كمنترين كصيحتن
KEMENTERIAN KESIHATAN
MINISTRY OF HEALTH
NEGARA BRUNEI DARUSSALAM

BDTR

BRUNEI DIALYSIS & TRANSPLANT REGISTRY

14TH EDITION 2024

TO PROMULGATE KIDNEY DISEASE AWARENESS, ESTABLISH WORLD-CLASS SERVICES AND ENHANCE PATIENTS' QUALITY OF LIFE

Foreword

Dr. Jackson Tan

The year 2024 continues to witness an exponential rise in the End-Stage Kidney Failure (ESKF) population, primarily driven by diabetes mellitus (DM). Brunei Darussalam bears an exceptionally high burden of diabetic kidney disease (DKD), with 74% of incident ESKF cases attributed to DM— a pattern consistent over the past decade. Consequently, Brunei continues to report among the world's highest rates of DM related ESKF incidence and percentage, as reflected in the United States Renal Data System (USRDS) reports of recent years.

Overall ESKF prevalence and incidence in Brunei remain among the top five globally. By the end of 2024, the total number of ESKF patients reached 1,085, reflecting an average annual growth rate of 5% over the previous decade. This equates to approximately one ESKF patient per 420 residents. Alarmingly, the ESKF population growth (5% annually) has far outpaced the national population growth rate of 1.4%. If this trajectory persists, projections suggest that by 2035 there could be one ESKF patient for every 300–350 residents— a trend that directly conflicts with the aspirational goals of Wawasan 2035.

In May 2025, the World Health Organization (WHO) formally prioritized kidney health within the global Noncommunicable Disease (NCD) agenda at the World Health Assembly in Geneva— a milestone achieved after years of dedicated advocacy by the nephrology community. This recognition highlights the global epidemic of chronic kidney disease (CKD) and the looming "healthcare cost tsunami" that threatens vulnerable nations. The paradigm shift emphasizes earlier detection, improved prevention, and stronger health systems aligned with the United Nations Sustainable Development Goals (SDGs): reducing premature mortality from NCDs (Goal 3.4) and achieving universal health coverage (Goal 3.8).

Brunei has taken commendable steps to combat NCDs through the Multisectoral Action Plan for the Prevention and Control of Noncommunicable Diseases (BruMAP-NCD 2021–2025). However, the current roadmap lacks dedicated strategic objectives for renal health— a gap that likely reflects an underestimation of the significance of ESKF within the national NCD context. The country's heavy reliance on government-funded kidney replacement therapy (KRT) is not sustainable. Instead, a transition toward public–private partnerships and non-governmental organization (NGO) involvement is urgently needed. Independent renal-specific entities— such as a National Kidney Foundation or similar charitable bodies— should be encouraged to emerge with minimal bureaucratic barriers. Long-term sustainability requires reducing dependence on government subsidies while promoting a culture of personal health responsibility. Strengthened collaborations between governmental agencies and NGOs are vital to promote health literacy, self-care, and cost-sharing initiatives within the community. Prioritizing cost effective renal replacement modalities— particularly kidney transplantation and peritoneal dialysis— through clear policy incentives is crucial to offset the escalating cost burden of haemodialysis.

Addressing CKD and DM in their early stages is pivotal to preventing disease progression and complications. Primary care professionals, as first points of contact, must be empowered with standardized CKD management algorithms and treatment guidelines co-developed with nephrology specialists. Such tools would support early diagnosis, timely intervention, and regular monitoring, thereby delaying or preventing progression to ESKF. In parallel, public health professionals should spearhead preventive education campaigns emphasizing the consequences of late CKD presentation. Enhancing public awareness can improve early health-seeking behavior, reduce disease burden, and ultimately alleviate pressure on tertiary care systems.

An alchemy of science, public health education, and policy resolve is essential to mitigate Brunei's growing CKD crisis. Sustaining current healthcare standards will depend on diversifying funding streams, strengthening early intervention frameworks, and fostering community participation. A unified, multidisciplinary, and forward-looking approach— integrating government leadership with private and civil society partnerships— is indispensable to secure Brunei's renal health future and achieve the long-term aspirations of Wawasan 2035.

BRUNEI DIALYSIS & TRANSPLANT REGISTRY

Table of Content

Chapter 1 - Background

The Brunei Dialysis and Transplant Registry (BDTR) serves as a comprehensive national database that systematically collates information from all dialysis centers across Brunei Darussalam. Established to enhance the quality of care for individuals with kidney disease, the registry provides a structured and standardized framework for the continuous collection of observational data. This facilitates an accurate description of the natural history, epidemiology, and disease burden of chronic kidney disease (CKD) and end-stage kidney failure (ESKF) within the national population.

ESKF and its associated comorbidities contribute substantially to the health and socio-economic burden of the country. Reliable epidemiological data are therefore critical to support evidence-based planning, optimal allocation of healthcare resources, and evaluation of national renal care strategies. The BDTR also enables benchmarking of service performance and clinical outcomes against established international renal registries, promoting alignment with global best practices and continuous quality improvement in the delivery of kidney replacement therapy (KRT).

The core objectives of the BDTR remain consistent with its founding mandate and are as follows:

01 To describe the state and epidemiological profile of CKD in Brunei Darussalam.

02 To quantify the disease burden attributable to ESKF at the national level.

03 To identify factors influencing the outcomes of KRT among patients with ESKF.

04 To evaluate and benchmark the national KRT program against regional and international standards of care.

05 To stimulate and facilitate clinical and epidemiological research related to CKD, ESKF, and KRT in Brunei Darussalam.

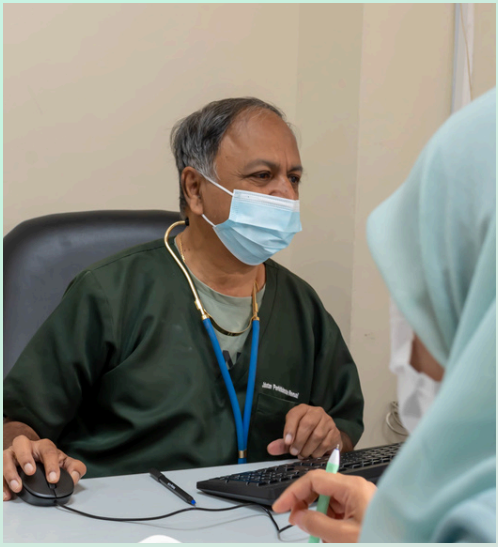
Chapter 2 - Methodology and Population

2.1 METHODOLOGY

The registry utilizes primary data collected through a prospective, multicenter cohort design, aimed at capturing accurate and comprehensive information from patients with ESKF undergoing treatment in all participating dialysis centers and hospitals across Brunei Darussalam. This design enables longitudinal tracking of clinical and outcome parameters, providing a robust framework for epidemiological and quality-of-care assessments. Consistent with previous registry cycles, data collection follows a standardized national protocol. Each dialysis center contributes quarterly datasets comprising prespecified laboratory and clinical parameters. Data are coordinated by designated registry focal persons within each centre, who are responsible for organizing, validating, and submitting the data to the central BDTR office.

Baseline demographic and clinical information are recorded at the point of entry into the KRT program by the admitting team in the respective hospitals. Subsequent patient outcomes, including transfers between centers, changes in treatment modality, deaths, and loss to follow-up, are documented and submitted monthly using pre-designed proformas. In addition, data from transplant and outpatient clinic cohorts are collected at predefined intervals by dedicated transplant and clinic coordinators. These datasets are synchronized with dialysis center submissions to ensure completeness and consistency across the BDTR.

RIMBA DIALYSIS CENTRE

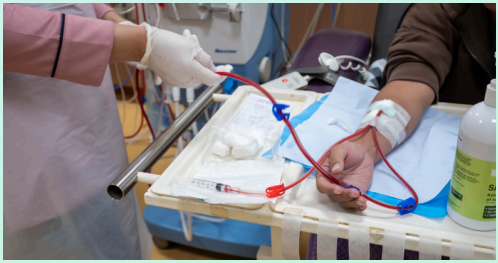


RENAL DIALYSIS UNIT
RAJA ISTERI PENGIRAN ANAK SALEHA HOSPITAL

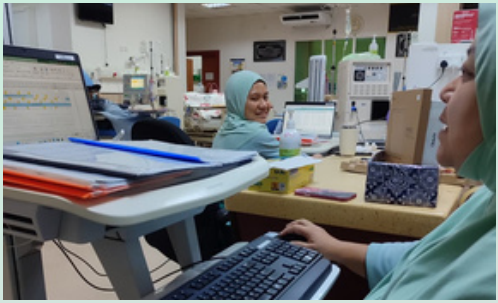
KIARONG DIALYSIS CENTRE

TUTONG DIALYSIS CENTRE

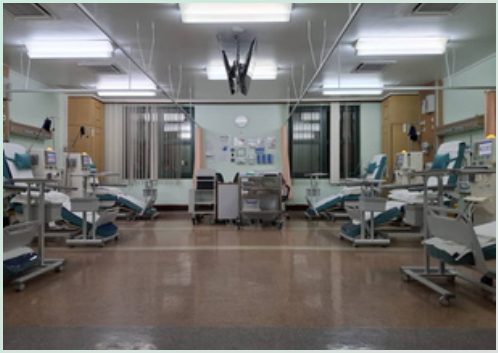
KUALA BELAIT DIALYSIS CENTRE



TEMBURONG DIALYSIS UNIT



JPMC RENAL DIALYSIS UNIT



2.2 ESKF REGISTRY POPULATION

INCLUSION CRITERIA

The Registry population comprised of all ESKF patients treated at MOH facilities in Brunei Darussalam. This population covered all ESKF patients in Brunei as there was currently no other dialysis provider in the country. Non-Brunei citizens and residents who dialysed permanently in Brunei or had functioning transplant grafts under long term follow up in Brunei were also included in the registry.

EXCLUSION CRITERIA

A Patients who underwent temporary acute hemodialysis (less than 2 weeks) are not included in the registry

B Patients who died within 2 weeks of starting KRT

C Foreign Nationals who had short-term (less than 4 weeks) KRT in Brunei

D Foreign Nationals who had short-term renal transplant follow up in Brunei

E Intensive Care patients who required slow low efficiency dialysis (SLED), continuous venovenohaemofiltration (CVVHF), continuous veno-veno hemodiafiltration (CVVHDF) or single pass albumin dialysis (SPAD).

F Patients who had KRT in private institutions (not applicable in this cohort)

Chapter 3 – Incidence and prevalence

The treated point prevalence of ESKF on 31/12/2024 was 2372 per million population (pmp) from a national population of 456,000; which corresponded to 1082 prevalent patients. However, if prevalence was only limited to citizens and permanent residents (from a population of 347,000), then the adjusted point prevalence of ESKF was 3118 pmp. The treated annual incidence rate of ESKF was 524 pmp, which corresponded to 239 new patients. The associated incidence for citizens and permanent residents was 689 pmp.

There was a 6.3% increase in absolute prevalent numbers (from 1018 to 1082) in the past 12 months, which is consistent with annual increment trends over the past decade. To enable comparison with international registries and studies, ESKF patients who were dialysed for less than 3 months were not eligible to be included as incident patients. HD remained the dominant KRT modality, accounting for 81% of patients; followed by PD (14%) and Tx (5%). There was a slight decline in overall PD numbers compared to 2023, but overall HD and Tx numbers have increased. The overall linear forecast, utilizing data from the past 10 years, for KRT, HD, PD and Tx were 39, 28, 10 and 1 patients, respectively.

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
All	698	754	778	783	786	881	893	915	1018	1082
HD	586	629	656	655	660	752	732	737	811	874
PD	67	78	75	82	80	81	114	125	151	149
TX	45	47	47	46	46	48	47	49	56	59

Table 1- Total numbers of KRT patients (2015-2024)

LEGEND	HD - Haemodialysis PD - Peritoneal Dialysis TX - Transplant

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
All KRT	698	754	778	783	786	881	893	915	1018	1082
HD	586	629	656	655	660	752	732	737	811	874
PD	67	78	75	82	80	81	114	125	151	149
Tx	45	47	47	46	46	48	47	49	56	59

Figure 1- Prevalence (pmp) and incidence (pmp) trends over 10 years (2015-2024)

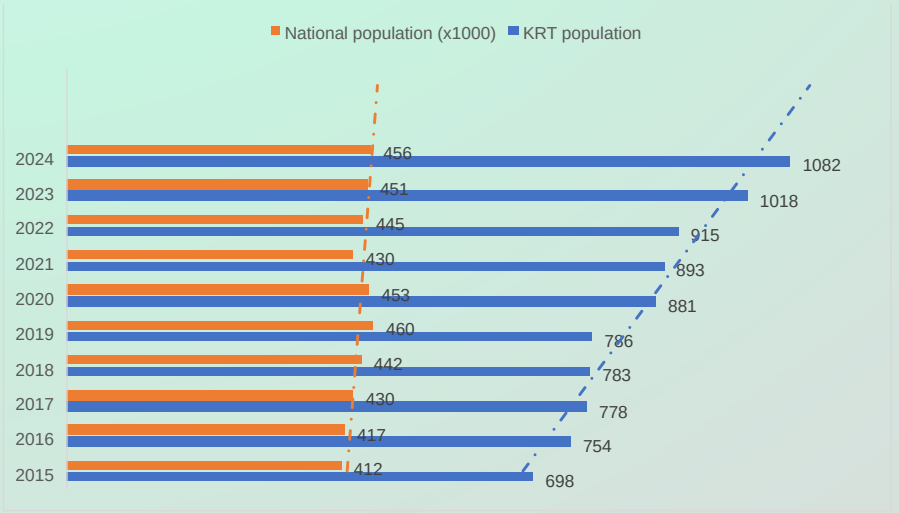


Figure 2- Comparison of national population and KRT trends over 10 years

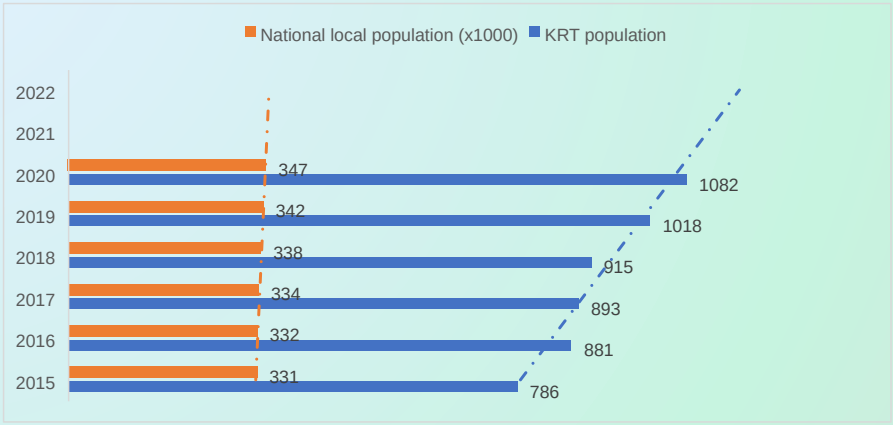


Figure 3- Comparison of national population (citizens and permanent residents) and ESKF trends over 10 years

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
KRT prevalent population	698	754	778	783	786	881	893	915	1018	1082
KRT incident population	105	175	166	168	176	217	218	189	259	239
National population (1,000)	412	417	430	442	460	453	430	445	451	456
Prevalence ppm	1694	1808	1809	1769	1708	1944	2077	2056	2244	2372
Incidence ppm	256	420	387	380	382	479*	506*	424*	574*	524*
Incidence to prevalence ratio	NA	NA	NA	NA	NA	0.25	0.24	0.21	0.26	0.22

Table 2- National population, prevalence and incidence of ESKF trends over the last ten years (2015-2024)

Year	2019	2020	2021	2022	2023	2024
KRT prevalent population	786	881	893	915	1018	1082
KRT incident population	176	217	218	189	259	239
National local*	331	332	334	338	342	347
Prevalence ppm	2374	2654	2673	2707	2976	3118
Incidence ppm	531	653	652	559	757	689

**(Citizens and permanent residents) population (1,000)*

Table 3 National population (citizens an permanent residents only), prevalence and incidence of ESKF trends over the last six years (2019-2024)

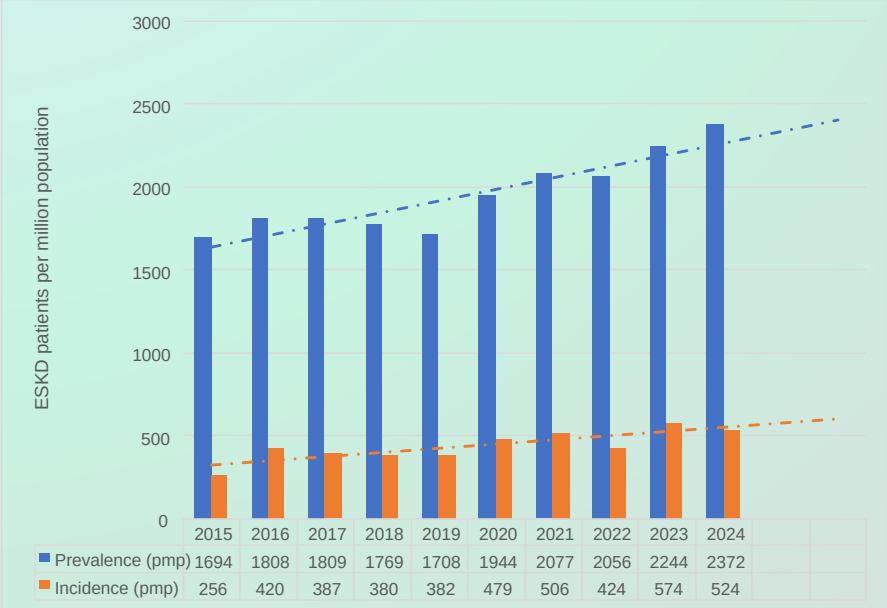


Figure 4 Prevalence (pmp) and incidence (pmp) trends over 10 years (2015-2024)

Chapter 4 - Demographics of prevalent ESKF patients

Rimba Dialysis Centre hosted the most HD patients with 329 patients; followed by Kuala Belait Dialysis Centre and Renal Dialysis Unit RIPAS Hospital with 136 and 128 HD patients respectively. The mean dialysis vintage of HD and PD patients were 3.76 ± 4.60 and 2.66 ± 2.53 years respectively. The overall dialysis vintage for dialysis patients was 3.61 ± 4.40. The median dialysis vintage for both HD and PD patients was 2 years.

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Rimba Dialysis Centre	246	244	263	290	294	292	298	279	265	277	329
Kiarong Dialysis Centre	60	60	60	58	57	60	64	65	60	59	58
Renal Dialysis Unit RIPASH	134	112	131	130	119	121	165	119	100	140	128
JPMC Renal Dialysis Unit	NA	NA	NA	NA	NA	NA	NA	45	88	93	95
Tutong Dialysis Centre	51	60	61	63	62	60	77	76	76	87	98
Kuala Belait Dialysis Centre	85	83	93	93	98	104	112	121	120	125	136
Temburong Dialysis Unit	30	27	21	22	25	23	36	27	28	30	30
HD	606	586	629	656	655	660	752	732	737	811	874
PD	53	67	78	75	82	80	81	114	125	151	149
Tx	39	45	47	47	46	46	48	47	49	56	59
All	698	698	754	778	783	786	881	893	915	1018	1082

Table 4- Distribution of patients by dialysis centres and KRT modalities

Year	N	% Data recorded	Mean (years)	SD	Median (years)
Rimba Dialysis Centre	311	95	4.07	4.52	2
Kiarong Dialysis Centre	58	100	6.16	7.06	4
Renal DialysisUnit RIPASH	128	100	1.47	1.84	1
JPMC RenalDialysis Unit	94	99	2.8	2.12	3
Tutong DialysisCentre	98	100	5.07	5.25	3
Kuala BelaitDialysis Centre	136	100	3.84	5.22	2
TemburongDialysis Unit	30	100	4.1	3.77	3
HD	855	98	3.76	4.6	2
PD	149	100	2.66	2.53	2
Tx	1004	98	3.61	4.4	2
All	311	95	4.07	4.52	2

Table 5 – Dialysis vintage of HD and PD patients

Chapter 5 – Demographics and aetiology of incident patients

There were 239 incident ESKF patients in 2024 that fulfilled the registry criteria for commencing KRT. There were 212 new HD starts, 25 PD starts and 2 pre-emptive KTs. The mean and median age of patients were 56.13 ± 13.89 and 57 years respectively. There was a male predisposition (57%), with 88% of patients being of Malay racial origin.

74% of all ESKF patients were caused by diabetes mellitus. Glomerulonephritis and hypertension were the two next most common causes accounting for 12% and 8% of all causes. The majority of glomerulonephritis cases were unclassified but focal segmental glomerulosclerosis was the most common diagnosed entity (5 cases).

		N (%)
All	–	239
Mean Age (years)	–	56.13 ± 13.89
Median Age (years)	–	57
Gender	Male	136 (57%)
	Female	103 (43%)
Race	Malay	211 (88%)
	Chinese	18 (8%)
	Iban	6 (3%)
	Others	4 (2%)
Hospital / Modality start	HD (RIPAS / Rimba)	168 (70%)
	HD (KB)	44 (18%)
	Peritoneal Dialysis	25 (10%)
	Transplant (pre-emptive)	2 (1%)

Table 6- Demographic details of incident patients

Incident		2024	2023	2022	2021	2020	2019
All		239	259	189	244	229	176
Diabetes Mellitus		177 (74%)	204 (79%)	139(74%)	177 (73%)	180(79%)	134(76%)
Hypertension		18 (8%)	20 (8%)	12 (6%)	22 (9%)	18 (8%)	16 (9%)
Glomerulonephritis	All	28 (12%)	24 (9%)	28 (15%)	29 (12%)	21 (9%)	14 (8%)
	FSGS	5 (2%)	5 (2%)	6 (3%)	3 (1%)	10 (4%)	4 (3%)
	IgAN / HSN	3 (1%)	1 (0%)	4 (2%)	4 (2%)	1 (0%)	1 (1%)
	RPGN	2 (1%)	0	0	0	0	0
	MPGN	0	1 (0%)	2 (1%)	0	2 (1%)	0
	IgMN	0	0	0	0	0	1 (1%)
	MN	2 (1%)	1 (0%)	1 (1%)	3 (1%)	0	0
	Others	0	0	1 (1%)	1 (0%)	0 (0%)	1 (1%)
	Unspecified	16 (7%)	16 (6%)	14 (7%)	18 (7%)	8 (3%)	7 (4%)
Interstitial Nephritis		0	0	0	1 (0%)	0 (0%)	3 (2%)
Obstructive		8 (3%)	4 (2%)	3 (2%)	4 (2%)	4 (2%)	2 (1%)
SLE		2 (1%)	3 (1%)	2 (1%)	1 (0%)	2 (1%)	1 (1%)
APKD		1 (0%)	1 (0%)	1 (1%)	1 (0%)	0	0
Others		5 (2%)	3 (1%)	3 (2%)	4 (2%)	4 (2%)	6 (4 %)

Table 7 – Aetiology of incident ESKF patients

Chapter 6 – Mortality

There were 180 deaths amongst all KRT patients in 2024. The mean and median age of deaths were 60.41 ± 12.43 and 61 years respectively. The mean and median dialysis vintage were 3.47 ± 4.84 and 2 years respectively. The most common causes of deaths were sepsis (24%), cardiovascular (13%) and cerebrovascular (7%). The majority of deaths were not classified.

The mortality rates for HD, PD and Tx patients were 15%, 15% and 2% respectively. By proportion of patients, patients from dialysis units at RIPASH and KB Hospital recorded the highest death rates (22% and 20% respectively) – likely through the effects of being acute centers for the country.

		Total
All		180
Mean Age (years)		60.41 ± 12.43
Median Age (years)		61
Mean dialysis vintage (years)		3.47 ± 4.84
Median dialysis vintage (years)		2
Gender	Male	105 (58%)
	Female	75 (42%)
Cause of deaths	Sepsis	44 (24%)
	Cardiovascular	23 (13%)
	Cerebrovascular	12 (7%)
	Others	13 (7%)
	Not specified	88 (49%)
Race	Malay	160 (89%)
	Chinese	12 (7%)
	Others	8 (4%)

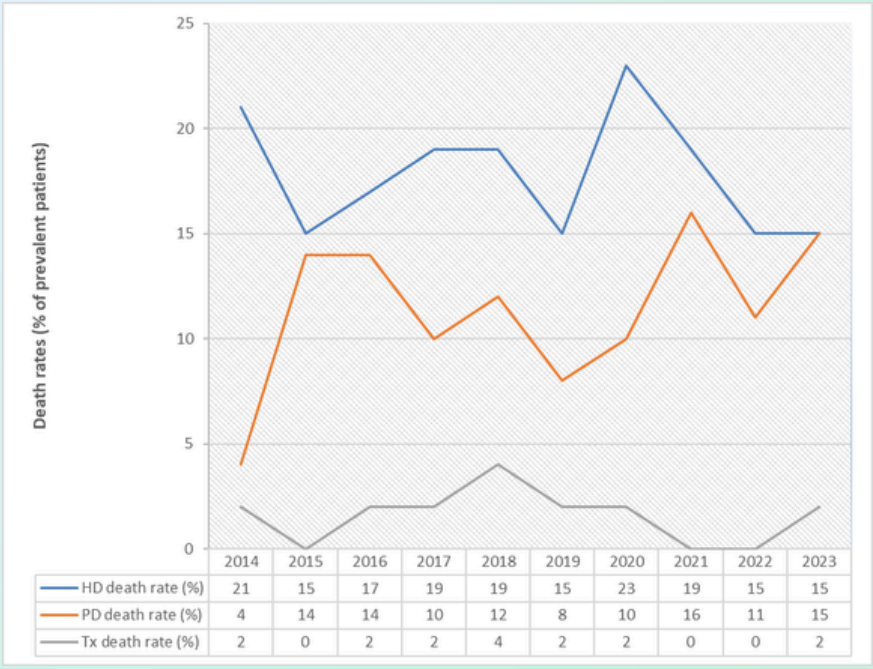
Table 8 – Demographics of ESKF patients who died in 2024.

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Rimba Dialysis Centre	37	30	52	56	60	44	63	60	41	60
Kiarong Dialysis Centre	4	2	5	9	10	5	23	12	10	11
Renal Dialysis Unit RIPASH	76	41	36	48	37	38	62	46	32	37
JPMC Renal Dialysis Unit	NA	NA	NA	NA	NA	NA	10	7	12	6
Tutong Dialysis Centre	7	9	12	10	10	13	20	12	13	4
Kuala Belait Dialysis Centre	21	21	29	23	30	28	30	29	30	34
Temburong Dialysis Unit	9	6	4	3	5	2	13	3	5	1
HD	154	109	138	149	152	131	221	169	143	153
PD	3	13	12	9	11	7	13	23	19	26
Tx	1	0	1	1	2	1	1	0	0	1
All	158	122	151	159	165	138	235	192	162	180

Table 9 - Mortality by center / modality

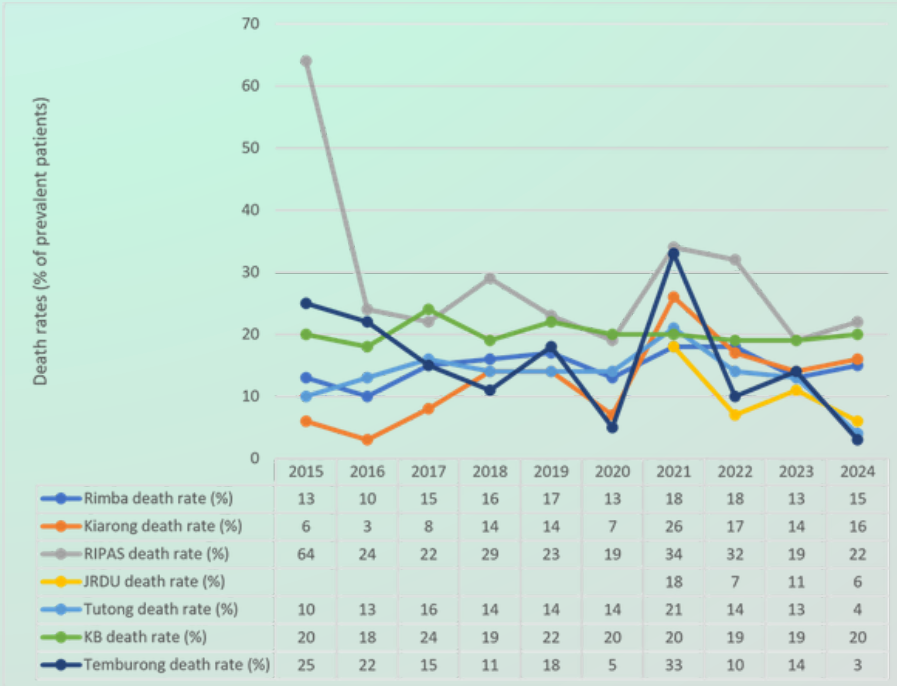
Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Rimba Dialysis Centre	13	10	15	16	17	13	18	18	13	15
Kiarong Dialysis Centre	6	3	8	14	14	7	26	17	14	16
Renal DialysisUnit RIPASH	64	24	22	29	23	19	34	32	19	22
JPMC RenalDialysis Unit	–	–	–	–	–	–	18	7	11	6
Tutong DialysisCentre	10	13	16	14	14	14	21	14	13	4
Kuala BelaitDialysis Centre	20	18	24	19	22	20	20	19	19	20
TemburongDialysis Unit	25	22	15	11	18	5	33	10	14	3
HD	21	15	17	19	19	15	23	19	15	15
PD	4	14	14	10	12	8	10	16	11	15
Tx	2	0	2	2	4	2	2	0	0	2
All	18	14	16	17	17	14	21	17	14	14

Table 10 - Mortality percentage (%) by centers / modality



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
HD death rate (%)	21	15	17	19	19	15	23	19	15	15
PD death rate (%)	4	14	14	10	12	8	10	16	11	15
Tx death rate (%)	2	0	2	2	4	2	2	0	0	2

Figure 5 – Death rates percentage (%) – modality comparison



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Rimba death rate (%)	13	10	15	16	17	13	18	18	13	15
Kiarong death rate (%)	6	3	8	14	14	7	26	17	14	16
RIPAS death rate (%)	64	24	22	29	23	19	34	32	19	22
JRDU death rate (%)							18	7	11	6
Tutong death rate (%)	10	13	16	14	14	14	21	14	13	4
KB death rate (%)	20	18	24	19	22	20	20	19	19	20
Temburong death rate (%)	25	22	15	11	18	5	33	10	14	3

Figure 6- Death rates (%) – HD centers comparison

Chapter 7 – Anaemia Management

The mean and median haemoglobin levels for all dialysis patients were 10.96 ± 1.82 g/dl. The haemoglobin levels for HD and PD patients were 10.92 ± 1.82 and 11.13 ± 1.85 g/dl respectively. However, only 34% of KRT patients achieved the target of 10.0-11.5 g/dl recommended by KDIGO. The target range has been altered from 10.0-12.9 g/dl to 10.0-11.5 g/dl to align with KDIGO recommendations, hence comparisons with previous years will be flawed.

Location	N	% data recorded	Mean (g/dll)	SD	Median (g/dll)	Under 10 g/dl (%)	10.0-11.5 g/dl (%)	11.6-12.9 g/dl (%)	Over 13 g/dl (%)
Rimba Dialysis Centre	329	89	11.03	1.73	11.1	27	34	27	12
Kiarong Dialysis Centre	58	100	11.44	1.57	11.2	17	33	31	19
Renal Dialysis Unit RIPASH	128	99	10.1	2.01	9.7	54	20	17	9
JPMC Renal Dialysis Unit	95	97	11.81	1.89	11.5	12	39	22	27
Tutong Dialysis Centre	98	100	10.71	1.32	10.8	31	40	24	5
Kuala Belait Dialysis Centre	136	98	10.69	1.95	10.6	39	29	20	11
Temburong Dialysis Unit	30	100	11.33	1.34	11.3	17	43	33	7
HD	874	95	10.92	1.82	10.9	31	33	24	12
PD	149	100	11.13	1.85	11.1	26	36	23	15
All	1023	96	10.96	1.82	10.9	30	34	24	12

Table 11- Haemoglobin levels in ESKF patients (by centers and modalities)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Mean Hb	11.18	10.71	10.6	10.8	11.15	11.57	10.56	11.08	11.07	10.96
% in target range	–	–	–	–	–	57	56	58	54	34*

Table 12 – Haemoglobin levels in ESKF patients (2015-2024)

Figure 7 -Trend of haemoglobin levels (2015-2024)

Chapter 8 – Dialysis adequacy, HD blood flow and HD AVF rate

45% and 53% of HD and PD patients achieved dialysis adequacy of 0.7 (urea reduction ratio) and 1.7 (kt/v) respectively. The mean and median URR of HD patients were 0.67 ± 0.09 and 0.69 respectively. The mean and median kt/v of PD patients were 1.72 ± 0.41 and 1.70 respectively. Over the past decade, there was a progressive improvement in URR in HD patients, but decline in kt/v in PD patients.

Mean and median HD blood flow were 273.09 ± 25.21 and 280 mls/min respectively. However only 29% of patients achieved the target blood flow rate of 300 mls/min. The overall HD blood flow rate has improved over the past decade, but levels have been static over the past 5 years.

The overall AVF % rate was 62%, a decline from the previous year. Low AVF usage rates were mainly evident in the acute HD centers- RIPASH and KB Hospital.

Location	N	% data recorded	Mean URR (HD) or Kt/V (PD)	SD	Median URR (HD) or Kt/V (PD)	% With URR > 0.7 (HD) or Kt/V > 1.7(PD)
Rimba Dialysis Centre	329	82	0.67	0.1	0.68	46
Kiarong Dialysis Centre	58	100	0.68	0.09	0.69	47
Renal Dialysis Unit RIPASH	128	63	0.66	0.1	0.67	44
JPMC Renal Dialysis Unit	95	98	0.72	0.1	0.72	69
Tutong Dialysis Centre	98	98	0.69	0.08	0.7	53
Kuala Belait Dialysis Centre	136	88	0.63	0.09	0.63	21
Temburong Dialysis Unit	30	100	0.65	0.11	0.66	43
HD	874	85	0.67	0.09	0.69	45
PD (kt/v)	149	97	1.72	0.41	1.7	53

Table 13 – Dialysis adequacy in ESKF patients (by centers and modalities)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Mean URR (HD)	0.67	0.67	0.60	0.66	0.64	0.66	0.64	0.68	0.66	0.69

Table 14 - URR in HD patients (2015-2024)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Mean kt/v (PD)	1.86	1.84	1.79	1.77	1.75	1.74	1.74	1.73	1.71	1.72

Table 15 – Kt/v in PD patients (2015-2024)

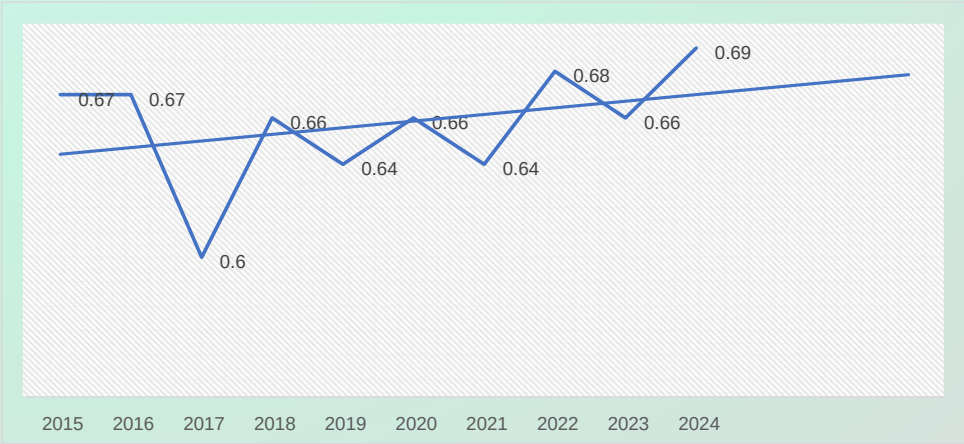


Figure 8 - URR in HD patients (2015-2024)

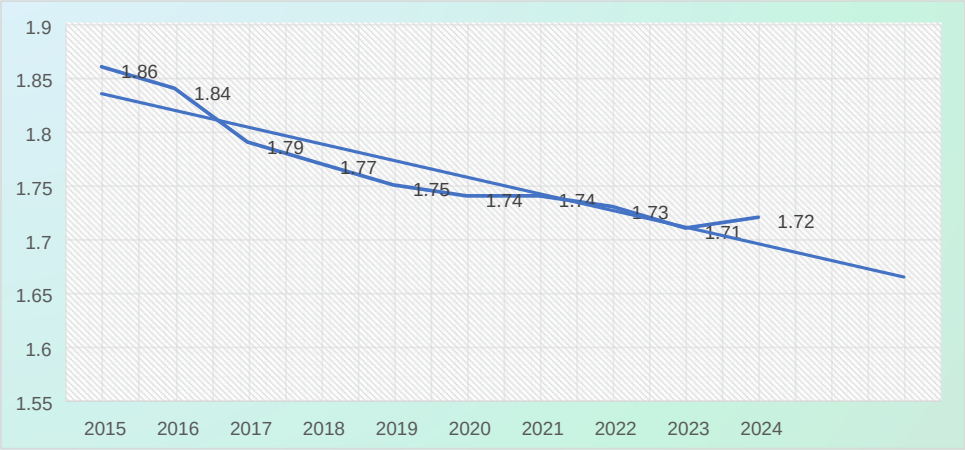


Figure 9 - Kt/v in PD patients (2015-2024)

Location	N	% Data recorded	Mean (ml/min)	SD	Median (ml/min)	≥ 300mls/min (%)
Rimba Dialysis Centre	329	86	285.42	25.89	280	46
Kiarong Dialysis Centre	58	100	285	24.65	280	38
Renal Dialysis Unit RIPASH	128	99	265.04	24.78	250	25
JPMC Renal Dialysis Unit	95	98	289.82	26.4	290	30
Tutong Dialysis Centre	98	99	265.26	23.59	260	8
Kuala Belait Dialysis Centre	136	98	244.15	26.89	250	4
Temburong Dialysis Unit	30	100	270	32.16	280	40
HD	874	94	273.09	25.21	280	29

Table 16 – Mean blood flow in HD centers (2015-2024)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Mean blood flow rate (HD)	246	253	248	255	280	278	282	273	272	273

Table 17- Mean HD blood flow rates (2015-2024)

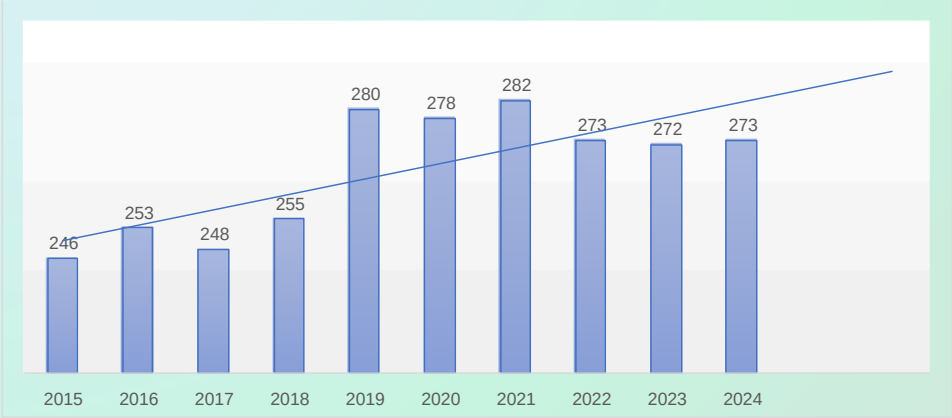


Figure 10 - Mean HD blood flow rates (2015-2024)

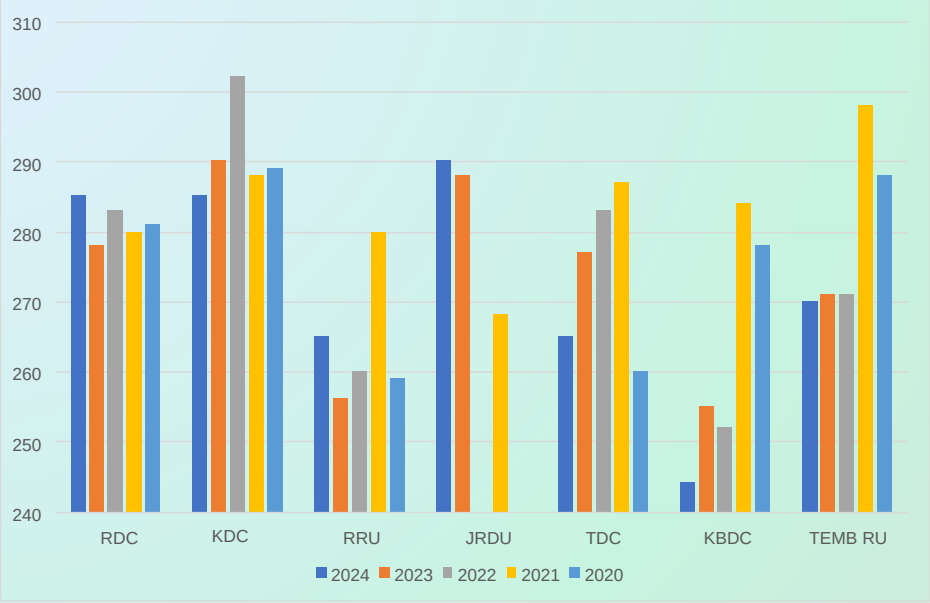


Figure 11 – Mean HD blood flow rates by HD centers (2020-2024)

LEGEND	**RDC – Rimba Dialysis Centre** **KDC – Kiarong Dialysis Centre** **RRU- Renal Dialysis Unit, RIPASH** **JRDU- JPMC Renal Dialysis Unit** **TDC- Tutong Dialysis Centre** **KBDC- Kuala Belait Dialysis Centre** **Temb RU- Temb Dialysis Unit**

Location	No. of HD patients	% Data recorded	No. of HD patients with functioning AVF	AVF (%) 2024	AVF (%) 2023	AVF (%) 2022	AVF (%) 2021	AVF (%) 2020
Rimba Dialysis Centre	329	89	200	68	81	76	75	84
Kiarong Dialysis Centre	58	100	45	78	83	77	75	83
Renal Dialysis Unit RIPASH	128	100	43	34	30	36	37	47
JPMC Renal Dialysis Unit	95	99	71	75	60	22	NA	NA
Tutong Dialysis Centre	98	100	74	75	76	79	71	74
Kuala Belait Dialysis Centre	136	100	65	48	52	42	39	45
Temburong Dialysis Unit	30	100	23	77	74	58	62	72
HD	874	96	531	62	64	56	59	70

Table 18- Trends and distribution of HD patients with AVF (2020-2024)

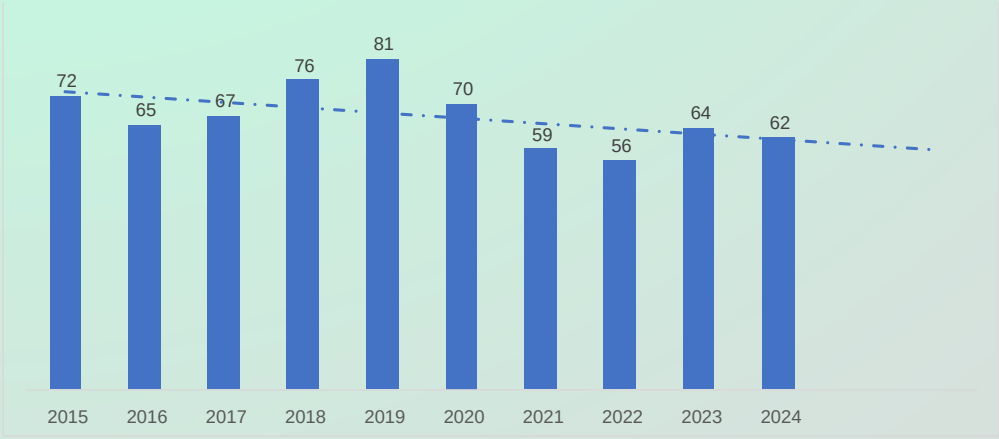


Figure 12 - Trends of AVF prevalence (% of patients with functioning AVF) from 2015-2024

Chapter 9 – Kidney biopsies

A total of 71 kidney biopsies were performed in 2024 by the radiologists. 87% (n=62) were done by ultrasound guidance while the rest were CT-guided. The mean and median serum creatinine at the time of biopsies were 261 ± 283.63 and 147 mmol/l respectively. The mean and median urine protein creatinine ratio were 713.99 ± 666.95 and 529 mg/mmol respectively. 86% of the biopsy were elective procedures and 96% on native grafts. The mean and median number of viable glomeruli on biopsies were 13.23 ± 10.81 and 10 respectively. Minimal change disease, lupus nephritis and diffuse glomerulosclerosis were the most common histopathological entities.

Number of biopsies		71 (100%)
Gender	Male	43 (61%)
	Female	28 (39%)
Mean Age (years)		40.54 ± 15.99
Mean Cr (mmol/l)		261.71 ± 283.63
Median Cr (mmol/l)		147
Mean Urine PCR (mg/mmol)		713.99 ± 666.95
Median Urine PCR (mg/mmol)		529
Radiology mode	Ultrasound	62 (87%)
	CT	9 (13%)
Timing	Acute	10 (14%)
	Chronic	61 (86%)
Graft	Native	68 (96%)
	Transplant	3 (4%)
Mean number of glomeruli		13.23 ± 10.81
Median number of glomeruli		10
Diagnosis	Minimal Change	16 (23%)
	Lupus Nephropathy	12 (17%)
	Diffuse Glomerulosclerosis	7 (10%)
	Focal Segmental Glomerulosclerosis	5 (7%)
	IgA Nephropathy	3 (4%)
	Pauci immune Crescentic GN	3 (4%)
	Diabetic Nephropathy	2 (3%)
	Hypertensive Nephropathy	2
	Chronic rejection	2

Table 13 – Dialysis adequacy in ESKF patients (by centers and modalities)

Chapter 10 – Mineral Bone Disease

The mean and median phosphate levels of HD and PD patients were 1.90 ± 0.65 mmol/l and 1.84 mmol/l respectively in 2024. 38% of HD and 36% of PD patients achieved the desired range of 1.13 to 1.78 mmol/l (KDOQI guideline). Compared to HD patients, PD patients recorded significantly higher phosphate levels.

Parathyroid hormone levels remained poor with mean and median values of 69.10 ± 61.74 pmol/l and 52 pmol/l respectively. 19% of all patients were able to achieve KDOQI guideline level of 16.5-33 pmol/l. PD patients have lower PTH levels and greater proportion of patients with target PTH levels. The mean and median calcium level of HD and PD patients were 2.21 ± 0.26 mmol/l and 2.20 mmol/l respectively. 54% of dialysis patients respectively were able to achieve KDOQI target levels of 2.1-2.37 mmol/l.

Location	N	% data recorded	Mean (mmol/l)	SD	Median (mmol/l)	% Between 1.13 to 1.78 mmol/l
Rimba Dialysis Centre	329	86	1.89	0.6	1.86	37
Kiarong Dialysis Centre	58	98	2.02	0.8	1.89	39
Renal Dialysis Unit RIPASH	128	97	1.74	0.78	1.62	31
JPMC Renal Dialysis Unit	95	98	1.92	0.59	1.84	42
Tutong Dialysis Centre	98	99	1.91	0.72	1.85	32
Kuala Belait Dialysis Centre	136	97	1.9	0.62	1.78	43
Temburong Dialysis Unit	30	100	2.19	0.66	1.91	37
HD	874	93	1.9	0.67	1.84	38
PD	149	99	1.9	0.59	1.84	36
All Dialysis	1023	94	1.9	0.65	1.84	38

Table 20 - Phosphate levels in ESKF patients (by centers and KRT modalities)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Mean Ph	1.94	1.92	1.93	1.79	1.85	1.87	1.75	1.86	1.84	1.9
% in target range	-	-	-	-	-	39	39	40	44	38

Table 21- Phosphate levels in ESKF patients (2015-2024)

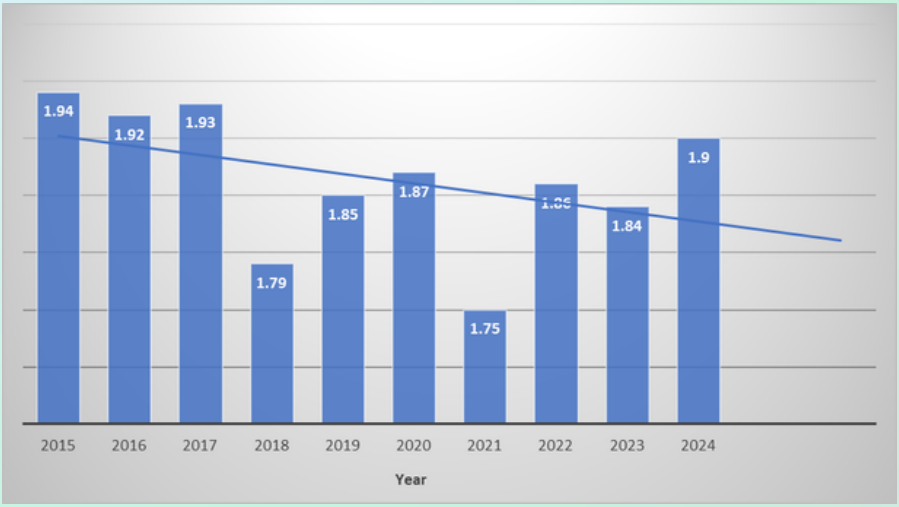


Figure 13 – Trends of phosphate levels in dialysis patients (2015-2024)

Location	N	% data recorded	Mean (pmol/L)	SD	Median (pmol/L)	% Between 16.5 to 33 pmol/L
Rimba Dialysis Centre	329	84	69.85	64.47	54	18
Kiarong Dialysis Centre	58	100	74.51	59.34	59	19
Renal Dialysis Unit RIPASH	128	81	58.61	51.5	45	21
JPMC Renal Dialysis Unit	95	98	93.54	76.66	80	14
Tutong Dialysis Centre	98	99	65.29	53.24	49	24
Kuala Belait Dialysis Centre	136	92	76.08	72.02	49	17
Temburong Dialysis Unit	30	100	63.3	50.2	57	20
HD	874	90	71.69	64.15	54	18
PD	149	100	55.37	44.63	41	23
All Dialysis	1023	91	69.1	61.74	52	19

Table 22 – Parathyroid hormone levels in ESKF patients (by centers and KRT modalities)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Median PTH	47	52	50	40	39	43	59	50	53	52
% in target range	-	-	-	-	-	21	26	15	15	19

Table 23- PTH levels in ESKF patients (2015-2024)

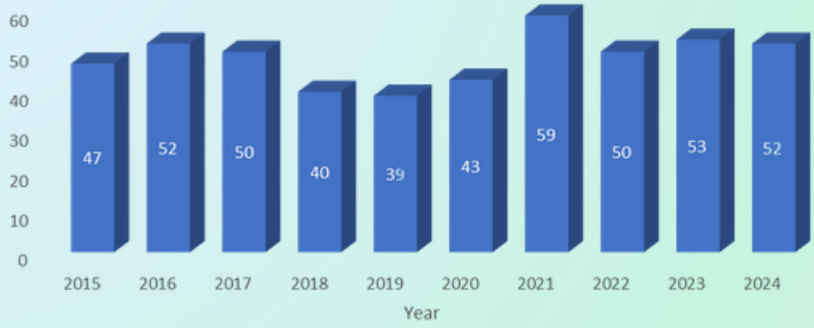


Figure 14 – Trends of PTH levels in dialysis patients (2015-2024)

Location	N	% Data recorded	Mean	SD	Median	% Between 2.1 to 2.37*
Rimba Dialysis Centre	329	76	2.24	0.25	2.25	54
Kiarong Dialysis Centre	58	100	2.14	0.28	2.17	38
Renal Dialysis Unit RIPASH	128	46	2.27	0.42	2.23	46
JPMC Renal Dialysis Unit	95	97	2.05	0.21	2.06	35
Tutong Dialysis Centre	98	98	2.14	0.2	2.16	52
Kuala Belait Dialysis Centre	136	93	2.26	0.23	2.25	57
Temburong Dialysis Unit	30	100	2.14	0.21	2.13	40
HD	874	82	2.2	0.27	2.2	54
PD	149	95	2.27	0.2	2.25	55
All Dialysis	1023	83	2.21	0.26	2.2	54

Table 24 – Serum calcium levels in ESKF patients (by centers and KRT modalities)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Mean Ca	2.25	2.26	2.26	2.32	2.26	2.19	2.21	2.23	2.2	2.2
% in target range	-	-	-	-	-	49	47	55	50	54

Table 25 - Trends of PTH levels in dialysis patients (2015-2024)

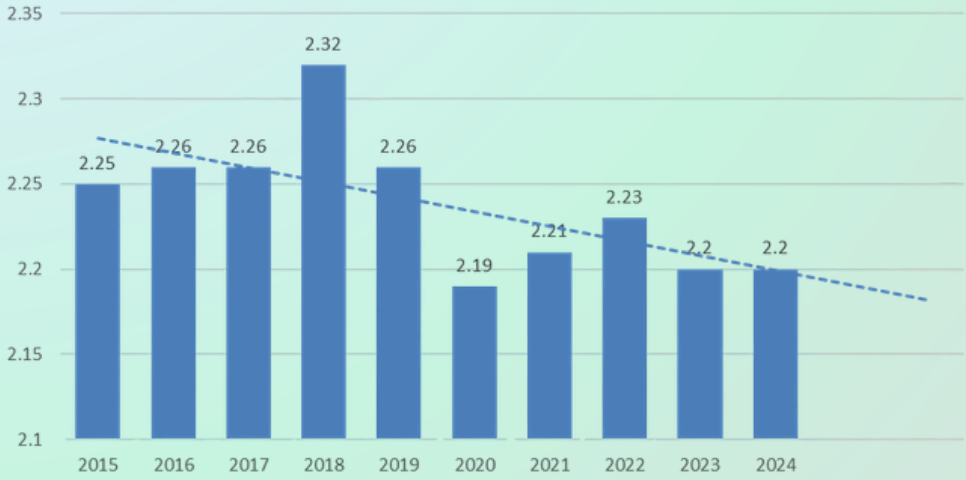


Figure 15 – Trends of calcium levels in dialysis patients (2015-2024)

Chapter 11 – Systolic and diastolic blood pressure

The mean and median systolic blood pressure for HD and PD patients were 140.99 ± 18.02 mm Hg and 140 mm Hg respectively. PD patients had mean and median SBP of 139.04 ± 19.56 and 138 mm Hg respectively. The mean and median diastolic blood pressure were 78.07 ± 9.09 and 80 mm Hg respectively in HD patients while the corresponding mean and median diastolic blood pressure in PD patients were 81.17 ± 12.51 mm Hg respectively. There was no significant SBP and DBP trend across all dialysis patients between 2015-2024.

Location	N	% Data recorded	Mean SBP	SD	Median SBP
Rimba Dialysis Centre	329	88	134.75	14.67	130
Kiarong Dialysis Centre	58	100	136.87	13.81	139
Renal Dialysis Unit RIPASH	128	100	145.33	19.67	142
JPMC Renal Dialysis Unit	95	98	151.21	18.37	153
Tutong Dialysis Centre	98	98	149.32	19.51	150
Kuala Belait Dialysis Centre	136	97	137.59	17.18	133
Temburong Dialysis Unit	30	100	147.16	14.78	142
HD	874	95	140.99	18.02	140
PD	149	96	139.04	19.56	138
All Dialysis	1082	90	140.7	18.26	140

Table 26 – Mean SBP in ESKF patients (by centers and KRT modalities)

Location	N	% Data recorded	Mean SBP	SD	Median SBP
Rimba Dialysis Centre	329	88	79.39	6.61	80
Kiarong Dialysis Centre	58	100	75.87	9.11	80
Renal Dialysis Unit RIPASH	128	100	78.54	12.13	80
JPMC Renal Dialysis Unit	95	98	77.48	10.1	76
Tutong Dialysis Centre	98	98	81.22	8.19	80
Kuala Belait Dialysis Centre	136	97	73.51	12.45	73
Temburong Dialysis Unit	30	100	79.07	9.25	80
HD	874	95	78.07	9.09	80
PD	149	96	81.17	12.51	82
All Dialysis	1082	90	78.52	10.29	80

Table 27 - Mean DBP in ESKF patients (by centers and KRT modalities)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Mean SBP	148	152	143	140	141	139	140	141	139	141
Mean DBP	83	84	82	84	82	80	80	78	77	78

Table 28 – SBP and SDP trends from 2015-2024

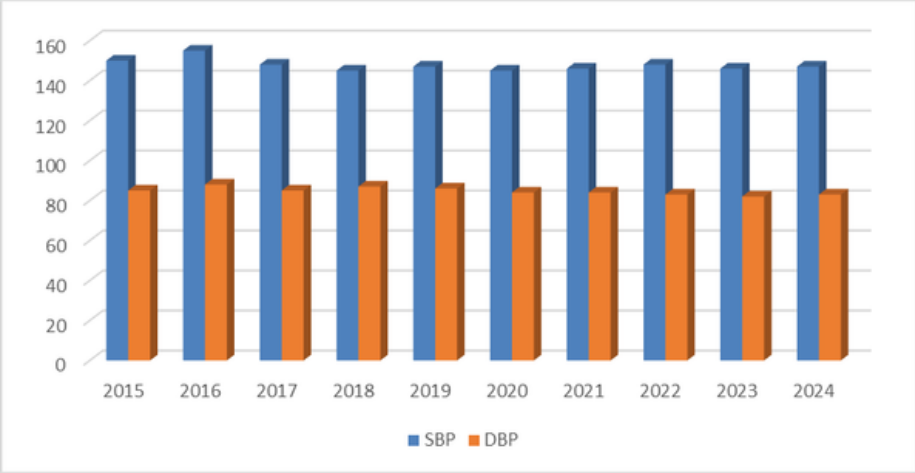


Figure 16 – SBP and DBP trends from 2015 to 2024

Chapter 12 – Kidney transplantation

5 kidney transplants were performed in 2024: 4 locally in Jerudong Park Medical Center and 1 in National University Hospital, Singapore (government sponsored). There was no commercialised transplant in 2024.

The total number of prevalent KT recipients in 2024 was 59 patients. The mean and median age were 42.15 ± 12.83 and 41 years respectively. There was a male preponderance with 71% of recipients being male. The mean and median creatinine were 153.01 ± 115.75 and 122 mmol/l respectively.

There were 51 prevalent KT donors under active follow up, with a sizeable number of donors not being captured by the registry. The mean and median age were 49.60 ± 11.90 and 50 years respectively. The mean and median creatinine were 99.53 ± 29.85 and 88 mmol/l respectively.

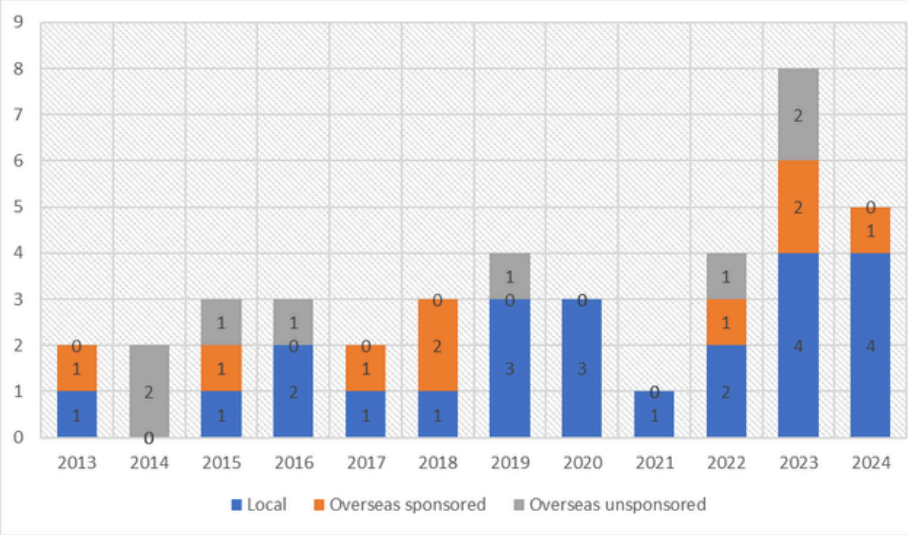


Figure 17 – Incidence of kidney transplantation from 2013 to 2024

Total number		59
Age (years)	Mean	42.15 ± 12.83
	Median	41
Gender	Male	43 (71%)
	Female	16 (29%)
Race	Malay	41(69%)
	Chinese	11(19%)
	Others	7 (12%)
Age of graft (years)	Mean	9.64 ± 7.29
	Median	8
Place of transplant	Local	22 (37%)
	Overseas	37 (63%)
Sponsorship	Government	44 (75%)
	Others	15 (25%)
Donor relationship with recipient	Unknown	13 (22%)
	Brother	10 (17%)
	Wife	9 (15%)
	Husband	7 (12%)
	Sister	7 (12%)
	Mother	4 (7%)
	Father	4 (7%)
	Son	2 (3%)
	Daughter	1 (2%)
	Uncle	1 (2%)
	Cousin	1 (2%)
Serum creatinine (mmol/l)	Mean	153.01 ± 115.75
	Median	122

Table 29 – Demographics of prevalent KT recipients in 2024

Total number		51
Age (years)	Mean	49.60 ± 11.90
	Median	50
Gender	Male	31
	Female	24
Race	Malay	44
	Chinese	3
	Others	4
Serum creatinine (mmol/l)	Mean	99.53 ± 29.85
	Median	88

Table 30 – Demographics of prevalent KT donors in 2024

Chapter 13 – Catheter-related bloodstream infections in HD patients

The national CRBSI rate for all HD centers in 2024 was 2.31 infections per 1000 catheter days. JRDU has the lowest rate at 1.15 per 1000 catheter days. A total of 277 infections was recorded over a catchment period of 119956 days.

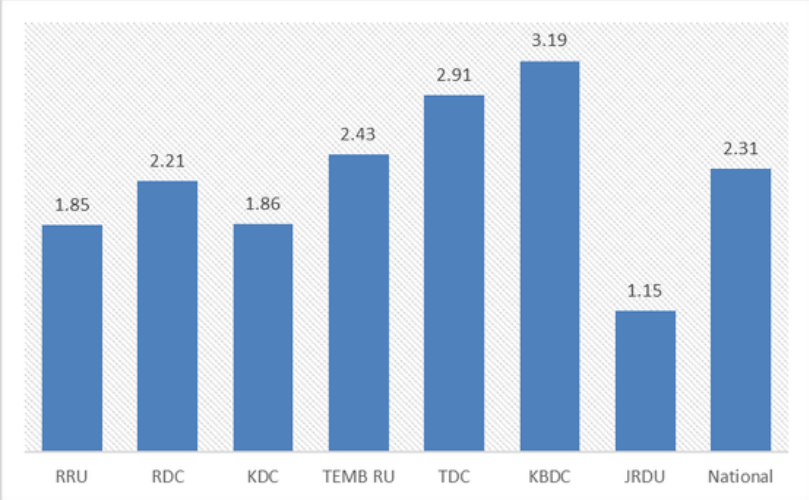


Figure 18 – CRBSI rates (infection per 1000 catheter days) of HD patients in 2024 – comparison between centers

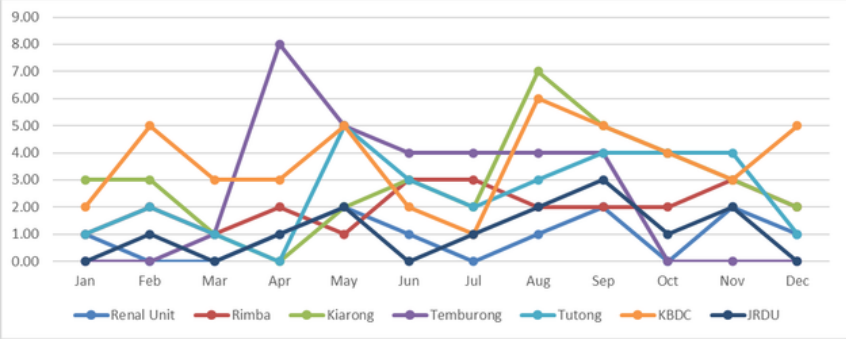


Figure 19 – Monthly CRBSI rate per 1000 catheter days in 2024

Chapter 14 – Hepatitis B and C in dialysis patients

The total number of hepatitis B and C patients amongst dialysis patients in 2024 were 19 and 7 respectively. There is an improving trend of hepatitis C infections over the past decade, but hepatitis B infection levels remain static

Year	Hepatitis B	Hepatitis C
2015	13	18
2016	24	16
2017	11	15
2018	19	11
2019	10	11
2020	14	9
2021	17	8
2022	16	8
2023	17	7
2024	19	7

Table 31 – Hepatitis B and C infections from 2015 to 2024

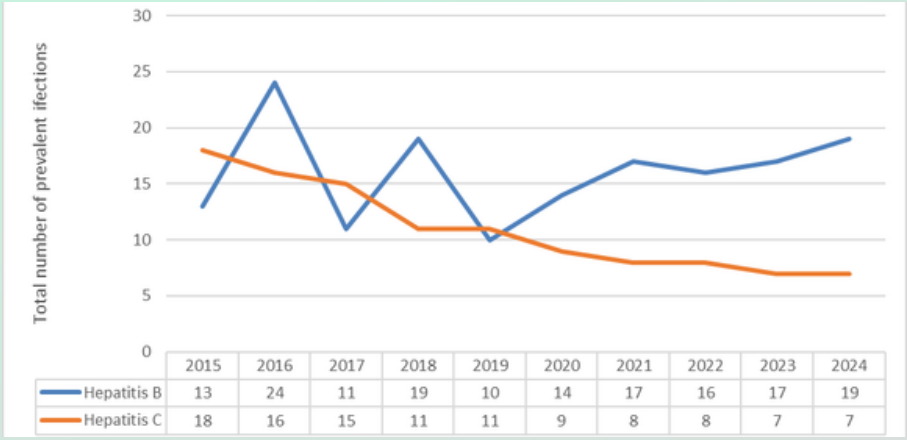


Figure 20 – Hepatitis B and C infections from 2015 to 2024

REFERENCES

BRUNEI DIALYSIS & TRANSPLANT REGISTRY 2024.
DEPARTMENT OF RENAL SERVICES
MINISTRY OF HEALTH

DIALYSIS PATIENT NOTIFICATION

Complete this form to notify all Dialysis patient in your Centre/Unit

* Indicates required question

1. Name: *

_____

2. Bru-HIMS No: *

_____

3. ID Card No: *

_____

4. Date of Birth: *

_____

5. Gender: *

Mark only one oval.

- ◯ Male
- ◯ Female

6. Race: *

Mark only one oval.

- ◯ Malay
- ◯ Chinese
- ◯ India
- ◯ Other: _____

7. Date of start Dialysis: *

_____

Example: 7 January 2019

8. Known to renal clinic previously?
(Only for new patient - 2024)

Tick all that apply.

- ☐ Yes
- ☐ No

9. Access on the 1st Dialysis?

Tick all that apply.

- ☐ Catheter
- ☐ Fistula
- ☐ Peritoneal Dialysis

10. No of years on Dialysis
(Current date - date of start Dialysis) *

_____

11. Modality: *

Tick all that apply.

- ☐ Haemodialysis(HD)
- ☐ Peritoneal Dialysis(PD)

12. Virology Test *

Tick all that apply.

- ☐ HBsAG : Positive
- ☐ Anti-HCV : Positive
- ☐ HEP B & HEP C : Negative
- ☐ Other: _____

13. Location: *

Mark only one oval.

- ◯ Rimba Dialysis Centre
- ◯ Tutong Dialysis Centre
- ◯ Kuala Belait Dialysis Centre
- ◯ Kiarong Dialysis Centre
- ◯ Renal Dialysis Unit RIPAS Hospital
- ◯ Temburong Dialysis Unit
- ◯ Peritoneal Dialysis Unit
- ◯ Transplant Unit
- ◯ JPMC Renal Dialysis Unit

DIALYSIS ANNUAL RETURN

DIALYSIS PARAMETERS

Please complete this form for each patient on Dialysis at your Centre/Unit for the year 2024.

14. HEMOGLOBIN (HB) LEVEL *

(Mar - Jun)

_____

15. HEMOGLOBIN (HB) LEVEL *

(Sept - Dec)

_____

16. CALCIUM (ADJUSTED) *

(Mar - Jun)

_____

17. CALCIUM (ADJUSTED) *

(Sept - Dec)

_____

18. PHOSPHATE LEVEL *

(Mar - Jun)

_____

20. PTH LEVEL *
(Mar - Jun)

_____

21. PTH LEVEL *
(Sept - Dec)

_____

22. SYSTOLIC BLOOD PRESSURE (mmHg) *
(Mar - Jun)

_____

23. DIASTOLIC BLOOD PRESSURE (mmHg) *
(Mar - Jun)

_____

24. SYSTOLIC BLOOD PRESSURE (mmHg) *
(Sept - Dec)

_____

25. DIASTOLIC BLOOD PRESSURE (mmHg) *
(Sept - Dec)

_____

DIALYSIS ACCESS

26. CURRENT TYPE OF ACCESS *
Mark only one oval.
- ⬭ Arteriovenous Fistula(AVF)
- ⬭ Permanent Catheter (PC)
- ⬭ Non-failure AVF and Perm cath
- ⬭ Peritoneal Dialysis (PD)

27. Dialysis Patient using PC *
Tick all that apply.
- ☐ Exhausted AVF Creation
- ☐ Awaiting appt/ AVF creation
- ☐ Refused
- ☐ Unknown
- ☐ Nil/AVF on rest

28. Patient with Non-failure AVF and PC *

Tick all that apply.

- ☐ Has an AVF (waiting maturity / successful needling & waiting removal of PC)
- ☐ Immature AVFs
- ☐ AVF on rest
- ☐ For Standby AVFs (PD/TX patient)
- ☐ Nil

FOR HAEMODIALYSIS DIALYSIS (HD) PATIENT

29. UREA REDUCTION RATIO MEASUREMENT (URR%) *
(Mar - Jun)

_____

30. UREA REDUCTION RATIO MEASUREMENT (URR%) *
(Sept - Dec)

_____

31. BLOOD FLOW RATE OBTAINED (ml/min) *
(Mar - Jun)

_____

32. BLOOD FLOW RATE OBTAINED (ml/min) *
(Sept - Dec)

_____

FOR PERITONEAL DIALYSIS (PD) PATIENT

33. Date of PD start?

_____
Example: 7 January 2019

34. No of years on PD
(Current date - date of start PD)

_____

35. Dialysis vintage
(Current years on PD + previous years on HD)

_____

36. Type of PD?
Mark only one oval.
⬭ Automated Peritoneal Dialysis(APD)
⬭ Continuous Ambulatory Peritoneal Dialysis(CAPD)

37. KT/V

_____

38. Date of P.E.T done?

_____
Example: 7 January 2019

39. P.E.T Status
Tick all that apply.
☐ LA
☐ L/LA
☐ HA

Your support and cooperation is very much appreciated.
Thank you for your time and contribution

40. Done by: *
Name:
_____
_____
_____

41. Job Title *
Tick all that apply.
☐ NO
☐ SN
☐ AN
Other: _____

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ABBREVIATIONS

AN – Assistant Nurse
APD – Automated Peritoneal Dialysis
AVF – Arteriovenous Fistula
BDTR- Brunei Dialysis and Transplant Registry
CAPD – Continuous Ambulatory Peritoneal Dialysis
CKD – Chronic Kidney Dialysis
CVVHDF- Continuous Veno-Veno hemodiafiltration
CVVHF - Continuous Veno-Venohaemofiltration
DBP – Diastolic Blood Pressure
DC – Dialysis Centre
DKD – Diabetic Kidney Disease
DM – Diabetes Mellitus
ESKF – End Stage Kidney Failure
HD – Haemodialysis
HTN - Hypertension
IJC – Internal Jugular Catheter
JPMC - Jerudong Park Medical Centre
JRDU – JPMC Renal Dialysis Unit
KB – Kuala Belait
KRT – Kidney Replacement Therapy
KT – Kidney Transplant
MOH – Ministry of Health
NO. – Nursing Officer
PC – Permanent Catheter
PD - Peritoneal Dialysis
PMP – Per Million Population
RIPAS – Raja Isteri Pengiran Anak Saleha
SBP – Systolic Blood Pressure
SEA -South East Asia
SLED – Slow Low Efficient Dialysis
SN – Staff Nurse
SPAD – Single Pass Albumin Dialysis
TX - Transplant
URR – Urea Reduction Ration Measurement
USRDS – United States Renal Data System
PIHM - Pengiran Isteri Hajjah Mariam

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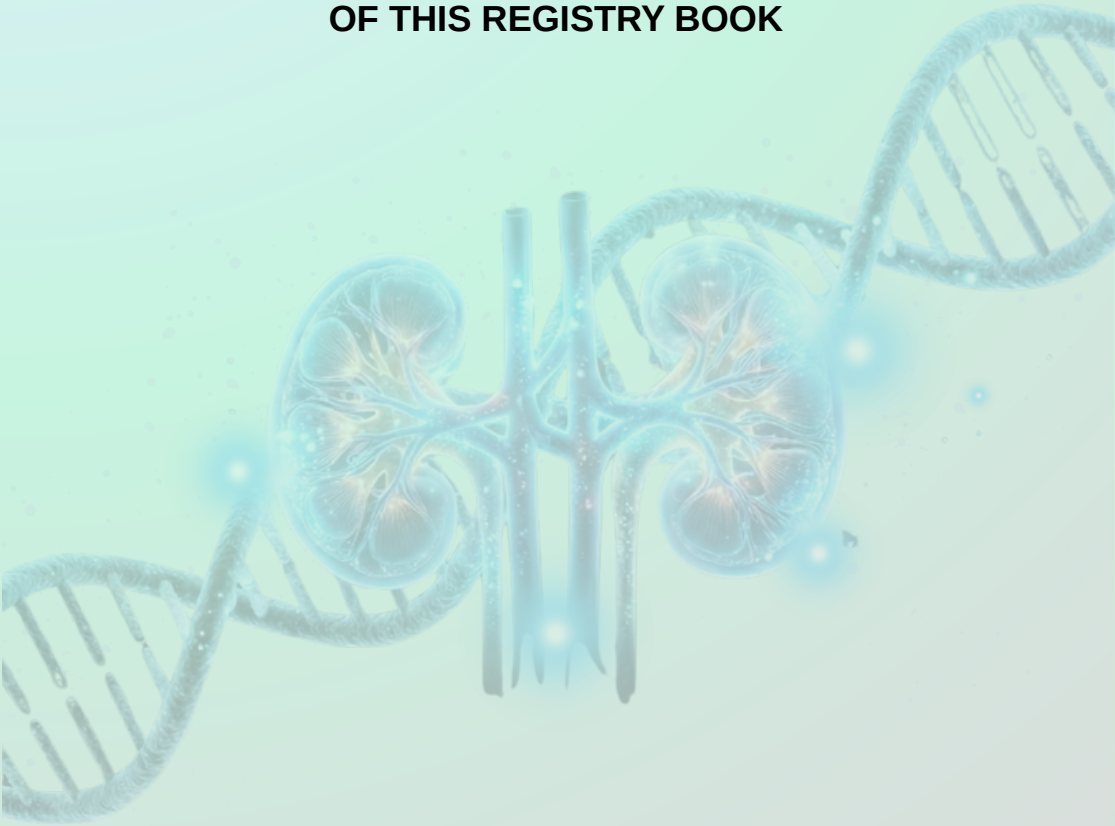

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