4.1:** Primary Renal Diseases for New Dialysis Patients 2002-2011

