

THE GLOBAL KIDNEY HEALTH ATLAS



<Congress title>

Date

Overview

- Aim
- Methods
- Key Results
- Implications



Aim of the Global Kidney Health Atlas



60
years
1960-2020

To understand, compare and monitor how different countries around the world detect, treat, monitor and advocate for people with kidney disease (AKI or CKD)

Key focus on availability, accessibility, affordability and quality of ESKD care

Global Kidney Health Atlas survey



Design and scope


Desk research (across countries and regions)

- Published and grey literature review
- Systematic review ESKD burden and outcomes
- Data extraction from major renal registries (USRDS, ERA-EDTA) and relevant national registries where available
- Scoping review of KRT cost estimates

Online questionnaire-based survey July – September 2018

- 3 languages (English, French, Spanish)
- Across 182 countries
- ≥ 3 stakeholders per country
 - National nephrology society leadership
 - Healthcare policymakers
 - Patients / patient advocacy groups
- Discrepancies resolved by follow-up conferences with regional and country nephrology leaders

Overall survey components



WHAT DO YOU NEED TO GET, BE AND STAY HEALTHY?

Health worker → CAN YOU GET HELP FROM A WELL-TRAINED HEALTH WORKER?

Treatment → CAN YOU GET TREATMENT THAT HELPS YOU GET BETTER, AND IS SAFE?

Medicine → CAN YOU GET THE MEDICINES AND OTHER HEALTH PRODUCTS YOU NEED?

\$ → WHO WILL PAY FOR IT?

Health policy → ARE THERE POLICIES IN PLACE TO MAKE QUALITY SERVICES AVAILABLE TO EVERYONE, EVERY TIME?

Information → DOES YOUR GOVERNMENT HAVE THE INFORMATION IT NEEDS TO MAKE THE RIGHT DECISIONS ABOUT THE WHOLE SYSTEM?

THE WORLD HEALTH ORGANIZATION IS WORKING AROUND THE WORLD SO THAT ALL PEOPLE AND COMMUNITIES RECEIVE THE QUALITY SERVICES THEY NEED, AND ARE PROTECTED FROM HEALTH THREATS, WITHOUT SUFFERING FINANCIAL HARDSHIP.

THAT'S WHAT WE CALL
UNIVERSAL HEALTH COVERAGE

WWW.WHO.INT/UHC

Overall GKHA response

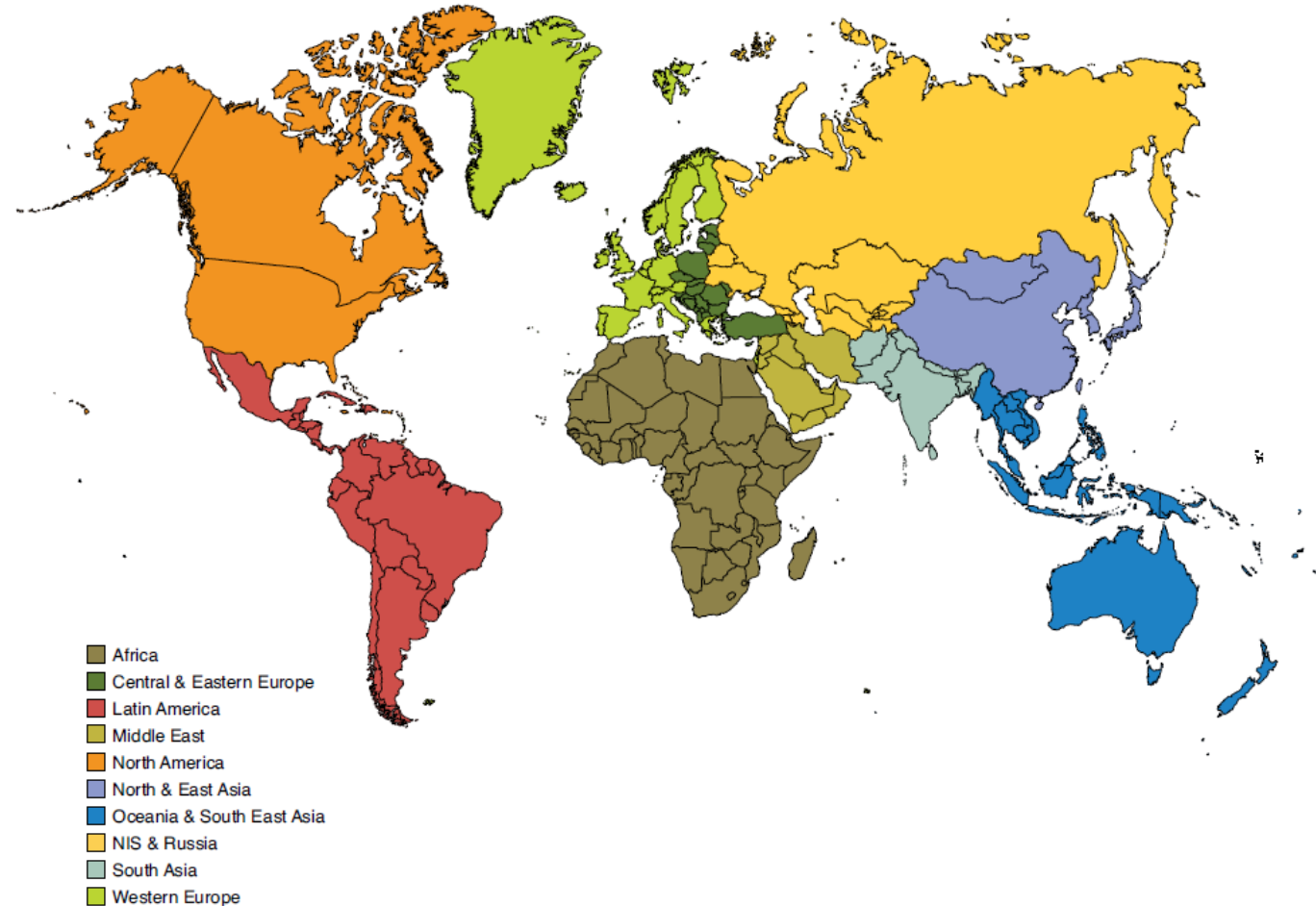
■ Participated in survey ■ Did not participate in survey



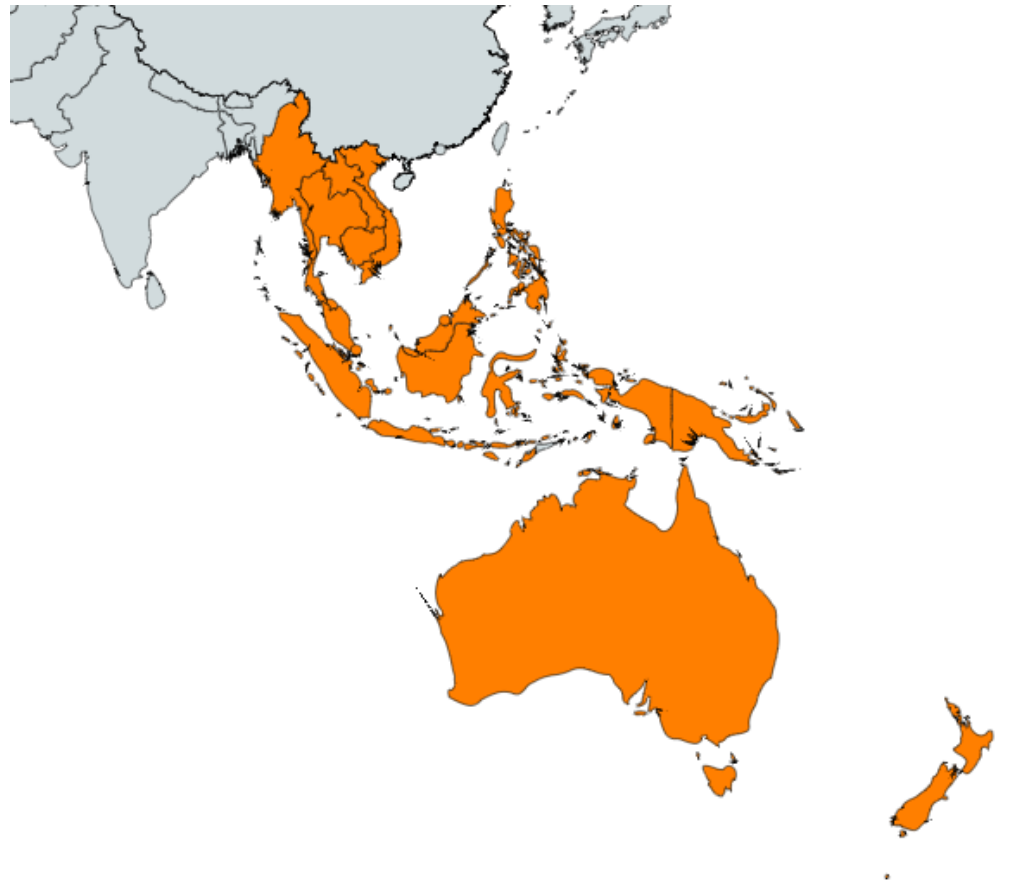
160 countries (88%)
99% world's population
317 individuals (69%) response
3 respondents/country (IQR 2-4)

113 countries participated
in both GKHA surveys

Results presented by ISN regions



ISN Region: Oceania & South East Asia



Demographics

| Country | World bank ranking | Area (sq km) | Total population (2018) | GDP (PPP) (\$ billion) | Total health expenditures (% of GDP) |
|--------------------------|---------------------|--------------|-------------------------|------------------------|--------------------------------------|
| American Samoa | Upper middle income | 224 | 50,826 | 0.658 | - |
| Australia | High income | 7,741,220 | 23,470,145 | 1248 | 9.3 |
| Brunei Darussalam | High income | 5,756 | 450,565 | 33.87 | 2.3 |
| Cambodia | Lower middle income | 181,035 | 16,449,519 | 64.21 | 6.1 |
| Fiji | Upper middle income | 18,274 | 926,276 | 8.629 | 3.6 |
| French Polynesia | High income | 4,167 | 290,373 | 5.49 | - |
| Guam | High income | 544 | 167,772 | 5.793 | - |
| Indonesia | Lower middle income | 1,904,569 | 262,787,403 | 3250 | 3.3 |
| Kiribati | Lower middle income | 811 | 109,367 | 0.227 | 11.9 |
| Lao PDR | Lower middle income | 236,800 | 7,234,171 | 49.34 | 2.8 |
| Malaysia | Upper middle income | 329,847 | 31,809,660 | 933.3 | 4.0 |
| Marshall Islands | Upper middle income | 181 | 75,684 | 0.196 | 23.3 |
| Micronesia | Lower middle income | 702 | 103,643 | 0.348 | 12.6 |
| Myanmar | Lower middle income | 676,578 | 55,622,506 | 329.8 | 5.1 |
| Nauru | Upper middle income | 21 | 9,692 | 0.160 | 11.1 |
| New Caledonia | High income | 18,575 | 282,754 | 11.11 | - |
| New Zealand | High income | 268,838 | 4,545,627 | 189 | 9.3 |
| Northern Mariana Islands | High income | 464 | 51,994 | 1.242 | - |
| Palau | High income | 459 | 21,516 | 0.264 | 11.7 |
| Papua New Guinea | Lower middle income | 462,840 | 7,027,332 | 30.19 | 2.0 |
| Philippines | Lower middle income | 300,000 | 105,893,381 | 877.2 | 4.4 |
| Samoa | Upper middle income | 2,831 | 201,316 | 1.137 | 5.6 |
| Singapore | High income | 697 | 5,995,991 | 528.1 | 4.3 |
| Solomon Islands | Lower middle income | 28,896 | 660,121 | 1.33 | 5.2 |
| Thailand | Upper middle income | 513,120 | 68,615,858 | 1236 | 3.8 |
| Timor-Leste | Lower middle income | 14,874 | 1,321,929 | 7.426 | 4.0 |
| Tonga | Upper middle income | 747 | 106,398 | 0.591 | 5.3 |
| Tuvalu | Upper middle income | 26 | 11,147 | 0.042 | 15.5 |
| Vanuatu | Lower middle income | 12,189 | 288,037 | 0.772 | 3.7 |
| Vietnam | Lower middle income | 331,210 | 97,040,334 | 648.7 | 5.7 |



‘ - ’: data not reported/unavailable

CKD and its risk factors burden

| Country | CKD Prevalence % (95% CI) | Death attributed to CKD % (95% CI) | DALYS attributed to CKD % (95% CI) | Obesity % (95% CI) | Increased BP % (95% CI) | Smoking % (95% CI) |
|--------------------------|------------------------------|--|--|-----------------------|----------------------------|-----------------------|
| American Samoa | 11.89 (10.97 - 12.84) | 7.17 (6.47 - 7.64) | 4.52 (3.97 - 5) | - | - | 19.8 (16.7 - 23.4) |
| Australia | 11.15 (10.35 - 12.08) | 2.61 (2.48 - 2.74) | 1.26 (1.14 - 1.38) | 30.4 (26.5 - 34.4) | 15.2 (11.5 - 19.4) | 14.6 (13.6 - 15.6) |
| Brunei Darussalam | 10.26 (9.36 - 11.23) | 3.75 (3.48 - 4.03) | 2.45 (2.18 - 2.71) | 14.7 (11.0 - 18.9) | 18.9 (13.5 - 25.2) | 12.7 (11.3 - 14.2) |
| Cambodia | 8.0 (7.39 - 8.66) | 1.8 (1.66 - 1.96) | 1.26 (1.13 - 1.4) | 3.5 (2.3 - 5.1) | 26.1 (19.6 - 33.0) | 15.4 (13.7 - 17.1) |
| Fiji | 13.64 (12.56 - 14.8) | 3.83 (3.53 - 4.14) | 2.7 (2.44 - 2.96) | 30.0 (24.4 - 35.9) | 21.7 (15.6 - 28.7) | 11.1 (9.5 - 12.9) |
| French Polynesia | - | - | - | - | - | - |
| Guam | 13.41 (12.41 - 14.49) | 4.78 (4.28 - 5.13) | 3.22 (2.83 - 3.56) | - | - | 18.4 (15.9 - 21.0) |
| Indonesia | 10.84 (9.99 - 11.71) | 2.16 (2.07 - 2.33) | 1.71 (1.57 - 1.83) | 6.9 (5.1 - 9.1) | 23.8 (18.5 - 29.5) | 25.6 (23.6 - 27.8) |
| Kiribati | 9.93 (9.15 - 10.78) | 2.73 (2.24 - 3.04) | 1.94 (1.6 - 2.2) | 45.6 (39.4 - 51.6) | 21.5 (15.8 - 28.2) | 33.9 (30.0 - 37.9) |
| Lao PDR | 8.54 (7.9 - 9.22) | 2.3 (1.99 - 2.54) | 1.51 (1.29 - 1.72) | 4.5 (3.0 - 6.4) | 24.8 (18.8 - 31.1) | 25.1 (21.6 - 29.2) |
| Malaysia | 11.08 (10.12 - 12.1) | 2.86 (2.65 - 3.1) | 1.85 (1.67 - 2.06) | 15.3 (12.3 - 18.7) | 22.9 (17.9 - 28.7) | 17.2 (15.2 - 19.2) |
| Marshall Islands | 9.67 (8.88 - 10.47) | 4.7 (3.99 - 5.33) | 3.3 (2.79 - 3.83) | 52.4 (46.2 - 58.6) | 21.3 (15.2 - 28.1) | - |
| Micronesia | 10.70 (9.88 - 11.62) | 5.18 (4.25 - 5.9) | 3.49 (2.71 - 4.12) | 41.6 (35.5 - 47.6) | 25.0 (18.9 - 32.0) | 13.0 (10.7 - 15.6) |
| Myanmar | 10.23 (9.45 - 11.03) | 2.93 (2.69 - 3.3) | 2.07 (1.84 - 2.32) | 5.7 (4.0 - 7.8) | 24.6 (18.5 - 31.1) | 15.0 (13.3 - 17.0) |
| Nauru | - | - | - | 60.7 (55.0 - 66.3) | - | - |
| New Caledonia | - | - | - | - | - | - |
| New Zealand | 10.95 (10.15 - 11.87) | 2.37 (2.26 - 2.48) | 1.27 (1.14 - 1.4) | 32.0 (28.4 - 35.6) | 16.2 (12.3 - 20.8) | 15.3 (14.4 - 16.2) |
| Northern Mariana Islands | 14.69 (13.47 - 16.05) | 6.86 (6.27 - 7.36) | 4.16 (3.61 - 4.67) | - | - | 39.7 (34.3 - 45.6) |
| Palau | - | - | - | 54.9 (48.8 - 60.7) | 22.9 (16.8 - 30.0) | - |
| Papua New Guinea | 8.23 (7.54 - 8.94) | 2.31 (1.97 - 2.62) | 1.7 (1.44 - 1.95) | 19.4 (14.0 - 25.3) | 25.6 (18.4 - 33.5) | 26.1 (22.8 - 29.7) |
| Philippines | 9.31 (8.6 - 10.02) | 5.11 (4.84 - 5.37) | 3.31 (2.97 - 3.65) | 6.0 (4.3 - 8.1) | 22.6 (17.4 - 28.1) | 20.1 (17.5 - 23.0) |
| Samoa | 9.94 (9.19 - 10.69) | 5.21 (4.56 - 5.75) | 3.07 (2.63 - 3.51) | 45.5 (39.8 - 51.5) | 24.0 (17.9 - 30.8) | 21.5 (18.5 - 24.7) |
| Singapore | 12.43 (11.49 - 13.46) | 3 (2.85 - 3.15) | 1.81 (1.6 - 2.01) | 6.6 (4.6 - 9.0) | 14.6 (10.8 - 19.0) | 12.4 (11.1 - 13.7) |
| Solomon Islands | 8.63 (7.96 - 9.41) | 3.61 (3.33 - 3.92) | 2.71 (2.35 - 3.05) | 20.5 (15.8 - 25.7) | 22.0 (15.7 - 29.0) | 17.9 (15.0 - 20.8) |
| Thailand | 13.9 (12.75 - 15.13) | 4.69 (4.15 - 5.02) | 2.74 (2.45 - 3.02) | 10.8 (8.0 - 14.0) | 22.3 (16.9 - 28.3) | 17.9 (15.8 - 20.3) |
| Timor-Leste | 7.47 (6.94 - 8.07) | 2.05 (1.72 - 2.34) | 1.26 (0.97 - 1.46) | 2.9 (1.9 - 4.4) | 27.6 (21.4 - 34.4) | 24.1 (21.6 - 26.8) |
| Tonga | 11.81 (10.91 - 12.75) | 5.48 (4.56 - 6.12) | 3.45 (2.93 - 3.93) | 45.9 (39.7 - 51.9) | 23.7 (17.5 - 30.6) | 22.3 (20.0 - 24.7) |
| Tuvalu | - | - | - | 51.0 (44.4 - 57.3) | 23.7 (17.6 - 31.2) | - |
| Vanuatu | 9.03 (8.36 - 9.80) | 2.99 (2.54 - 3.43) | 2.04 (1.74 - 2.33) | 23.5 (18.2 - 29.1) | 24.2 (17.3 - 31.5) | 15.8 (13.8 - 17.9) |
| Vietnam | 10.72 (9.93 - 11.59) | 2.87 (2.63 - 3.12) | 1.89 (1.7 - 2.09) | 2.1 (1.4 - 3.1) | 23.4 (18.0 - 29.4) | 18.8 (16.8 - 20.9) |

Abbreviations:

CKD (Chronic Kidney Disease),
DALYS (disability-adjusted life years),
BP (blood pressure),
CI (confidence interval)

Data sources:

GBD study database
(<http://www.healthdata.org/gbd>),
WHO data observatory
(<https://www.who.int/gho/en/>)

' - ': data not reported/unavailable

Burden of ESKD

Prevalence of treated ESKD



Treated ESKD: all dialysis + transplant

* pmp (per million population)

Data sources: Abu-Aisha & Elamin (Peritoneal Dialysis International) 2010, Jain et al. (JASN) 2012, Liyanage et al. (The Lancet) 2015, 2017/2018 USRDS Annual Data Report

'-': data not reported/unavailable

| Country | Treated ESKD | | Chronic dialysis (HD+PD) | | Chronic Hemodialysis | | Chronic Peritoneal dialysis | |
|--------------------------|--------------|------------|--------------------------|------------|----------------------|------------|-----------------------------|------------|
| | Incidence | Prevalence | Incidence | Prevalence | Incidence | Prevalence | Incidence | Prevalence |
| American Samoa | - | - | - | - | - | - | - | - |
| Australia | 124 | 1026 | 119 | 536 | 111.6 | 425.5 | 45.6 | 101.1 |
| Brunei Darussalam | 393 | 1673 | - | 1235 | - | 1064.6 | - | 170.4 |
| Cambodia | - | - | - | - | - | - | - | - |
| Fiji | - | - | - | - | - | - | - | - |
| French Polynesia | - | - | - | - | - | - | - | - |
| Guam | - | - | - | - | - | - | - | - |
| Indonesia | 135 | 323 | - | 320 | - | - | - | 3.3 |
| Kiribati | - | - | - | - | - | - | - | - |
| Lao PDR | - | - | - | - | - | - | - | - |
| Malaysia | 259 | 1352 | 245.7 | 1295 | 185 | 970 | 25 | 95 |
| Marshall Islands | - | - | - | - | - | - | - | - |
| Micronesia | - | - | - | - | - | - | - | - |
| Myanmar | - | - | - | - | - | - | - | 0 |
| Nauru | - | - | - | - | - | - | - | - |
| New Caledonia | - | - | - | - | - | - | - | - |
| New Zealand | 127 | 985 | 119 | 583 | 109.52 | 410.61 | 69.47 | 175.37 |
| Northern Mariana Islands | - | - | - | - | - | - | - | - |
| Palau | - | - | - | - | - | - | - | - |
| Papua New Guinea | - | - | - | - | - | - | - | - |
| Philippines | 172 | 319 | - | 314 | - | 69.2 | - | 10.1 |
| Samoa | - | - | - | - | - | - | - | - |
| Singapore | 333 | 2076 | 209.4 | 1248.6 | - | 681.9 | - | 158.3 |
| Solomon Islands | - | - | - | - | - | - | - | - |
| Thailand | 346 | 1515 | 308.57 | 1192.5 | 168.01 | 823.5 | 140.56 | 369 |
| Timor-Leste | - | - | - | - | - | - | - | - |
| Tonga | - | - | - | - | - | - | - | - |
| Tuvalu | - | - | - | - | - | - | - | - |
| Vanuatu | - | - | - | - | - | - | - | - |
| Vietnam | - | - | - | 53.2 | - | 41.7 | - | 11.5 |

Burden of ESKD (cont'd)

Prevalence of treated ESKD



■ <5.2 pmp
 ■ 5.2–13.5 pmp
 ■ 13.6–37.8 pmp
 ■ >37.8 pmp
 ■ Data not reported

* pmp (per million population)

Data sources: GODT database

(<http://www.transplant-observatory.org/data-charts-and-tables/>)

' - ': data not reported/unavailable

| Country | Kidney transplantation | | | | |
|--------------------------|------------------------|--------------------|-----------------------------|---------------------------|--------------------------|
| | Incidence overall | Prevalence overall | Incidence of deceased donor | Incidence of living donor | Incidence of pre-emptive |
| American Samoa | - | - | - | - | - |
| Australia | 46.0 | 490 | 34.0 | 11.1 | 4.5 |
| Brunei Darussalam | - | - | - | - | - |
| Cambodia | - | - | - | - | - |
| Fiji | - | - | - | - | - |
| French Polynesia | - | - | - | - | - |
| Guam | - | - | - | - | - |
| Indonesia | 2.0 | - | 0 | 2.0 | - |
| Kiribati | - | - | - | - | - |
| Lao PDR | - | - | - | - | - |
| Malaysia | 2.5 | 58 | 0.8 | 1.7 | - |
| Marshall Islands | - | - | - | - | - |
| Micronesia | - | - | - | - | - |
| Myanmar | 0.04 | - | 0 | 0.04 | - |
| Nauru | - | - | - | - | - |
| New Caledonia | - | - | - | - | - |
| New Zealand | 37.0 | 402 | 25.1 | 14.7 | 5 |
| Northern Mariana Islands | - | - | - | - | - |
| Palau | - | - | - | - | - |
| Papua New Guinea | - | - | - | - | - |
| Philippines | 4.7 | 5 | 0.4 | 4.3 | - |
| Samoa | - | - | - | - | - |
| Singapore | 12.6 | 278.2 | 7.0 | 5.6 | - |
| Solomon Islands | - | - | - | - | - |
| Thailand | 9.4 | 114.1 | 6.1 | 3.2 | - |
| Timor-Leste | - | - | - | - | - |
| Tonga | - | - | - | - | - |
| Tuvalu | - | - | - | - | - |
| Vanuatu | - | - | - | - | - |
| Vietnam | 2.9 | - | 0.1 | 2.8 | - |

Annual cost of kidney replacement therapy components

| Country | Hemodialysis | Peritoneal dialysis | Kidney Transplant (First year) | Kidney Transplant (later years) | HD/PD cost ratio |
|--------------------------|--------------|---------------------|--------------------------------|---------------------------------|------------------|
| American Samoa | - | - | - | - | - |
| Australia | 57,183 | 49,099 | 34,894 | 10,269 | 1.16 |
| Brunei Darussalam | 20,205 | 23,464 | - | - | 0.86 |
| Cambodia | 8,760 | - | - | - | - |
| Fiji | - | - | - | - | - |
| French Polynesia | - | - | - | - | - |
| Guam | - | - | - | - | - |
| Indonesia | 10,140 | 8,134 | 19,743 | 2,956 | 1.25 |
| Kiribati | - | - | - | - | - |
| Lao PDR | - | - | - | - | - |
| Malaysia | 10,386 | 9,977 | 20,396 | 5,385 | 1.04 |
| Marshall Islands | - | - | - | - | - |
| Micronesia | - | - | - | - | - |
| Myanmar | 7,169 | 14,339 | 4,302 | - | 0.50 |
| Nauru | - | - | - | - | - |
| New Caledonia | - | - | - | - | - |
| New Zealand | 41,390 | 28,788 | 38,642 | 19,117 | 1.44 |
| Northern Mariana Islands | - | - | - | - | - |
| Palau | - | - | - | - | - |
| Papua New Guinea | - | - | - | - | - |
| Philippines | - | - | - | - | - |
| Samoa | - | - | - | - | - |
| Singapore | 28,532 | 15,547 | 43,901 | 16,479 | 1.84 |
| Solomon Islands | - | - | - | - | - |
| Thailand | 24,996 | 23,267 | 8,603 | 5,736 | 1.07 |
| Timor-Leste | - | - | - | - | - |
| Tonga | - | - | - | - | - |
| Tuvalu | - | - | - | - | - |
| Vanuatu | - | - | - | - | - |
| Vietnam | 28,559 | 16,479 | 4,575 | - | 1.73 |

*Cost is in \$US 2016

Abbreviations:

HD (hemodialysis),
PD (peritoneal dialysis)

Data sources:

Agar et al. (2005), Ashton & Marshall (2007), Bavanandan et al. (2015), Hooi et al. (2005), Howard et al. (2009), Khoe et al. (2017), Komenda et al. (2012), Li & Chow (2001), Lim et al. (1999), Morad et al. (2005), Naidas et al. (1998), Neil et al. (2009), Prodjosudjadi (2006), Tan et al. (2005), Teerawattanon et al. (2007), Van Bui (2008), van der Tol et al. (2019), Visith Sitprija (2003), Yang et al. (2016)

‘ - ’ : data not reported/unavailable

Survey response

- 15 of 30 countries in OSEA (50%) responded to the 2018 survey
- This represents 95% of the region's population

Country level scorecard

| Countries | Availability of KRT and CKM | | | | Funding for Medications | | Availability and Distribution of Registry | | | | Advocacy Group | | | Nephrology Workforce (PMP) | |
|--------------------------------------|-----------------------------|-----------------------------|------------------------|-----|-------------------------|------------------------|---|----------|-----------------|---------------|----------------|-----|----------|----------------------------|-----------------------|
| | Chronic hemodialysis | Chronic peritoneal dialysis | Kidney transplantation | CKM | Dialysis medications | Transplant medications | CKD | Dialysis | Transplantation | AKI | CKD | AKI | ESKD/RRT | Nephrologists | Nephrologist trainees |
| Oceania & South East Asia | | | | | | | | | | | | | | | |
| Australia | 2017 | Yes | Yes | Yes | No | No | No | Yes | Yes | No | Yes | Yes | No | 20.88 | 4.83 |
| | 2019 | Yes | Yes | Yes | No | No | No | Yes | Yes | No | Yes | Yes | No | 21.30 | 4.96 |
| Brunei Darussalam | 2017 | No | No | No | No | No | No | No | No | No | No | No | No | | |
| | 2019 | Yes | Yes | Yes | No | No | No | Yes | Yes | No | Yes | Yes | No | 28.85 | 11.10 |
| Cambodia | 2017 | No | No | No | No | No | No | No | No | No | Yes | No | No | 1.27 | 0.13 |
| | 2019 | Yes | No | No | No | No | No | No | No | No | Yes | No | No | 0.91 | 0.30 |
| Fiji | 2017 | No | No | No | No | No | No | No | No | No | Yes | No | No | 1.10 | 1.10 |
| | 2019 | Yes | Yes | No | No | No | No | No | No | No | Yes | No | No | 1.08 | 1.08 |
| Indonesia | 2017 | No | Yes | Yes | No | No | No | No | No | No | No | No | No | 0.43 | 0.08 |
| | 2019 | Yes | Yes | Yes | No | No | No | No | No | No | Yes | No | No | 0.49 | 0.23 |
| Lao PDR | 2017 | No | No | No | No | No | No | No | No | No | Yes | No | No | 0.43 | 0.29 |
| | 2019 | Yes | No | No | No | No | No | No | No | No | Yes | No | No | 11.34 | |
| Malaysia | 2017 | No | Yes | Yes | No | No | No | No | No | No | No | No | No | 4.92 | 0.69 |
| | 2019 | Yes | Yes | Yes | No | No | No | No | No | No | Yes | No | No | 5.66 | 1.10 |
| Myanmar | 2017 | No | Yes | Yes | No | No | No | No | No | No | No | No | No | 0.37 | 0.24 |
| | 2019 | Yes | Yes | Yes | No | No | No | No | No | No | Yes | No | No | 0.49 | 0.31 |
| New Caledonia | 2017 | No | No | No | No | No | No | No | No | No | No | No | No | | |
| | 2019 | Yes | No | Yes | No | No | No | No | No | No | Yes | No | No | 40.67 | 0.00 |
| New Zealand | 2017 | Yes | Yes | No | No | No | No | No | No | No | No | No | No | 11.27 | 3.27 |
| | 2019 | Yes | Yes | Yes | No | No | No | No | No | No | Yes | No | No | 15.40 | 4.51 |
| Philippines | 2017 | No | Yes | Yes | No | No | No | No | No | No | No | No | No | 5.45 | 0.79 |
| | 2019 | Yes | Yes | Yes | No | No | No | No | No | No | Yes | No | No | 5.67 | 0.85 |
| Nephrologists density | | <1.2 PMP | | | | 1.2–10.0 PMP | | | | 10.1–22.9 PMP | | | | >22.9 PMP | |
| Nephrology trainees density | | <0.3 PMP | | | | 0.3–1.4 PMP | | | | 1.5–3.7 PMP | | | | >3.7 PMP | |

| |
|-----|
| Yes |
| No |
| N/A |

Abbreviations

KRT: kidney replacement therapy
 CKM: conservative kidney management
 CKD: chronic kidney disease
 AKI: acute kidney injury
 ESKD: end stage kidney disease
 RRT: renal replacement therapy

Country level scorecard (cont'd)

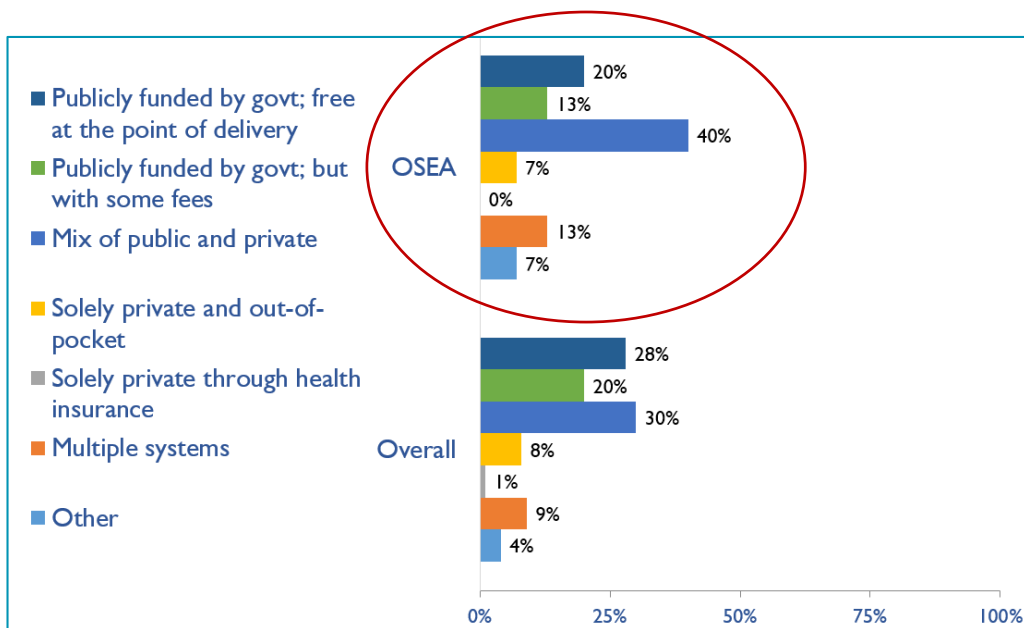
| Countries | Availability of KRT and CKM | | | | Funding for Medications | | Availability and Distribution of Registry | | | | Advocacy Group | | | Nephrology Workforce (PMP) | |
|--------------------------------------|-----------------------------|-----------------------------|------------------------|--------------|-------------------------|------------------------|---|-----------|-----------------|-----|----------------|-----|----------|----------------------------|---------------------|
| | Chronic hemodialysis | Chronic peritoneal dialysis | Kidney transplantation | CKM | Dialysis medications | Transplant medications | CKD | Dialysis | Transplantation | AKI | CKD | AKI | ESKD/RRT | Nephrologists | Nephrology trainees |
| Oceania & South East Asia | | | | | | | | | | | | | | | |
| Samoa | 2017 | | | | | | | | | | | | | 0.00 | 5.06 |
| | 2019 | | | | | | | | | | | | | 4.97 | 0.00 |
| Singapore | 2017 | | | | | | | | | | | | | 9.69 | 2.64 |
| | 2019 | | | | | | | | | | | | | 16.59 | 3.50 |
| Thailand | 2017 | | | | | | | | | | | | | 8.80 | 0.59 |
| | 2019 | | | | | | | | | | | | | 11.66 | 1.31 |
| Vietnam | 2017 | | | | | | | | | | | | | 6.36 | 1.59 |
| | 2019 | | | | | | | | | | | | | 3.09 | 0.52 |
| Nephrologists density | | <1.2 PMP | | 1.2–10.0 PMP | | 10.1–22.9 PMP | | >22.9 PMP | | | | | | | |
| Nephrology trainees density | | <0.3 PMP | | 0.3–1.4 PMP | | 1.5–3.7 PMP | | >3.7 PMP | | | | | | | |

| |
|-----|
| Yes |
| No |
| N/A |

Abbreviations

KRT: kidney replacement therapy
 CKM: conservative kidney management
 CKD: chronic kidney disease
 AKI: acute kidney injury
 ESKD: end stage kidney disease
 RRT: renal replacement therapy

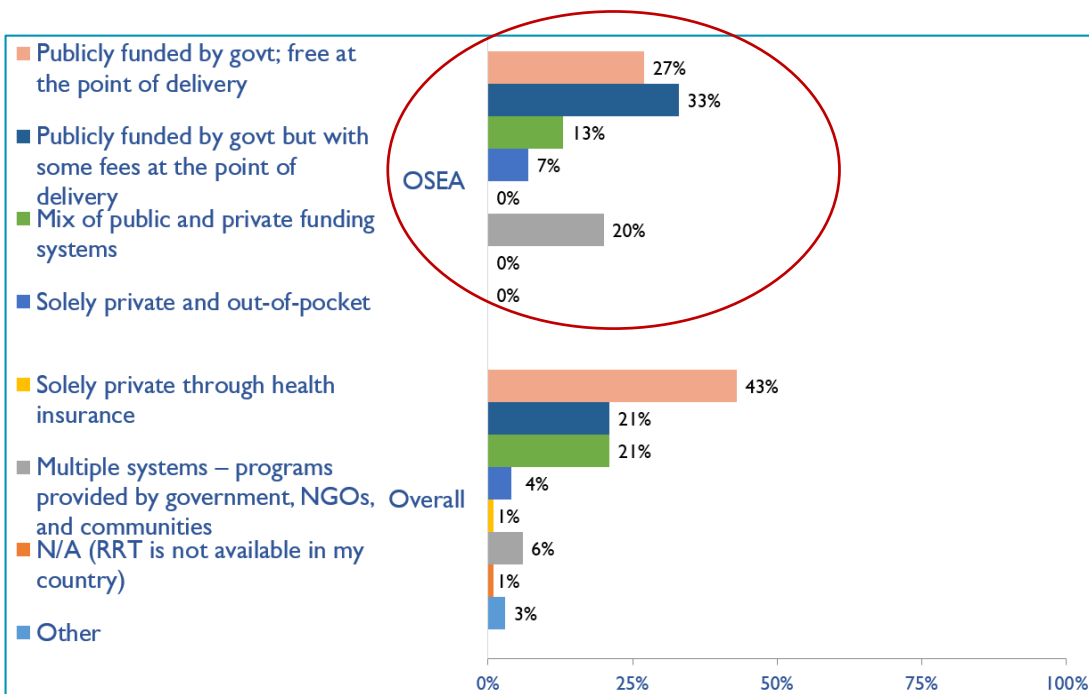
Funding for non-dialysis CKD



| Country | Publicly funded by govt; free at the point of delivery | Publicly funded by govt but with some fees | Mix of public and private | Solely private and out-of-pocket | Solely private through health insurance | Multiple systems | Other |
|-------------------|--|--|---------------------------|----------------------------------|---|------------------|-------|
| Australia | X | | | | | | |
| Brunei Darussalam | X | | | | | | |
| Cambodia | | | | X | | | |
| Fiji | | | | | | X | |
| Indonesia | | X | | | | | |
| Lao PDR | | | | | | X | |
| Malaysia | | | X | | | | |
| Myanmar | | | X | | | | |
| New Caledonia | X | | | | | | |
| New Zealand | | X | | | | | |
| Philippines | | | | | | | X |
| Samoa | | | X | | | | |
| Singapore | | | X | | | | |
| Thailand | | | X | | | | |
| Vietnam | | | X | | | | |

X : Yes

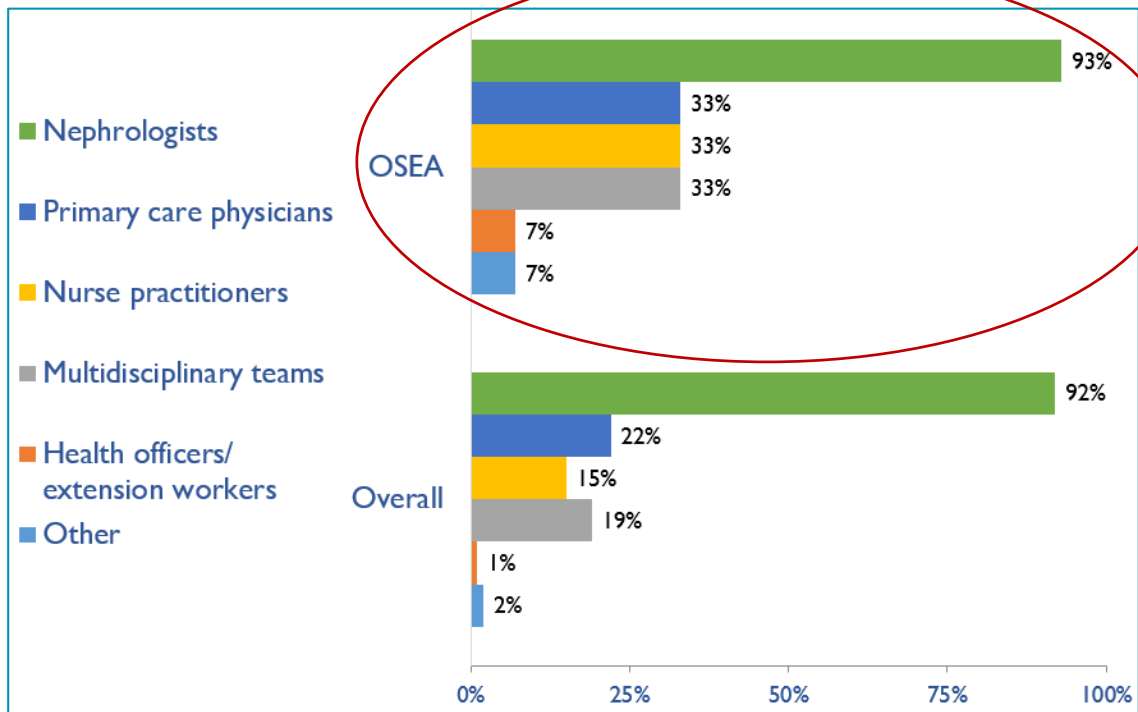
Funding for kidney replacement therapy (KRT)



| Country | Publicly funded by govt; free at the point of delivery | Publicly funded by govt but with some fees at the point of delivery | Mix of public and private funding systems | Solely private and out-of-pocket | Solely private through health insurance | Multiple systems | N/A (RRT is not available in my country) | Other |
|-------------------|--|---|---|----------------------------------|---|------------------|--|-------|
| Australia | X | | | | | | | |
| Brunei Darussalam | X | | | | | | | |
| Cambodia | | | | X | | | | |
| Fiji | | | X | | | | | |
| Indonesia | | X | | | | | | |
| Lao PDR | | | | | | X | | |
| Malaysia | | | X | | | | | |
| Myanmar | | | | | | X | | |
| New Caledonia | X | | | | | | | |
| New Zealand | X | | | | | | | |
| Philippines | | X | | | | | | |
| Samoa | | X | | | | | | |
| Singapore | | | | | | X | | |
| Thailand | | X | | | | | | |
| Vietnam | | X | | | | | | |

X : Yes

Providers primarily responsible for ESKD care



| Country | Nephrologists | Primary care physicians | Nurse practitioners or specialized nurses | Multidisciplinary teams | Health officers/extension workers | Other |
|-------------------|---------------|-------------------------|---|-------------------------|-----------------------------------|-------|
| Australia | X | | | | | |
| Brunei Darussalam | X | | X | | | |
| Cambodia | X | X | X | | | |
| Fiji | X | | | | | X |
| Indonesia | X | X | | | | |
| Lao PDR | | | | | X | |
| Malaysia | X | | | | | |
| Myanmar | X | X | | | | |
| New Caledonia | X | | | | | |
| New Zealand | X | | X | X | | |
| Philippines | X | | X | X | | |
| Samoa | X | X | | X | | |
| Singapore | X | | | | | |
| Thailand | X | | X | X | | |
| Vietnam | X | X | | X | | |

X : Yes

Shortage of ESKD care providers

| Country | Nephrologists | Transplant surgeons | Surgeons (HD access) | Surgeons (PD access) | Interventional radiologists (HD access) | Interventional radiologists (PD access) | Laboratory technicians | Dietitians | Radiologists (ultrasound) | Vascular access coordinators | Counsellors/psychologists | Transplant coordinators | Dialysis nurses | Dialysis technicians |
|-------------------|---------------|---------------------|----------------------|----------------------|---|---|------------------------|-------------|---------------------------|------------------------------|---------------------------|-------------------------|-----------------|----------------------|
| Australia | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage |
| Brunei Darussalam | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | No shortage | No shortage | No shortage | Shortage | Shortage | Shortage | Shortage | Shortage |
| Cambodia | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage |
| Fiji | Shortage | Shortage | Shortage | No shortage | Shortage | Shortage | No shortage | No shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage |
| Indonesia | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | No shortage | Shortage | No shortage | Shortage | Shortage | Shortage | Shortage | Shortage |
| Lao PDR | Shortage | No shortage | Shortage | Shortage | No shortage | No shortage | No shortage | No shortage | No shortage | Shortage | No shortage | Shortage | Shortage | Shortage |
| Malaysia | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage |
| Myanmar | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage |
| New Caledonia | No shortage | Shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage | No shortage |
| New Zealand | No shortage | No shortage | Shortage | Shortage | Shortage | Shortage | Shortage | No shortage | No shortage | No shortage | Shortage | No shortage | No shortage | No shortage |
| Philippines | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | No shortage | No shortage | Shortage | Shortage | Shortage | Shortage | Shortage |
| Samoa | Shortage | No shortage | Shortage | No shortage | Shortage | No shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage |
| Singapore | Shortage | No shortage | No shortage | Shortage | No shortage | No shortage | Shortage | No shortage | No shortage | Shortage | No shortage | No shortage | Shortage | No shortage |
| Thailand | Shortage | Shortage | No shortage | No shortage | Shortage | Shortage | No shortage | Shortage | No shortage | Shortage | Shortage | No shortage | Shortage | Shortage |
| Vietnam | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | Shortage | No shortage | No shortage | Shortage | Shortage | Shortage | Shortage | Shortage |

No shortage

Shortage

Prevalence of nephrologists and trainees

Nephrologists



■ <1.2 pmp
 ■ 1.2–10.0 pmp
 ■ 10.1–22.9 pmp
 ■ >22.9 pmp
 ■ Data not reported

Nephrology trainees



■ <0.3 pmp
 ■ 0.3–1.4 pmp
 ■ 1.5–3.7 pmp
 ■ >3.7 pmp
 ■ Data not reported

| Country | Nephrologists PMP | Nephrology trainees PMP |
|-------------------|-------------------|-------------------------|
| Australia | 21.3 | 4.96 |
| Brunei Darussalam | 28.85 | 11.10 |
| Cambodia | 0.91 | 0.3 |
| Fiji | 1.08 | 1.08 |
| Indonesia | 0.49 | 0.23 |
| Lao PDR | - | 11.34 |
| Malaysia | 5.66 | 1.1 |
| Myanmar | 0.49 | 0.31 |
| New Caledonia | 40.67 | 0 |
| New Zealand | 15.4 | 4.51 |
| Philippines | 5.67 | 0.85 |
| Samoa | 4.97 | 0 |
| Singapore | 16.59 | 3.5 |
| Thailand | 11.66 | 1.31 |
| Vietnam | 3.09 | 0.52 |

'-': data not reported/unavailable

Capacity for chronic dialysis (HD)

Chronic HD centers



■ <1.2 pmp
 ■ 1.2–4.5 pmp
 ■ 4.6–9.9 pmp
 ■ >9.9 pmp
 ■ Data not reported

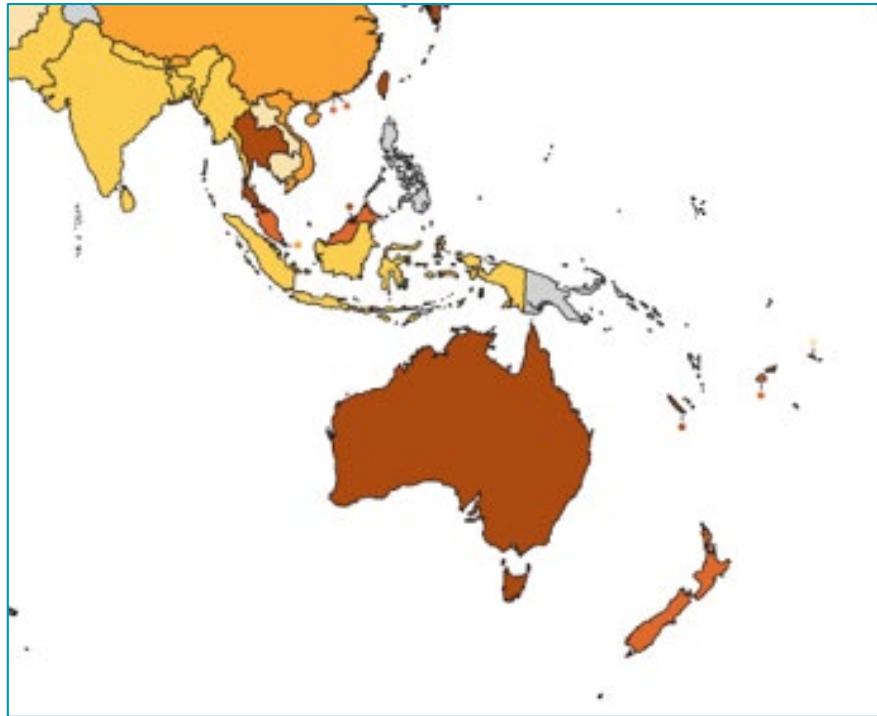
- Chronic HD services are available in all countries of the region
- The OSEA average of HD treatment centers is 5.67 pmp

| Country | Chronic HD Centres (PMP) |
|-------------------|--------------------------|
| Australia | 4.26 |
| Brunei Darussalam | 14.43 |
| Cambodia | 0.61 |
| Fiji | 6.48 |
| Indonesia | 2.5 |
| Lao PDR | 1.24 |
| Malaysia | 23.58 |
| Myanmar | 1.49 |
| New Caledonia | 47.74 |
| New Zealand | 2.42 |
| Philippines | 5.67 |
| Samoa | 9.93 |
| Singapore | 19.43 |
| Thailand | 10.74 |
| Vietnam | 1.34 |

'-': data not reported/unavailable

Capacity for chronic dialysis (PD)

Chronic PD centers



Chronic PD not provided
 <0.4 pmp
 0.4–1.3 pmp
 1.4–2.5 pmp
 >2.5 pmp
 Data not reported

- Chronic HD services are available in all countries of the region
- The OSEA average of HD treatment centers is 5.67 pmp

| Country | Chronic PD Centres (PMP) |
|-------------------|--------------------------|
| Australia | 4.26 |
| Brunei Darussalam | 3.33 |
| Cambodia | - |
| Fiji | 2.16 |
| Indonesia | 0.17 |
| Lao PDR | - |
| Malaysia | 1.41 |
| Myanmar | 0.07 |
| New Caledonia | 26.52 |
| New Zealand | 2.42 |
| Philippines | - |
| Samoa | - |
| Singapore | 0.92 |
| Thailand | 3.21 |
| Vietnam | 0.57 |

' - ': data not reported/unavailable

Capacity for kidney transplantation

Kidney transplantation centers



■ <1.2 pmp
 ■ 1.2–4.5 pmp
 ■ 4.6–9.9 pmp
 ■ >9.9 pmp
 ■ Data not reported

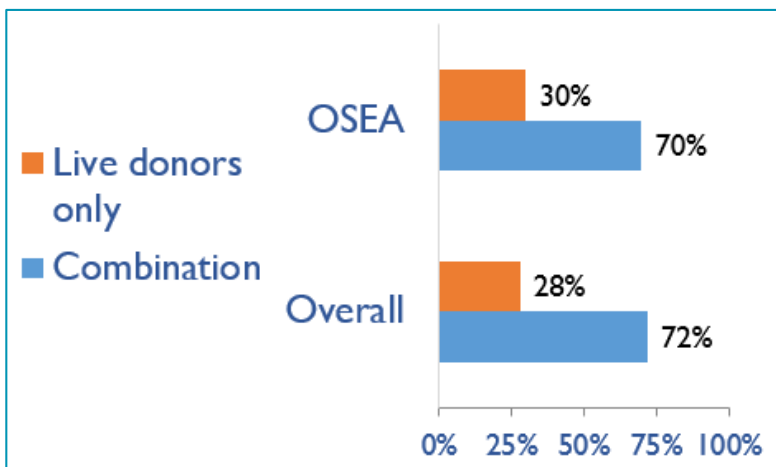
- Kidney transplantation services are available in 10 (67%) countries of the region
- The OSEA average of Kidney transplantation centers is 0.36 pmp

| Country | Kidney Transplantation Availability | Transplant Centers (PMP) |
|-------------------|-------------------------------------|--------------------------|
| Australia | X | 0.85 |
| Brunei Darussalam | X | 2.22 |
| Cambodia | | - |
| Fiji | | - |
| Indonesia | X | 0.02 |
| Lao PDR | | - |
| Malaysia | X | 0.13 |
| Myanmar | X | 0.08 |
| New Caledonia | | - |
| New Zealand | X | 0.66 |
| Philippines | X | 0.3 |
| Samoa | | - |
| Singapore | X | 0.42 |
| Thailand | X | 0.41 |
| Vietnam | X | 0.16 |

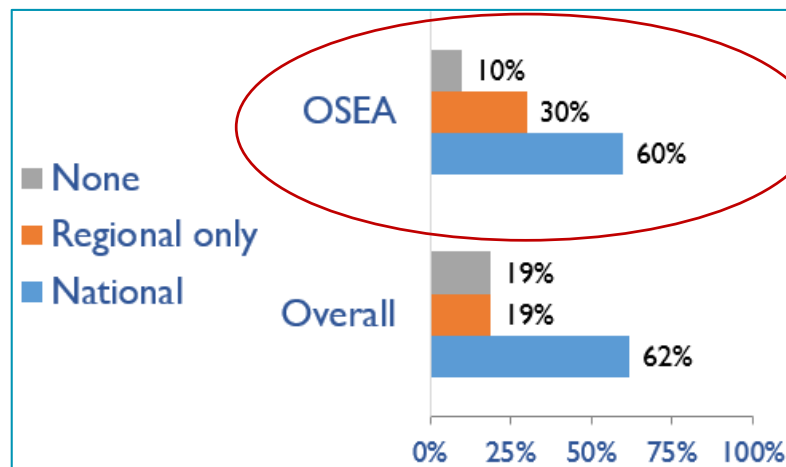
X : Yes

Capacity for kidney transplantation (cont'd)

Transplant donor type



Transplant waitlist

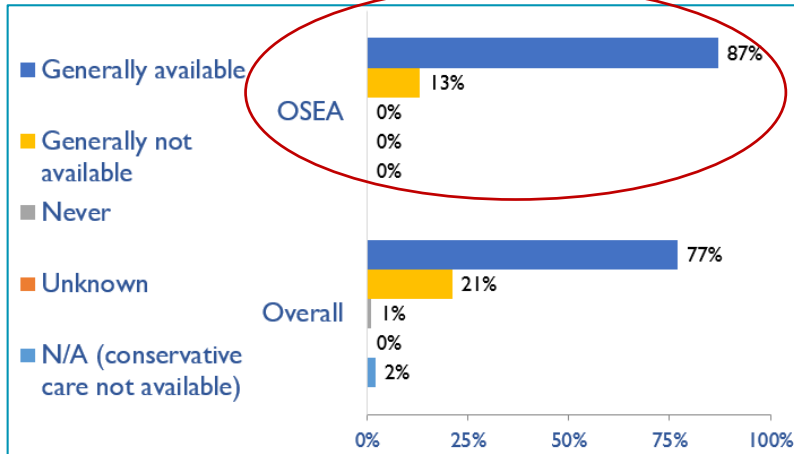


| Country | Donor Type | | Transplant waitlist | | |
|-------------------|------------------|-------------|---------------------|---------------|------|
| | Live donors only | Combination | National | Regional only | None |
| Australia | | X | X | | |
| Brunei Darussalam | X | | X | | |
| Cambodia | | | | | |
| Fiji | | | | | |
| Indonesia | X | | | X | |
| Lao PDR | | | | | |
| Malaysia | | X | X | | |
| Myanmar | X | | | X | |
| New Caledonia | | | | | |
| New Zealand | | X | X | | |
| Philippines | | X | | | X |
| Samoa | | | | | |
| Singapore | | X | X | | |
| Thailand | | X | X | | |
| Vietnam | | X | | X | |

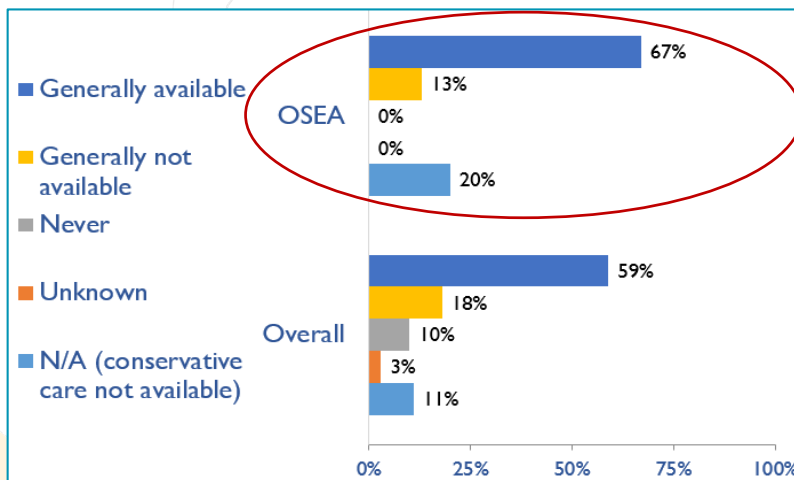
X : Yes

Availability of services within dialysis care

HD frequency



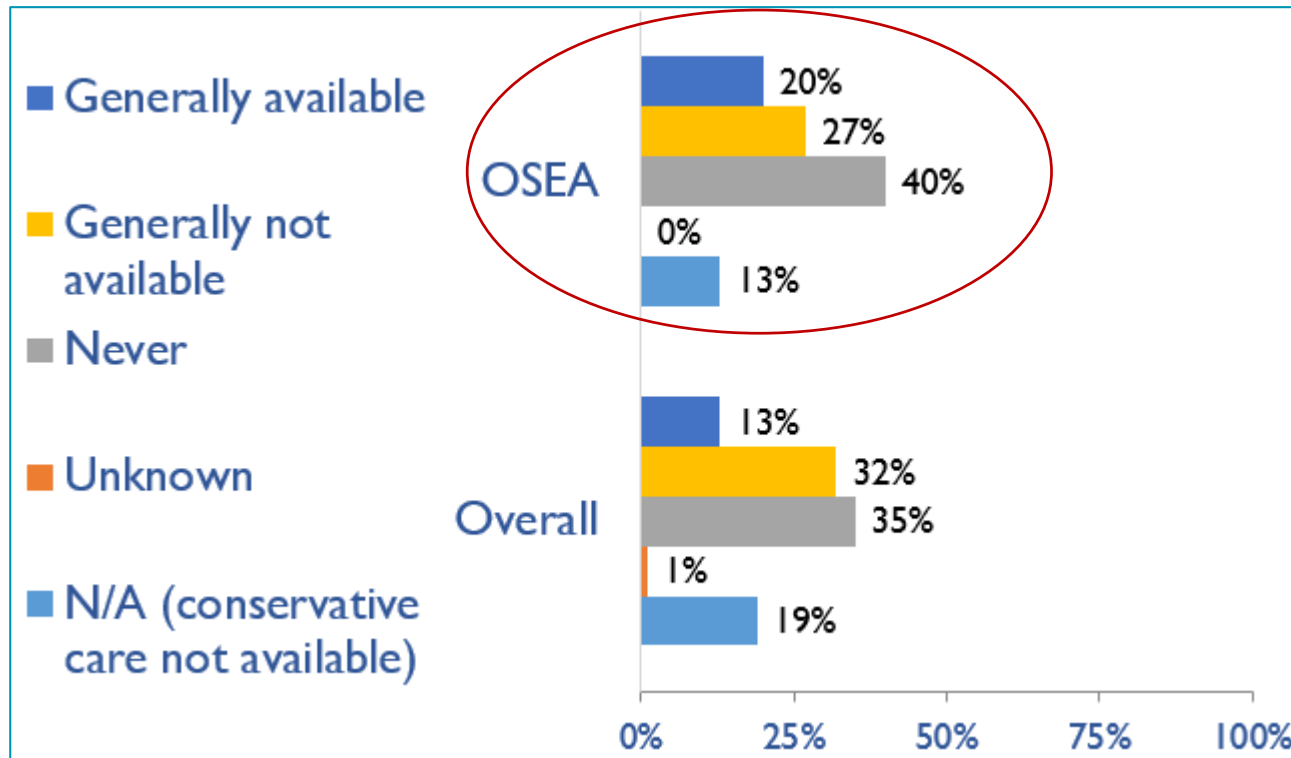
PD frequency



| Country | HD frequency a center-based service that involves treatment 3x week/3-4x hours | | | | | PD frequency ability to do adequate exchanges 3-4x day (or equivalent cycles on automated PD) | | | | |
|-------------------|--|-------------------------|-------|---------|-----------------------------|--|-------------------------|-------|---------|-----------------------------|
| | Generally available | Generally not available | Never | Unknown | N/A (dialysis not provided) | Generally available | Generally not available | Never | Unknown | N/A (dialysis not provided) |
| Australia | X | | | | | X | | | | |
| Brunei Darussalam | X | | | | | X | | | | |
| Cambodia | | X | | | | | | | | X |
| Fiji | X | | | | | X | | | | |
| Indonesia | X | | | | | X | | | | |
| Lao PDR | X | | | | | | | | | X |
| Malaysia | X | | | | | X | | | | |
| Myanmar | | X | | | | | X | | | |
| New Caledonia | X | | | | | X | | | | |
| New Zealand | X | | | | | X | | | | |
| Philippines | X | | | | | | X | | | |
| Samoa | X | | | | | | | | | X |
| Singapore | X | | | | | X | | | | |
| Thailand | X | | | | | X | | | | |
| Vietnam | X | | | | | X | | | | |

X : Yes

Availability of home hemodialysis

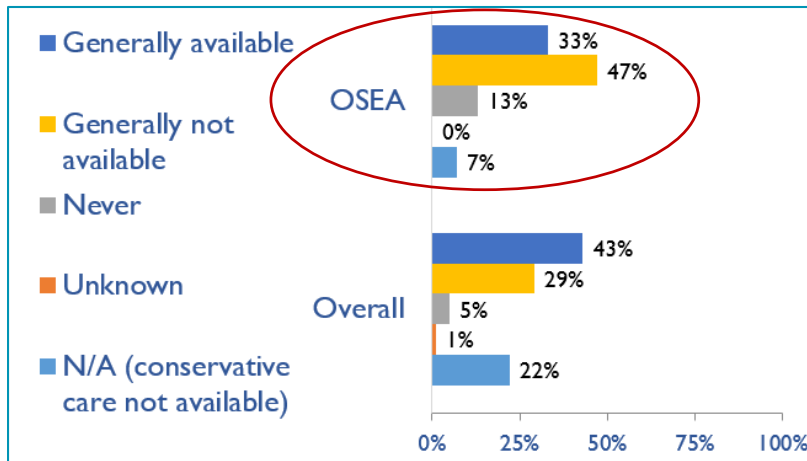


| Country | Availability of Home hemodialysis | | | | |
|-------------------|-----------------------------------|-------------------------|-------|---------|-----------------------------|
| | Generally available | Generally not available | Never | Unknown | N/A (dialysis not provided) |
| Australia | X | | | | |
| Brunei Darussalam | | | X | | |
| Cambodia | | | X | | |
| Fiji | | | X | | |
| Indonesia | | | X | | |
| Lao PDR | | | | | X |
| Malaysia | | X | | | |
| Myanmar | | X | | | |
| New Caledonia | X | | | | |
| New Zealand | X | | | | |
| Philippines | | X | | | |
| Samoa | | | X | | |
| Singapore | | X | | | |
| Thailand | | | | | X |
| Vietnam | | | X | | |

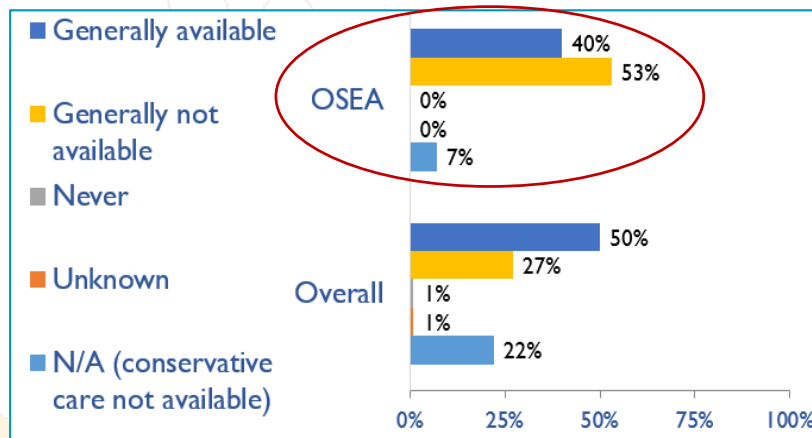
X : Yes

Capacity for conservative kidney management (CKM)

Choice-restricted CKM



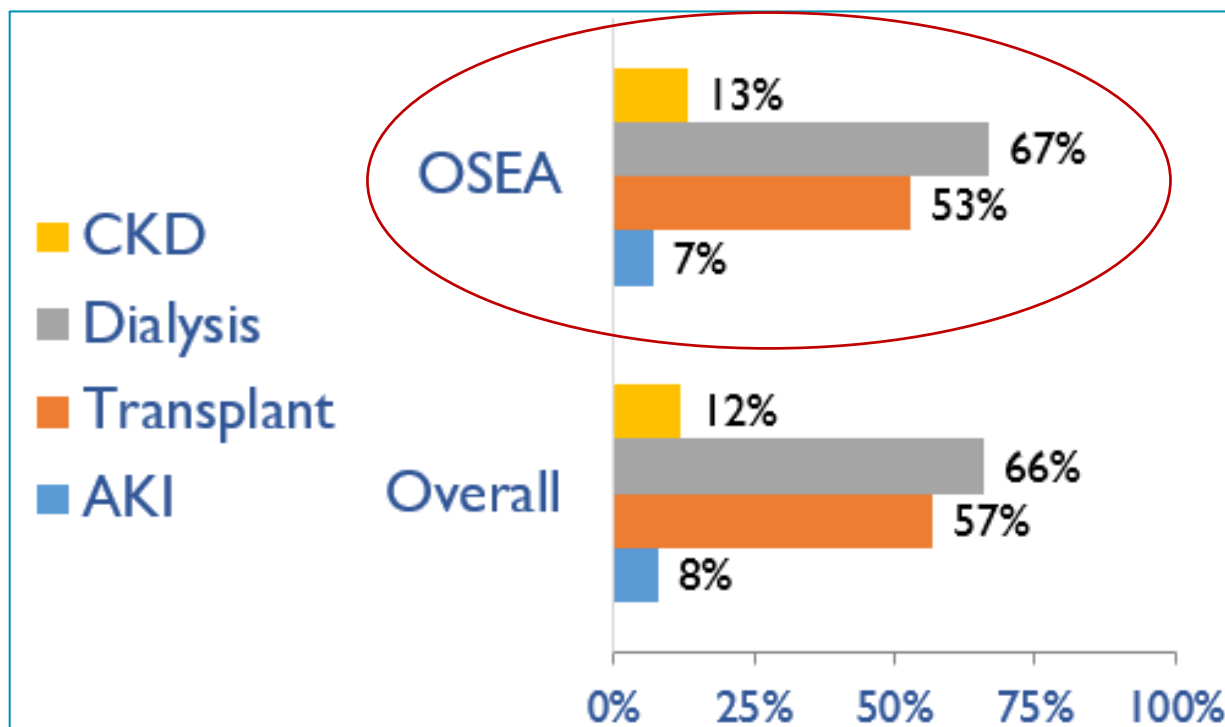
Chosen or medically advised CKM



| Country | Established choice-restricted conservative care | | | | | Established conservative care that is chosen or medically advised | | | | |
|-------------------|---|-------------------------|-------|---------|---------------------------------------|---|-------------------------|-------|---------|---------------------------------------|
| | Generally available | Generally not available | Never | Unknown | N/A (conservative care not available) | Generally available | Generally not available | Never | Unknown | N/A (conservative care not available) |
| Australia | X | | | | | X | | | | |
| Brunei Darussalam | | X | | | | | X | | | |
| Cambodia | | | | | X | | | | | X |
| Fiji | | X | | | | | X | | | |
| Indonesia | X | | | | | | X | | | |
| Lao PDR | | | X | | | X | | | | |
| Malaysia | | X | | | | | X | | | |
| Myanmar | X | | | | | | X | | | |
| New Caledonia | | | X | | | X | | | | |
| New Zealand | | X | | | | X | | | | |
| Philippines | | X | | | | | X | | | |
| Samoa | | X | | | | | X | | | |
| Singapore | X | | | | | X | | | | |
| Thailand | X | | | | | X | | | | |
| Vietnam | | X | | | | | X | | | |

X : Yes

Availability of official registry



| Country | Official Registry | | | |
|-------------------|-------------------|----------|------------|-----|
| | CKD | Dialysis | Transplant | AKI |
| Australia | | X | X | |
| Brunei Darussalam | X | X | X | |
| Cambodia | | | | |
| Fiji | | | | |
| Indonesia | | X | | |
| Lao PDR | X | X | | X |
| Malaysia | | X | X | |
| Myanmar | | | | |
| New Caledonia | | X | X | |
| New Zealand | | X | X | |
| Philippines | | X | X | |
| Samoa | | | | |
| Singapore | | X | X | |
| Thailand | | X | X | |
| Vietnam | | | | |

X : Yes

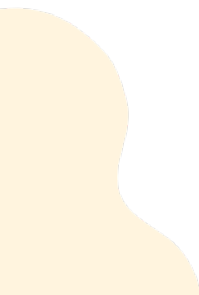
Summary of 2019 GKHA findings

- KRT availability, access, and quality is high
- Conservative kidney management is available, not often chosen or medically-advised
- Government funding for kidney care is low
- Moderate use of registries, low for AKI and CKD
- Many workforce limitations, especially nephrologists
- Little advocacy for kidney disease in OSEA

Implications



60
years
1960-2020



To access the Atlas report:



www.theisn.org/global-atlas