

Capacity for the management of kidney failure in the International Society of Nephrology Oceania and South East Asia (OSEA) region: report from the 2023 ISN Global Kidney Health Atlas (ISN-GKHA)



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The International Society of Nephrology (ISN) region of Oceania and South East Asia (OSEA) is a mix of high- and low-income countries, with diversity in population demographics and densities. Three iterations of the ISN-Global Kidney Health Atlas (GKHA) have been conducted, aiming to deliver in-depth assessments of global kidney care across the spectrum from early detection of CKD to treatment of kidney failure. This paper reports the findings of the latest ISN-GKHA in relation to kidney-care capacity in the OSEA region. Among the 30 countries and territories in OSEA, 19 (63%) participated in the ISN-GKHA, representing over 97% of the region's population. The overall prevalence of treated kidney failure in the OSEA region was 1203 per million population (pmp), 45% higher than the global median of 823 pmp. In contrast, kidney replacement therapy (KRT) in the OSEA region was less available than the global median (chronic hemodialysis, 89% OSEA region vs. 98% globally; peritoneal dialysis, 72% vs. 79%; kidney transplantation, 61% vs. 70%). Only 56% of countries could provide access to dialysis to at least half of people with incident kidney failure, lower than the global median of 74% of countries with available dialysis services. Inequalities in access to KRT were present across the OSEA region, with widespread availability and low out-of-pocket costs in high-income countries and limited availability, often coupled with large out-of-pocket costs, in middle- and low-income countries. Workforce limitations were observed across the OSEA region, especially in lower-middle-income countries. Extensive collaborative work within the OSEA region and globally will help close the noted gaps in kidney-care provision.

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Rising rates of obesity, noncommunicable diseases, average population age, and new threats, such as climate change, are contributing to changing patterns of chronic kidney disease (CKD) and kidney failure (KF) across the world. Even within similar World Bank income-group countries, wide variability in health system architecture, and funding, as well as differences in the predominant patterns of CKD, lead to disparities in access to kidney care and kidney health outcomes.^{1,2}

The International Society of Nephrology (ISN) Oceania and South East Asia (OSEA) region includes countries from the World Health Organization's regions of South East Asia and the Western Pacific.^{3,4} The region includes a mixture of high-income countries (HICs) and middle-income countries (MICs), with diversity in population ethnicity, age distribution, and density, and predominant pattern of kidney disease. Although South East Asia for the most part is densely

populated, the population of the Pacific region is sparse. The OSEA region is affected by a high prevalence of diabetes and infectious disease outbreaks and is susceptible to natural disasters. The low-lying islands of the Pacific are especially vulnerable to rising sea waters caused by climate change. Although well-structured and organized quality kidney-care delivery is available in countries such as Australia, New Zealand, Singapore, and Malaysia, it is limited in some Pacific Islands.⁵

The ISN launched the ISN-Global Health Kidney Atlas (ISN-GKHA) in 2016, to understand the state of kidney care around the world and explore variations in care within regions and countries. From the 2023 ISN-GKHA, findings for the ISN OSEA region are provided in this report, supplemented by data from literature reviews. The methodology for this research is described in detail elsewhere.⁶

RESULTS

The ISN-GKHA results are broadly categorized as literature review (Tables 1^{7–20} and 2,^{7,21–26}; Supplementary Table S1²⁷) and survey response (Figures 1–4; Supplementary Tables S2 and S3; Supplementary Figures S1 and S2).

Study setting

The ISN OSEA region is home to over 720 million people and includes South East Asian countries (Indonesia, Myanmar, Thailand, Timor-Leste, Brunei Darussalam, Cambodia, Lao People's Democratic Republic [PDR], Malaysia, Philippines, Singapore, Vietnam), Australia, New Zealand, and a large group of Pacific Island nations (Kiribati, Marshall Islands, Federated States of Micronesia, Fiji, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu; the French territories of French Polynesia and New Caledonia; and the US territories of American Samoa, Guam, and Northern Mariana Islands).^{7,8} The most populous countries are Indonesia (population 277 million), Philippines (114 million), and Vietnam (103 million). The OSEA region covers a land mass of 12.8 million square kilometers, with Australia representing 61% of the area.^{7,8} Population densities in the area vary widely, ranging from 3 people per square kilometer (Australia) to 308 people per square kilometer (Vietnam). Most countries are MICs, whereas Australia, Brunei Darussalam, New Caledonia, New Zealand, and Singapore are HICs or territories (Table 1).^{7,8} The ISN-GKHA is a global survey of clinicians, policymakers, advocacy groups, and kidney health society leads. The survey was supplemented with literature review, with data available for Australia, Brunei Darussalam, Cambodia, Fiji, Indonesia, Lao PDR, Malaysia, Myanmar, New Caledonia, New Zealand, Philippines, Samoa, Singapore, Thailand, and Vietnam.

Current status of kidney care

In the ISN OSEA region, vastly different healthcare systems and levels of economic development result in inequalities in access to, and availability and quality of, kidney care.

Table 1 | General demographic and economic indicators of the ISN OSEA region^{7–20}

Country/territory	World Bank ranking	Total population (2022)	GDP (PPP) (2021 \$ billion)	Total health expenditures (% of GDP 2021)	Annual cost KRT (US\$) ^a and funding model				
					HD	PD	Tx, 1st year	Tx, later years	Funding for KRT
Global, median [IQR]	—	7,802,702,984	134 [40–545]	6.2 [4.3–8.2]	19,380	18,959	26,903	14,537	
OSEA, median [IQR]	—	720,284,052	238 [29–1138]	4.1 [3.8–6.7]	[11,818–38,005]	[10,891– 31,014]	[15,425– 70,749]	[6098– 19,924]	
Australia	HIC	26,141,369	1446	9.9	44,432	48,026	71,270	10,287	Public (free)
Brunei Darussalam	HIC	478,054	29	2.2	22,845	8954	—	—	Public (free)
Cambodia	LMIC	16,713,015	79	7	10,086	—	—	—	Private/mixed
Fiji	UMIC	943,737	11	3.8	—	—	—	—	—
Indonesia	LMIC	277,300,000	3566	2.9	8176	7664	14,181	3216	Public (some fees)
Lao PDR	LMIC	7,749,595	64	—	—	—	—	—	—
Malaysia	UMIC	33,871,431	971	3.8	10,344	10,610	30,133	6466	Mixed
Myanmar	LMIC	57,526,449	238	—	3644	5011	4680	—	Private/mixed
New Caledonia	HIC	297,160	11	—	—	—	—	—	—
New Zealand	HIC	5,053,004	238	9.7	29,264	28,211	42,877	21,212	Public (free)
Philippines	LMIC	114,600,000	1013	4.1	5205	5205	8509	6098	Public (some fees)
Samoa	LMIC	206,179	1	6.4	—	—	—	—	—
Singapore	HIC	5,921,231	635	4.1	35,545	17,062	71,621	17,996	Multiple systems
Thailand	UMIC	69,648,117	1343	3.8	7758	6631	31,554	14,595	Public (some fees)
Vietnam	LMIC	103,800,000	1138	5.3	7809	7809	4978	—	Public (some fees)

—, data not reported or unavailable; GDP, gross domestic product; HD, hemodialysis; HIC, high-income country; IQR, interquartile range; ISN, International Society of Nephrology; KRT, kidney replacement therapy; LMIC, lower-middle-income country; OSEA, Oceania and South East Asia; PD, peritoneal dialysis; PDR, People's Democratic Republic; PPP, purchasing power parity; Tx, kidney transplantation; UMIC, upper-middle-income country.

^aCost is given in 2021 \$.

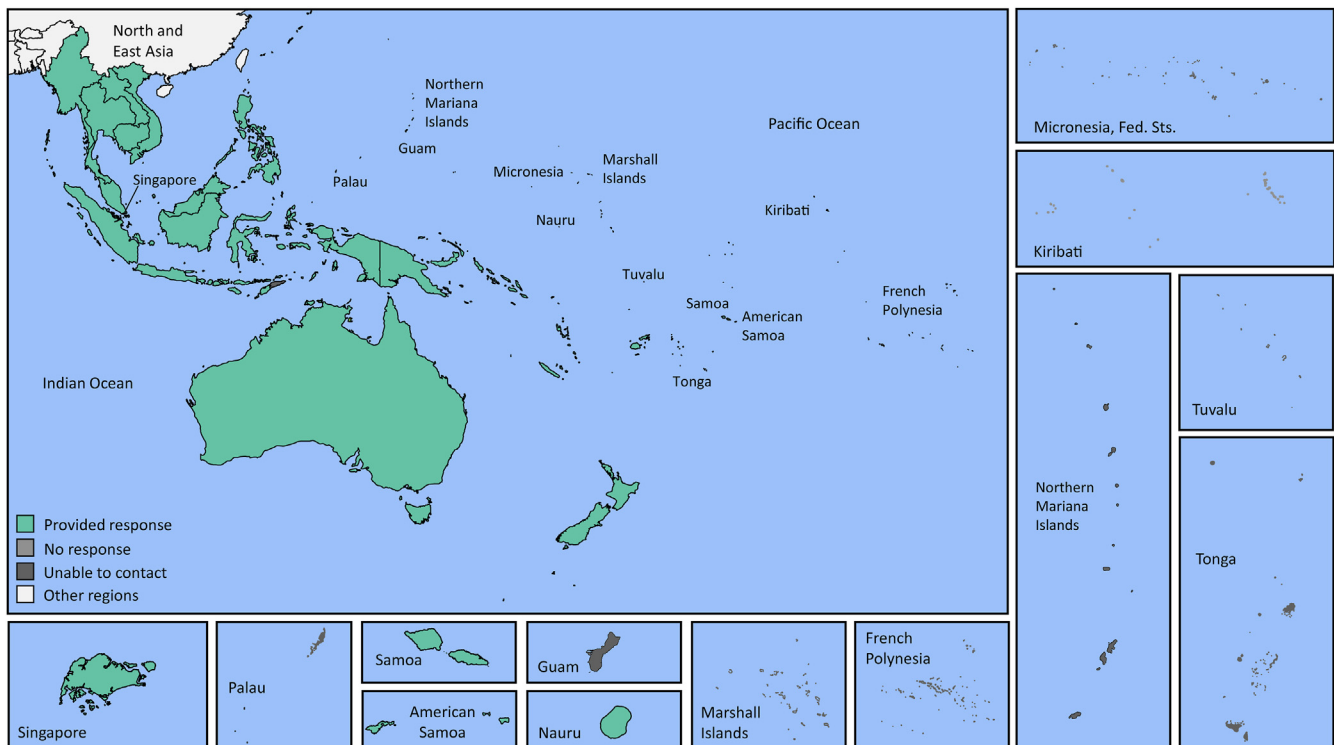


Figure 1 | Countries and territories of the International Society of Nephrology Oceania and South East Asia (ISN OSEA) region. Fed. Sts., federated states.

Literature-review data for countries in the ISN OSEA region

Burden of CKD in the OSEA region. Data from the Global Burden of Disease database reveal the burden of CKD in the region (Supplementary Table S1).²⁷ The median prevalence of CKD was 10.4% (interquartile range [IQR]: 9.1–10.3), higher than the global prevalence of 9.5%.²⁷ The prevalence of CKD ranged from 8.2% (95% confidence interval [CI] 7.6%–8.9%) in Cambodia to 16.7% (95% CI 15.5%–17.9%) in Thailand. The median prevalence of death in the region due to CKD was 3.4% (IQR 2.7%–4.2%) higher than the global median of 2.4% (IQR 1.6%–3.9%), and varied from 2.0% (95% CI 1.8%–2.2%) in Cambodia to 5.5% (95% CI 4.9%–6.0%) in Thailand. The median of disability-adjusted life years attributable to CKD for the OSEA region was 2.4% (IQR 1.97%–2.96%; global median 1.6% [IQR 1.5%–1.8%]) and was higher in low-middle-income countries (LMICs; e.g., 3.5% of total disability-adjusted life years in Samoa).^{7,27}

Burden of KF in the OSEA region. The overall prevalence of treated KF in the ISN OSEA region was 1203 per million population (pmp) among 9 countries with available data; this level is 45% higher than the global median of 823 pmp (Table 2).^{21–26} Singapore (2030 pmp) and Thailand (2063 pmp) had almost double the prevalence of treated KF, compared to that in Australia (1054 pmp) or New Zealand (1009 pmp), and an even larger difference in the incident number of people with KF. The incidence of KF was highest in Brunei (393 pmp), Thailand (377 pmp), and Singapore (364 pmp). In Australia and New Zealand, the number of

people on chronic dialysis was similar to the number of those with a kidney transplant (around 500 pmp). By contrast, in Malaysia, Philippines, Brunei, Singapore, and Thailand, 5–60 fold as many people were on chronic dialysis. In all countries for which data were available, hemodialysis (HD) was more commonly chosen than peritoneal dialysis (PD) for chronic kidney replacement therapy (KRT). Although the prevalence of treated KF in the ISN OSEA region was higher than that in the rest of the world, the median number of people living with a kidney transplant in OSEA (104 pmp) was less than half that in the global estimation (279 pmp; Table 2).^{21–26}

Overview of gross domestic product and government health expenditure by individual countries. Health expenditure as a percent of gross domestic product varied between and within country income-level categories, from 2% (Brunei) to 10% (Australia), and from 2.9% (Indonesia) to 7% (Cambodia; Table 1).⁸

Cost of KRT in the OSEA region. The global median health spending was \$216 per person, and \$163 for the OSEA region.²⁸ For the 11 countries with available data, the median annual cost for HD was \$10,086 for the OSEA region, just over half the global median of \$19,380 (Table 1).^{9–20} The median annual cost for PD was \$8382 for the OSEA region, less than half the global median of \$18,959. Annual costs for HD and PD were higher in HICs (e.g., Australia \$44,432 and \$48,026, respectively), but these treatments were largely free to the individual. Costs were lower in MICs, such as Indonesia (\$8176 and \$7664, respectively), but were often covered by private payors (Cambodia and Myanmar; Table 1).^{9–20} The cost of PD and HD was nearly

Country/territory		Availability of KRT			Availability of CKM		Funding for medications			Availability of distribution of registry				Advocacy group			Nephrology workforce (PMP)	
		HD	PD	KT	Shared decision	Choice-restricted (limited)	CKD	Dialysis	KT	CKD	Dialysis	KT	AKI	CKD	AKI	KF/KRT	Nephrologists	Nephrologist trainees
American Samoa	2019																	
American Samoa	2023																	
Australia	2019																21.30	5.20
Australia	2023																23.11	5.74
Brunei Darussalam	2019																28.85	11.10
Brunei Darussalam	2023																12.55	6.28
Cambodia	2019																0.91	0.30
Cambodia	2023																1.02	0.30
Fiji	2019																1.08	1.08
Fiji	2023																3.18	1.06
Indonesia	2019																0.49	0.23
Indonesia	2023																0.80	0.20
Lao PDR	2019																	11.34
Lao PDR	2023																1.03	1.03
Malaysia	2019																5.66	1.10
Malaysia	2023																5.90	0.89
Myanmar	2019																0.49	0.31
Myanmar	2023																0.61	0.26
New Caledonia	2019																40.67	0.00
New Caledonia	2023																33.65	6.73
New Zealand	2019																15.40	4.51
New Zealand	2023																12.86	3.96
Papua New Guinea	2019																	
Papua New Guinea	2023																0.10	0.10
Philippines	2019																5.67	0.85
Philippines	2023																8.87	1.22
Samoa	2019																4.97	0.00
Samoa	2023																0.00	0.00
Singapore	2019																16.59	3.50
Singapore	2023																25.33	3.88
Solomon Islands	2019																	
Solomon Islands	2023																0.00	0.00
Thailand	2019																11.66	1.31
Thailand	2023																12.92	1.44
Vanuatu	2019																	
Vanuatu	2023																0.00	0.00
Vietnam	2019																3.09	0.52
Vietnam	2023																	0.29

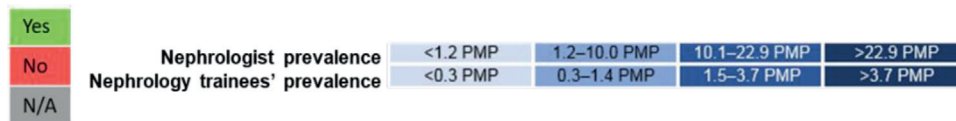


Figure 2 | Country-level scorecard for kidney replacement therapy (KRT), conservative kidney management (CKM), funding for medications, registry, and advocacy group in the International Society of Nephrology Oceania and South East Asia (ISN OSEA) region in 2019 and 2023. Funding for medications means that the medications are 100% publicly funded by the government (free at the point of delivery). AKI, acute kidney injury; CKD, chronic kidney disease; HD, hemodialysis; KF, kidney failure; KT, kidney transplantation; PD, peritoneal dialysis; PMP, per million population; N/A, not available or not provided; PDR, People’s Democratic Republic.

equivalent in most countries except Brunei (PD 2.5 times cheaper; Table 1).^{9–20} Taking a long-term perspective, for all countries in the OSEA region with established transplantation programs, kidney transplantation appeared to be a more sustainable KRT option than dialysis, owing to the costs being lower beyond the first year (Table 1).^{9–20}

Survey response data for countries in the ISN OSEA region that participated in the survey

Characteristics of countries. Of the 30 countries and territories in the ISN OSEA region, 17 countries and 2 territories (New Caledonia and American Samoa) participated (63%), representing over 97% of the region’s population

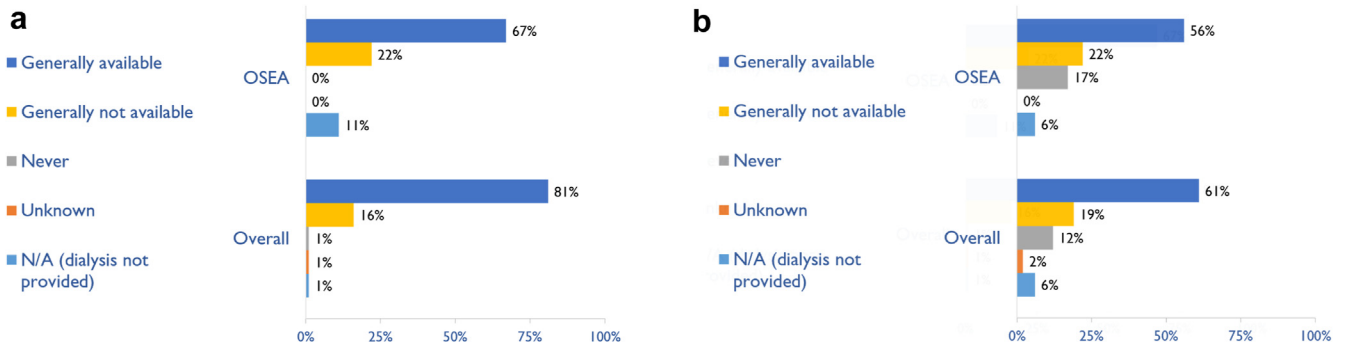


Figure 3 | Availability of (a) hemodialysis and (b) peritoneal dialysis in the International Society of Nephrology Oceania and South East Asia (ISN OSEA) region, compared to their global availability. Values represent the absolute number of countries in each category expressed as a percentage of the total number of countries. N/A, dialysis not provided.

(Figure 1). Four HICs, 4 upper-middle-income countries (UMICs), and 9 LMICs were represented. New Caledonia and American Samoa are territories—high-income and upper-middle-income, respectively.⁷ The survey had 47 respondents, 29 nephrologists (62%), 5 non-nephrologist physicians (11%), 2 nonphysician health professionals (4%), and 11 others (23%).

Availability and affordability of services for the delivery of CKD care. Nondialysis CKD care was available in all countries and was publicly funded and free at point of delivery in 21% of countries in the region, compared to the global median of 27%, with solely private funding in 5%, compared to 6% globally. Nondialysis CKD medications were fully government funded in 17% of OSEA region countries, compared to 16% globally (Supplementary Figure S1).

Availability and affordability of services for the delivery of KF care. In the region, chronic dialysis was available in 95% of countries (none in Solomon Islands), but only 56% of countries were able to provide access (availability and affordability) to dialysis to at least half the people needing it, lower than the global median of 74%.

Chronic HD services were available in 16 countries in the region (89%; Figure 2), compared to 98% of countries

globally. In 12 countries in the ISN OSEA region (67%), HD was generally available, compared to 81% of countries globally (Figure 3). In 4 countries, HD existed (Lao PDR, Myanmar, Papua New Guinea, and Vietnam), but it was generally unavailable. Chronic HD was not available at all in either Solomon Islands or Vanuatu. Home HD was generally available in Australia, New Zealand, and Philippines (17% of countries, compared to 19% globally).

Chronic PD services were available in 14 of 17 countries and 2 territories (74%; Figure 2), compared to 79% of countries globally. In 10 countries of the region (56%), PD was generally available, compared to 61% of countries globally (Figure 3). In 4 countries (Cambodia, Vanuatu, Fiji, and Vietnam), PD existed, but it was generally unavailable. PD was not available in Lao PDR, Papua New Guinea, Samoa, or Solomon Islands.

Kidney transplantation services were available in 11 countries (61%; Figure 2), compared to 70% globally. Despite this, in only 39% of countries could at least half of all people eligible for transplantation actually access transplantation services. In the region, 36% (n = 4; Brunei Darussalam, Myanmar, Indonesia, and Vietnam) of countries were offering transplantation using live donors only, compared to a global average of 29%. For those centers with a transplant waitlist,

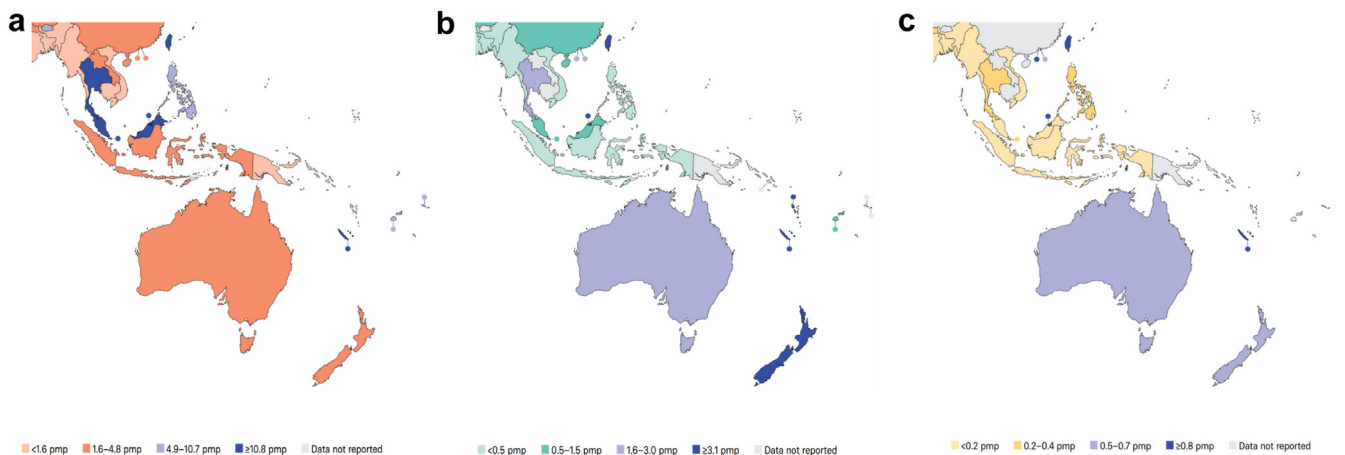


Figure 4 | Availability of kidney replacement therapy centers in the International Society of Nephrology Oceania and South East Asia (ISN OSEA) region: (a) hemodialysis centers; (b) peritoneal dialysis centers; and (c) transplantation centers. pmp, per million population.

Table 2 | Incidence and prevalence of kidney replacement therapy in the ISN OSEA region^{7,21–26}

Country / territory	World Bank ranking	Treated kidney failure		Chronic dialysis prevalence			Kidney transplantation	
		Incidence	Prevalence	Total	HD	PD	Incidence	Prevalence
Global		146	823	397	323	21	12	279
OSEA region		283	1203	980	177	95	4	104
Australia	HIC	127	1054	549	454	95	35	505
Brunei Darussalam	HIC	393	1673	1235	1065	170	—	—
Cambodia	LMIC	—	—	—	—	—	—	—
Fiji	UMIC	—	—	—	—	—	—	—
Indonesia	LMIC	306	973	973	-	3.3	2	—
Lao PDR	LMIC	—	—	—	—	—	—	—
Malaysia	UMIC	259	1352	1295	970	95	2	58
Myanmar	LMIC	—	—	—	—	—	0.04	—
New Caledonia	HIC	—	—	—	—	—	—	—
New Zealand	HIC	133	1009	583	484	182	39	426
Philippines	LMIC	172	319	314	69	10	1	5
Samoa	LMIC	—	—	—	—	—	—	—
Singapore	HIC	364	2030	2030	1762	269	12	398
Thailand	UMIC	377	2063	1969	823	369	10	93
Vietnam	LMIC	—	—	53	412	12	3	—

—, data not reported or unavailable; HD, hemodialysis; HIC, high-income country; ISN, International Society of Nephrology; LMIC, lower-middle-income country; OSEA, Oceania and South East Asia; PD, peritoneal dialysis; People's Democratic Republic, PDR; UMIC, upper-middle-income country. Incidence and prevalence are per million population.

82% had a national waitlist, higher than the global average of 64%. Transplantation was not available in Cambodia, Fiji, Lao PDR, Samoa, Vanuatu, or Solomon Islands.

Conservative kidney management (CKM) was generally available in 7 countries (39%; [Figure 2](#)), compared to 53% globally. CKM existed but was generally not available in a further 9 countries (50%) and was not available at all in Vanuatu.

Chronic dialysis and transplantation were free at the point of delivery in 17% of OSEA region countries (18 countries provided data), compared to 43% globally ([Supplementary Table S2](#)). Publicly funded, chronic HD, free at the point of delivery was available in only 17% of countries, compared to 45% globally. Publicly funded PD, free at the point of delivery, was available in only 11% of countries, compared to 42% globally. Kidney transplantation medications were free in 11% of countries, compared to 36% globally. HICs had acute kidney injury (AKI) and KRT care that was either publicly funded (free at the point of care) or funded through mixed or multiple systems. In contrast, in MICs, care was solely privately funded (Vanuatu, Papua New Guinea), partially publicly funded (Indonesia, Philippines, Thailand, Vietnam), or had mixed funding (Malaysia, New Caledonia; [Supplementary Table S2](#)). Dialysis and transplantation medications were fully government-funded for 6% and 11% of countries, respectively, compared to 24% and 30% globally ([Figure 2](#)).

Pediatric kidney care in the ISN OSEA region. In the region, differences were present in access to dialysis care for children and adults. Of all the countries with HD services, 88% provided HD to adults and children, but 12% provided it to adults only. In countries where PD was offered, 75% reported more access for adults than children. This region had a

median of 0.13 (IQR 0.0–0.79) pediatric nephrologists pmp, compared to a global median of 0.69 (IQR 0.03–1.78; [Supplementary Table S3](#)).

Health workforce and infrastructure. Within the ISN OSEA region, 6% of countries reported having extremely poor health infrastructure, and 27% reported having poor or below-average infrastructure. In countries providing HD, the median of HD treatment centers was 9.36 pmp, compared to 5.1 pmp globally. However, the prevalence increased with country wealth, from 0.96 chronic HD centers pmp in Vietnam to 40 pmp in New Caledonia ([Figure 4](#); [Supplementary Table S3](#)). The median of PD treatment centers was 1.75 pmp in countries with PD services, similar to the global median of 1.6 pmp ([Figure 4](#); [Supplementary Table S3](#)). The OSEA region median of kidney transplantation centers in countries with access to transplantation was 0.74 pmp, higher than the global median of 0.46 pmp ([Figure 4](#); [Supplementary Table S3](#)).

In the region, 72% of specialist physicians primarily responsible for the medical care of people with KF were nephrologists, and 28% were primary care physicians, compared to 87% and 7%, respectively, for the world. In most LMICs, primary care physicians are the main providers of medical care for KF. However, in all income settings, nurses, technicians, and other allied healthcare providers play a vital role in the healthcare team.

The region had 3.2 nephrologists pmp, compared to a global median of 11.8 pmp. The prevalence of nephrologists varied by country income, with Australia (23 pmp) and Singapore (25 pmp) having the highest workforce capacity ([Figure 2](#); [Supplementary Table S3](#).) However, even among HICs, marked variation in capacity was present, with New

Zealand and Brunei (both 13 pmp) having half the nephrologist density of Australia and Singapore (Supplementary Table S3). Most middle-income countries had 1–6 nephrologists pmp, whereas Vanuatu and Solomon Islands had no nephrologists. The median prevalence of nephrology trainees in the region was 0.96 pmp (global median 1.15 pmp), with Australia, Brunei, and New Caledonia being better staffed, with 5–7 trainees pmp. Nephrologist prevalence remained similar from 2019 to 2023, except in Brunei (where it halved) and Fiji (where it tripled). The majority of respondents (60%) reported shortages in non-nephrologist KF care providers, a category that includes surgeons, allied health professionals (e.g., dialysis and nursing staff, technicians, dieticians, and social workers), and supporting service providers, such as radiologists and counsellors and psychologists (Supplementary Figure S3).

Registries, advocacy, and policy for kidney disease. Dialysis registries existed in 11 countries, and transplant registries existed in 9 countries (Figure 2). All HICs had dialysis and transplant registries. No countries had AKI or CKD registries. CKD advocacy groups existed in Australia, Indonesia, Malaysia, Myanmar, New Zealand, and Papua New Guinea. KF advocacy groups existed in Australia, Indonesia, New Caledonia, New Zealand, and Samoa. The only AKI advocacy group was in Australia.

DISCUSSION

The 2023 ISN-GKHA highlighted that outcomes for people with CKD were worse in the ISN OSEA region, compared to global data, and that notable variations exist in access to care, usually related to national income levels. The prevalence of CKD and CKD-related deaths was higher in the region, compared to the global median. The burden of disability related to CKD was nearly double the global median, and it was higher in LICs in the region. Treated KF was 43% more prevalent in the ISN OSEA region, compared with the global median, yet access to kidney transplantation was far lower than the global median and was directly related to country wealth. Although the annual costs of HD and PD were around half the global median, lower availability of dialysis and the need for copayments in MICs made it difficult for many people to access KRT.

The noted limitations in the availability of KRT services in a large proportion of the countries is especially concerning given that the prevalence of CKD in the ISN OSEA region (10.4%) was higher than the global median (9.5%) and has increased in many countries even since the previous iteration of the 2019 ISN-GKHA.⁵ In Thailand, the CKD prevalence has increased from 13.9% to 16.7%.⁵ Similar to findings in the last ISN-GKHA, a lack of CKD prevalence data remained in most of the Pacific Island nations. A failure to understand the scope of the burden of CKD in these countries hampers efforts to screen for CKD and translates into missed opportunities to change the disease course with antiproteinuric and blood pressure-lowering medications.²⁹ Although data from Malaysia showed that a majority of people with known CKD

were prescribed appropriate cardiovascular disease prevention medications, low rates of screening for CKD indicate that opportunities to prescribe protective treatments are being missed.³⁰ Accurate and current data on the prevalence of CKD are indispensable for planning efficient healthcare resource allocation and developing screening and early intervention programs.³¹

The causes of CKD likely vary around the OSEA region, with chronic glomerulonephritis and infectious disease-related CKD occurring in some countries, and obesity and diabetes playing major roles in Pacific countries.^{32–35} Understanding the burden of CKD is the first step to discovering regional variations in risk factors and developing targeted risk-reduction programs. To this end, some countries have started evaluating local noncommunicable disease risk factors: for example, Guam has instituted a longitudinal health assessment of university students and integrated the research on noncommunicable diseases into the core curriculum.³⁶ Addressing the main precipitants of kidney disease will help reduce its burden, and potential exists for increasing leverage by linking with other disciplines to consolidate spending and extract necessary information to inform treatment strategy.

The prevalence of treated KF was higher in the ISN OSEA region (1203 pmp), compared to the global median (823 pmp). The prevalence was driven by data from a few countries with universal access to healthcare. In many LICs, marked disparities were present between the prevalence of CKD and the prevalence of treated KF. For example, in Philippines, the rate of CKD was 9.5%, similar to the 10.8% seen in Australia. However, the prevalence of treated KF was 319 pmp in Philippines, compared to 1054 pmp in Australia. The missing numbers likely represent those who died prematurely from reaching the KF stage and not having access to KRT. Even for those with treated KF, with the exception of Australia, New Zealand, and a select few countries, the proportion receiving dialysis far outweighs the proportion receiving transplantation. This situation will create an even greater financial burden, with cost implications limiting access to dialysis for others.

Most forms of kidney care in the ISN OSEA region were less available and less affordable than the global average. Although nondialysis CKD care was available in all countries, it was wholly publicly funded in less than a quarter (21%), was lower than the global median of 27%, and was unchanged since 2019. Among countries with fully publicly funded nondialysis CKD care, all except Solomon Islands were HICs or UMICs. Many MICs have put considerable effort into establishing and expanding KF programs, despite their limited resources. For example, in Fiji, where the consumer pays for dialysis at the point of care, nephrologists have worked through an ISN Sister Renal Center program with an Australian hospital to establish HD clinics, and it now has 6 dialysis centers.³⁷ Likewise, the National Kidney Foundation of Samoa has established a sister renal center program with Counties Manukau Hospital in New Zealand to support dialysis initiatives in Samoa. This example demonstrates how international cooperation and partnerships

can play a vital role in improving access to KRT services. Despite these efforts, fewer countries in the region, particularly the Pacific Islands, have publicly funded chronic dialysis and transplantation, compared to the rest of the world. The level of access to transplantation remained lower than the global median, and in Solomon Islands, no access was available to any form of KRT. The transplantation rate remained low in countries where only living-donor transplantation is available (Brunei, Indonesia, Myanmar, Vietnam). This limitation can be attributed to factors such as medical infrastructure, awareness, and perhaps cultural norms affecting the willingness of individuals to donate organs. Transplantation remained unavailable in several MICs. The majority of people with CKD in the ISN OSEA region reside in LICs or LMICs where the prevalence is rising rapidly, and the level of affordability of kidney care is low.^{38,39}

The level of access to CKM in the ISN OSEA region is noted to be the lowest in the world, and minimal improvement in access occurred between the 2019 and 2023 ISN-GKHA iterations.⁴⁰ Although CKM provides high value to people living with kidney disease, delivery of CKM requires infrastructure, resources, and training, which may not be readily available in LICs and LMICs.⁴¹ Within the region, economic, social, or cultural influences, as well as knowledge and clinical practice culture, may also impact CKM access. For instance, a study from Indonesia found that physicians were more likely to recommend dialysis, compared to CKM, for wealthier people.⁴² A study from Philippines found widespread support for CKM, but many institutions were unable to offer it.⁴³ This finding suggests that a gap exists between the demand for CKM and the capacity of healthcare facilities to provide it.

Moreover, the level of access to publicly funded AKI care (including AKI-related dialysis) was also lower in the ISN OSEA region, compared to that in other world regions. This finding is largely unchanged since the 2019 GKHA.⁴⁴ Given that public funding for KRT increases with income level, this finding is not surprising, but it may be an important contributor to increased mortality in LICs and LMICs where people living with kidney disease have less capacity to cover out-of-pocket costs. AKI is common in LICs and MICs, with a diverse range of causes, including infections, heat, envenomation, and medications.^{45,46} Lack of access to publicly funded AKI care may be explained by low rates of government prioritization of AKI in the region and lack of AKI advocacy support. Government recognition is key to supporting the development and implementation of policies and strategies that ensure adequate AKI care, even as advocacy groups play an important role in creating awareness among communities and political leaders and organizing regional and national resources to support disease prevention and treatment.⁴⁷

This situation is further complicated by the geography and remote nature of the communities. Access to kidney care in rural areas is complicated by challenging terrains, transportation, and lack of local facilities, resulting in people having to travel hours to obtain kidney treatment.¹

The impact on families can also be catastrophic, as the absence of public funding for kidney care in most LICs and LMICs often results in high out-of-pocket costs for kidney-care treatment. Families either cannot afford to pay for care or are financially crippled by the costs. Kidney disease is the most common cause of catastrophic family health expenditure for people in LICs and MICs.⁴⁸ Mitigation strategies for climate change are a barrier to establishing solid health infrastructure, impacting kidney-care delivery, particularly in small island states that are especially vulnerable to rising sea levels.

The high burden of kidney disease in the ISN OSEA region calls for urgent action from governments and health systems. High-quality registries such as those in Australia and New Zealand may serve as a model for registries in other countries in the region.⁴⁹ Reliable data on kidney disease incidence, treatment patterns, and outcomes will inform resource allocation by policymakers and underpin effective advocacy for improved access to KF treatment and for primary and secondary prevention of CKD.⁵⁰ The large burden of CKD in the region also underscores the need and opportunity for clinical trials to recruit people in the region. In 2017, the ISN outlined a “stretch” goal of “30 by 30”—that is, 30% of people with CKD should be enrolled in clinical trials by 2030.⁵¹ Given the large burden of CKD in the region and the unique epidemiologic factors (e.g., IgA nephropathy), developing trial infrastructure and the workforce in the region should be a priority, and includes leveraging registries to enable collection of trial endpoints.^{52,53} Finally, greater collaboration between advocacy and professional organizations across countries is critical to facilitating the exchange of skills between workforces to improve equity and access to kidney care.

The 2023 ISN-GKHA had some limitations; these have been discussed.⁶ However, this work is important for guiding kidney-care policy in the OSEA region.

Conclusion

CKD is more common in the ISN OSEA region, with poorer access to kidney care, than it is in the rest of the world. Barriers to optimal kidney care are multifactorial, and they include the limited health system infrastructure, workforce, and governmental health spending. Although progress has been made on extending the reach of kidney care and developing registries, further collaborative work in the region is needed to achieve ISN’s vision of a future in which all people have equitable access to sustainable kidney health. The 2023 ISN-GKHA had some limitations; these have been discussed.⁶ However, this work is important for guiding kidney-care policy in the ISN OSEA region.

APPENDIX

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SUPPLEMENTARY MATERIAL

[Supplementary File \(PDF\)](#)

Supplementary Table S1. Burden of chronic kidney disease (CKD) in the International Society of Nephrology–Oceania and South East Asia (ISN OSEA) region.

Supplementary Table S2. Funding for kidney replacement therapy (KRT) in the International Society of Nephrology–Oceania and South East Asia (ISN OSEA) region.

Supplementary Table S3. Workforce and kidney replacement therapy (KRT) centers per million population (pmp) for medical kidney care in the International Society of Nephrology–Oceania and South East Asia (ISN OSEA) region.

Supplementary Figure S1. Funding for nondialysis chronic kidney disease (CKD; left) care and (right) medications in the International Society of Nephrology–Oceania and South East Asia (ISN OSEA) region.

Supplementary Figure S2. Funding for (left) dialysis and (right) transplant medications in the International Society of Nephrology–Oceania and South East Asia (ISN OSEA) region.

Supplementary Figure S3. Workforce shortages for medical kidney care in the International Society of Nephrology–Oceania and South East Asia (ISN OSEA) region.

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