THE GLOBAL KIDNEY HEALTH ATLAS

<Congress title>

Date

www.theisn.org/global-atlas

Overview

- **Aim**
- **Methods**
- **Key Results**
- **Implications**

Aim of the Global Kidney Health Atlas

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)

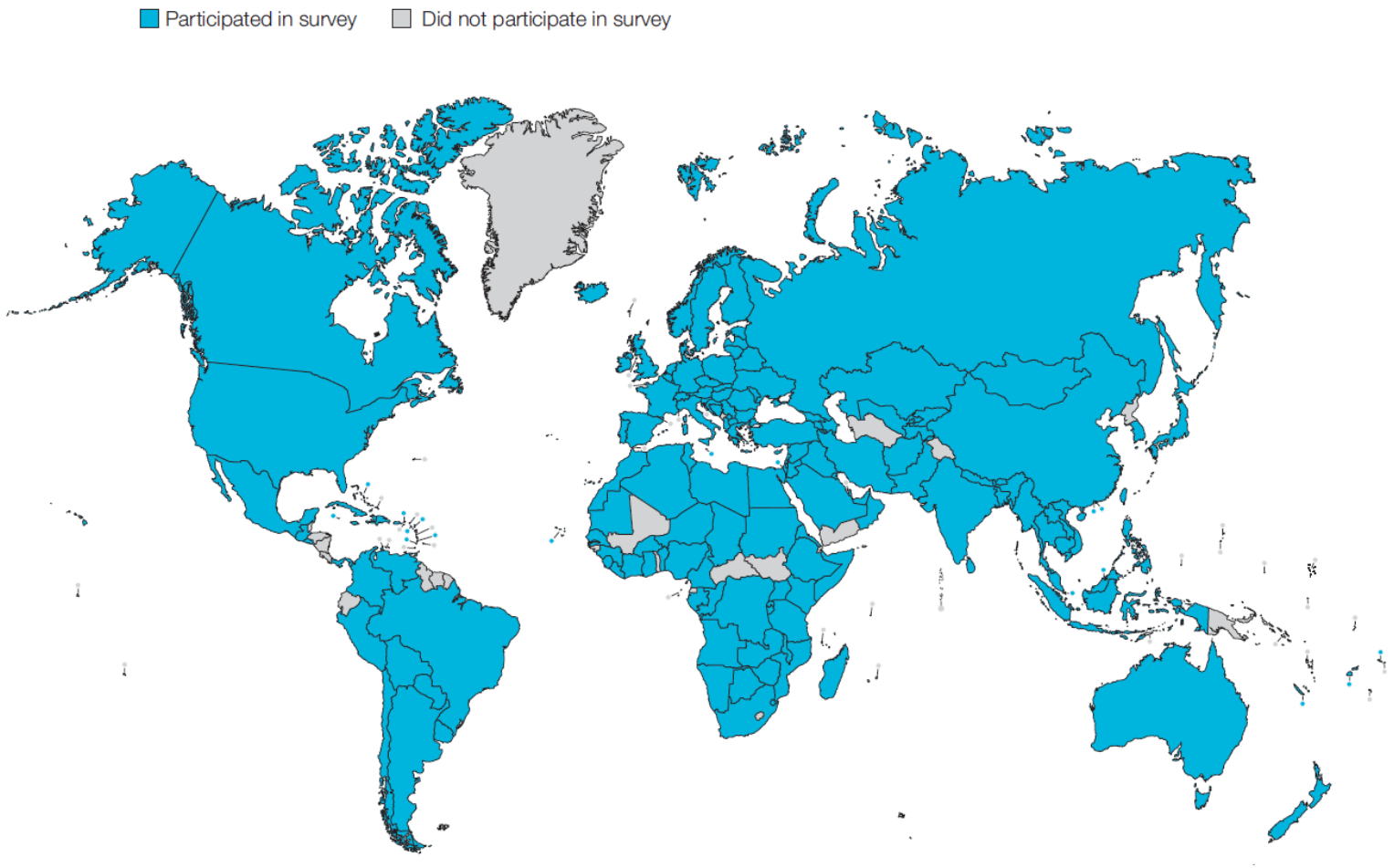
- Published and grey literature review
- Systematic review ESKD burden and outcomes
- Data extraction from major renal registries (USRDS, ERA-EDTA) and relevant national registries where available
- Scoping review of KRT cost estimates

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

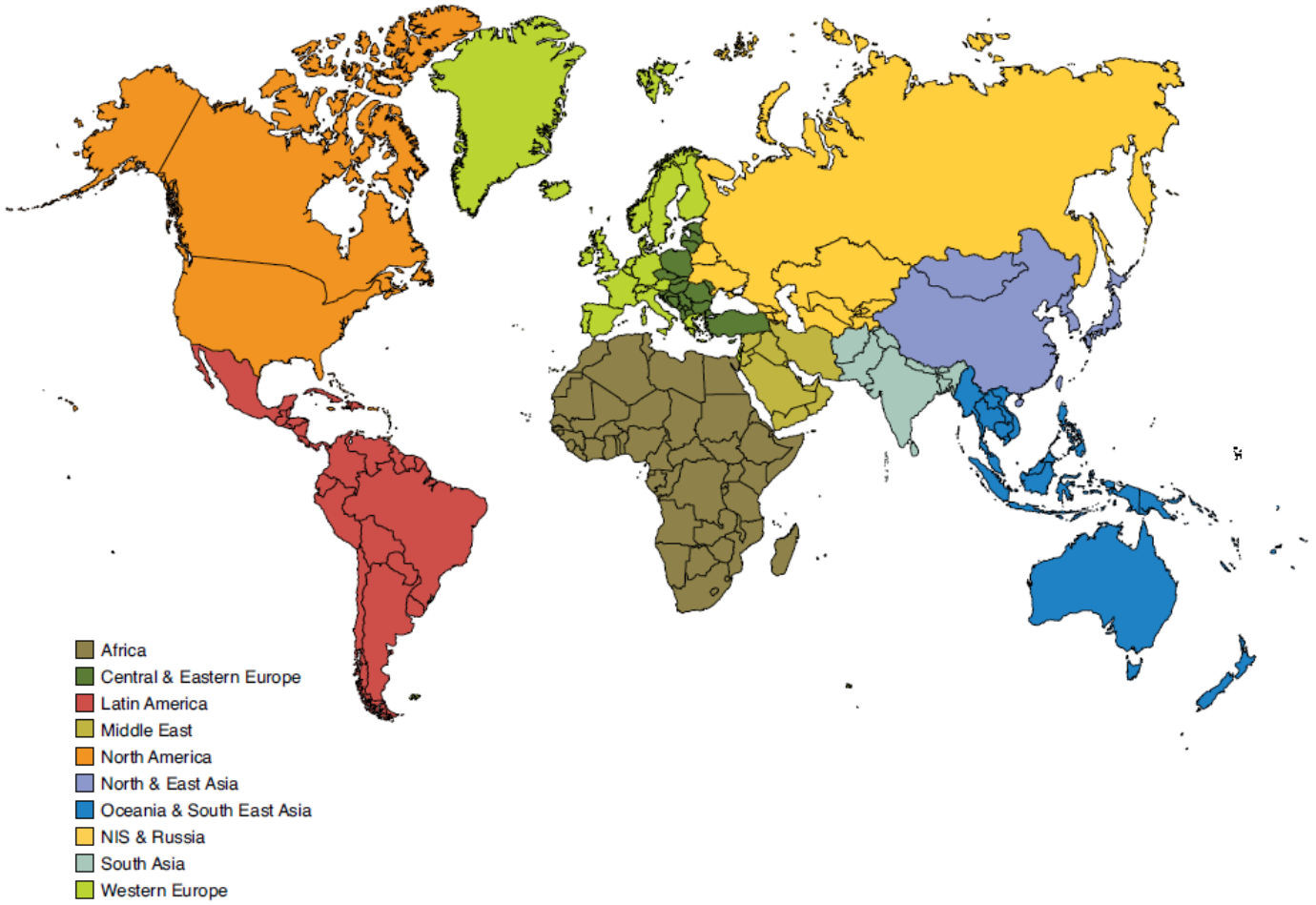
Overall GKHA response



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: South Asia

Demographics

Country	World bank ranking	Area (sq km)	Total population (2018)	GDP (PPP) ($ billion)	Total health expenditures (% of GDP)
Afghanistan	Low income	652,230	34,940,837	69.45	10.2
Bangladesh	Lower middle income	148,460	159,453,001	690.3	2.4
Bhutan	Lower middle income	38,394	766,397	7.205	3.5
India	Lower middle income	3,287,263	1,296,834,042	9474	3.9
Maldives	Upper middle income	298	392,473	6.901	10.6
Nepal	Low income	147,181	29,717,587	79.19	6.1
Pakistan	Lower middle income	796,095	207,862,518	1061	2.7
Sri Lanka	Upper middle income	65,610	22,576,592	275.8	3.0

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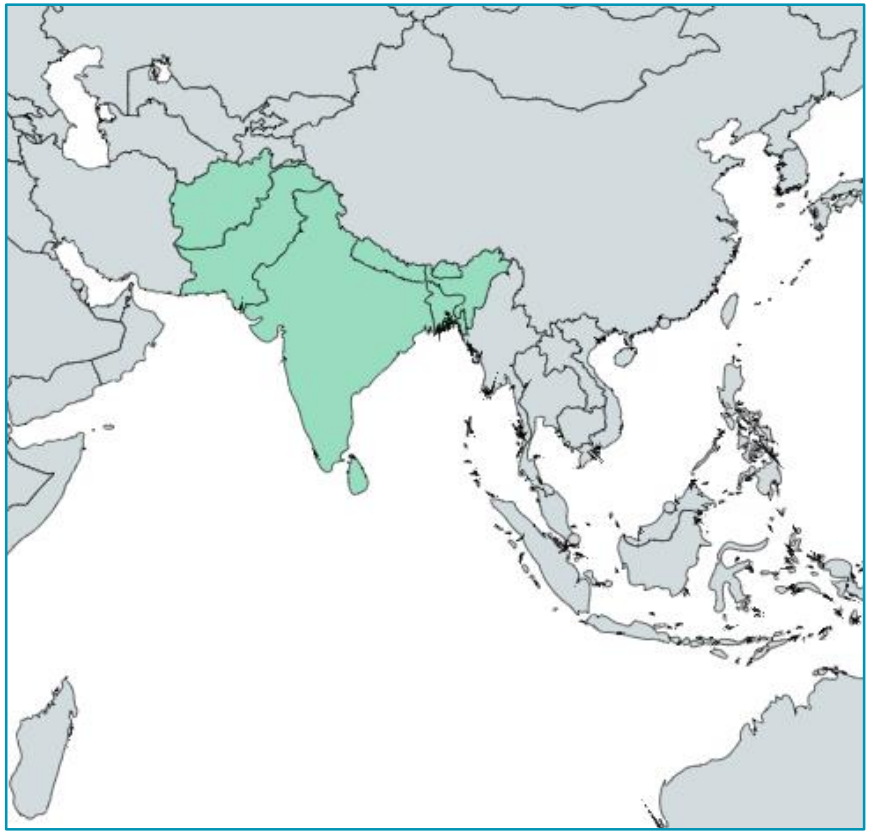

CKD and its risk factors burden

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)
Afghanistan	5.01 (4.63 - 5.46)	1.72 (1.52 - 1.97)	1.09 (0.95 - 1.26)	4.5 (2.8 - 6.7)	30.6 (23.6 - 38.3)	13.1 (10.4 - 16.2)
Bangladesh	7.28 (6.74 - 7.9)	1.89 (1.74 - 2.05)	1.27 (1.15 - 1.39)	3.4 (2.2 - 4.7)	24.7 (19.1 - 30.6)	19.3 (16.8 - 22.0)
Bhutan	7.49 (6.93 - 8.06)	3.28 (2.75 - 3.71)	1.95 (1.61 - 2.26)	5.8 (3.8 - 8.2)	28.1 (21.9 - 34.6)	6.6 (5.4 - 8.0)
India	8.5 (7.88 - 9.16)	2.26 (2.1 - 2.37)	1.53 (1.41 - 1.63)	3.8 (2.9 - 4.9)	25.8 (21.3 - 30.7)	9.8 (9.4 - 10.3)
Maldives	9.34 (8.57 - 10.16)	5.93 (5.45 - 6.41)	2.66 (2.29 - 3.05)	7.9 (5.5 - 10.8)	24.4 (17.9 - 31.5)	-
Nepal	7.48 (6.95 - 8.11)	2.67 (2.25 - 3.04)	1.71 (1.43 - 2)	3.8 (2.6 - 5.2)	29.4 (23.6 - 35.7)	16.7 (13.8 - 19.9)
Pakistan	7.09 (6.57 - 7.67)	2.6 (2.23 - 2.96)	1.65 (1.42 - 1.93)	7.8 (5.7 - 10.3)	30.5 (24.4 - 37.4)	10.5 (8.9 - 12.2)
Sri Lanka	13.24 (12.26 - 14.31)	3.58 (3.27 - 3.9)	2.39 (2.12 - 2.67)	5.4 (3.7 - 7.7)	22.4 (16.5 - 29.3)	10.0 (8.7 - 11.4)

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/)

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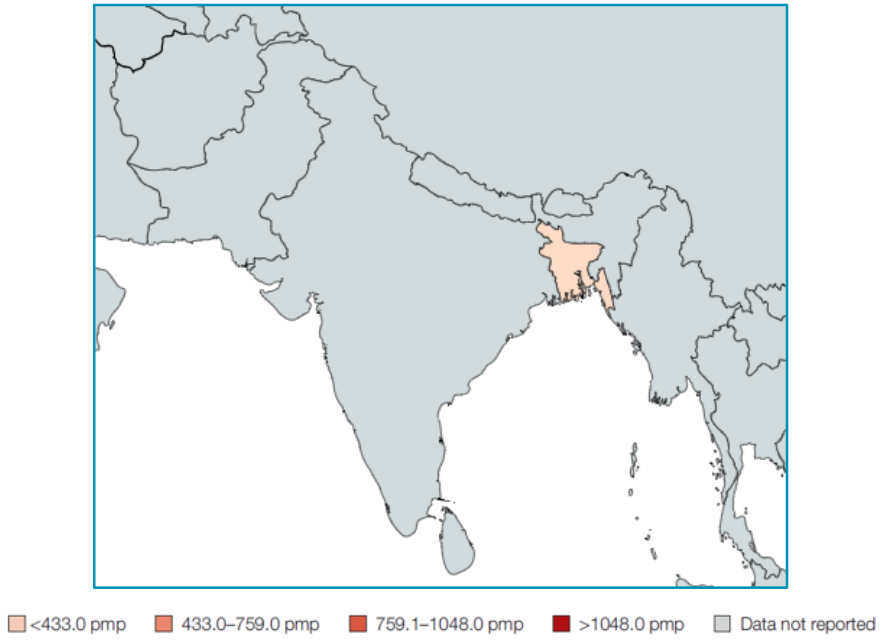
Burden of ESKD

Prevalence of treated ESKD



Treated ESKD: all dialysis + transplant

Country	Treated ESKD		Chronic dialysis (HD+PD)		Chronic HD		Chronic PD	
	Incidence	Prevalence	Incidence	Prevalence	Incidence	Prevalence	Incidence	Prevalence
Afghanistan	-	-	-	-	-	-	-	-
Bangladesh	51	117	-	113	-	112.1	-	1.8
Bhutan	-	-	-	-	-	-	-	-
India	-	-	-	49.2	-	18	-	5.8
Maldives	-	-	-	-	-	-	-	14.4
Nepal	-	-	-	11.6	-	10.1	-	1.5
Pakistan	-	-	-	53.3	-	34.3	-	0.2
Sri Lanka	-	-	-	-	-	-	-	0.6

* 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

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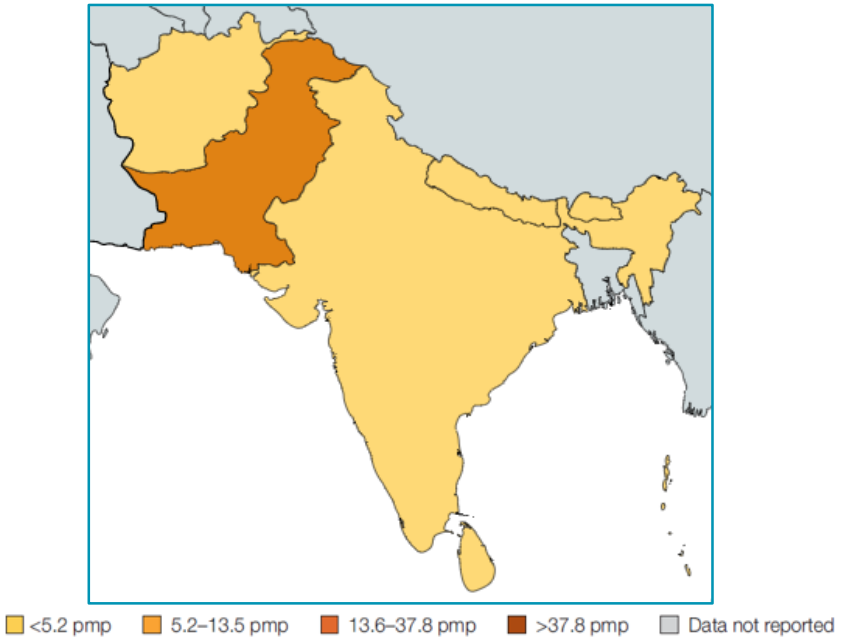
Burden of ESKD (cont'd)

Incidence of kidney transplantation



Country	Kidney transplantation				
	Incidence overall	Prevalence overall	Incidence of deceased donor	Incidence of living donor	Incidence of pre-emptive
Afghanistan	0.18	-	0	0.18	-
Bangladesh	-	-	-	-	-
Bhutan	4.96	-	0	4.96	-
India	3.51	-	0	3.51	-
Maldives	-	-	-	-	-
Nepal	4.75	-	0	4.75	-
Pakistan	14.08	-	0	14.08	-
Sri Lanka	0.18	-	0	0.18	-

* pmp (per million population)
Data sources: GODT database
(http://www.transplant-observatory.org/data-charts-and-tables/)

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Annual cost of kidney replacement therapy components

Country	Hemodialysis	Peritoneal dialysis	Kidney Transplant (First year)	Kidney Transplant (later years)	HD/PD cost ratio
Afghanistan	-	-	-	-	-
Bangladesh	5,202	7,219	3,285	-	0.72
Bhutan	-	-	-	-	-
India	9,849	15,538	9,238	10,367	0.63
Maldives	-	-	-	-	-
Nepal	2,727	-	-	-	-
Pakistan	4,873	8,606	-	-	0.57
Sri Lanka	26,242	8,921	-	-	2.94

*Cost is in $US 2016

Abbreviations:
HD (hemodialysis),
PD (peritoneal dialysis)

Data sources:
Abu Aisha & Elamin (2010), El Matri et al. (2008), Mahmoud et al. (2010), Soliman et al. (2012), Sumaili et al. (2009), Tshamba et al. (2014), van der Tol et al. (2019)

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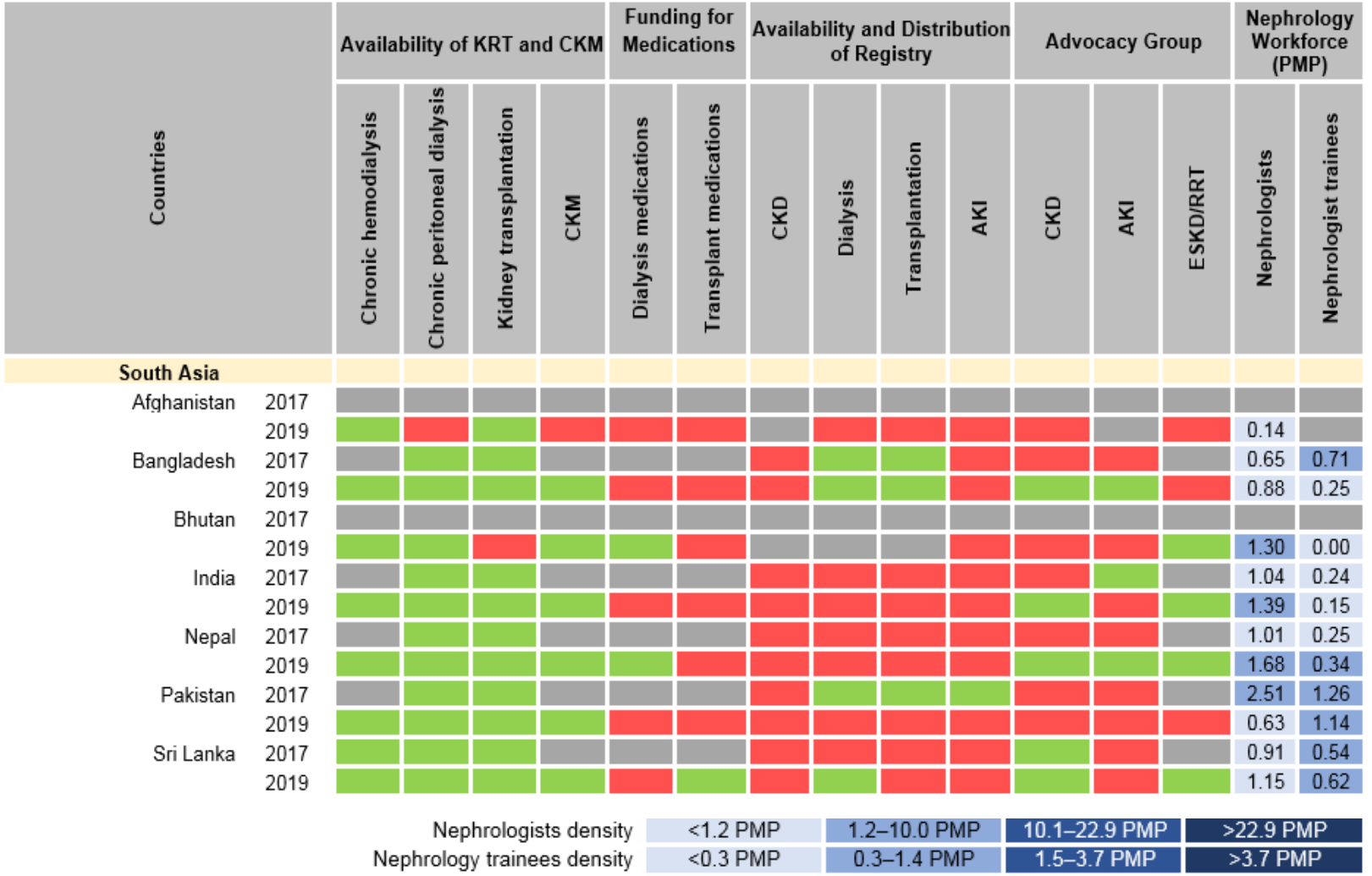
Survey response

- 7 of 8 countries in South Asia (88%) responded to the 2018 survey
- This represents 99% of the region's population

Country level scorecard



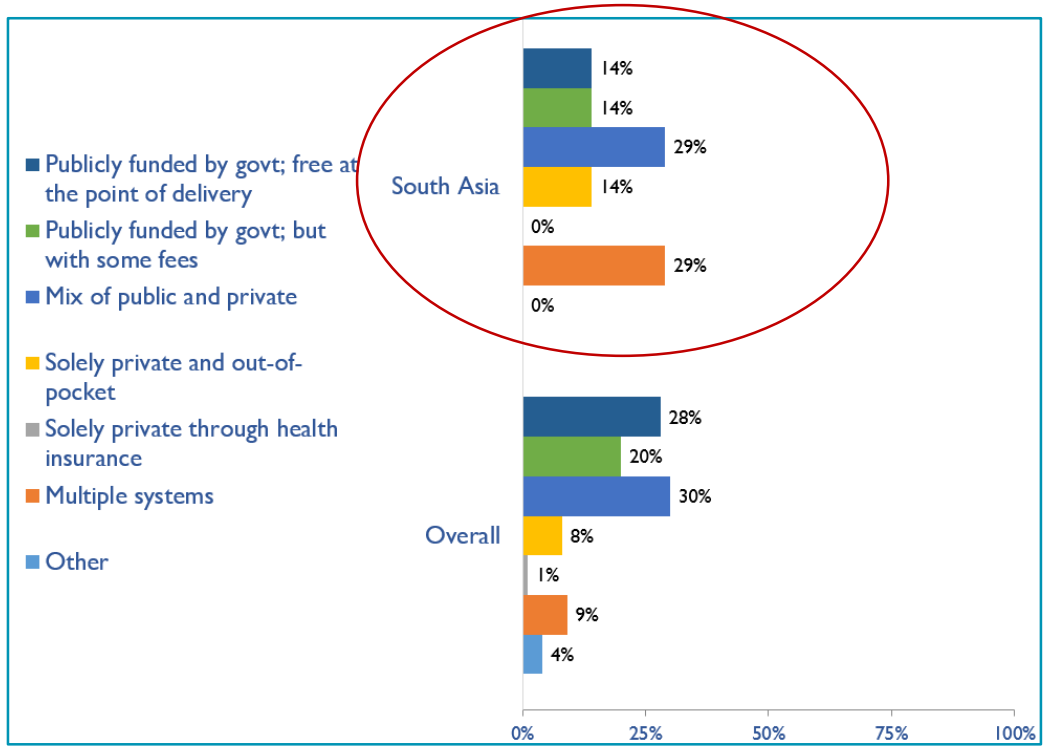
Countries		Availability of KRT and CKM				Funding for Medications		Availability and Distribution of Registry				Advocacy Group			Nephrology Workforce (PMP)	
		Chronic hemodialysis	Chronic peritoneal dialysis	Kidney transplantation	CKM	Dialysis medications	Transplant medications	CKD	Dialysis	Transplantation	AKI	CKD	AKI	ESKD/RRT	Nephrologists	Nephrologist trainees
South Asia																
Afghanistan	2017															
	2019														0.14	
Bangladesh	2017														0.65	0.71
	2019														0.88	0.25
Bhutan	2017															
	2019														1.30	0.00
India	2017														1.04	0.24
	2019														1.39	0.15
Nepal	2017														1.01	0.25
	2019														1.68	0.34
Pakistan	2017														2.51	1.26
	2019														0.63	1.14
Sri Lanka	2017														0.91	0.54
	2019														1.15	0.62

Yes
No
N/A

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

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

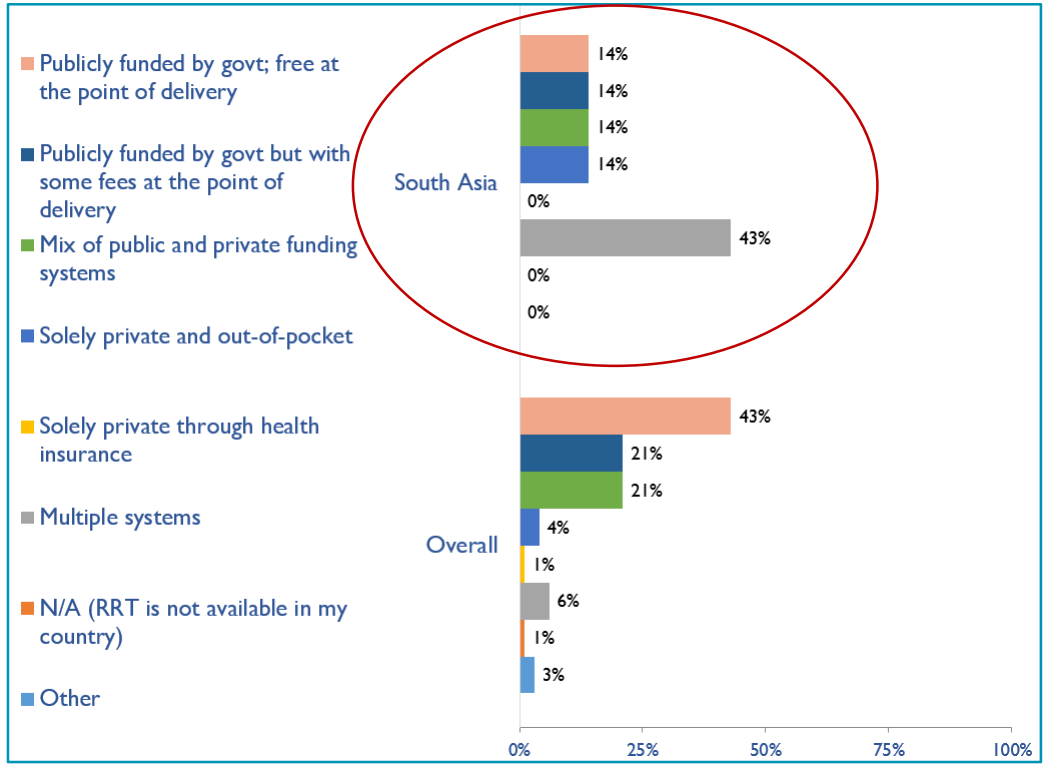
Funding for non-dialysis CKD



Country	Publicly funded by govt; free at the point of delivery	Publicly funded by govt but with some fees 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	Other
Afghanistan				X			
Bangladesh						X	
Bhutan	X						
India						X	
Nepal			X				
Pakistan			X				
Sri Lanka		X					

X : Yes

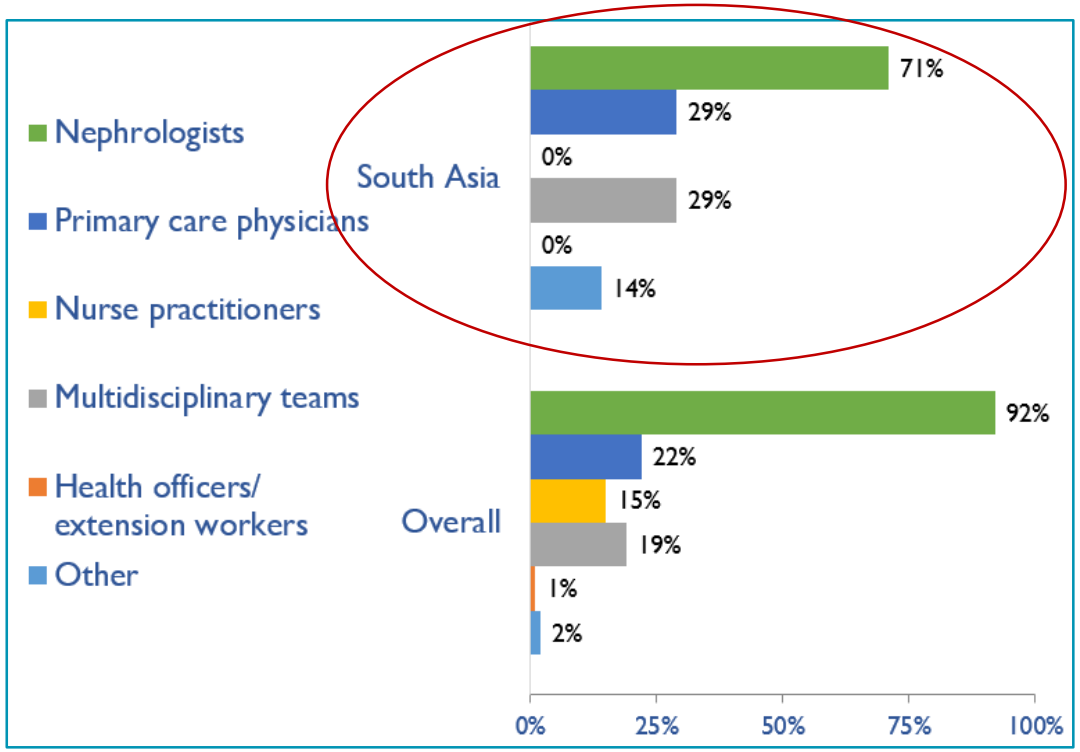
Funding for kidney replacement therapy (KRT)



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
Afghanistan				X				
Bangladesh						X		
Bhutan	X							
India						X		
Nepal		X						
Pakistan						X		
Sri Lanka			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
Afghanistan		X				
Bangladesh	X					
Bhutan				X		
India	X	X		X		
Nepal	X					
Pakistan	X					X
Sri Lanka	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
Afghanistan														
Bangladesh														
Bhutan														
India														
Nepal														
Pakistan														
Sri Lanka														

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
Afghanistan	0.14	-
Bangladesh	0.88	0.25
Bhutan	1.30	0.00
India	1.39	0.15
Nepal	1.68	0.34
Pakistan	0.63	1.14
Sri Lanka	1.15	0.62

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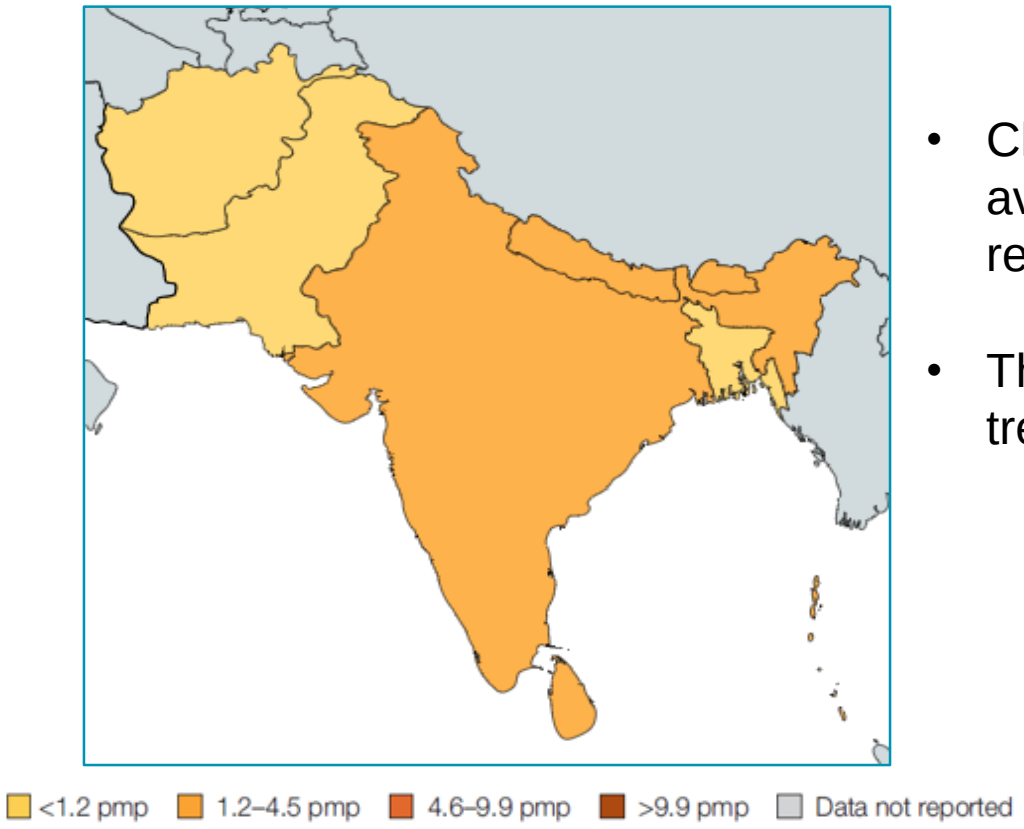
Capacity for chronic dialysis (HD)

Chronic HD centers



- Chronic HD services are available in all countries of the region
- The South Asia average of HD treatment centers is 1.39 pmp

Country	Chronic HD Centres PMP
Afghanistan	0.29
Bangladesh	0.63
Bhutan	3.91
India	1.39
Nepal	1.72
Pakistan	0.58
Sri Lanka	1.71

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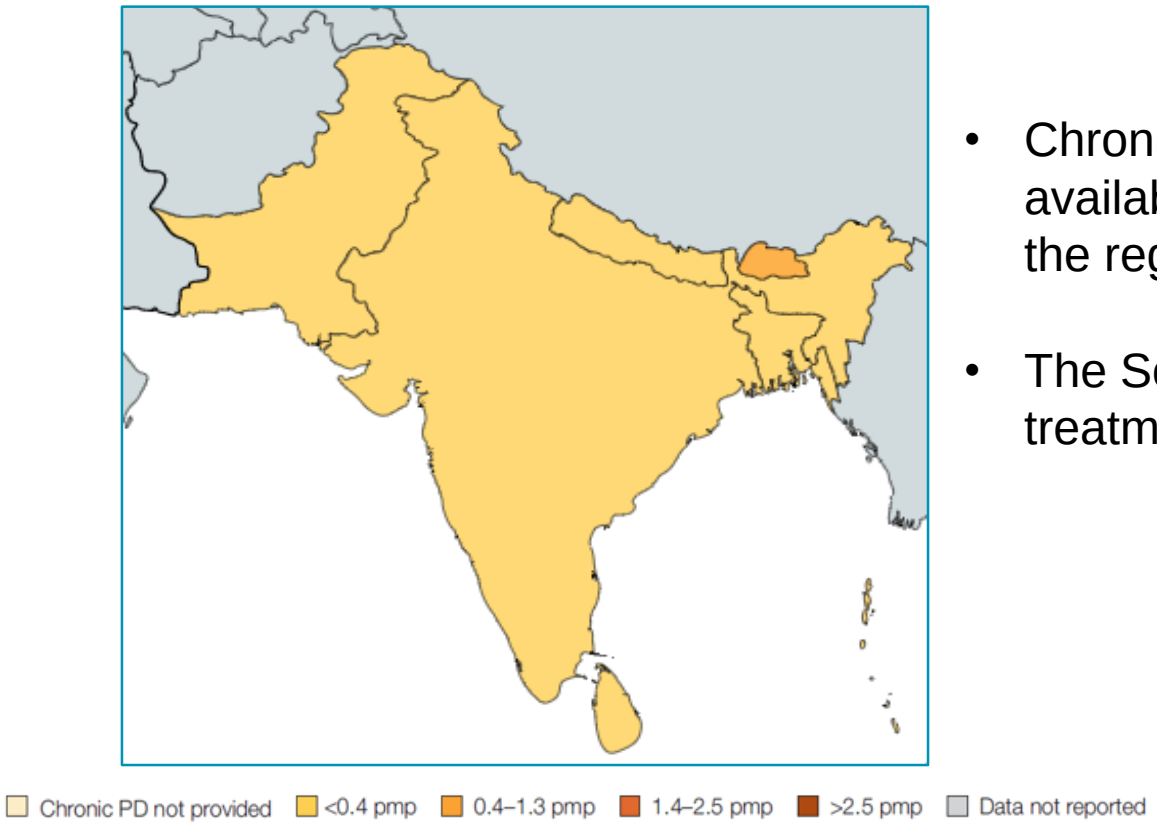
Capacity for chronic dialysis (PD)

Chronic PD centers



- Chronic PD services are available in 6 (86%) countries of the region.
- The South Asia average of PD treatment centers is 0.15 pmp.

Country	Chronic PD Centres PMP
Afghanistan	-
Bangladesh	0.04
Bhutan	1.30
India	0.23
Nepal	0.17
Pakistan	0.01
Sri Lanka	0.13

' – ' : data not reported/unavailable

Capacity for kidney transplantation

Kidney transplantation centers

- Kidney transplantation services are available in 6 (86%) countries of the region.
- The South Asia average of kidney transplantation centers is 0.07 pmp.

Country	Kidney Transplantation availability	Transplant centers PMP
Afghanistan	X	0.06
Bangladesh	X	0.04
Bhutan		-
India	X	0.19
Nepal	X	0.13
Pakistan	X	0.07
Sri Lanka	X	0.51

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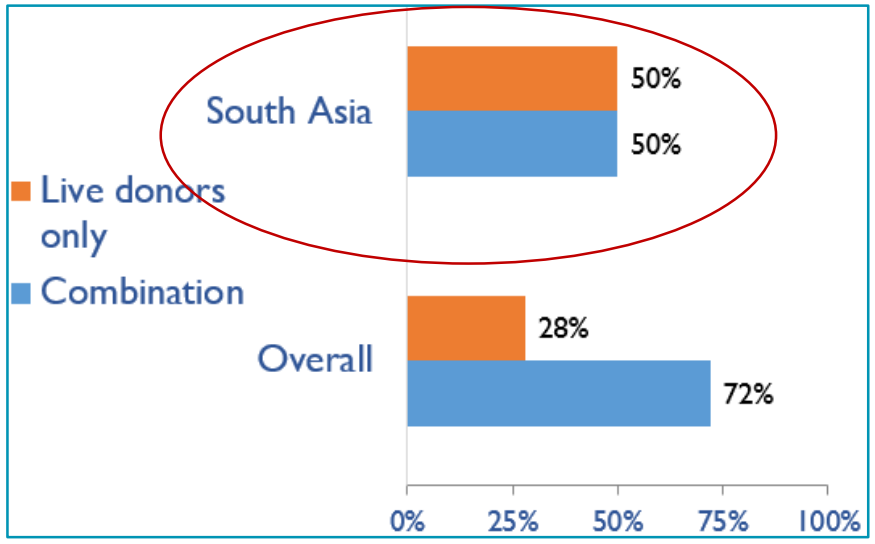
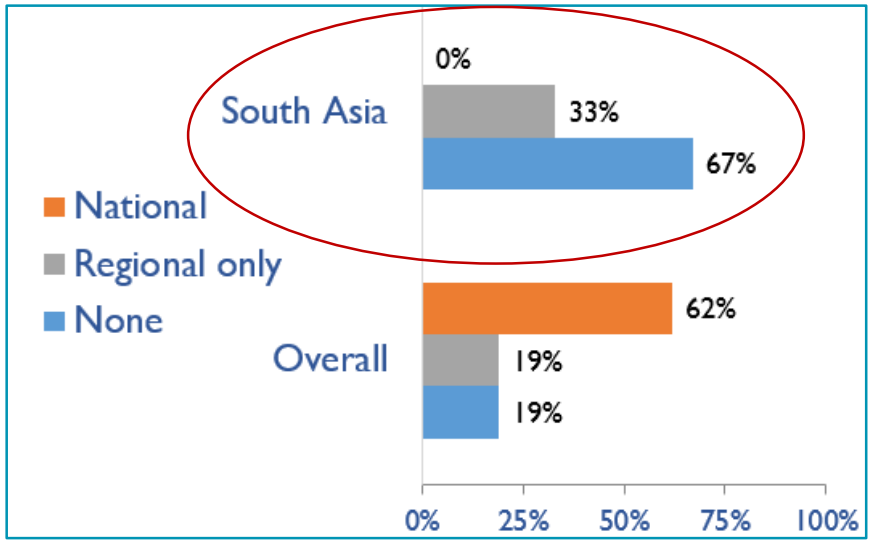
X : Yes

Capacity for kidney transplantation (cont'd)

Transplant donor type



Transplant waitlist

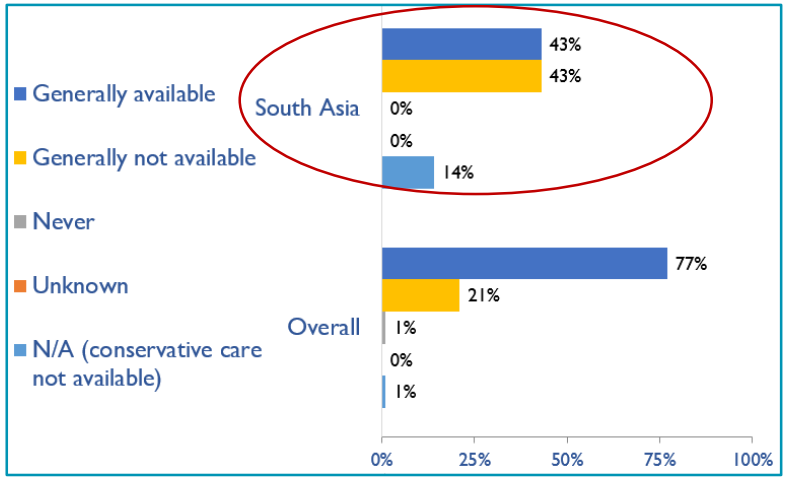


Country	Donor type		Transplant waitlist		
	Live donors only	Combination	National	Regional only	None
Afghanistan	X			X	
Bangladesh	X				X
Bhutan					
India		X		X	
Nepal	X				X
Pakistan		X			X
Sri Lanka		X			X

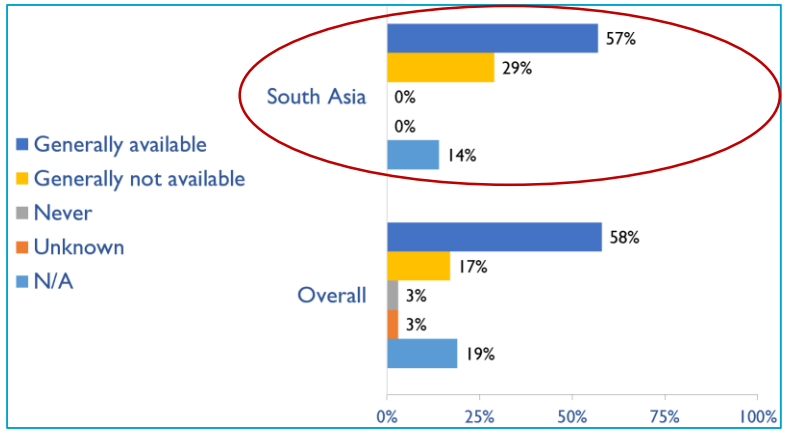
X : Yes

Availability of services within dialysis care

HD frequency



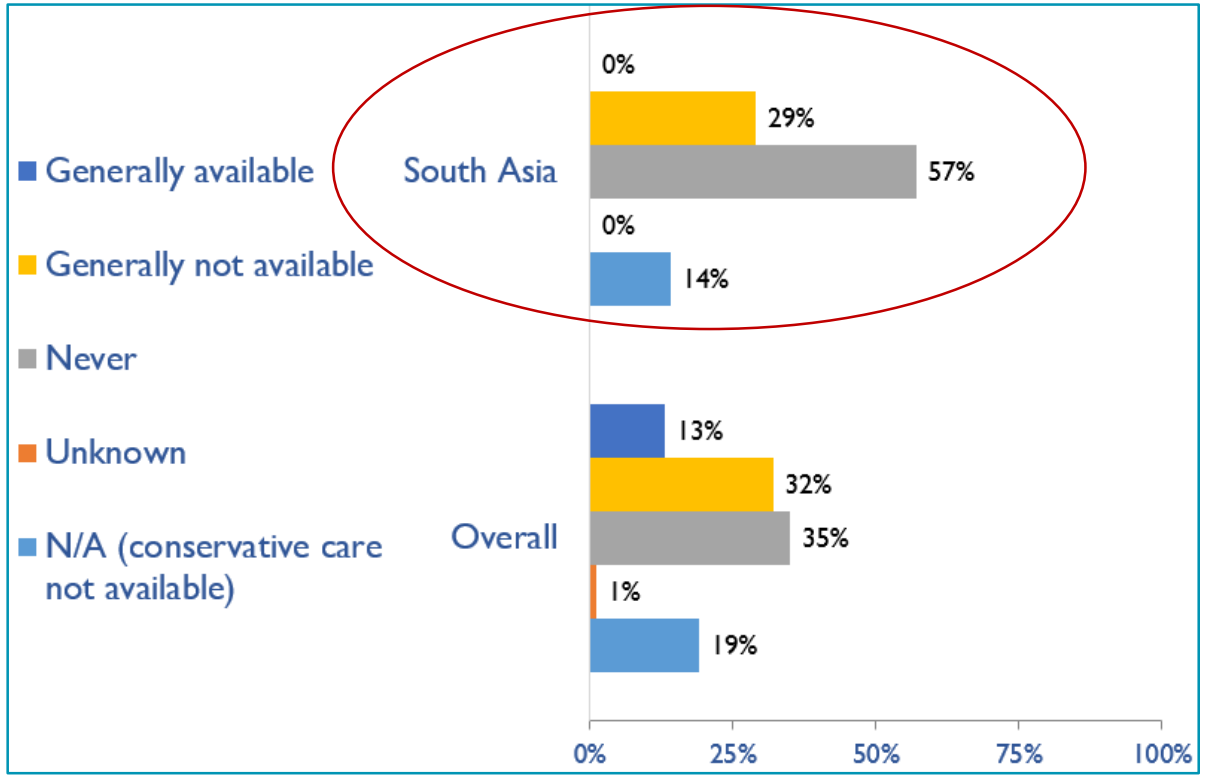
PD frequency



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)
Afghanistan					X					X
Bangladesh		X				X				
Bhutan		X					X			
India	X					X				
Nepal	X					X				
Pakistan	X					X				
Sri Lanka		X					X			

X : Yes

Availability of home hemodialysis

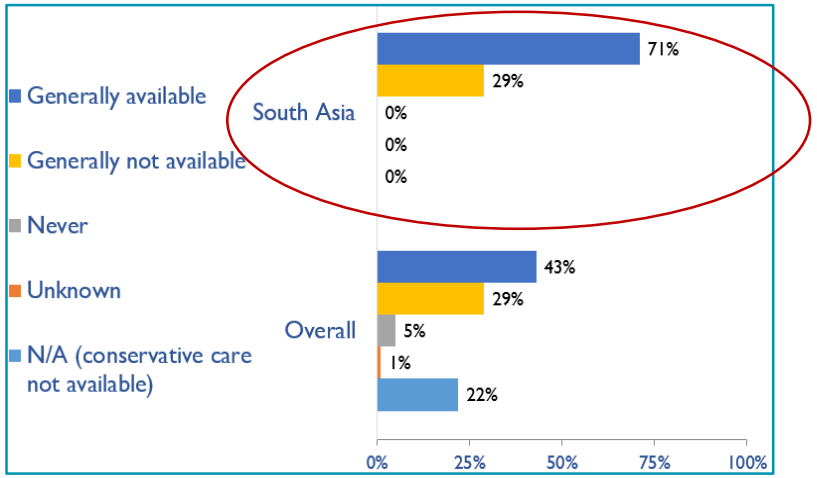


Country	Availability of Home hemodialysis				
	Generally available	Generally not available	Never	Unknown	N/A (dialysis not provided)
Afghanistan			X		
Bangladesh			X		
Bhutan			X		
India		X			
Nepal			X		
Pakistan			X		
Sri Lanka		X			

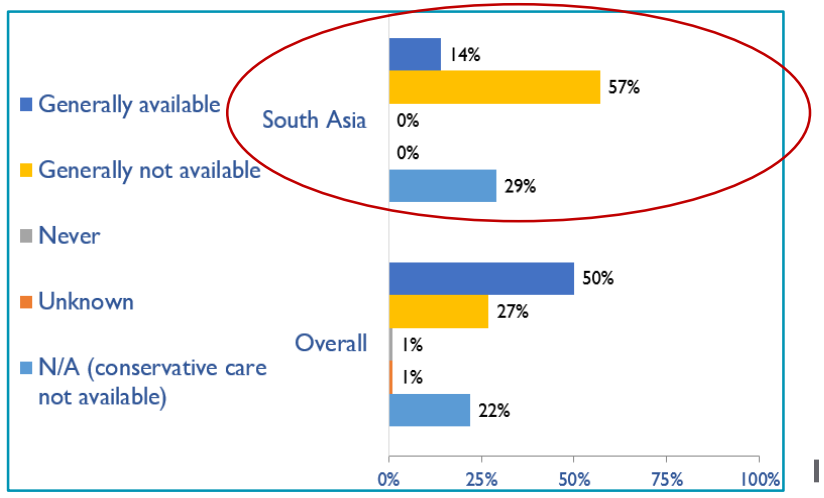
X : Yes

Capacity for conservative kidney management (CKM)

Choice–restricted CKM



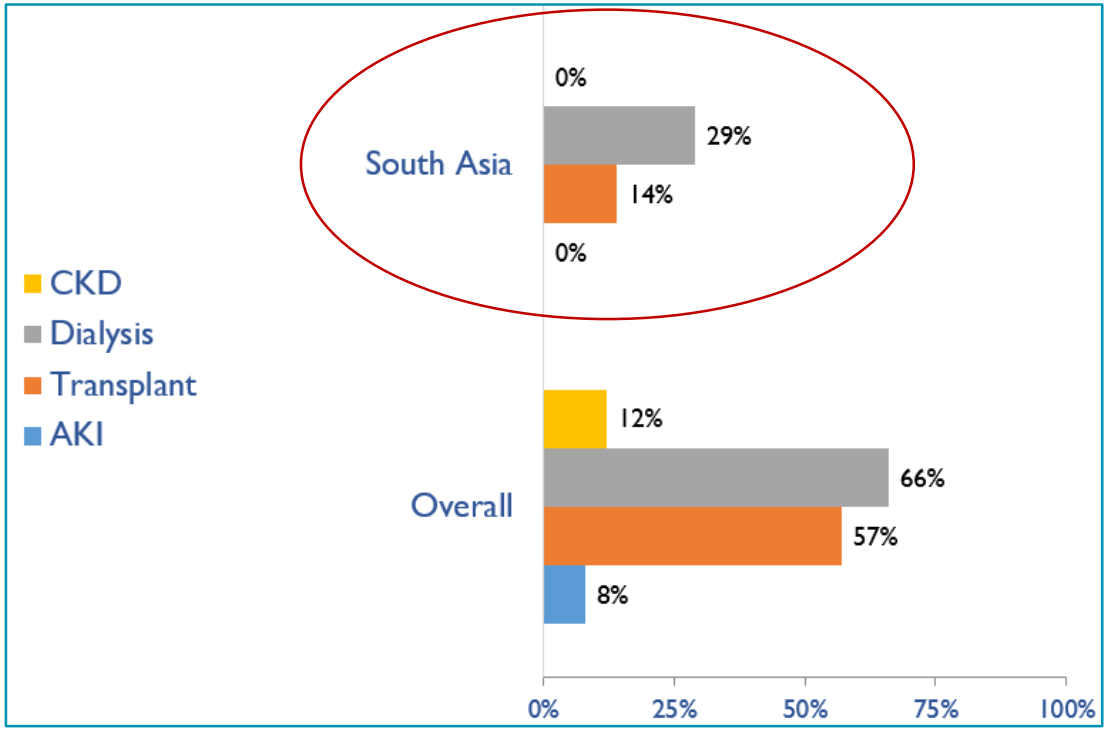
Chosen or medically advised CKM



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)
Afghanistan		X					X			
Bangladesh	X									X
Bhutan		X					X			
India	X						X			
Nepal	X						X			
Pakistan	X									X
Sri Lanka	X					X				

X : Yes

Availability of official registry



Country	CKD	Dialysis	Transplant	AKI
Afghanistan		X		
Bangladesh			X	
Bhutan				
India				
Nepal				
Pakistan				
Sri Lanka		X		

X :
Yes

Summary of 2019 GKHA findings

- KRT is highly availability, but limited access and quality
- Conservative kidney management is available, often choice-restricted
- Government funding for kidney care is low
- Few registries across all levels of kidney disease
- Many workforce limitations across all provider types
- Little advocacy for kidney disease in South Asia

Implications

- **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**

To access the Atlas report:

www.theisn.org/global-atlas