

CHAPTER 2

DIALYSIS IN MALAYSIA

Ong Loke Meng
Sunita Bavanandan
Hooi Lai Seong
Choo Cheh Loo

SECTION 2.1: PROVISION OF DIALYSIS IN MALAYSIA

2.1.1: Dialysis treatment provision

Table 2.1.1: Stock and flow - Dialysis Patients, Malaysia 2011-2021

Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
New Dialysis patients	9123	9427	9485	8548	8088	8111	8047	7628	7000	6695	6045
Died	9042	6333	6493	6152	5947	5402	5004	4728	4012	3647	3292
Transplanted	60	139	130	81	101	71	99	90	73	79	103
Lost to Follow-up	43	53	48	64	41	36	37	46	25	34	35
Dialysing at 31st December	49770	50150	47418	44818	42702	40795	38138	35171	32366	29443	26480

Table 2.1.1(a): Stock and flow - HD Patients, Malaysia 2011-2021

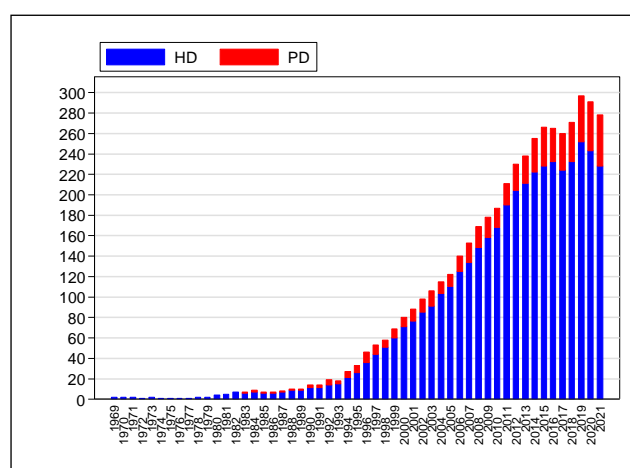
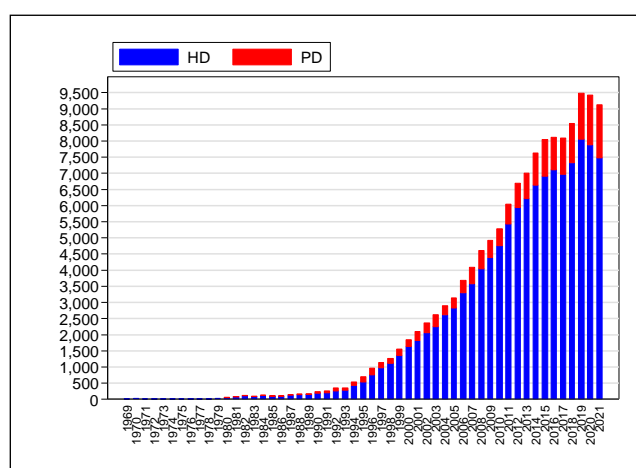
Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
New Dialysis patients	7477	7868	8052	7318	6955	7105	6909	6631	6216	5935	5430
Died	7879	5451	5600	5333	5172	4671	4373	4152	3541	3252	2918
Transplanted	52	112	103	56	93	65	89	76	56	65	86
Lost to Follow-up	33	49	45	57	39	34	36	45	25	34	33
Dialysing at 31st December	43968	44649	42440	40248	38408	36811	34351	31869	29502	26873	24301

Table 2.1.1(b): Stock and flow - PD Patients, Malaysia 2011-2021

Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
New Dialysis patients	1646	1559	1433	1230	1133	1006	1138	997	784	760	615
Died	1163	882	893	819	775	731	631	576	471	395	374
Transplanted	8	27	27	25	8	6	10	14	17	14	17
Lost to Follow-up	10	4	3	7	2	2	1	1	0	0	2
Dialysing at 31st December	5802	5501	4978	4570	4294	3984	3787	3302	2864	2570	2179

Figure 2.1.1: New Dialysis (Hemodialysis & Chronic PD) Incidence Rate per Million Population, Malaysia 1969-2021

(a) Number of New Dialysis Incidence, Malaysia 1969-2021 (b) New Dialysis Incidence Rates, Malaysia 1969-2021



(For actual numbers refer to Appendix T1.1.1)

2.1.2: Geographic distribution

There were a total of 9,123 new dialysis patients in 2021 comprising 7,477 new HD and 1,646 new PD patients. One state surpassed an acceptance rate (AR) of 400 pmp, 9 states recorded an AR of between 300 to 399, 2 states had an AR of between 200 to 299 pmp and 2 states reported an AR of less than 200 pmp. The state with the highest AR was Negeri Sembilan (402 pmp) followed by Melaka (393 pmp), Perak (361 pmp), Terengganu (355 pmp) and Pulau Pinang (345 pmp). Sabah remains the state with the lowest acceptance rate (140 pmp) followed by Perlis (174 pmp), Kelantan (197 pmp), Selangor (231 pmp) and Sarawak (242 pmp) (Appendix T2.1.2a). In general, the west coast states of Peninsular Malaysia had higher AR compared with the east coast states of Peninsular Malaysia followed by East Malaysian states.

Table 2.1.2(a): Dialysis Treatment and Rate by Centre state, per million population 2011-2021

Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Johor	327	341	362	334	341	340	310	330	305	295	285
Kedah	344	303	320	297	285	281	264	275	262	231	190
Kelantan	197	242	231	209	178	218	210	137	134	159	123
Melaka	393	367	379	349	306	311	334	333	301	266	274
Negeri Sembilan	402	362	415	393	367	367	348	354	274	300	261
Pahang	306	263	284	237	226	229	254	243	209	220	171
Perak	361	411	393	322	292	286	343	283	272	270	268
Perlis	174	176	181	240	179	175	177	204	169	184	164
Pulau Pinang	345	379	361	325	328	359	319	334	320	334	312
Sabah WP Labuan	140	131	139	113	115	128	113	99	107	98	88
Sarawak	242	250	221	175	194	174	183	176	159	126	124
Selangor	231	254	271	257	224	225	251	243	212	222	201
Terengganu	355	378	345	324	279	281	263	274	262	246	188
WP Kuala Lumpur	317	352	354	355	387	389	381	362	388	353	345

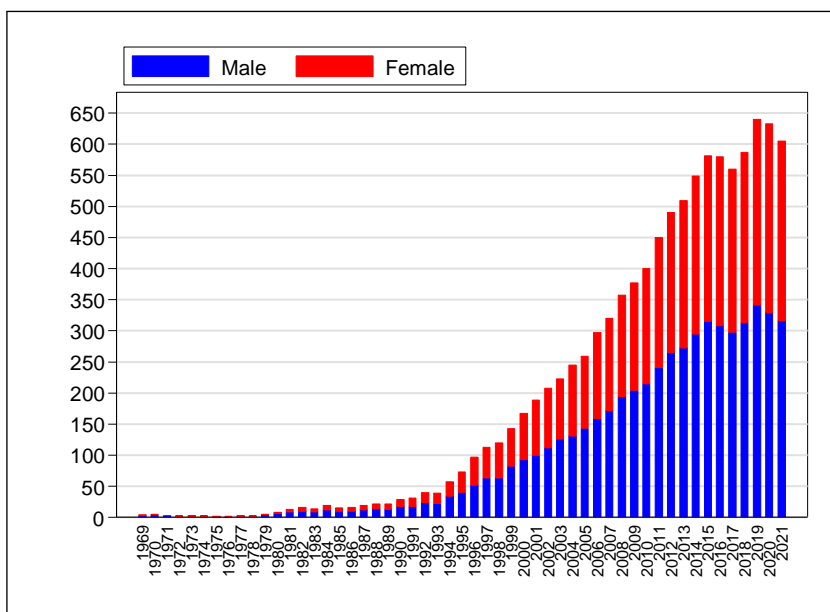
2.1.3: Gender distribution

The acceptance rate for males has remained higher compared with females. However, over the last decade there has been a modest trend toward narrowing of the gap. In the last 2 years the percentage difference has been less than 5% (52%:48% male:female ratio). This ratio is a great improvement when compared to 1970's ratio which was 70:30 and 1980's ratio which was 60:40 (Appendix T2.1.3b).

Table 2.1.3(a): Dialysis Treatment Rate by Gender, per million male or female population 2011-2021

Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Male	316	330	341	313	297	308	315	295	273	265	240
Female	289	303	299	274	263	272	266	254	236	225	210

Figure 2.1.3(a): Dialysis Treatment Rate by Gender 1969-2021



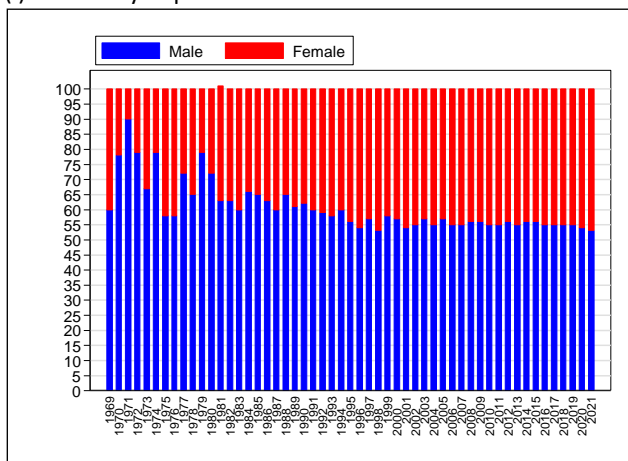
(For actual numbers in Fig 2.1.3a, refer to Appendix T2.1.3a)

Table 2.1.3(b): Gender Distribution of Dialysis Patients 2011-2021

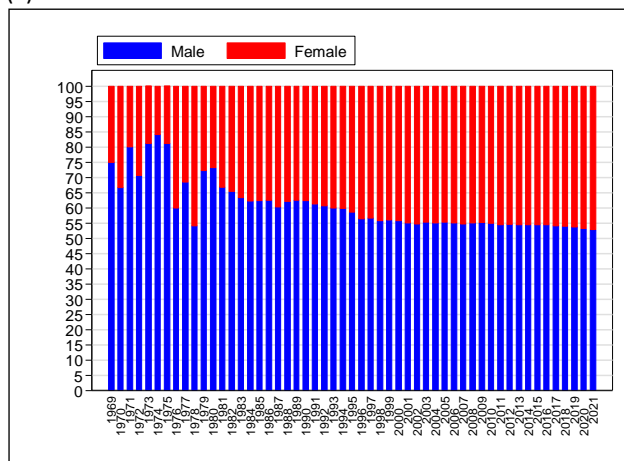
Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
New Dialysis patients	9123	9427	9485	8548	8088	8111	8047	7628	7000	6695	6045
% Male	53	54	55	55	55	55	56	56	55	56	55
% Female	47	46	45	45	45	45	44	44	45	44	45
ESKD patients at 31st December	49770	50150	47418	44818	42702	40795	38138	35171	32366	29443	26480
% Male	52.8	53.2	53.8	54	54.2	54.6	54.6	54.6	54.5	54.7	54.6
% Female	47.2	46.8	46.2	46	45.8	45.4	45.4	45.4	45.5	45.3	45.4

Figure 2.1.3(b): Gender Distribution of Dialysis Patients 1969-2021

(i) New Dialysis patients



(ii) ESKD Patients at 31st December



(For actual numbers in Fig 2.1.3b, refer to Appendix T2.1.3b)

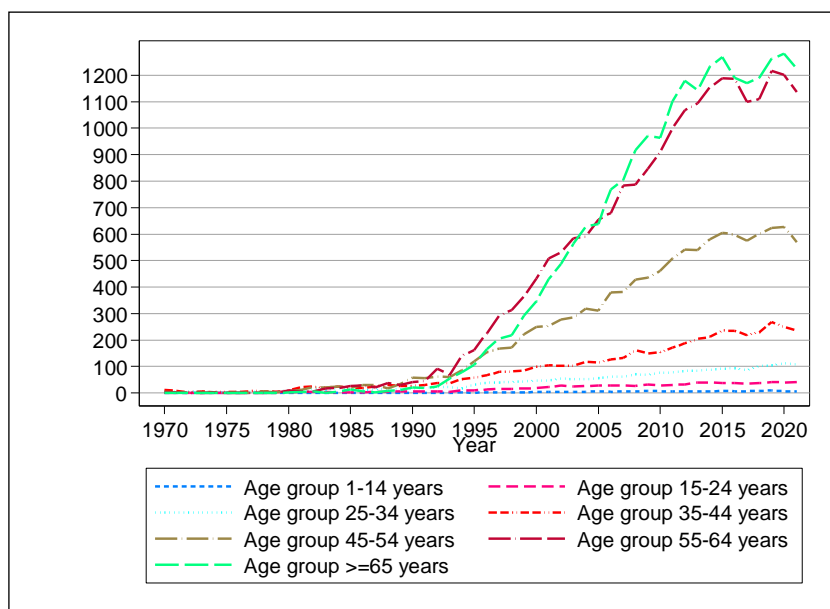
2.1.4: Age distribution

As can be expected, the treatment rate is age dependent with the highest incidence among the elderly (Figure 2.1.4a). The sharpest increase was noted among the elderly (>= 65 years old) and those between 55-64 years old. (Figure 2.1.4a). In 2021, about 80% of new patients and 70% of all prevalent patients on dialysis were in the age group of 45 years or older. (Figure 2.1.4b).

Table 2.1.4(a): Dialysis Treatment Rate by Age Group, per million age group population 2011-2021

Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
≤14	7	7	10	8	7	7	8	6	7	6	7
15-24	41	40	42	37	36	37	37	40	40	33	30
25-34	108	113	104	102	87	93	92	88	85	84	78
35-44	237	249	269	230	219	235	236	212	204	188	171
45-54	570	628	623	601	576	598	605	581	540	541	509
55-64	1137	1201	1216	1110	1100	1186	1189	1154	1093	1068	1002
≥ 65	1225	1281	1263	1190	1170	1190	1268	1233	1143	1179	1102

Figure 2.1.4(a): Dialysis Treatment Rate by Age Group 1969-2021



(For actual numbers in Fig 2.1.4a, refer to Appendix T2.1.4a)

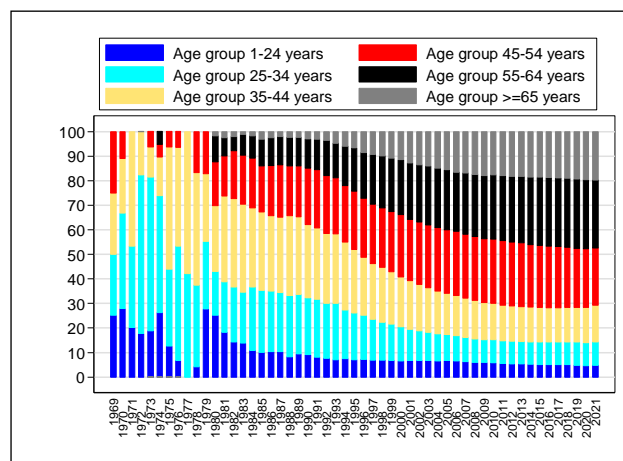
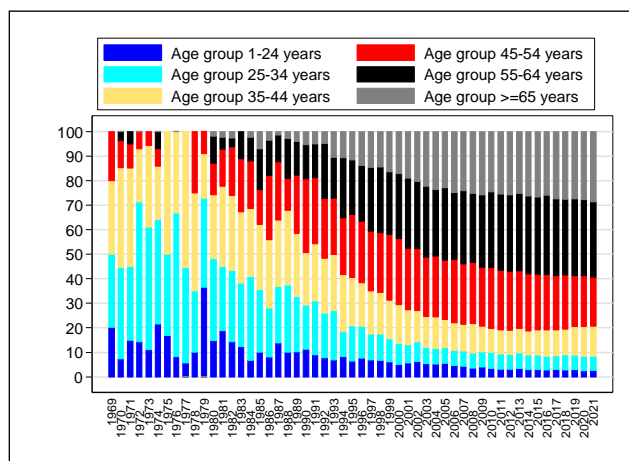
Table 2.1.4(b): Percentage Age Distribution of Dialysis Patients 2011-2021

Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
New Dialysis patients	9123	9427	9485	8548	8088	8111	8047	7628	7000	6695	6045
% ≤24	2.6	2.4	2.9	2.7	2.8	2.7	3.0	3.0	3.5	3.1	3.2
% 25-34	5.9	6.1	5.9	6.2	5.8	5.7	5.7	5.8	6.1	5.9	6.0
% 35-44	12.0	11.8	11.6	10.6	10.6	10.7	10.4	9.9	10.2	9.9	9.9
% 45-54	20.0	21.0	20.8	22.0	22.1	22.6	22.7	23.3	23.3	23.9	24.2
% 55-64	30.9	30.9	31.3	30.9	31.3	32.2	31.4	31.6	31.5	31.2	30.9
% ≥ 65	28.6	27.8	27.5	27.6	27.4	26.1	26.8	26.4	25.4	26	25.8
ESKD patients at 31st December	49770	50150	47418	44818	42702	40795	38138	35171	32366	29443	26480
% ≤24	4.8	4.7	4.8	4.9	4.9	4.9	5.0	5.1	5.2	5.3	5.4
% 25-34	9.6	9.2	9.3	9.3	9.2	9.2	9.2	9.3	9.3	9.3	9.4
% 35-44	14.7	14.4	14.1	14.0	14.0	14.0	14.0	14.0	14.1	14.2	14.4
% 45-54	23.5	24.0	24.3	24.7	25.1	25.2	25.4	25.6	25.9	26.0	26.2
% 55-64	27.7	28.1	28.1	27.9	27.9	27.9	27.7	27.4	27.1	26.9	26.6
% ≥ 65	19.7	19.6	19.4	19.2	18.9	18.8	18.7	18.6	18.4	18.3	18.0

Figure 2.1.4(b): Age Distribution of Dialysis Patients 1969-2021

(i) New Dialysis Patients

(ii) ESKD Patients at 31st December



(For actual numbers in Fig 2.1.4b, refer to Appendix T2.1.4b)

2.1.5: Method and Location of Dialysis

Centre HD continues to dominate over other methods and location of dialysis accounting for 82% and 86% for new and prevalent dialysis patients respectively in 2021. Even though there was an encouraging trend of an increase in new PD patients for the last 4 years, the prevalent PD patients has remained <12%. This probably signifies the high dropout rate of PD patients. The percentage of incidence patients on home dialysis (both PD and HD) was 14% in 2018 (Appendix T2.1.5). The golden age for home dialysis (PD and HD) was in the 1980's where at one time it was >50% of all dialysis (Appendix T2.1.5 and Figure 2.1.5).

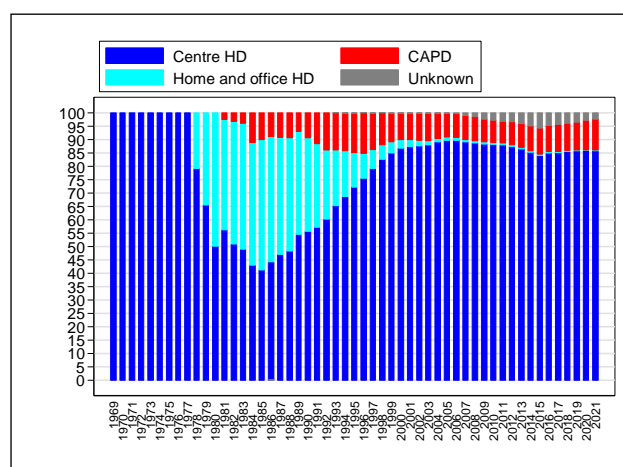
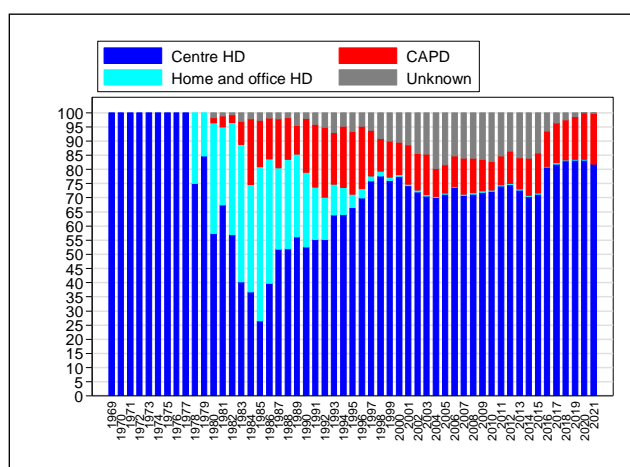
Table 2.1.5: Method and Location of Dialysis Patients 2011-2021

Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
New Dialysis patients	9123	9427	9485	8548	8088	8110	8047	7628	6999	6697	6045
% Centre HD	81.8	83.3	83.3	83.0	81.8	80.8	71.2	70.5	72.5	74.6	74.1
% Home and office HD	0.0	0.1	0.1	0.1	0.5	0.3	0.4	0.4	0.4	0.4	0.4
% PD	18.0	16.5	15.1	14.4	14.0	12.4	14.1	13.1	11.2	11.3	10.2
% Unknown	0.2	0.1	1.5	2.5	3.7	6.5	14.3	16.0	15.9	13.7	15.3
ESKD patients at 31st December	49770	50150	47418	44818	42702	40795	38138	35171	32366	29443	26480
% Centre HD	85.7	85.9	85.7	85.4	85.0	84.9	84.0	85.1	86.5	87.4	87.9
% Home and office HD	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7
% PD	11.7	11.0	10.5	10.2	10.1	9.8	9.9	9.4	8.8	8.7	8.2
% Unknown	2.3	2.8	3.5	4.0	4.4	4.8	5.6	4.9	4.1	3.3	3.2

Figure 2.1.5: Method and Location of Dialysis Patients 1969-2021

(i) New Dialysis Patients

(ii) ESKD Patients at 31st December



(For actual numbers in Fig 2.1.5, refer to Appendix T2.1.5)

2.1.6: Funding for dialysis treatment

The government continued to be the main source of funding for dialysis therapy for new and existing patients in this country. These funds were channeled not only to the government dialysis centres, but also as subsidies to NGO centres and payment of dialysis treatment for public pensioners, civil servants, and their dependents in private centres. Out of pocket payment i.e., self-funding for dialysis, was 11.6% in 2021. Funding from NGO bodies was 1.8% in 2021 (Table & Figure 2.1.6).

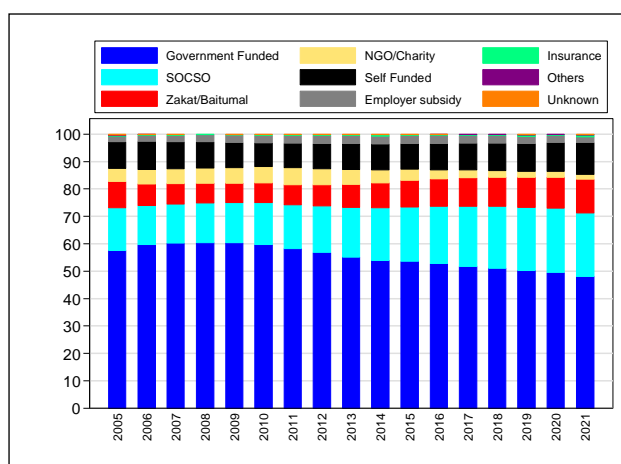
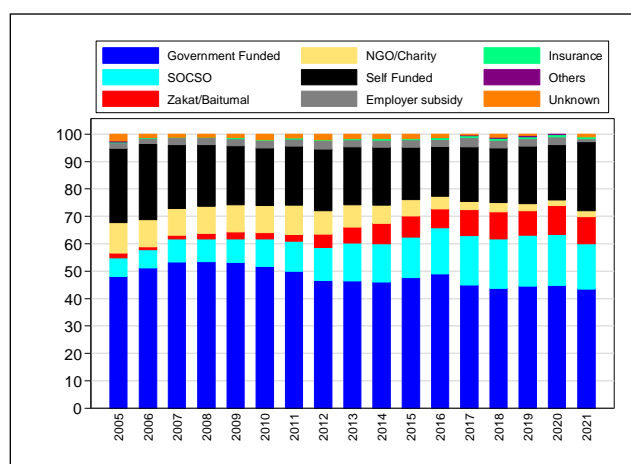
Table 2.1.6: Funding for Dialysis Treatment 2011-2021

Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
New Dialysis patients	9123	9427	9485	8548	8088	8110	8047	7628	6999	6697	6045
% Government Funded	43.4	44.8	44.6	43.7	45.0	48.9	47.6	45.9	46.3	46.5	49.9
% SOCSO	16.4	18.4	18.4	18.1	17.9	16.8	14.7	14.0	13.8	12.1	11.1
% Zakat/Baitumal	9.9	10.6	9.1	9.9	9.4	6.9	7.7	7.5	5.8	4.8	2.2
% NGO/Charity	2.4	2.1	2.6	3.4	3.2	4.6	6.0	6.7	8.3	8.7	10.9
% Self Funded	25.0	20.2	21.0	19.9	19.9	18.3	19.2	21.1	21.2	22.5	21.5
% Employer Subsidised	1.2	3.0	2.6	2.8	3.3	2.6	2.8	2.6	2.5	3.0	2.6
% Insurance	0.8	0.7	0.7	0.7	0.7	0.6	0.4	0.6	0.4	0.4	0.4
% Others	0.0	0.2	0.5	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0
% Unknown	0.9	0.0	0.5	1.1	0.4	1.2	1.6	1.6	1.7	2.0	1.4
Dialysing at 31st December	49770	50150	47418	44818	42702	40795	38138	35171	32366	29443	26480
% Government Funded	48.1	49.4	50.2	51.0	51.8	52.7	53.5	53.9	55.1	56.8	58.2
% SOCSO	23.2	23.5	23.0	22.5	21.8	20.9	19.8	19.1	18.1	16.9	16.1
% Zakat/Baitumal	12.2	11.4	11.0	10.7	10.4	10.0	9.8	9.2	8.5	7.9	7.3
% NGO/Charity	1.8	2.0	2.1	2.4	2.8	3.3	4.0	4.6	5.3	5.6	6.2
% Self Funded	11.6	10.6	10.2	10.0	9.8	9.6	9.4	9.5	9.5	9.3	8.8
% Employer Subsidised	2.2	2.5	2.7	2.8	2.9	2.9	3.0	3.0	3.0	3.0	2.9
% Insurance	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.3
% Others	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
% Unknown	0.2	0.0	0.2	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.2

Figure 2.1.6: Funding for Dialysis Treatment 1969-2021

(i) New Dialysis Patients

(ii) Dialysis Patients at 31st December



2.1.7: Distribution of dialysis patients by sector

In 2021, the proportion of new dialysis patients accepted into private dialysis centres continue to increase (60.7%) while government centres (26.9%) and NGO centres (12.4%) have declined. A similar pattern is seen with prevalent patients with the private centre providing dialysis to a majority of patients since 2018 (Table 2.1.7).

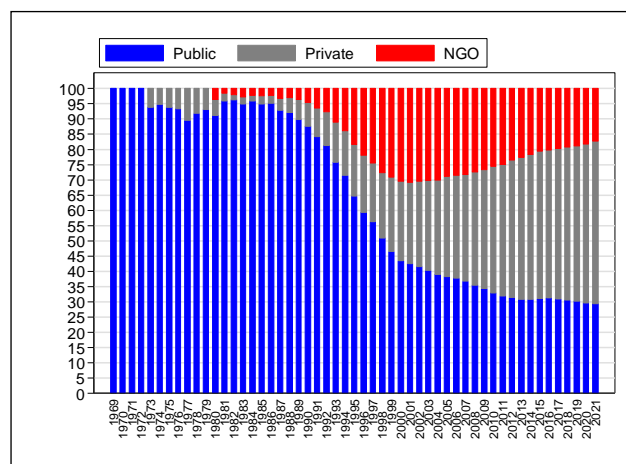
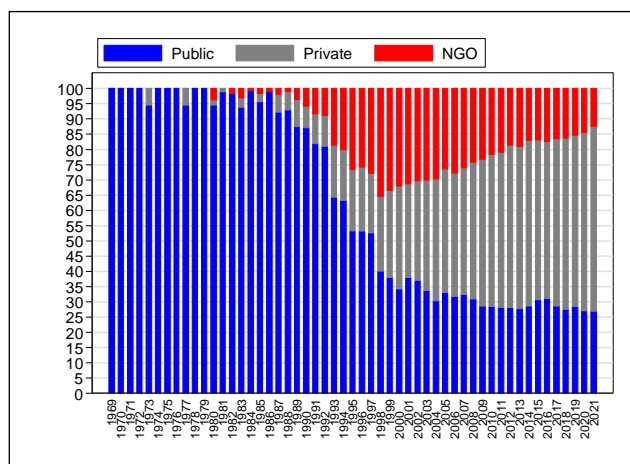
Table 2.1.7: Distribution of Dialysis Patients by Sector 2011-2021

Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
New Dialysis patients	9123	9427	9485	8548	8088	8110	8047	7628	6999	6697	6045
% Government centre	26.9	27.1	28.4	27.4	28.6	31	30.6	28.6	27.7	28.1	28.1
% NGO centre	12.4	14.6	15.3	16.4	16.6	17.5	17	17.1	18.9	18.6	20.9
% Private centre	60.7	58.3	56.3	56.2	54.8	51.5	52.4	54.3	53.4	53.3	51
ESKD patients at 31st December	49770	50150	47418	44818	42702	40795	38138	35171	32366	29443	26480
% Government centre	29.4	29.7	30.3	30.5	30.9	31.2	31	30.7	30.7	31.4	31.8
% NGO centre	17.4	18.2	18.8	19.2	19.8	20.3	20.7	21.7	22.8	23.6	24.9
% Private centre	53.2	52.1	50.9	50.3	49.3	48.5	48.3	47.6	46.5	45	43.3

Figure 2.1.7: Distribution of Dialysis Patients by Sector 1969-2021

(i) New Dialysis Patients

(ii) Dialysis Patients at 31st December



(For actual numbers in Fig 2.1.7, refer to Appendix T2.1.7)

Table 2.1.7(a): Distribution of Dialysis Patients by Modality and Sector 2011-2021

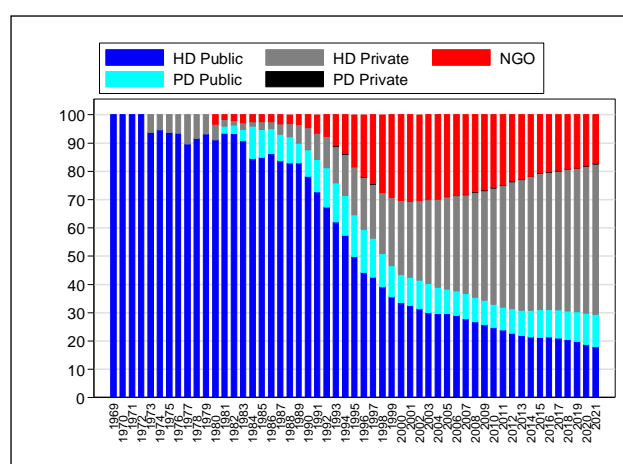
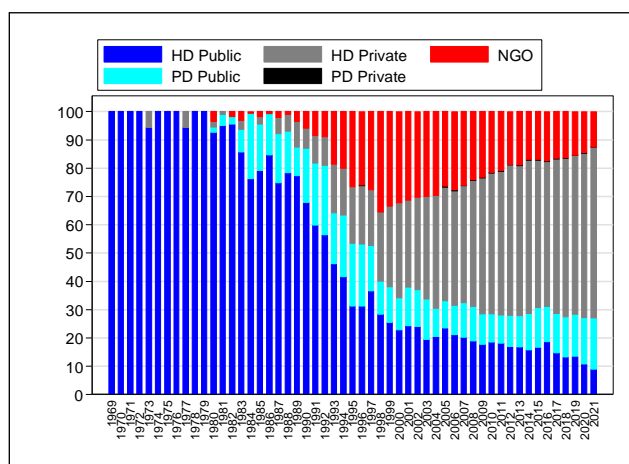
Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
New Dialysis patients	9123	9427	9485	8548	8088	8110	8047	7628	6999	6697	6045
% Public Centre	26.9	27.1	28.4	27.4	28.6	31.0	30.6	28.6	27.7	28.1	28.1
% HD Public Centre	9.0	10.7	13.4	13.2	14.8	18.7	16.6	15.8	16.7	16.9	18.2
% PD Public Centre	17.9	16.4	15.0	14.2	13.8	12.3	14.0	12.8	11.0	11.2	9.9
% NGO	12.4	14.6	15.3	16.4	16.6	17.5	17.0	17.1	18.9	18.6	20.9
% Private Centre	60.7	58.3	56.3	56.2	54.8	51.5	52.4	54.3	53.4	53.3	51.0
% HD Private Centre	60.5	58.1	56.1	56.0	54.6	51.3	52.3	54.1	53.2	53.1	50.7
% PD Private Centre	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.3
ESKD patients at 31st December	49770	50150	47418	44818	42702	40795	38138	35171	32366	29443	26480
% Public Centre	29.4	29.7	30.3	30.5	30.9	31.2	31.0	30.7	30.7	31.4	31.8
% HD Public Centre	17.9	18.8	19.8	20.4	20.9	21.5	21.2	21.4	22.0	22.8	23.8
% PD Public Centre	11.5	10.9	10.5	10.1	10.0	9.7	9.8	9.3	8.7	8.6	8.0
% NGO	17.4	18.2	18.8	19.2	19.8	20.3	20.7	21.7	22.8	23.6	24.9
% Private Centre	53.2	52.1	50.9	50.3	49.3	48.5	48.3	47.6	46.5	45.0	43.3
% HD Private Centre	53.1	52.1	50.9	50.2	49.2	48.4	48.2	47.5	46.4	44.9	43.1
% PD Private Centre	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2

PD is almost exclusively provided by the public sector with the private providing only 0.2% of new patients and 0.1% of prevalent patients. The public sector continued to provide an increasing proportion of PD to new patients accounting for 17.9% in 2021 while the proportion of new HD patients in public HD centres declined to less than 10%. A similar trend is reflected in prevalent patients. (Table 2.1.7 (a) & Figure 2.1.7(a))

Figure 2.1.7(a): Distribution of Dialysis Patients by Modality and Sector 1969-2021

(i) New Dialysis Patients

(ii) Dialysis Patients at 31st December



(For actual numbers in Fig 2.1.7a, refer to Appendix T2.1.7a)

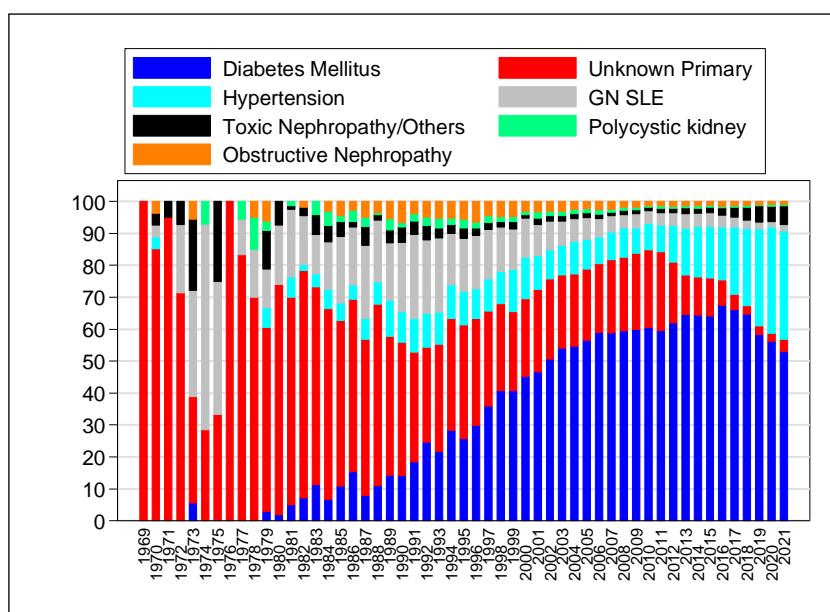
2.1.8: Primary renal disease

Diabetes mellitus remained the main cause of ESKD in new dialysis patients (53%) followed by hypertension (33.9%), unknown (4%) and glomerulonephritis/SLE (1.9%) (Figure 2.1.8). Although the proportion of diabetes appeared to have declined, this was probably artifactual due to changes in the classification of diabetes as the primary renal disease from 2019. Other reasons include reminders to sites to check their patients' status of diabetes and verification with sites prior to migration to a new kidney transplant allocation system (MyKAS).

Table 2.1.8: Primary Renal Diseases for New Dialysis Patients 2011-2021

Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
New Dialysis patients	9123	9427	9485	8548	8088	8110	8047	7628	6999	6697	6045
% Unknown cause	3.9	2.5	2.6	2.6	4.8	8.0	11.9	12.0	12.5	19.1	24.7
% Diabetes Mellitus	53.0	56.2	58.5	64.7	66.1	67.4	64.1	64.3	64.6	61.9	59.6
% GN/SLE	1.9	1.8	2.2	2.6	3.1	3.8	4.3	4.2	4.7	4.1	3.9
% Polycystic kidney	0.4	0.6	0.4	0.6	0.5	0.5	0.7	0.7	0.6	0.6	0.7
% Obstructive Nephropathy	0.9	0.9	1.0	1.2	1.4	1.5	1.2	1.4	1.4	1.6	1.4
% Toxic Nephropathy	0.4	0.5	0.8	0.9	1.0	0.8	0.5	0.5	0.5	0.5	0.4
% Hypertension	33.9	33.2	30.3	24.2	21.0	16.5	16.1	15.8	14.5	11.4	8.3
% Others	5.6	4.3	4.2	3.2	2.1	1.5	1.2	1.1	1.2	0.8	1.0

Figure 2.1.8: Primary Renal Diseases for New Dialysis Patients 1969-2021



(For actual numbers in Fig 2.1.8, refer to Appendix T2.1.8)

SECTION 2.2: GROWTH OF DIALYSIS IN MALAYSIA

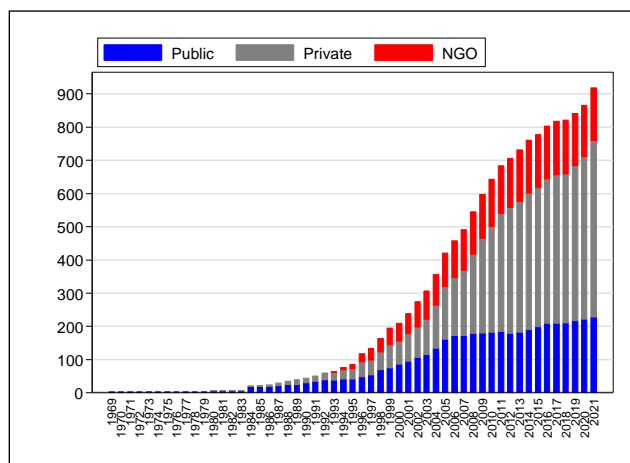
2.2.1: Growth in dialysis in Malaysia by sector

The number of dialysis centres (PD and HD Centres combined) for the whole of Malaysia increased from 683 in 2011 to 918 in 2021. The increase in number of dialysis centres was mainly contributed by the private dialysis centres, which grew from 354 in 2011 to 532 in 2021. The number of NGO centres in the same interval increased from 144 to 159 while the number of public dialysis centres increased from 185 in 2011 to 227 in 2021. The number of private dialysis centres predominates in the west coast of Peninsula Malaysia.

Table 2.2.1: Number and density of Dialysis, HD and PD Centres in Malaysia by State and Sector, Year 2011-2021

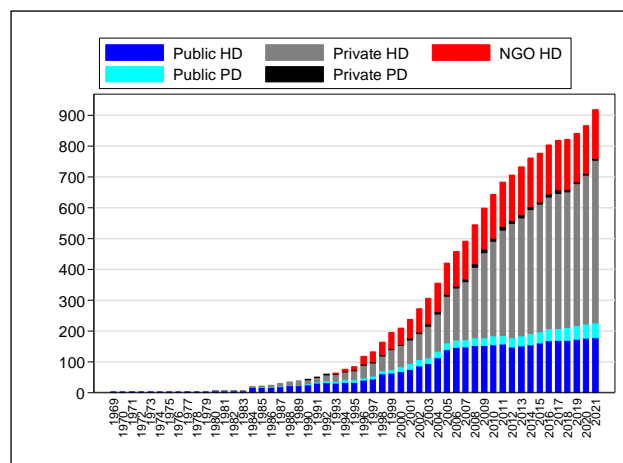
Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Public Centres	227	222	217	211	209	209	198	191	183	178	185
NGO Centres	159	156	157	162	161	160	159	159	156	148	144
Private Centres	532	488	467	448	448	434	420	411	393	380	354
HD Centres											
Public HD Centres	178	177	174	170	170	169	160	154	151	149	157
NGO HD Centres	159	156	157	162	161	160	159	159	156	148	144
Private HD Centres	526	482	461	441	438	424	412	403	384	370	343
PD Centres											
Public PD Centres	49	45	43	41	39	40	38	37	32	29	28
NGO PD Centres	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
Private PD Centres	6	6	6	7	10	10	8	8	9	10	11

Figure 2.2.1(a): Number of Dialysis Centre in Malaysia by Sector, 1969-2021



(For actual numbers in Fig 2.2.1, refer to Appendix T2.2.1)

Figure 2.2.1(b): Number of HD and PD Centre in Malaysia by Sector, 1969-2021



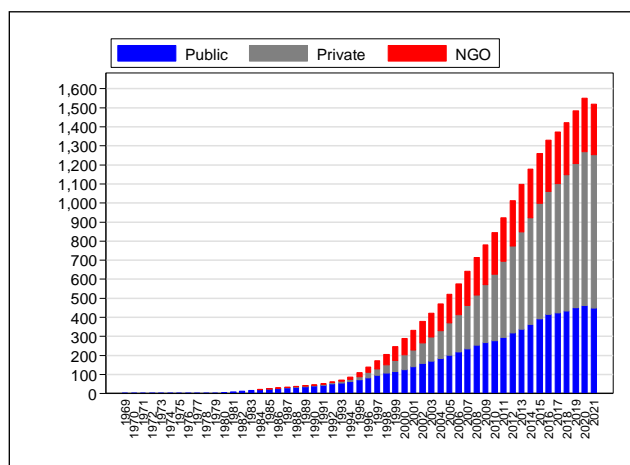
The proliferation of haemodialysis centres accounted for most of the increase in dialysis centres. Over the last 10 years, the total number of dialysis (HD and PD) patients had increased from 26,480 (923 pmp) in 2011 to 49,770 (1,518 pmp) in 2021.

In contrast to the economically advantaged West Coast states, where most of the patients were dialysing in the private sector, the public sector provided dialysis to most patients in the economically disadvantaged East Coast states and East Malaysia. Paradoxically, the NGO sector also provided higher number of dialysis treatment in the economically advantaged states compared to the less advantaged states.

Table 2.2.2: Number and Prevalence Rate of Dialysis (HD+PD), HD and PD Patients in Malaysia by State and Sector, 2011-2021

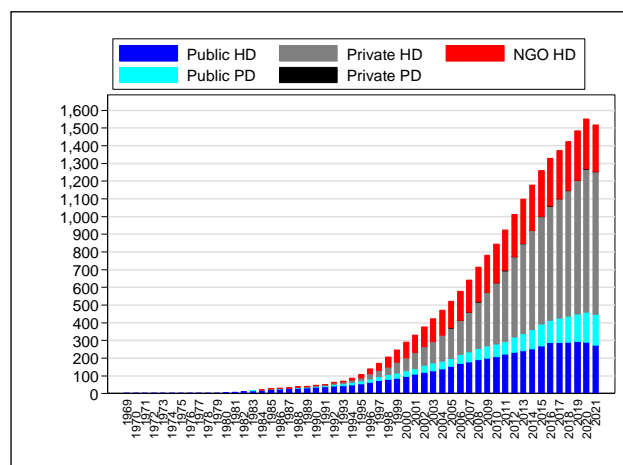
Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Dialysis patients, pmp											
Public	447	460	449	434	424	415	391	362	337	318	294
NGO	264	282	278	274	272	270	260	255	251	239	230
Private	807	808	757	714	677	645	608	560	510	456	399
HD patients, pmp											
Public	271	291	294	290	287	286	267	252	241	231	220
NGO	264	282	278	274	272	270	260	255	251	239	230
Private	806	807	755	713	675	643	608	559	509	454	398
PD patients, pmp											
Public	176	169	155	144	137	129	124	110	96	87	75
NGO	0	0	0	0	0	0	0	0	0	0	0
Private	1	1	1	1	1	1	1	1	1	1	1

Figure 2.2.2(a): Prevalence Rate of Dialysis Patient (HD+PD) Malaysia by Sector, 1969-2021



(For actual numbers in Fig 2.2.2, refer to Appendix T2.2.2)

Figure 2.2.2(b): Prevalence Rate of HD and PD Patient in Malaysia by Sector, 1969-2021



2.2.3: Growth in dialysis in Malaysia by region

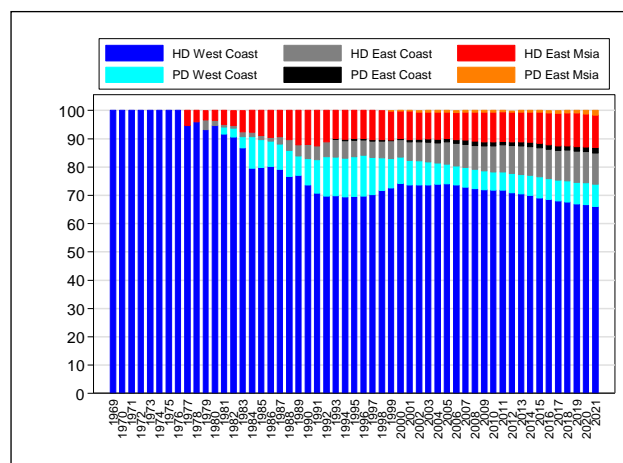
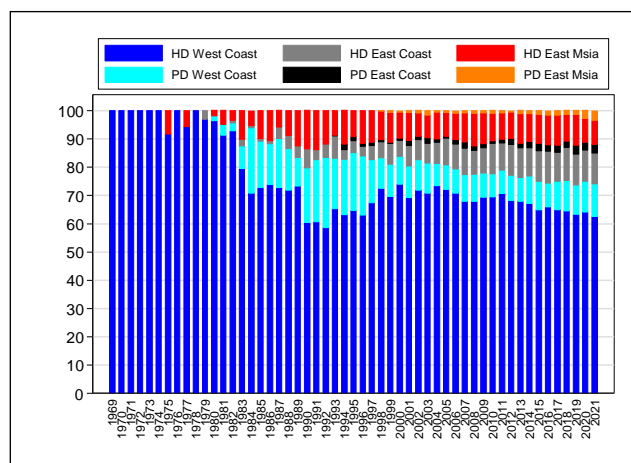
Table 2.2.3: Distribution of Dialysis Patients by Modality and Region 2011-2021

Year	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
New Dialysis patients	9123	9427	9485	8548	8088	8110	8047	7628	6999	6697	6045
% West Coast	74.2	75.0	73.5	75.2	75.0	74.4	75.0	76.7	76.2	77.0	78.8
% East Coast	13.8	13.7	14.1	13.8	12.8	13.5	13.5	12.3	12.1	13.0	11.0
% East Msia	12.0	11.3	12.4	11.0	12.2	12.1	11.5	11.0	11.7	10.0	10.2
New HD patients	7477	7868	8052	7318	6955	7104	6909	6631	6215	5937	5430
% West Coast	76.3	76.8	74.4	75.4	75.6	75.1	75.8	77.2	76.5	77.0	78.7
% East Coast	13.3	13.0	12.9	13.5	12.0	12.7	12.4	11.5	11.7	12.5	10.9
% East Msia	10.4	10.2	12.7	11.1	12.4	12.2	11.8	11.3	11.8	10.5	10.4
New PD patients	1646	1559	1433	1230	1133	1006	1138	997	784	760	615
% West Coast	64.9	65.8	68.5	74.1	71.1	69.5	70.7	73.5	74.0	77.4	79.7
% East Coast	16.3	16.8	20.9	15.4	17.8	19.3	19.7	17.5	14.8	17.0	11.9
% East Msia	18.8	17.4	10.6	10.5	11.1	11.2	9.6	9.0	11.2	5.6	8.4
Dialysing at 31st Dec	49770	50150	47418	44818	42702	40795	38138	35171	32366	29443	26480
% West Coast	73.9	74.4	74.6	75.1	75.4	75.9	76.4	77.0	77.4	77.8	78.3
% East Coast	12.9	12.7	12.6	12.4	12.1	12.0	11.9	11.6	11.3	11.2	10.6
% East Msia	13.2	12.9	12.8	12.5	12.5	12.1	11.7	11.4	11.3	11.0	11.1
HD Dialysing at 31st Dec	43968	44649	42440	40248	38408	36811	34351	31869	29502	26873	24301
% West Coast	74.6	74.8	74.7	75.2	75.6	76.1	76.5	77.0	77.4	77.7	78.2
% East Coast	12.5	12.3	12.1	12.0	11.6	11.5	11.4	11.3	11.1	10.9	10.3
% East Msia	12.9	12.9	13.2	12.8	12.8	12.4	12.1	11.7	11.5	11.4	11.5
PD Dialysing at 31st Dec	5802	5501	4978	4570	4294	3984	3787	3302	2864	2570	2179
% West Coast	68.8	70.9	73.0	73.7	73.7	74.1	75.3	76.3	77.5	78.4	79.0
% East Coast	16.4	16.6	16.4	15.7	16.3	16.2	15.9	14.4	13.9	14.2	13.2
% East Msia	14.8	12.5	10.6	10.6	10.0	9.7	8.8	9.3	8.6	7.4	7.8

Figure 2.2.3: Distribution of Dialysis Patients by Modality and Region 1969-2021

(i) New Dialysis Patients

(ii) ESKD Patients at 31st December



(For actual numbers in Fig 2.2.3, refer to Appendix T2.2.3)

Table 2.2.4: Number and Prevalence Rate of Dialysis Patients (HD & PD) in Malaysia by State and Sector, 2017-2021

State	Sector	Year 2021		Year 2020		Year 2019		Year 2018		Year 2017	
		N	PMP	N	PMP	N	PMP	N	PMP	N	PMP
Malaysia	Public	14651	450	14884	459	14346	441	13668	422	13188	412
	Private	26452	812	26147	806	24176	743	22524	696	21043	657
	NGO	8667	266	9119	281	8896	274	8626	266	8471	265
	Total	49770	1528	50150	1546	47418	1458	44818	1384	42702	1333
Johor	Public	1306	325	1333	332	1293	344	1240	331	1207	326
	Private	4855	1208	4730	1180	4396	1169	4161	1110	3967	1073
	NGO	1669	415	1786	445	1777	472	1768	472	1729	468
	Total	7830	1948	7849	1958	7466	1985	7169	1912	6903	1867
Kedah	Public	1102	512	1075	504	1032	475	989	457	947	442
	Private	2020	939	1973	926	1855	853	1733	801	1625	758
	NGO	409	190	437	205	432	199	411	190	388	181
	Total	3531	1641	3485	1635	3319	1527	3133	1449	2960	1381
Kelantan	Public	891	492	938	523	897	476	824	443	790	432
	Private	807	445	836	466	755	401	704	378	634	347
	NGO	223	123	221	123	200	106	191	103	171	93
	Total	1921	1060	1995	1113	1852	983	1719	924	1595	872
Melaka	Public	386	384	395	396	378	407	355	385	341	373
	Private	1225	1219	1164	1166	1084	1168	998	1082	910	997
	NGO	265	264	246	246	221	238	229	248	222	243
	Total	1876	1867	1805	1808	1683	1813	1582	1715	1473	1613
Negeri Sembilan	Public	771	640	802	668	780	693	748	666	687	617
	Private	1022	849	972	810	936	831	863	769	812	729
	NGO	619	514	594	495	540	480	530	472	537	482
	Total	2412	2003	2368	1973	2256	2003	2141	1907	2036	1828
Pahang	Public	962	601	961	604	932	558	911	547	877	532
	Private	1092	682	1003	630	936	560	840	505	758	460
	NGO	347	217	357	224	355	212	351	211	358	217
	Total	2401	1499	2321	1459	2223	1330	2102	1263	1993	1210
Perak	Public	1203	478	1242	498	1180	470	1122	448	1090	437
	Private	3149	1252	3126	1252	2832	1129	2603	1040	2435	977
	NGO	654	260	668	268	651	259	591	236	575	231
	Total	5006	1990	5036	2017	4663	1859	4316	1724	4100	1644
Perlis	Public	99	344	93	327	88	346	97	382	98	389
	Private	132	459	125	439	122	480	114	449	111	440
	NGO	41	143	53	186	55	216	61	240	57	226
	Total	272	946	271	952	265	1043	272	1072	266	1056
Pulau Pinang	Public	463	266	468	269	464	262	454	258	468	268
	Private	2007	1154	1991	1144	1832	1036	1779	1009	1724	989
	NGO	918	528	949	545	948	536	889	504	888	509
	Total	3388	1947	3408	1958	3244	1834	3122	1771	3080	1766
Sabah	Public	1736	509	1754	513	1714	439	1603	411	1525	395
	Private	578	169	572	167	550	141	482	124	449	116
	NGO	287	84	303	89	291	75	256	66	248	64
	Total	2601	762	2629	769	2555	655	2341	601	2222	576
Sarawak	Public	1687	684	1624	662	1514	540	1434	514	1371	496
	Private	1058	429	982	400	894	319	748	268	674	244
	NGO	1096	445	1111	453	1040	371	1017	364	987	357
	Total	3841	1558	3717	1515	3448	1229	3199	1146	3032	1096

State	Sector	Year 2021		Year 2020		Year 2019		Year 2018		Year 2017	
		N	PMP	N	PMP	N	PMP	N	PMP	N	PMP
Selangor	Public	1843	263	1965	281	1922	295	1826	282	1773	278
	Private	5844	833	6050	865	5636	866	5260	812	4886	766
	NGO	1177	168	1330	190	1319	203	1297	200	1261	198
	Total	8864	1264	9345	1336	8877	1364	8383	1295	7920	1241
Terengganu	Public	1176	1004	1181	1027	1105	888	1006	819	957	792
	Private	656	560	595	518	492	395	436	355	350	290
	NGO	281	240	295	257	289	232	274	223	266	220
	Total	2113	1805	2071	1802	1886	1515	1716	1397	1573	1302
WP Labuan	Public	114	1189	105	1105	102	1027	97	981	94	962
	Private	0	0	0	0	0	0	0	0	0	0
	NGO	0	0	0	0	0	0	0	0	0	0
	Total	114	1189	105	1105	102	1027	97	981	94	962
WP Putrajaya	Public	41	355	42	385	47	454	45	463	48	547
	Private	32	277	31	284	27	261	28	288	26	296
	NGO	0	0	0	0	0	0	0	0	0	0
	Total	73	633	73	668	74	714	73	751	74	843
WP Kuala Lumpur	Public	871	443	906	457	898	504	917	512	915	510
	Private	1975	1006	1997	1008	1829	1026	1775	992	1682	938
	NGO	681	347	769	388	778	436	761	425	784	437
	Total	3527	1796	3672	1853	3505	1966	3453	1929	3381	1886

(For actual numbers refer to Appendix T2.2.2)

Data Definition for Diabetes as the Primary Renal Disease

1. Prior to 2017 when data was submitted in paper form, primary and secondary causes of renal disease were allowed. The National Renal Registry (NRR) office adjudicated discrepancies in the data submitted to determine the primary renal disease (PRD).
 - If the PRD was recorded as unknown and patient has diabetes as the secondary cause or diabetes was included as a co-morbidity, the PRD was amended to diabetes.
 - If there was a discrepancy in PRD reported between centres, one as unknown and the other as diabetes, the PRD was amended to diabetes

2. In 2017 data collection migrated to eNRR, an online electronic form. From 2017 and 1st February 2021, the system allowed more than one PRD. The determination of PRD was based on the following algorithm:
 - If both unknown and diabetes were selected as PRD, diabetes was recorded as the PRD
 - If the PRD was recorded as unknown and diabetes was included as a co-morbidity, the PRD was amended to diabetes.
 - If there was a discrepancy in PRD reported between centres, the PRD at first notification was used
 - If multiple PRDs were entered, the order for PRD determination is as follows:
 - 1 ADPKD
 - 2 Hereditary nephritis, specify
 - 3 Glomerulonephritis, specify
 - 4 Obstructive uropathy, specify
 - 5 Drugs / toxic nephropathy
 - 6 Diabetes Mellitus
 - 7 Hypertension
 - 8 Others, specify
 - 9 Unknown
 Examples:
 - If 'Unknown' & 'diabetes' were selected as PRD then PRD is diabetes
 - If 'diabetes' & 'ADPKD' were selected as PRD then PRD is ADPKD
 - If 'Unknown' was selected as PRD and Comorbidities include diabetes then PRD is diabetes
 - If 'Unknown' was selected as PRD and Comorbidities include hypertension then PRD is hypertension
 - Change in PRD is permitted with written request and documentation from the source data providers to NRR

3. From 2nd February 2021 onwards
 - Only a single entry for PRD is permitted
 - If there was a discrepancy in PRD reported between centres, the PRD at first notification was used
 - If PRD is unknown and diabetes is included in comorbidity at notification, "Unknown" PRD is maintained
 - Change in PRD is permitted with written request and documentation from the source data providers to NRR

