

# THE GLOBAL KIDNEY HEALTH ATLAS

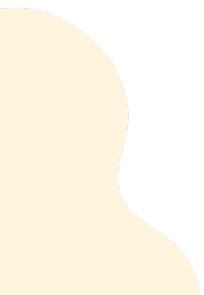


*<Congress title>*

Date

# 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



# Design and Scope

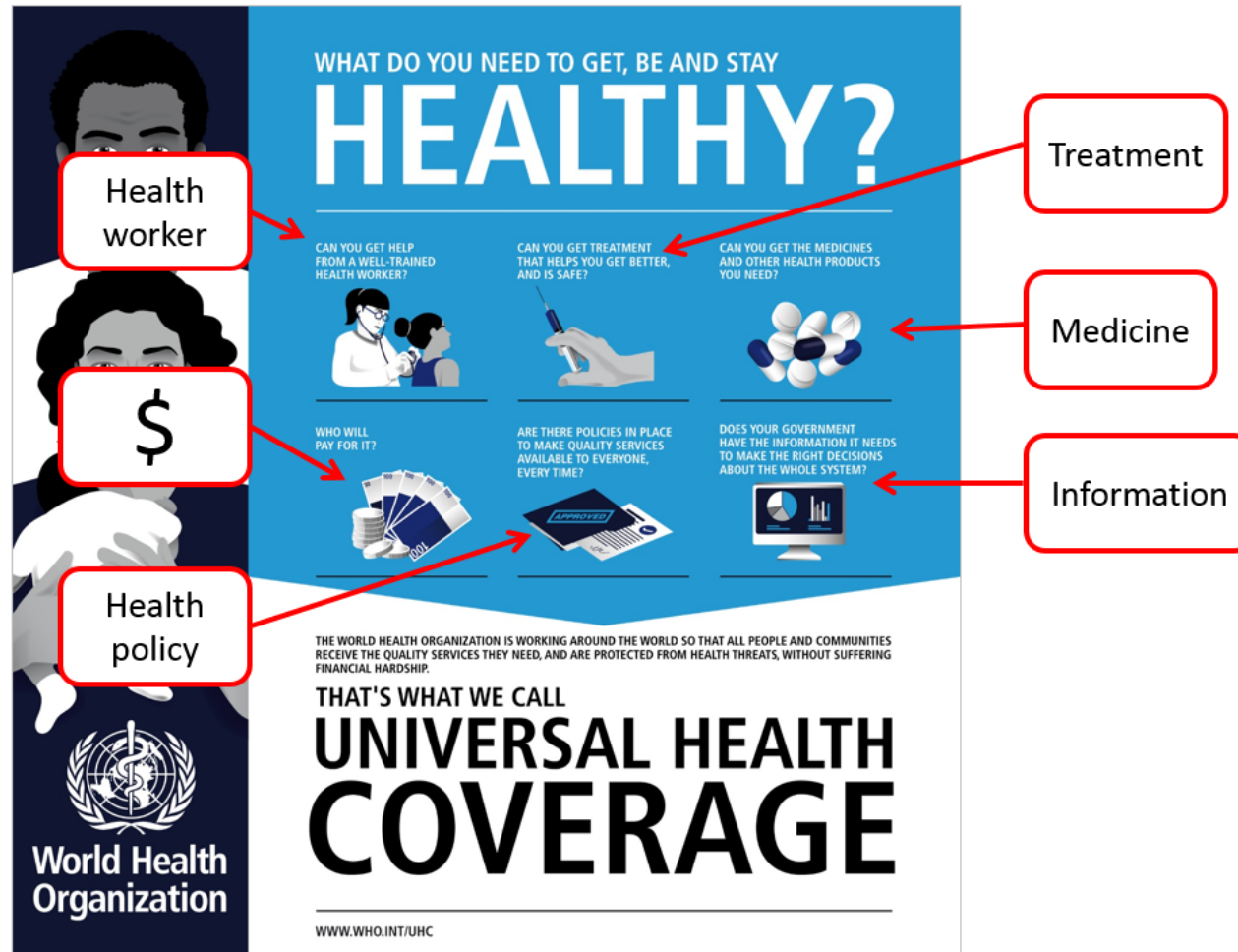
## Desk research (across countries and regions)

- 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
- $\geq 3$  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

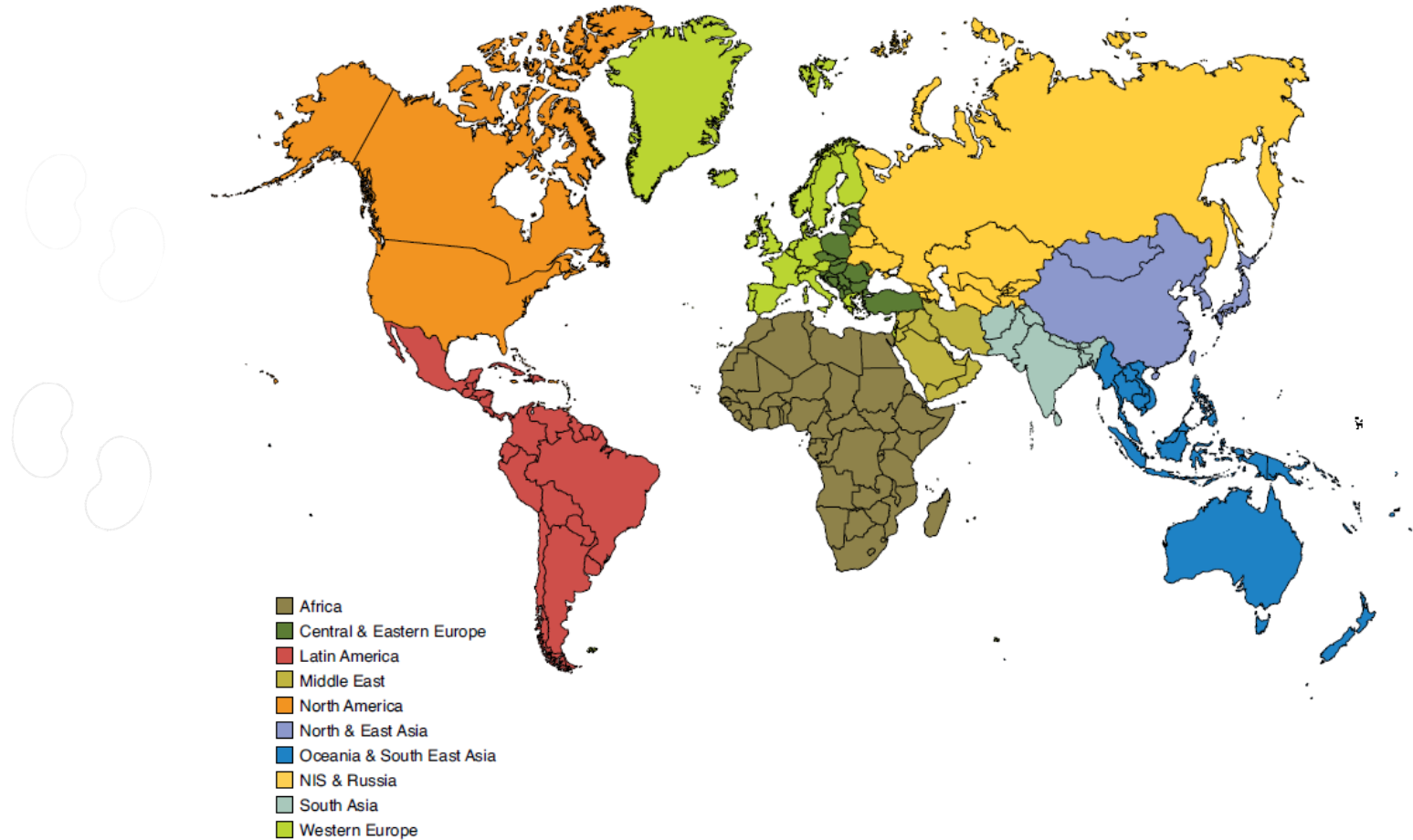
■ Participated in survey   ■ Did not participate in survey



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

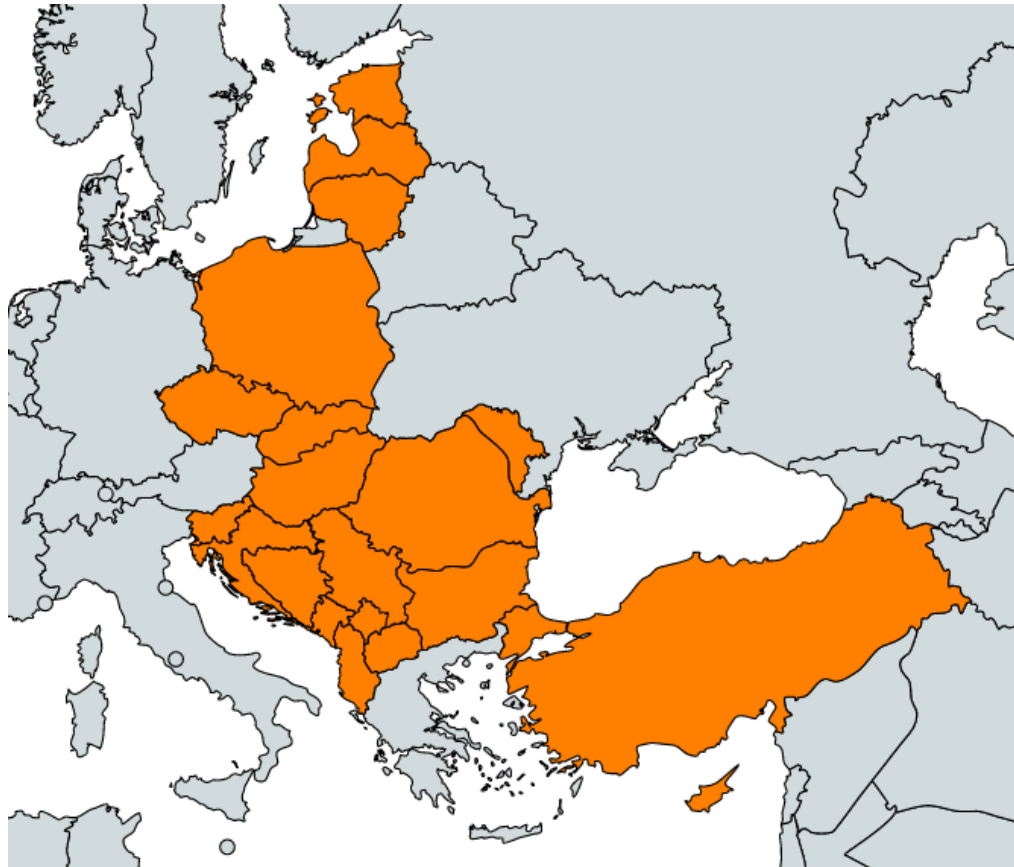
**113 countries participated  
in both GKHA surveys**

# Results presented by ISN regions



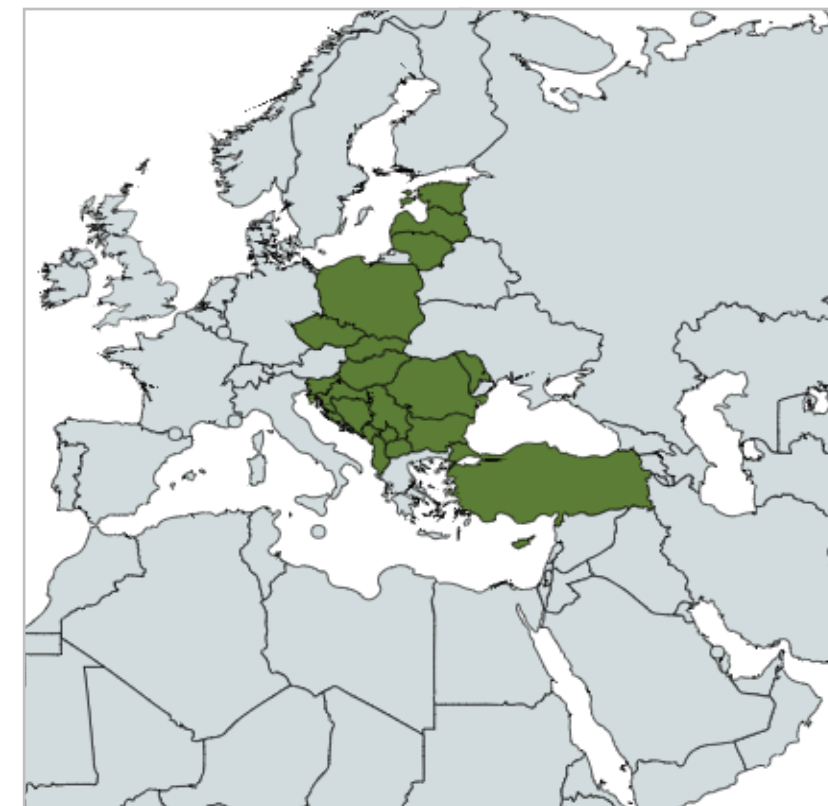


# ISN region: Eastern & Central Europe



# Demographics

Country	World bank ranking	Area (sq km)	Total population (2018)	GDP (PPP) (\$ billion)	Total health expenditures (% of GDP)
Albania	Upper middle income	28,748	3,057,220	36.01	6.8
Bosnia and Herzegovina	Upper middle income	51,197	3,849,891	44.83	9.2
Bulgaria	Upper middle income	110,789	7,057,504	153.5	8.2
Croatia	High income	56,594	4,270,480	102.1	7.2
Cyprus	High income	9,251	1,237,088	31.78	6.9
Czech Republic	High income	78,867	10,686,269	375.9	7.1
Estonia	High income	45,228	1,244,288	41.65	6.7
Hungary	High income	93,028	9,825,704	289.6	7.2
Kosovo	Upper middle income	10,887	1,907,592	19.6	-
Latvia	High income	64,589	1,923,559	54.02	5.8
Lithuania	High income	65,300	2,793,284	91.47	6.5
Macedonia, FYR	Upper middle income	25,713	2,118,945	31.03	6.1
Moldova	Lower middle income	33,851	3,437,720	23.72	10.2
Montenegro	Upper middle income	13,812	614,249	11.08	6.0
Poland	High income	312,685	38,420,687	1126	6.3
Romania	Upper middle income	238,391	21,457,116	483.4	5.0
Serbia	Upper middle income	77,474	7,078,110	105.7	9.4
Slovak Republic	High income	49,035	5,445,040	179.7	6.9
Slovenia	High income	20,273	2,102,126	71.23	8.5
Turkey	Upper middle income	783,562	81,257,239	2186	4.1



'-': 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)
Albania	10.18 (9.43 - 11.05)	1.67 (1.52 - 1.96)	1.31 (1.17 - 1.46)	22.3 (17.4 - 27.4)	29.0 (22.4 - 36.2)	15.6 (14.0 - 17.3)
Bosnia and Herzegovina	12.94 (11.97 - 14.06)	1.63 (1.51 - 1.76)	1.28 (1.17 - 1.39)	19.4 (15.1 - 24.1)	30.8 (24.5 - 37.6)	30.5 (27.3 - 33.7)
Bulgaria	14.32 (13.28 - 15.5)	1.34 (1.27 - 1.42)	1.25 (1.17 - 1.35)	27.4 (21.8 - 33.3)	28.4 (21.7 - 35.5)	30.3 (27.2 - 33.3)
Croatia	13.64 (12.61 - 14.79)	1.62 (1.54 - 1.71)	1.11 (1.02 - 1.2)	27.1 (22.4 - 32.1)	32.4 (26.4 - 39.3)	27.0 (24.1 - 30.1)
Cyprus	8.95 (8.33 - 9.67)	3.3 (2.5 - 3.61)	1.55 (1.24 - 1.77)	22.6 (17.4 - 28.3)	19.8 (14.1 - 26.7)	26.3 (23.9 - 28.9)
Czech Republic	13.52 (12.52 - 14.69)	1.14 (1.08 - 1.2)	0.9 (0.83 - 0.97)	28.5 (23.5 - 33.9)	27.9 (21.5 - 34.7)	24.5 (21.9 - 27.2)
Estonia	20.64 (19.16 - 22.22)	1.76 (1.63 - 1.88)	1.16 (1.06 - 1.26)	23.8 (19.8 - 28.1)	27.4 (22.3 - 32.9)	22.2 (20.1 - 24.4)
Hungary	14.09 (13.02 - 15.28)	1.27 (1.22 - 1.33)	0.94 (0.88 - 1)	28.6 (23.5 - 34.0)	30.0 (23.3 - 36.9)	25.1 (22.2 - 28.0)
Kosovo	-	-	-	-	-	-
Latvia	20.67 (19.2 - 22.42)	0.92 (0.87 - 0.98)	0.84 (0.79 - 0.91)	25.7 (19.9 - 31.7)	29.4 (22.6 - 36.9)	26.9 (24.7 - 29.2)
Lithuania	19.47 (18.03 - 21.11)	0.62 (0.59 - 0.65)	0.63 (0.59 - 0.68)	28.4 (23.2 - 33.8)	29.3 (22.4 - 36.6)	22.6 (20.4 - 24.9)
Macedonia, FYR	12.03 (11.16 - 13.06)	1.61 (1.48 - 1.76)	1.31 (1.19 - 1.44)	23.9 (18.4 - 29.6)	28.5 (21.9 - 36.1)	31.4 (28.3 - 34.7)
Moldova	16.28 (15.03 - 17.62)	0.5 (0.47 - 0.52)	0.61 (0.57 - 0.65)	20.1 (15.1 - 25.5)	29.8 (23.1 - 37.0)	19.4 (18.0 - 21.2)
Montenegro	11.90 (11.02 - 12.90)	1.95 (1.78 - 2.12)	1.43 (1.29 - 1.58)	24.9 (19.2 - 30.7)	29.1 (22.4 - 36.1)	31.0 (28.0 - 34.0)
Poland	11.73 (10.77 - 12.9)	0.87 (0.83 - 0.92)	0.74 (0.68 - 0.8)	25.6 (21.9 - 29.5)	28.7 (23.0 - 35.0)	24.1 (21.7 - 26.8)
Romania	12.26 (11.26 - 13.33)	1.17 (1.11 - 1.22)	1 (0.94 - 1.07)	24.5 (20.0 - 29.3)	30.0 (23.4 - 37.3)	21.9 (19.6 - 24.4)
Serbia	13.32 (12.38 - 14.42)	1.93 (1.61 - 2.07)	1.45 (1.27 - 1.59)	23.5 (19.1 - 28.1)	29.5 (23.4 - 35.6)	23.8 (20.9 - 27.0)
Slovak Republic	11.93 (11.04 - 12.94)	1.35 (1.26 - 1.45)	1.03 (0.94 - 1.12)	22.4 (17.9 - 27.3)	28.5 (22.5 - 34.9)	20.9 (18.3 - 23.6)
Slovenia	13.4 (12.41 - 14.57)	1.07 (1 - 1.15)	0.75 (0.69 - 0.81)	22.5 (17.2 - 28.2)	30.5 (23.9 - 37.9)	20.2 (17.8 - 22.7)
Turkey	11.83 (10.92 - 12.94)	3.77 (3.41 - 4.02)	2.18 (1.96 - 2.38)	32.2 (28.4 - 36.1)	20.3 (15.9 - 24.9)	22.9 (20.1 - 26.0)

## Abbreviations:

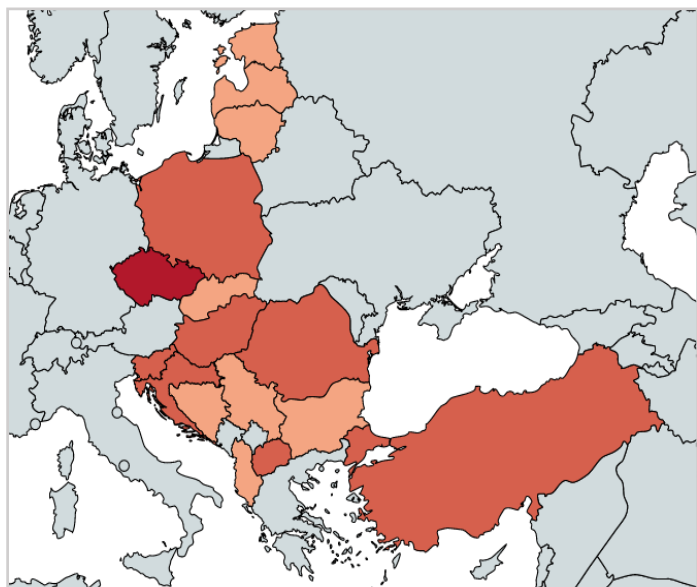
CKD (Chronic Kidney Disease),  
DALYS (disability-adjusted life years),  
BP (blood pressure),  
CI (confidence interval)

Data source: 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



<433.0 pmp   433.0-759.0 pmp   759.1-1048.0 pmp   >1048.0 pmp   Data not reported

Treated ESKD: all dialysis + transplant

\* pmp (per million population)

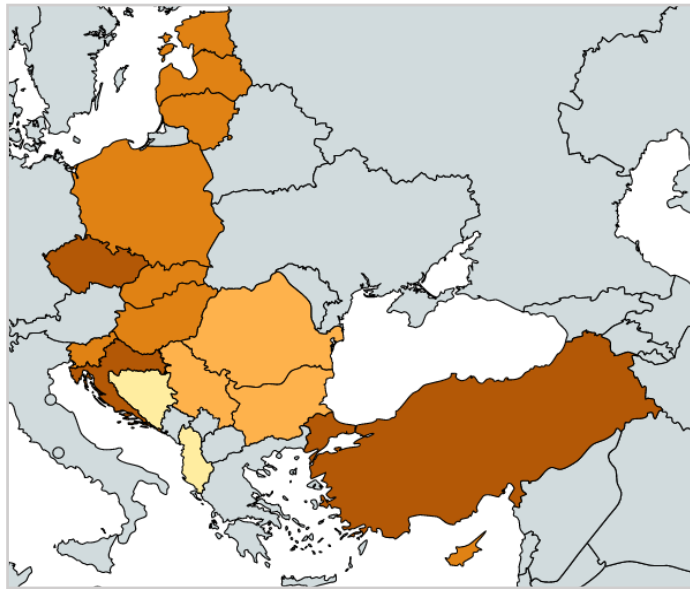
Data source: ERA-EDTA Registry Annual Report 2016/2017, Jain et al. (JASN) 2012, 2017/2018 USRDS Annual Data Report

'-': data not reported/unavailable

Country	Treated ESKD		Chronic dialysis (HD+PD)		Chronic Hemodialysis		Chronic Peritoneal dialysis	
	Incidence	Prevalence	Incidence	Prevalence	Incidence	Prevalence	Incidence	Prevalence
Albania	90	547	-	335	-	-	-	-
Bosnia and Herzegovina	108	749	107.8	652	105.3	627.6	2.5	24.4
Bulgaria	170	627	-	528	-	300.3	-	21.4
Croatia	191	1248	-	620.3	-	610.7	-	54.3
Cyprus	236	-	-	23.5	-	21	-	2.5
Czech Republic	232	1176	-	632	-	505.9	-	45.2
Estonia	66	720	85.1	302.5	70.7	260.7	14.4	41.8
Hungary	222	999	-	655	-	512	-	68.3
Kosovo	190	319	-	-	-	-	-	-
Latvia	114	684	-	275.5	-	156.8	-	49.5
Lithuania	120	796	-	491.2	-	364.6	-	16.8
Macedonia, FYR	181	871	-	721	-	608.8	-	13.8
Moldova	-	-	-	67.1	-	66.6	-	0.5
Montenegro	-	-	-	-	-	-	-	-
Poland	170	788	-	524	-	407	-	28.8
Romania	187	1143	186.6	1043.4	183	973.2	3.6	70.2
Serbia	100	712	95.8	598.1	81.9	536.3	13.9	61.8
Slovak Republic	170	655	-	620	-	532.1	-	37
Slovenia	126.2	1008.3	112.7	680.1	101.5	654.9	11.2	25.2
Turkey	146	957	-	754	122.5	531.2	-	81.6

# 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
Albania	3.1	80	0	3.1	-
Bosnia and Herzegovina	4.74	96.9	2.63	2.11	0
Bulgaria	5.63	83	4.51	1.13	-
Croatia	39.29	-	36.67	2.62	-
Cyprus	15.83	-	8.33	7.5	-
Czech Republic	44.25	-	39.43	4.81	-
Estonia	26.92	396	23.08	3.85	-
Hungary	30.62	344	26.49	4.12	-
Kosovo	-	-	-	-	-
Latvia	26.32	285	19.47	6.84	-
Lithuania	26.21	288	24.14	2.07	-
Macedonia, FYR	-	102	-	-	-
Moldova	-	-	-	-	-
Montenegro	-	-	-	-	-
Poland	28.56	282	27.09	1.47	-
Romania	7.56	98.4	4.97	2.59	0.7
Serbia	11.69	112.8	8.31	3.37	3.7
Slovak Republic	28.33	302	26.3	2.04	-
Slovenia	22.86	328.2	21.9	0.95	1.9
Turkey	43	179	9.85	33.15	-

\* pmp (per million population)

Data source: ERA-EDTA Registry Annual Report 2016/2017, Jain et al. (JASN) 2012, 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
Albania	15,081	11,078	-	-	1.36
Bosnia and Herzegovina	17,536	41,029	-	-	0.43
Bulgaria	26,598	26,871	-	-	0.99
Croatia	27,015	22,644	-	-	1.19
Cyprus	-	-	-	-	-
Czech Republic	21,709	24,296	-	-	0.89
Estonia	36,349	47,893	-	-	0.76
Hungary	12,673	14,155	43,045	56,844	0.90
Kosovo	-	-	-	-	-
Latvia	15,456	16,187	-	-	0.95
Lithuania	16,907	20,104	-	-	0.84
Macedonia, FYR	16,133	18,210	-	-	0.89
Moldova	-	-	-	-	-
Montenegro	-	-	-	-	-
Poland	16,899	21,488	-	-	0.79
Romania	18,445	14,271	-	-	1.29
Serbia	31,269	18,258	16,385	14,021	1.71
Slovak Republic	21,744	24,617	-	-	0.88
Slovenia	49,720	33,644	109,180	14,124	1.48
Turkey	27,290	20,786	30,962	13,273	1.31

\* Cost is in \$US 2016

**Abbreviations:**

HD (hemodialysis),

PD (peritoneal dialysis)

Data source: Cala et al. (2007), Erek et al. (2004), Gazdikova K. et al. (2003), Iannazzo et al. (2012), Kalo et al. (2001), Kandus et al. (2009), Mogyorosy et al. (2003), Neil et al. (2009), Perovic et al. (2009), Ursea et al. (1997), Vaiciuniene et al. (2005), van der Tol et al. (2019), Vazellov et al. (2004), Wordsworth et al. (2005)

'-': data not reported/unavailable

# Survey Response

- 18 of the 20 countries in Eastern and Central Europe (95%) responded to the 2018 survey
- This represents 99.7% 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
<b>Eastern &amp; Central Europe</b>															
Albania	2017	Yes	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	23.11	2.97
	2019	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	53.97	4.42
Bosnia and Herzegovina	2017	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	12.93	2.59
	2019	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	15.58	2.60
Bulgaria	2017	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes		
	2019	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	31.88	8.50
Croatia	2017	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	26.88	13.44
	2019	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	39.81	9.95
Cyprus	2017	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes		
	2019	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	20.21	2.43
Czech Republic	2017	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	23.49	4.70
	2019	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	28.07	3.74
Estonia	2017	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	15.01	3.16
	2019	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	14.47	2.81
Hungary	2017	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	21.72	3.03
	2019	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	No	Yes	30.53	1.02
Kosovo	2017	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes		
	2019	Yes	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No	Yes	22.54	3.67
Latvia	2017	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	20.13	2.01
	2019	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	23.39	1.56
Lithuania	2017	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	No	Yes	No	Yes	69.34	6.24
	2019	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	No	Yes	50.12	3.94
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

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
Macedonia	2017	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	9.54	4.77	
	2019	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	12.27	2.83	
Moldova	2017	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	9.02	7.33	
	2019	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	11.64	1.45	
Montenegro	2017	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	18.55	4.64	
	2019	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No			
Poland	2017	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	25.93	3.89	
	2019	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	26.03	6.51	
Romania	2017	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	15.46	2.88	
	2019	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	25.63	3.26	
Serbia	2017	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	20.90	9.75	
	2019	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	15.54	0.71	
Slovak Republic	2017	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	27.55	0.92	
	2019	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	36.73	3.67	
Slovenia	2017	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	40.33	7.56	
	2019	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	40.44	14.27	
Turkey	2017	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	6.30	1.89	
	2019	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	8.00	1.08	

Yes

No

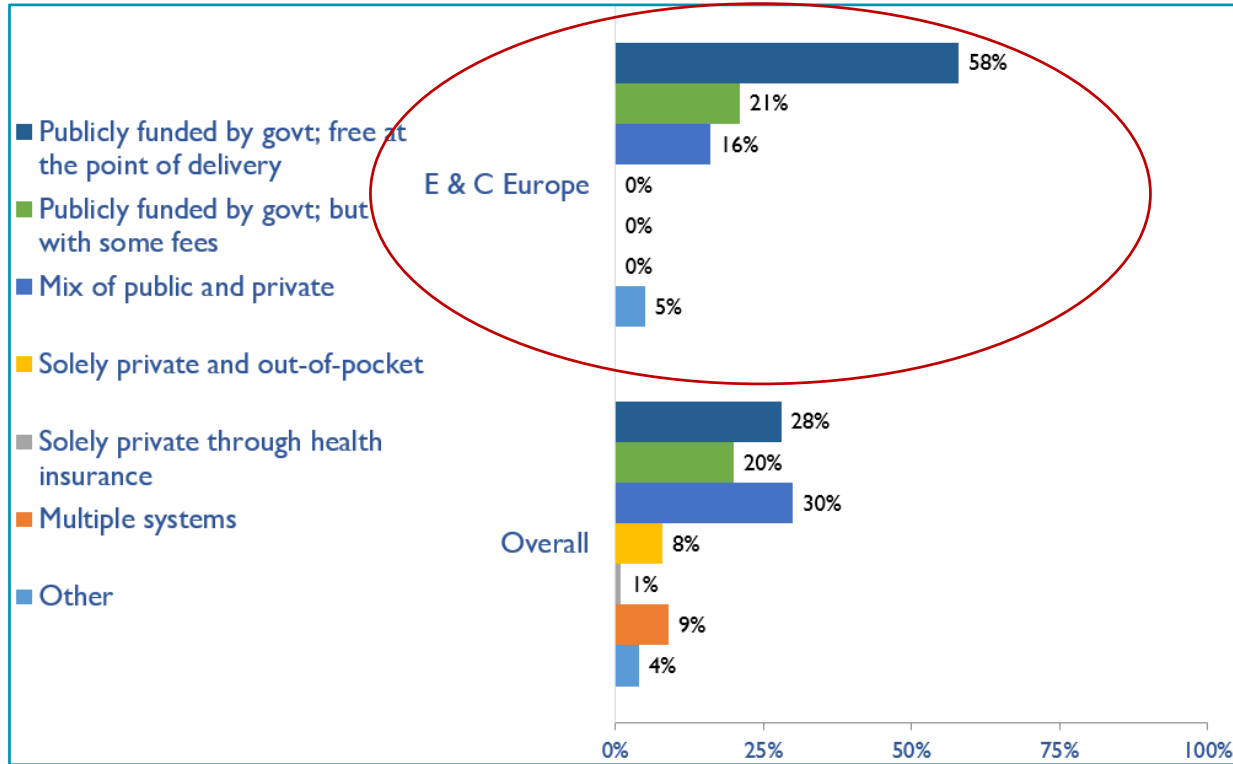
N/A

### 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

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

# Funding for non-dialysis CKD

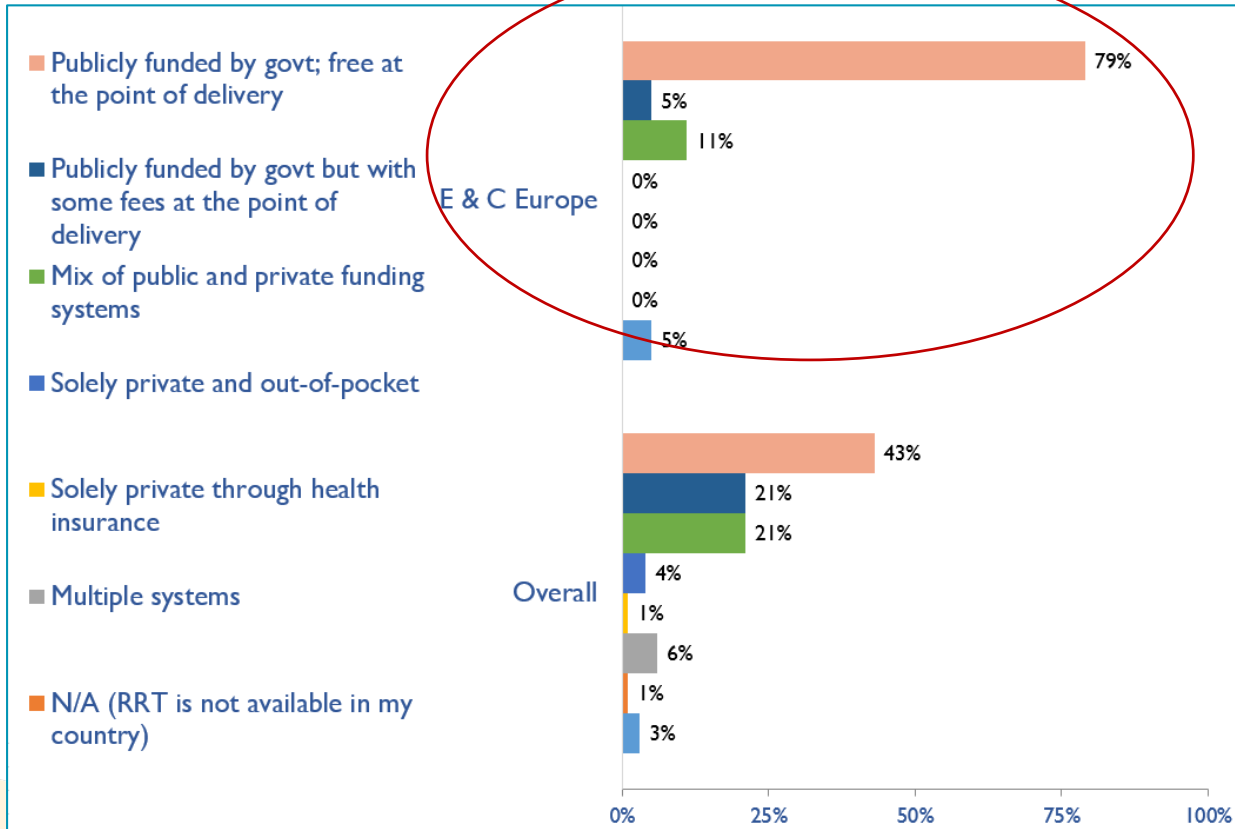


Country	Publicly funded by govt; free at the point of delivery	Publicly funded by govt but with some fees at the point of delivery	Mix of public and private funding systems	Solely private and out-of-pocket	Solely private through health insurance	Multiple systems	Other
Albania	X						
Bosnia and Herzegovina		X					
Bulgaria		X					
Croatia	X						
Cyprus			X				
Czech Republic	X						
Estonia	X						
Hungary	X						
Kosovo	X						
Latvia		X					
Lithuania	X						
Macedonia, FYR		X					
Moldova	X						
Poland	X						
Romania			X				
Serbia	X						
Slovak Republic							X
Slovenia	X						
Turkey			X				

X : Yes



# Funding for kidney replacement therapy (KRT)

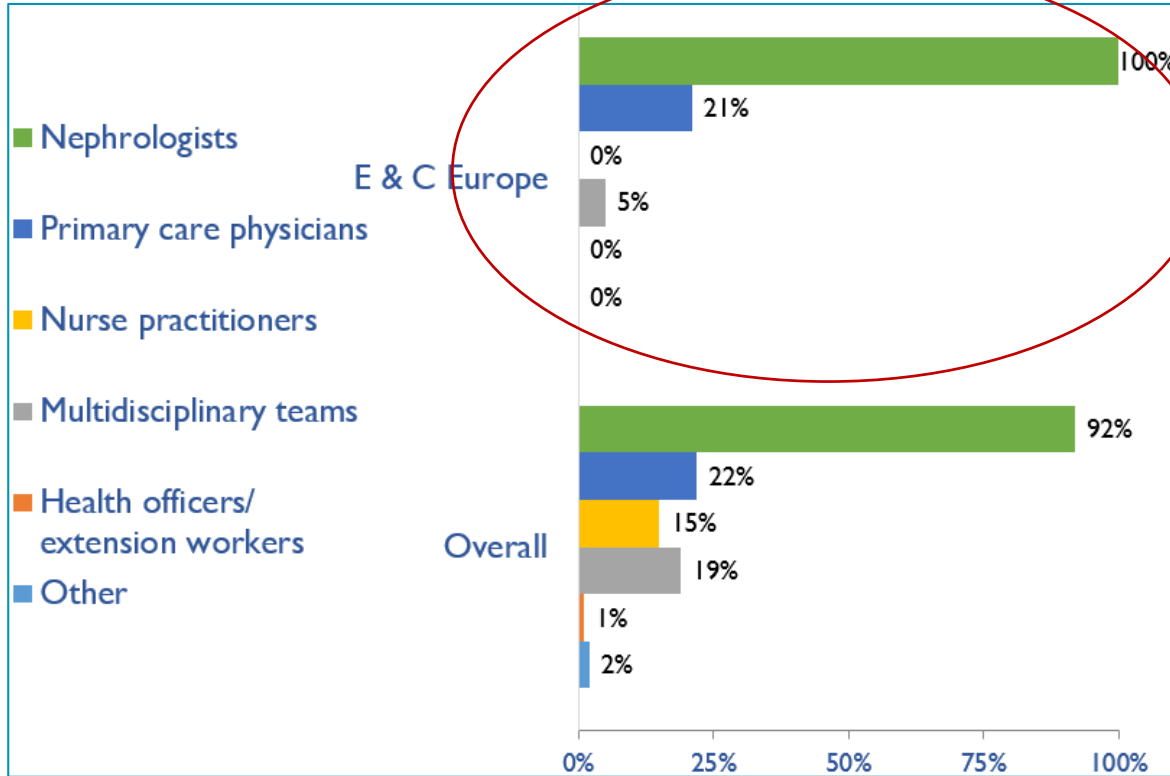


Country	Publicly funded by govt; free at the point of delivery	Publicly funded by govt but with some fees at the point of delivery	Mix of public and private funding systems	Solely private and out-of-pocket	Solely private through health insurance	Multiple systems	N/A (RRT is not available in my country)	Other
Albania			X					
Bosnia and Herzegovina			X					
Bulgaria		X						
Croatia	X							
Cyprus	X							
Czech Republic	X							
Estonia	X							
Hungary	X							
Kosovo	X							
Latvia	X							
Lithuania	X							
Macedonia, FYR	X							
Moldova	X							
Poland	X							
Romania	X							
Serbia	X							
Slovak Republic								X
Slovenia	X							
Turkey	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
Albania	X					
Bosnia and Herzegovina	X					
Bulgaria	X	X				
Croatia	X					
Cyprus	X					
Czech Republic	X					
Estonia	X			X		
Hungary	X					
Kosovo	X					
Latvia	X					
Lithuania	X					
Macedonia, FYR	X					
Moldova	X	X				
Poland	X					
Romania	X	X				
Serbia	X					
Slovak Republic	X					
Slovenia	X					
Turkey	X	X				

X : Yes



# Shortage of ESKD care providers

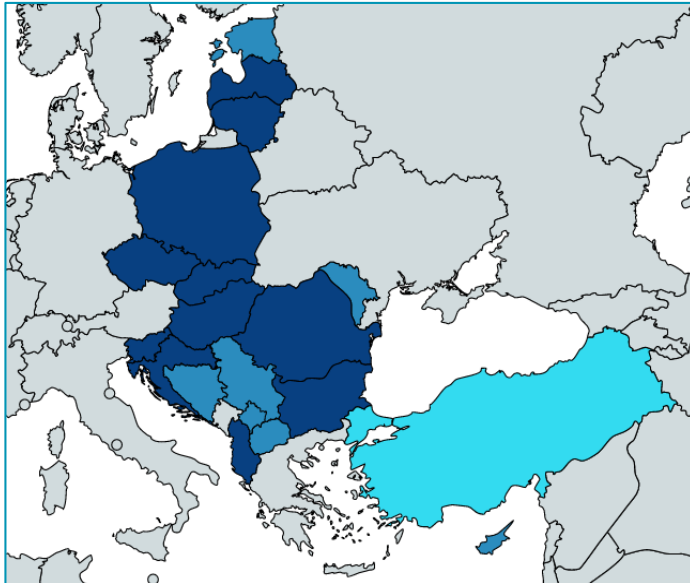
Country	Nephrologists	Transplant surgeons	Surgeons (HD access)	Surgeons (PD access)	Interventional radiologists (HD access)	Interventional radiologists (PD access)	Dietitians	Laboratory technicians	Radiologists (ultrasound)	Vascular access coordinators	Counsellors/psychologists	Transplant coordinators	Dialysis nurses	Dialysis technicians
Albania	Shortage	Shortage	Shortage	No shortage	Shortage	Shortage	Shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage
Bosnia and Herzegovina	Shortage	No shortage	Shortage	No shortage	Shortage	Shortage	Shortage	No shortage	No shortage	No shortage	No shortage	No shortage	Shortage	No shortage
Bulgaria	No shortage	Shortage	Shortage	Shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	Shortage	Shortage	Shortage
Croatia	Shortage	No shortage	Shortage	No shortage	No shortage	No shortage	Shortage	No shortage	No shortage	Shortage	No shortage	No shortage	Shortage	Shortage
Cyprus	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
Czech Republic	Shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	Shortage	No shortage
Estonia	Shortage	Shortage	Shortage	Shortage	No shortage	No shortage	Shortage	No shortage	No shortage	Shortage	Shortage	Shortage	Shortage	Shortage
Hungary	Shortage	Shortage	Shortage	No shortage	Shortage	Shortage	Shortage	No shortage	No shortage	Shortage	Shortage	Shortage	Shortage	Shortage
Kosovo	Shortage	No shortage	No shortage	No shortage	No shortage	No shortage	Shortage	No shortage	No shortage	Shortage	Shortage	Shortage	No shortage	No shortage
Latvia	Shortage	No shortage	Shortage	No shortage	No shortage	No shortage	Shortage	No shortage	No shortage	Shortage	Shortage	No shortage	Shortage	No shortage
Lithuania	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	Shortage	No shortage	No shortage	Shortage	Shortage	Shortage	No shortage	No shortage
Macedonia, FYR	Shortage	Shortage	Shortage	Shortage	No shortage	No shortage	Shortage	No shortage	No shortage	Shortage	Shortage	Shortage	Shortage	No shortage
Moldova	Shortage	Shortage	Shortage	No shortage	No shortage	No shortage	Shortage	No shortage	No shortage	Shortage	Shortage	No shortage	Shortage	No shortage
Poland	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	Shortage	No shortage	No shortage	Shortage	Shortage	Shortage	Shortage	No shortage
Romania	Shortage	Shortage	Shortage	Shortage	Shortage	Shortage	Shortage	No shortage	Shortage	Shortage	Shortage	Shortage	No shortage	No shortage
Serbia	Shortage	Shortage	No shortage	No shortage	Shortage	Shortage	No shortage	No shortage	No shortage	Shortage	Shortage	No shortage	No shortage	No shortage
Slovak Republic	Shortage	No shortage	Shortage	Shortage	No shortage	No shortage	Shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage	No shortage
Slovenia	Shortage	Shortage	Shortage	No shortage	No shortage	No shortage	Shortage	No shortage	No shortage	No shortage	Shortage	No shortage	Shortage	Shortage
Turkey	No shortage	No shortage	Shortage	Shortage	Shortage	No shortage	No shortage	No shortage	No shortage	Shortage	No shortage	No shortage	No shortage	No shortage

No shortage

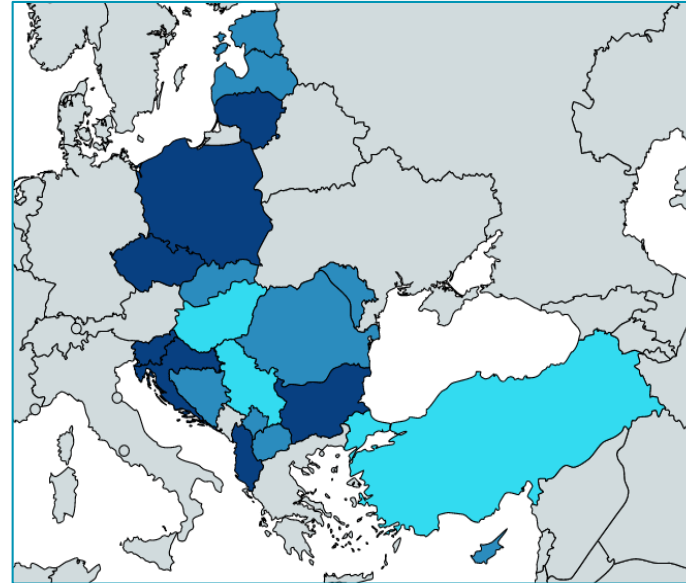
Shortage

# Prevalence of nephrologists and trainees

## Nephrologists



## Nephrology trainees



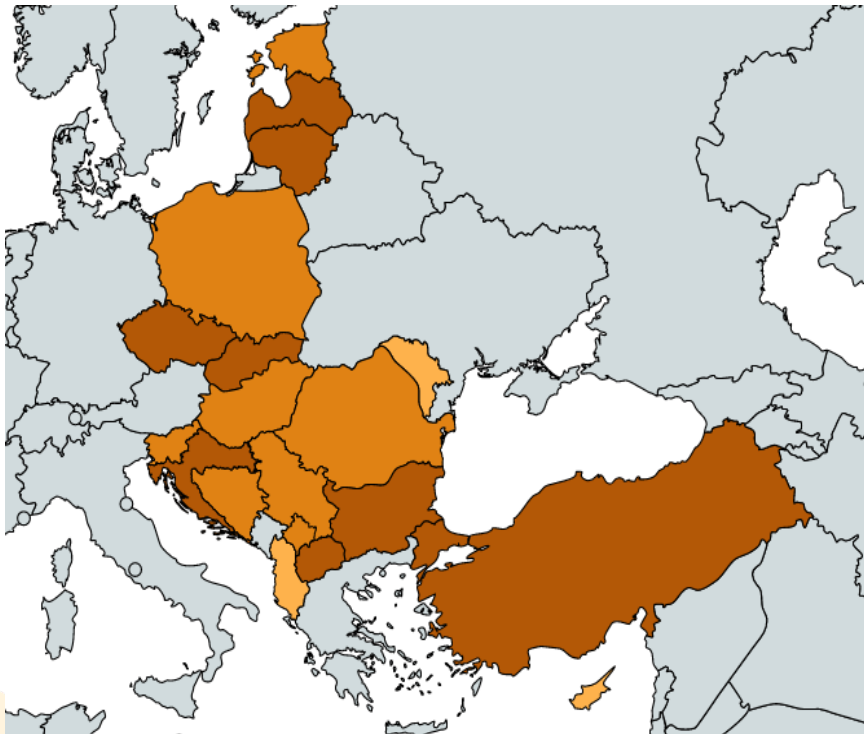
■ <1.2 pmp  
 ■ 1.2–10.0 pmp  
 ■ 10.1–22.9 pmp  
 ■ >22.9 pmp  
 ■ Data not reported

■ <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
Albania	53.97	4.42
Bosnia and Herzegovina	15.58	2.60
Bulgaria	31.88	8.50
Croatia	39.81	9.95
Cyprus	20.21	2.43
Czech Republic	28.07	3.74
Estonia	14.47	2.81
Hungary	30.53	1.02
Kosovo	22.54	3.67
Latvia	23.39	1.56
Lithuania	50.12	3.94
Macedonia, FYR	12.27	2.83
Moldova	11.64	1.45
Poland	26.03	6.51
Romania	25.63	3.26
Serbia	15.54	0.71
Slovak Republic	36.73	3.67
Slovenia	40.44	14.27
Turkey	8.00	1.08

# Capacity for chronic dialysis (HD)

Chronic HD centers



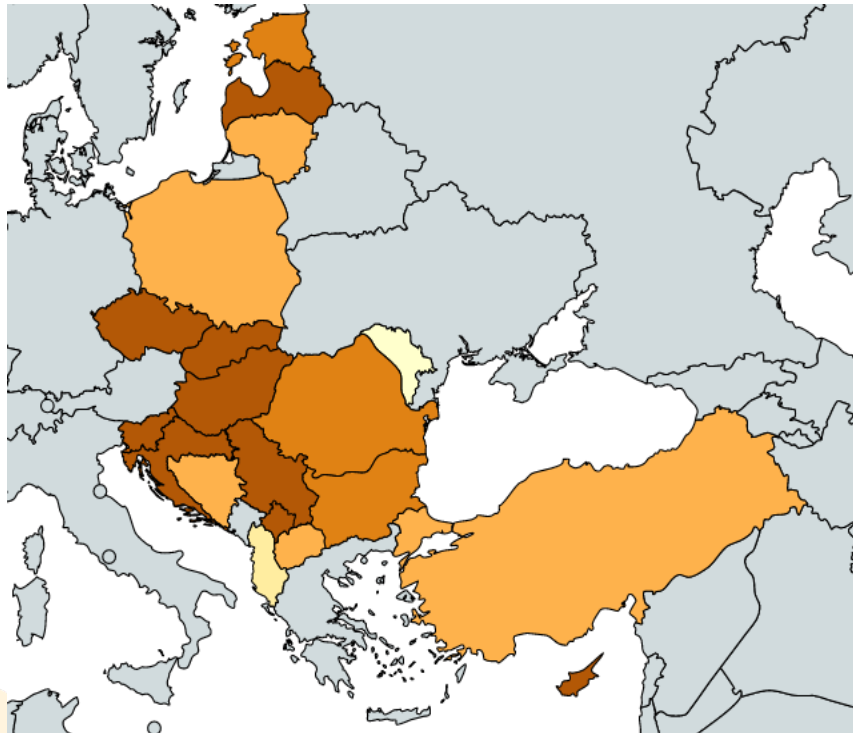
 <1.2 pmp   1.2–4.5 pmp   4.6–9.9 pmp   >9.9 pmp   Data not reported

- Chronic HD services are available in all countries of the region
- The Eastern & Central Europe average of HD treatment centers is 9.00 pmp

Country	Chronic HD Centres PMP
Albania	3.93
Bosnia and Herzegovina	7.01
Bulgaria	11.41
Croatia	10.77
Cyprus	4.04
Czech Republic	10.29
Estonia	7.23
Hungary	6.51
Kosovo	4.72
Latvia	12.48
Lithuania	22.20
Macedonia, FYR	9.91
Moldova	2.91
Poland	6.51
Romania	6.52
Serbia	9.18
Slovak Republic	13.41
Slovenia	9.51
Turkey	10.52

# Capacity for chronic dialysis (PD)

## Chronic PD centers



- Chronic PD services are available in all 19 (100%) countries of the region
- The Eastern & Central Europe average of PD treatment centers is 1.92 pmp

Country	Chronic PD Centres PMP
Albania	0.33
Bosnia and Herzegovina	1.30
Bulgaria	2.27
Croatia	5.85
Cyprus	4.04
Czech Republic	4.68
Estonia	2.41
Hungary	3.05
Kosovo	3.67
Latvia	2.60
Lithuania	1.07
Macedonia, FYR	0.71
Moldova	-
Poland	1.30
Romania	1.86
Serbia	4.66
Slovak Republic	3.67
Slovenia	3.81
Turkey	1.23

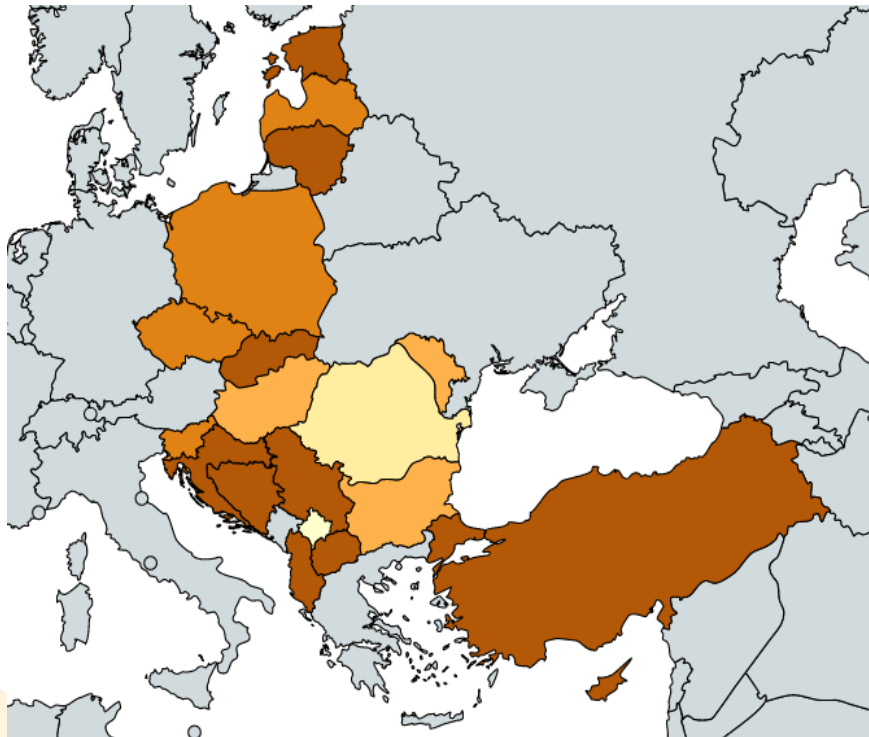
'-': data not reported/unavailable

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



# Capacity for Kidney Transplantation

## Kidney transplantation centers



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

- Kidney transplantation services are available in 18 (95%) countries of the region
- The Eastern & Central Europe average of Kidney transplantation centers is 0.62 pmp

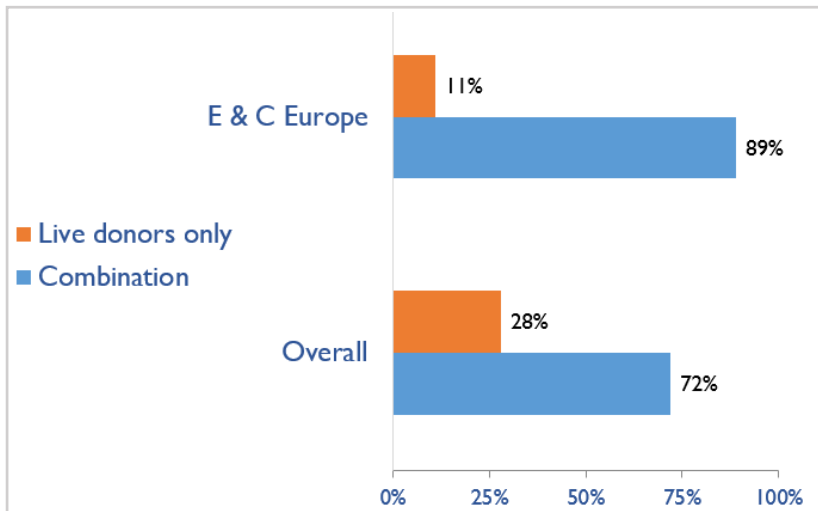
Country	Kidney Transplantation availability	Transplant centers PMP
Albania	X	0.82
Bosnia and Herzegovina	X	0.78
Bulgaria	X	0.35
Croatia	X	0.94
Cyprus	X	0.81
Czech Republic	X	0.47
Estonia	X	0.80
Hungary	X	0.41
Kosovo		-
Latvia	X	0.52
Lithuania	X	0.72
Macedonia, FYR	X	0.71
Moldova	X	0.29
Poland	X	0.55
Romania	X	0.16
Serbia	X	0.71
Slovak Republic	X	0.73
Slovenia	X	0.48
Turkey	X	0.82

X : Yes

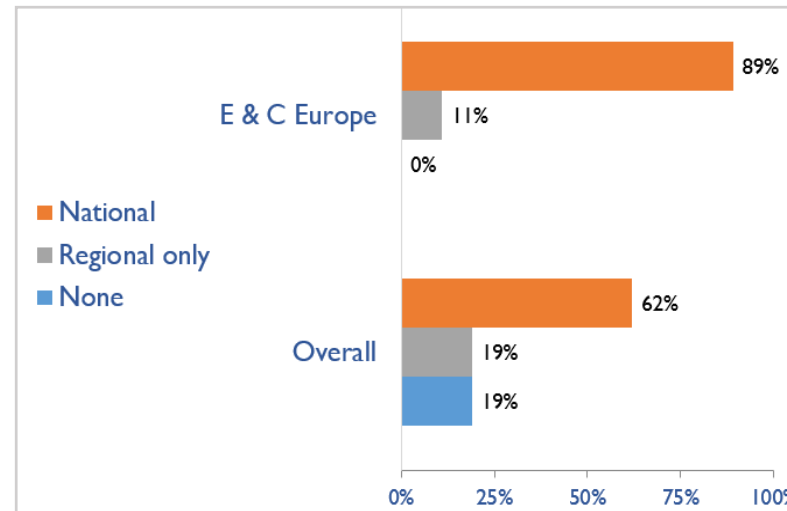
' - ' : data not reported/unavailable

# Capacity for Kidney Transplantation (cont'd)

### Transplant donor type



### Transplant waitlist

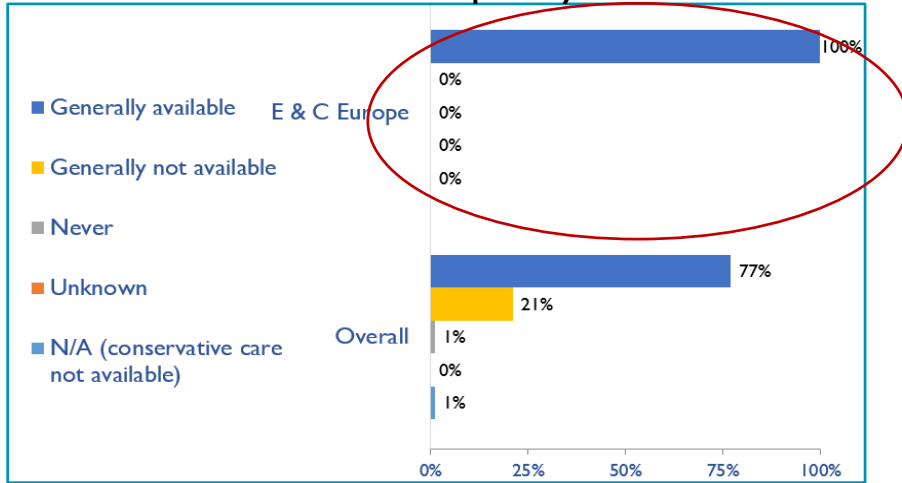


Country	Donor type		Transplant waitlist		
	Live donors only	Combination	National	Regional only	None
Albania	X		X		
Bosnia and Herzegovina		X		X	
Bulgaria		X	X		
Croatia		X	X		
Cyprus		X	X		
Czech Republic		X	X		
Estonia		X	X		
Hungary		X	X		
Kosovo					
Latvia		X	X		
Lithuania		X	X		
Macedonia, FYR	X		X		
Moldova		X	X		
Poland		X	X		
Romania		X		X	
Serbia		X	X		
Slovak Republic		X	X		
Slovenia		X	X		
Turkey		X	X		

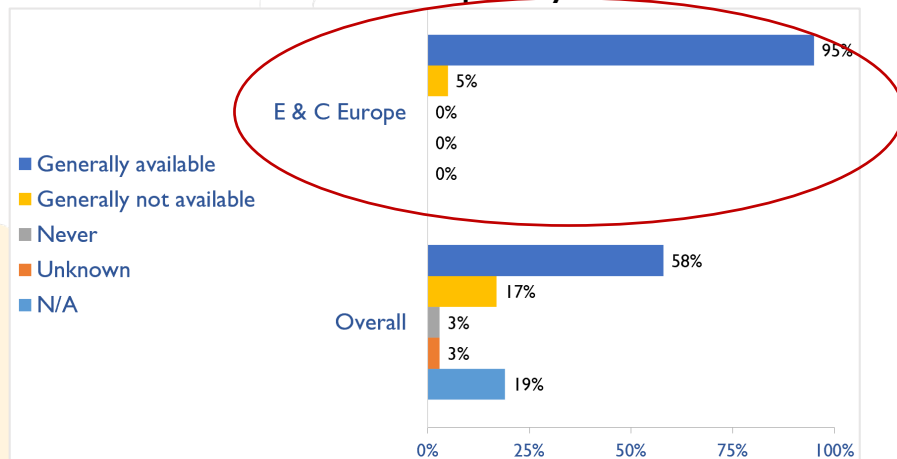
X : Yes

# Availability of services within dialysis care

## HD frequency



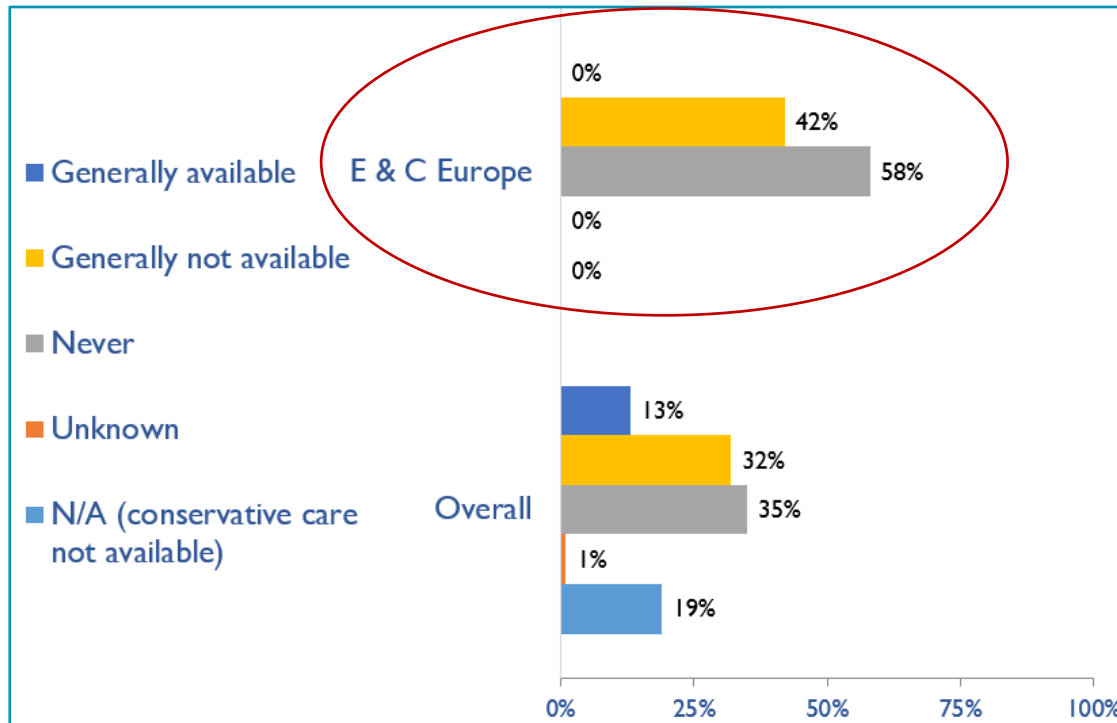
## PD frequency



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)
Albania	X					X				
Bosnia and Herzegovina	X					X				
Bulgaria	X					X				
Croatia	X					X				
Cyprus	X					X				
Czech Republic	X					X				
Estonia	X					X				
Hungary	X					X				
Kosovo	X					X				
Latvia	X					X				
Lithuania	X					X				
Macedonia, FYR	X					X				
Moldova	X						X			
Poland	X					X				
Romania	X					X				
Serbia	X					X				
Slovak Republic	X					X				
Slovenia	X					X				
Turkey	X					X				

X : Yes

# Availability of Home hemodialysis

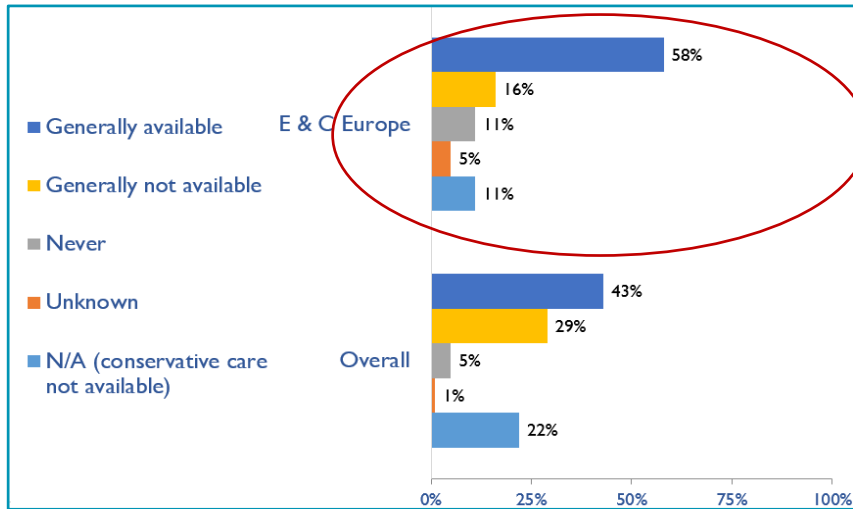


Country	Availability of Home hemodialysis				
	Generally available	Generally not available	Never	Unknown	N/A (dialysis not provided)
Albania			X		
Bosnia and Herzegovina			X		
Bulgaria			X		
Croatia		X			
Cyprus			X		
Czech Republic		X			
Estonia			X		
Hungary			X		
Kosovo		X			
Latvia			X		
Lithuania			X		
Macedonia, FYR		X			
Moldova			X		
Poland		X			
Romania			X		
Serbia		X			
Slovak Republic		X			
Slovenia			X		
Turkey		X			

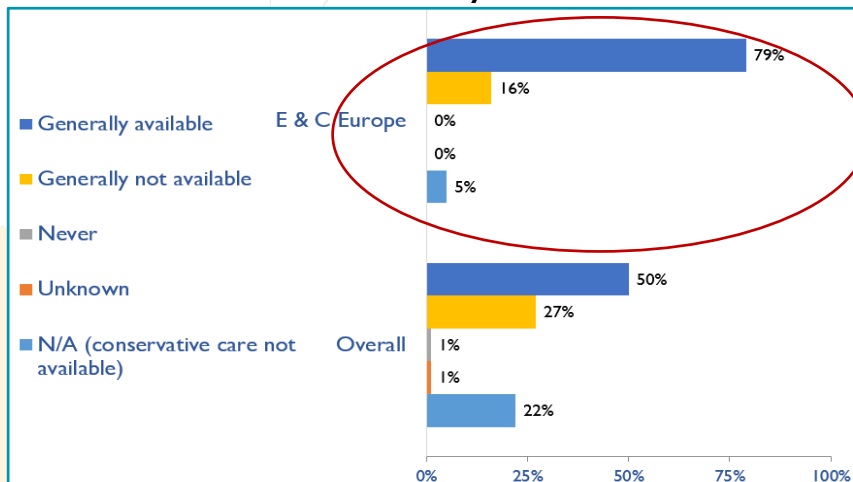
X : Yes

# Capacity for conservative kidney management (CKM)

## Choice-restricted CKM



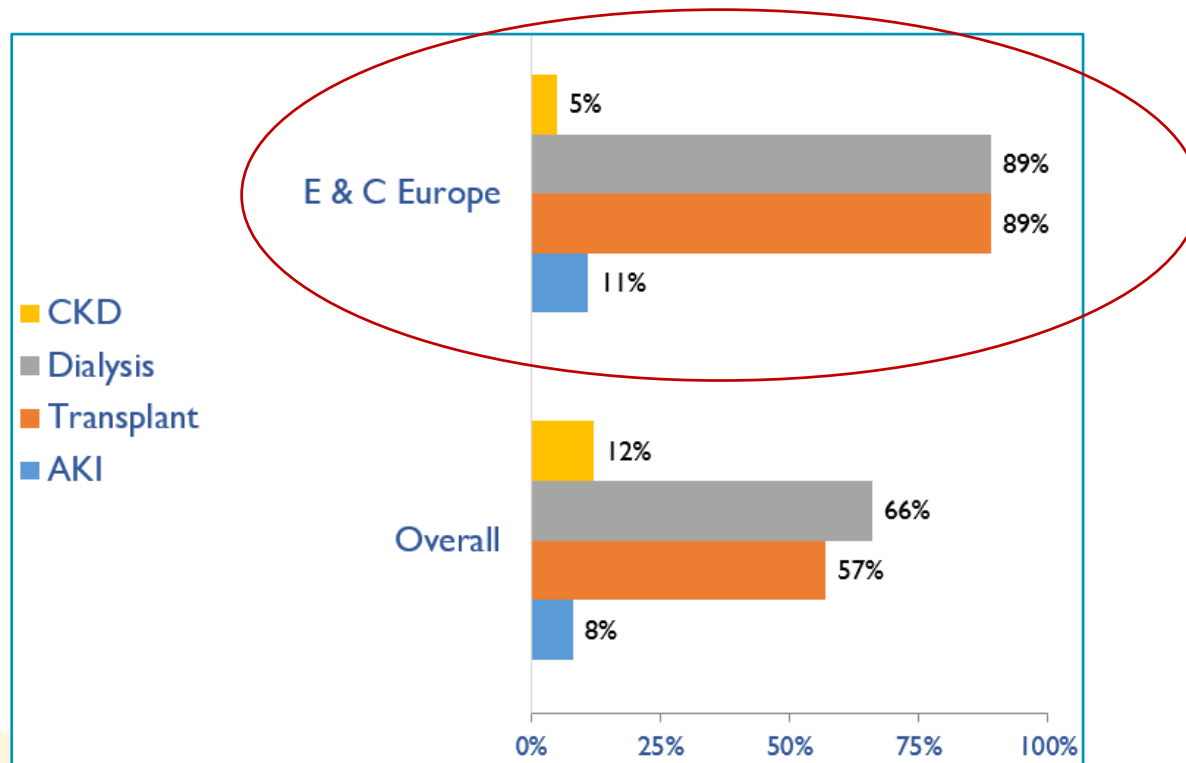
## Chosen or medically advised CKM



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)
Albania	X					X				
Bosnia and Herzegovina	X					X				
Bulgaria	X					X				
Croatia			X			X				
Cyprus					X	X				
Czech Republic	X					X				
Estonia	X					X				
Hungary	X					X				
Kosovo	X					X				
Latvia		X					X			
Lithuania					X					X
Macedonia, FYR	X						X			
Moldova				X		X				
Poland	X					X				
Romania		X				X				
Serbia	X					X				
Slovak Republic			X			X				
Slovenia	X					X				
Turkey		X					X			

X : Yes

# Availability of official registry



Country	CKD	Dialysis	Transplant	AKI
Albania		X	X	
Bosnia and Herzegovina		X	X	
Bulgaria		X	X	
Croatia		X	X	
Cyprus		X	X	
Czech Republic		X	X	
Estonia		X	X	
Hungary		X	X	
Kosovo				
Latvia		X	X	
Lithuania		X	X	
Macedonia, FYR		X	X	
Moldova		X	X	X
Poland		X	X	
Romania		X		
Serbia		X	X	
Slovak Republic	X		X	
Slovenia		X	X	X
Turkey		X	X	

X : Yes

# Summary of 2019 GKHA findings

- KRT availability, access, and quality is high in the region
- Conservative kidney management is available; delivered as chosen or medically-advised in more than half of countries
- Government funding for kidney care is high
- Many registries for advanced kidney disease, few for CKD and AKI
- High nephrologist/trainee density; however many workforce limitations noted, including nephrologists
- Moderate advocacy for kidney disease in Eastern and Central Europe

# 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](http://www.theisn.org/global-atlas)