

## THE GLOBAL KIDNEY HEALTH ATLAS

<Congress title>

Date

www.theisn.org/global-atlas

#### **Overview**

**SN** 

- Aim
- Methods
- Key Results
- Implications



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**



# 2016 2018 2022 2026

#### **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**





#### **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: North & East Asia**





 Taiwan, China
 High income

 ' - ' : data not reported/unavailable

Country	World bank ranking	Area (sq km)	Total population (2018)	GDP (PPP) (\$ billion)	expenditures (% of GDP)
China	Upper middle income	Upper middle income 9,596,960 1,384,6		23210	5.0
Hong Kong SAR, China	High income	1,108 7,213,338		455.9	-
Japan	High income	377,915	126,168,156	5443	10.9
Korea, Dem. People's Rep.	Low income	120,538	25,381,085	40	-
Korea, Rep.	High income	99,720	51,418,097	2035	7.4
Macao SAR, China	High income	28.2	606,340	71.82	-
Mongolia	Lower middle income	1,564,116	3,103,428	39.73	3.9
Taiwan, China	High income	35,980	23,545,963	1189	-

Demographics





#### **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% Cl)	Increased BP % (95% CI)	Smoking % (95% Cl)	
China	9.76 (8.98 - 10.6)	1.68 (1.54 - 1.72)	1.32 (1.21 - 1.41)	6.6 (5.1 - 8.4)	19.2 (14.9 - 24.0)	22.0 (21.6 - 22.4)	
Hong Kong SAR, China	-	-	-	-	-	-	Abbreviations:
Japan	17.62 (16.43 - 19.08)	2.6 (2.48 - 2.79)	1.92 (1.74 - 2.08)	4.4 (3.3 - 5.7)	17.6 (14.1 - 21.5)	17.2 (16.8 - 17.6)	CKD (Chronic Kidney Disease), DALYS (disability-adjusted life years),
Korea, Dem. People's Rep.	8.95 (8.27 - 9.68)	1.55 (1.37 - 1.74)	1.46 (1.3 - 1.62)	7.1 (3.8 - 6.2)	18.2 (12.7 - 24.9)	19.2 (17.4 - 21.1)	BP (blood pressure), Cl (confidence interval)
Korea, Rep.	10.85 (10.01 - 11.71)	2.03 (1.91 - 2.16)	1.4 (1.26 - 1.53)	4.9 (4.2 - 10.6)	(8.2 -  4.3)	22.1 (20.5 - 23.7)	Data source:
Macao SAR, China	-	-	-	-	-	-	GBD study database ( <u>http://www.healthdata.org/gbd</u> ),
Mongolia	8.68 (8.0 - 9.39)	1.55 (1.43 - 1.84)	1.25 (1.14 - 1.5)	19.6 (15.6 - 23.9)	29.0 (22.5 - 35.9)	21.7 (19.1 - 24.5)	WHO data observatory ( <u>https://www.who.int/gho/en/</u> )
Taiwan, China	12.2 (11.32 - 13.12)	3.75 (3.57 - 3.93)	2.53 (2.3 - 2.72)	-	-	11.5 (9.8 - 13.4)	' – ' : data not reported/unavailable

#### **Burden of ESKD**



Prevalence of treated ESKD



Treated ESKD: all dialysis + transplant

\* pmp (per million population) Data source: Chi Bon Leung et al. (Kidney Int. Suppl.) 2015, Jain et al. (JASN) 2012, 2017/2018 USRDS Annual Data Report

Treated ESKD Chronic dialysis (HD+PD) **Chronic HD Chronic PD** Country Prevalence Incidence Prevalence Incidence Prevalence Incidence Prevalence Incidence China 88.4 94.4 76.3 12.1 --Hong Kong SAR, 171 1315 154.7 818 22.1 165.8 132.6 531 China 296 2599 2532 2148.4 71.9 Japan -\_ -Korea, Dem. --------People's Rep. 311 1816 1464 1216 Korea, Rep. 250 143 --Macao SAR, China \_ -------Mongolia --\_ ---\_ -493 3392 Taiwan, China 3251 2106.8 216 \_ -\_

' – ' : data not reported/unavailable

### Burden of ESKD (cont'd)



#### Incidence of kidney transplantation



		Ki	dney transplantatio	on	
Country	Incidence overall	Prevalence overall	Incidence of deceased donor	Incidence of living donor	Incidence of pre- emptive
China	6.52	-	5.23	1.3	-
Hong Kong SAR, China	-	497	-	-	-
Japan	13.05	67	1.4	11.65	-
Korea, Dem. People's Rep.	-	-	-	-	-
Korea, Rep.	-	352		-	-
Macao SAR, China	-	-		-	-
Mongolia	6.67	-	0	6.67	-
Taiwan, China	-	4	-	-	-

\* pmp (per million population) Data source: GODT database (<u>http://www.transplant-observatory.org/data-charts-and-tables/</u>), 2017/2018 USRDS Annual Data Report



' – ' : data not reported/unavailable

#### **Annual cost of kidney replacement therapy** components



Country	Hemodialysis	Peritoneal dialysis	Kidney Transplant (First year)	Kidney Transplant (later years)	HD/PD cost ratio	
China	22,617	8,122	25,356	-	2.78	
Hong Kong SAR, China	35,074	15,199	-	-	2.31	*Cost is in \$US 2016
Japan	52,834	58,103	43,374	22,886	0.91	<b>Abbreviations</b> : HD (hemodialysis),
Korea, Dem. People's Rep.	-	-	-	-	-	PD (peritoneal dialys
Korea, Rep.	19,812	15,330	50,613	35,765	1.29	Data source: Fukuha et al. (1998), Kwon e
Macao SAR, China	-	-	-	-	-	al. (2014), Li & Chow (2009), Shimizu et al.
Mongolia	-	-	-	5,392	-	lumurbaatar et al. (2 al. (2019), Yu et al. (2
Taiwan, China	-	-	-	-	-	' – ' : data not report

eal dialysis) Fukuhara et al. (2007), Hu Kwon et al. (2011), Lee et & Chow (2001), Neil et al. nizu et al. (2012), r et al. (2012), van der Tol et u et al. (2007)

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- 7 of 8 countries (88%) in North & East Asia responded to the 2018 survey
- This represents 98.4% of the region's population

#### **Country level scorecard**



		Availa	Availability of KRT and CKM		Funding for Medications		Availa	ailability and Distribution of Registry		Advo	Advocacy Group		Nephrology Workforce (PMP)					
Countries		Chronic hemodialysis	Chronic peritoneal dialysis	Kidney transplantation	CKM	Dialysis medications	Transplant medications	CKD	Dialysis	Transplantation	AKI	CKD	AKI	ESKD/RRT	Nephrologists	Nephrologist trainees		
North & East Asia																		
China	2017														5.12	0.73	Yes	
	2019													_	5.78	1.09		
Hong Kong	2017														16.31	2.04	NO	
lanan	2019														18.02 78.79	2.08	N/A	
Japan	2017														79.26	5.94		
Korea Ren	2015														18.32	1 12		
Norea, Nep.	2019														19.45	1.94	Abbuenistisus	
Macao	2017																Appreviations KRT: kidney replacement therapy	
	2019														25.56	9.07	CKM: conservative kidney manageme	ent
Mongolia	2017														15.04	2.00	CKD: chronic kidney disease	
	2019														9.67	3.22	AKI: acute kidney injury	
Taiwan	2017														61.97	5.56	ESKD: end stage kidney disease	
	2019											) 1			54.60	3.91		
			Nenhr	ologists	s densit	/	<1.2 PM	1P	12-	10 0 PN	/P	10 1-22			22 9 <u>P</u>	MP _		
		Neph	rology t	trainees	s density	/	<0.3 PN	1P	0.3-	-1.4 PM	IP	1.5-3.7	7 PMP		>3.7 PN	1P		

### **Funding for non-dialysis CKD**





c Solohy	
f Solely private e and out- g of-pocket of solery solery private through health insurance Multiple systems	Other
X	
	of and te and of-pocket     Solely private through health insurance     Multiple systems       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1

### 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
China		Х						
Hong Kong SAR, China			Х					
Japan		Х						
Korea, Rep.		Х						
Macao SAR, China		Х						
Mongolia	Х							
Taiwan, China		X						

### **Providers primarily responsible for ESKD care**





Country	Nephrologists	Primary care physicians	Nurse practitioners or specialized nurses	Multidisciplinary teams	Health officers/ extension workers	Other
China	Х		Х			
Hong Kong SAR, China	Х		Х			
Japan	Х		Х	Х		
Korea, Rep.	Х					
Macao SAR, China	Х					
Mongolia	Х					
Taiwan, China	Х			Х		
X · Vec		$\sim$ )				



### 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	No shortage
China															
Hong Kong SAR, China															
Japan															
Korea, Rep.															
Macao SAR, China															
Mongolia															
Taiwan, China															

No shortage

Shortage



### **Prevalence of nephrologists and trainees**



Nephrologists



#### Nephrology trainees



Country	Nephrologists PMP	Nephrology trainees PMP		
China	5.78	1.09		
Hong Kong SAR, China	18.02	2.08		
Japan	79.26	5.94		
Korea, Rep.	19.45	1.94		
Macao SAR, China	25.56	9.07		
Mongolia	9.67	3.22		
Taiwan, China	54.60	3.91		

'-': data not reported/unavailable

10.1–22.9 pmp >22.9 pmp Data not reported 1.2 pmp ama 0.01–2.1

ama 2.0> 3.7 pmp Data not reported 0.3–1.4 pmp 1.5-3.7 pmp





### **Capacity for chronic dialysis (HD)**



#### Chronic HD centers



<1.2 pmp</p>

4.6–9.9 pmp Solution >9.9 pmp Data not reported

- Chronic HD services are available in all countries of the region
- The North & East Asia average of HD treatment centers is 14.16 pmp

Country	Chronic HD Centres PMP
China	0.54
Hong Kong SAR, China	1.80
Japan	34.84
Korea, Rep.	14.16
Macao SAR, China	4.95
Mongolia	16.11
Taiwan, China	35.36

'-': data not reported/unavailable

### **Capacity for chronic dialysis (PD)**



#### **Chronic PD centers**



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

- Chronic PD services are available in all countries of the region
- The North & East Asia average of PD treatment centers is 1.94 pmp

Country	Chronic PD Centres PMP
China	0.36
Hong Kong SAR, China	1.94
Japan	3.96
Korea, Rep.	1.94
Macao SAR, China	1.65
Mongolia	1.61
Taiwan, China	5.44

'-': data not reported/unavailable

### **Capacity for kidney transplantation**



#### Kidney transplantation centers



☐ Kidney transplantation not provided 
<0.2 pmp</p>
0.2–0.4 pmp
0.5–0.7 pmp
>0.7 pmp
Data not reported

- Kidney transplantation services are available in all countries of the region
- The North & East Asia average of Kidney transplantation centers is 0.55 pmp

Country	Kidney Transplantation availability	Transplant centers PMP
China	Х	0.36
Hong Kong SAR, China	Х	0.55
Japan	Х	1.14
Korea, Rep.	Х	1.23
Macao SAR, China	Х	1.65
Mongolia	Х	0.32
Taiwan, China	Х	0.42

'-': data not reported/unavailable

### **Capacity for kidney transplantation (cont'd)**





### Availability of services within dialysis care



#### HD frequency 0% Generally available N & E Asia 0% 0% Generally not available Never 77% 21% Overall 1% ■ N/A (conservative care not available) 0% 1% 25% 0% 50% 75% 100% PD frequency 86% 14% & E Asia 0% 0% Generally available Generally not available Never 58% Unknown 17% N/A Overall 3% 3% 25% 50% 75% 100% 0%

Country	a cent	H ter-based se 3x ۱	HD frequence ervice that in week/3-4x h	y nvolves trea ours	tment	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)
China	Х					х				
Hong Kong SAR, China	Х					х				
Japan	Х					х				
Korea, Rep.	Х					Х				
Macao SAR, China	х						х			
Mongolia	Х					х				
Taiwan, China	Х					Х				

#### **Availability of home hemodialysis**





	Availability of Home hemodialysis								
Country	Generally available	Generally not available	Never	Unknown	N/A (dialysis not provided)				
China		Х							
Hong Kong SAR, China		Х							
Japan		Х							
Korea, Rep.		Х							
Macao SAR, China			Х						
Mongolia					Х				
Taiwan, China		Х							

### **Capacity for conservative kidney management** (CKM)



#### Choice–restricted CKM



Chosen or medically advised CKM



	Estab	olished choic	ted conservat	ive care	Established conservative care that is chosen or medically advised					
Country	Generally available	Generally not available	Never	Unknown	N/A (conservative care not available)	Generally available	Generally not available	Never	Unknown	N/A (conservative not available)
China	×					×				
Hong Kong SAR, China	х					х				
Japan		х				Х				
Korea, Rep.		х				Х				
Macao SAR, China		Х					Х			
Mongolia		х				х				
Taiwan, China		Х				Х				



#### **Availability of official registry**





Country	СКД	Dialysis	Transplant	ΑΚΙ
China		х	х	
Hong Kong SAR, China		Х	Х	
Japan	Х	Х	Х	
Korea, Rep.		Х	Х	
Macao SAR, China		х	х	
Mongolia		x	х	х
Taiwan, China	х	х	х	

### **Summary of 2019 GKHA findings**



- KRT availability, access, and quality is high
- Conservative kidney management is available, typically chosen or medically-advised
- Government funding for medication is low but high for kidney care services
- High registry use in end-stage kidney disease
- Large variation in workforce capacity, highest in Japan, Korea, Taiwan
- Strong advocacy for chronic kidney disease in North & East Asia, limited for acute







- Increase health care financing for ESKD prevention and management
- Address workforce shortages through multidisciplinary teams and telemedicine
- Incorporate the collection and reporting of quality indicators in ESKD care
- Expand health information systems to prevent and manage ESKD
- Promote ESKD prevention and treatment by implementing policies, strategies, and advocacy, and mitigating barriers





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