DOPPS

DIALYSIS OUTCOMES AND PRACTICE PATTERNS STUDY

GCC-DOPPS UPDATE

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DOPPS

Goals of DOPPS: An international longitudinal observational study

1. *Describe variation in HD practice* and monitor trends by following nationally representative samples of dialysis facilities

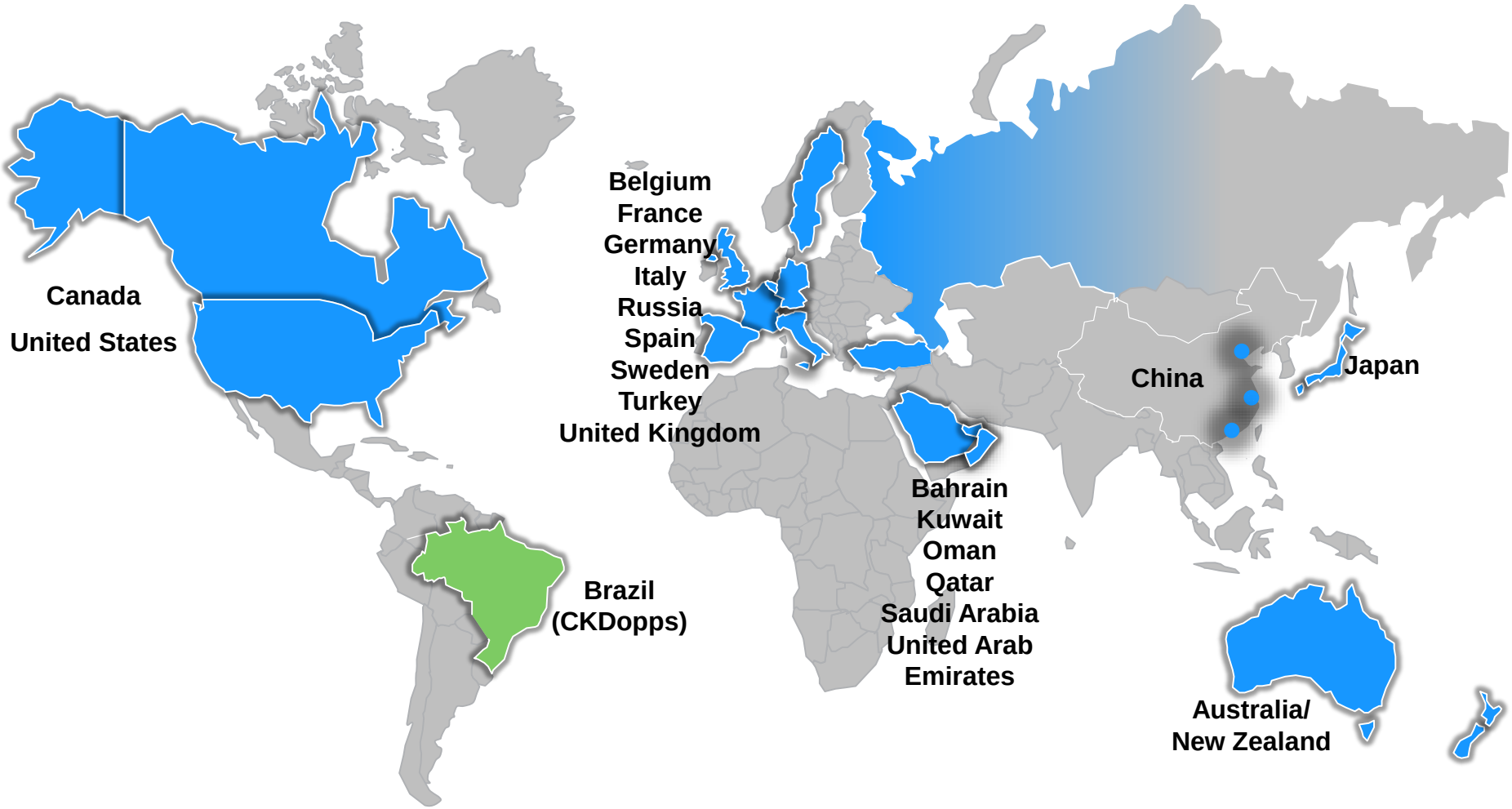
2. *Identify best practices* by analysing variations in practice and outcomes

3. *Translate* (communicate) key findings to improve clinical care, HD patient outcomes, and patient quality of life

DOPPS

***DOPPS has been ongoing since 1996**

The DOPPS Program Worldwide



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In China, the DOPPS is conducted in Beijing, Guangzhou, and Shanghai

ARBOR RESEARCH
COLLABORATIVE FOR HEALTH

GCC-DOPPS Study Sites

DOPPS in the Gulf Cooperation Council Countries

Country (N study sites)

- Saudi Arabia (20)
- United Arab Emirates (9)
- Kuwait (4)
- Oman (4)
- Qatar (2)
- Bahrain (1)

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GCC-DOPPS Investigators

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  - Dr. Mohamed Hassan
  - Dr. Abdul Kareem Saleh

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Acknowledgements, 2016

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Country/Project-Specific Support:

ERA-EDTA, Vifor Fresenius Renal Pharma, Keryx, Amgen, AstraZeneca, Relypsa, Roche, Proteon, Janssen, Hexal, Japanese Society for PD, Societies of Nephrology in Germany, Italy & Spain

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- GCC-DOPPS is specifically funded by Amgen

All support for the DOPPS program is provided without restrictions on publications

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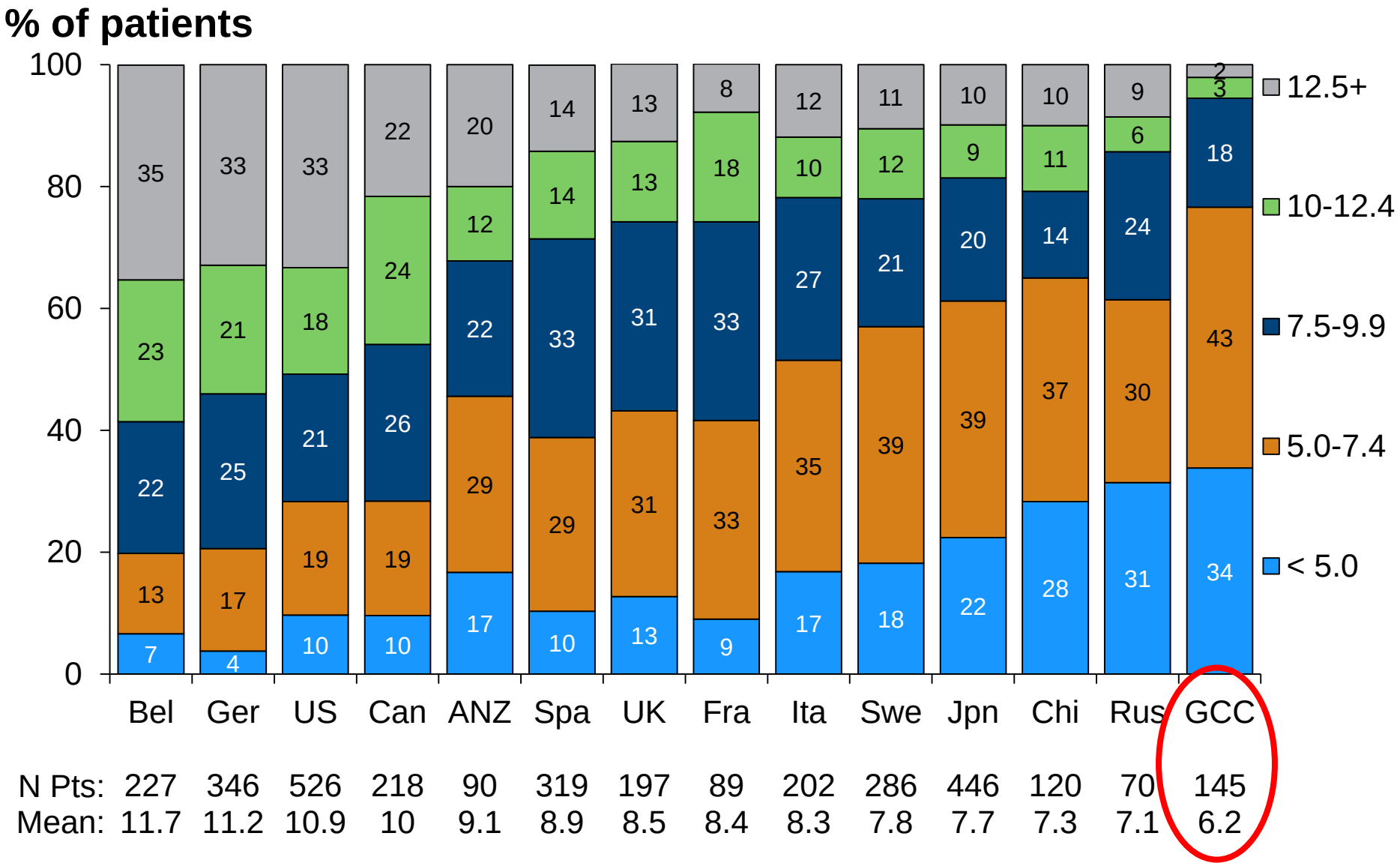
20 YEARS ARBOR RESEARCH COLLABORATIVE FOR HEALTH

DEMOGRAPHICS

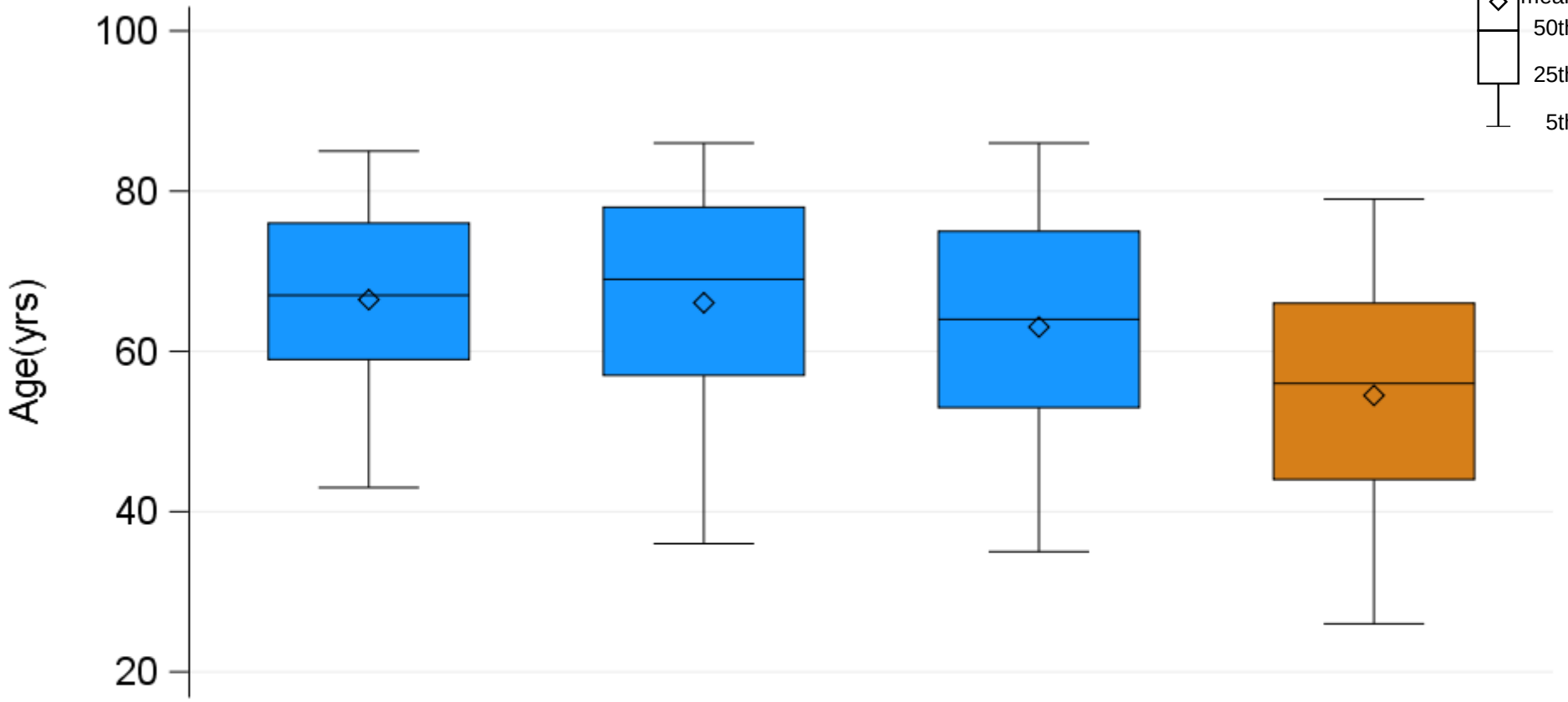
eGFR at dialysis initiation (DOPPS)*



DOPPS * 2009-2014

Adapted from Bieber et al. ASN abstract (2013)

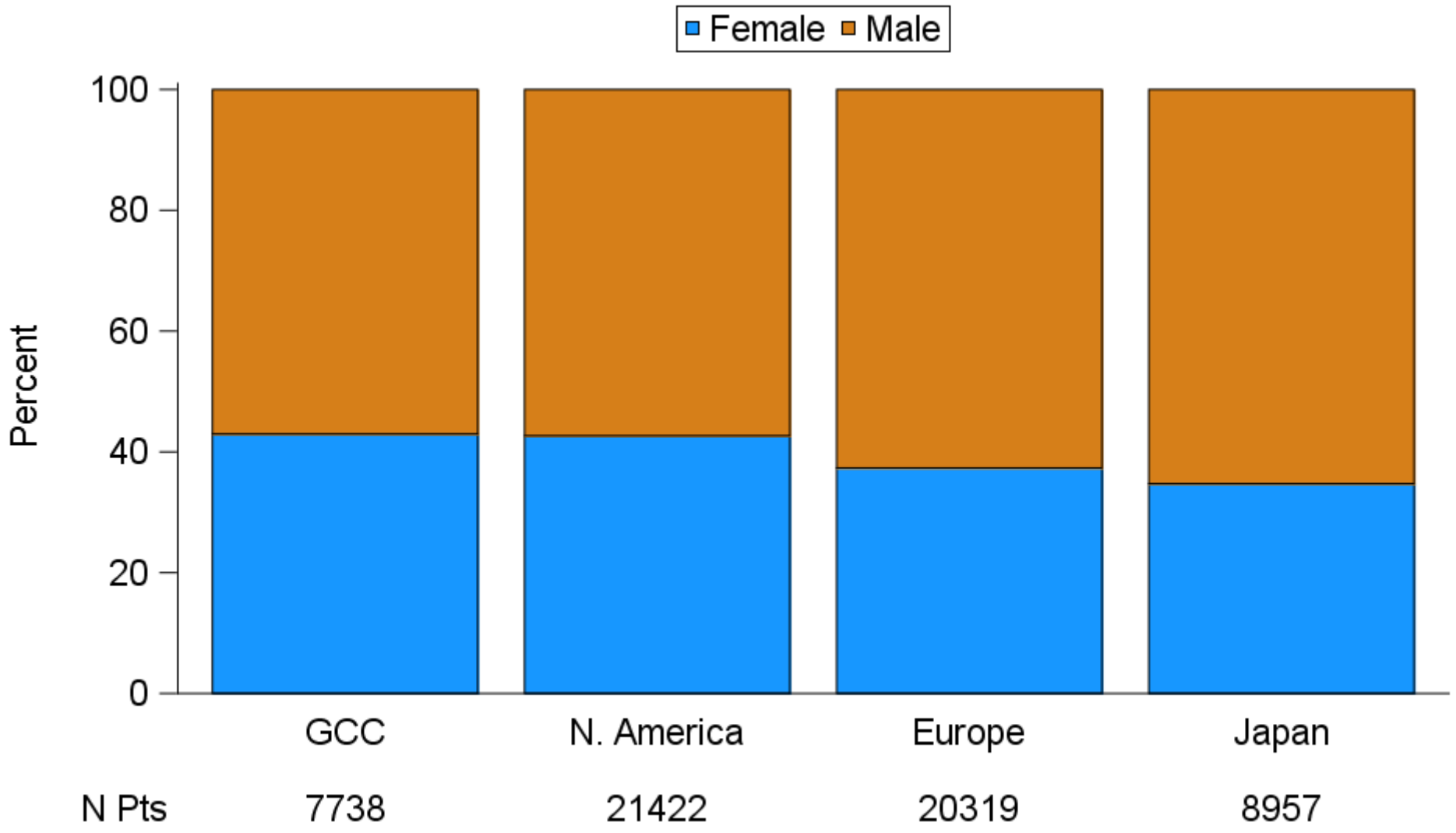
Age, by Region (census)



	Japan	Europe	N. America	GCC
N	8,963	20,335	21,412	7,748
Mean	66.5	66.1	63.0	54.5
Std Dev	12.9	15.3	15.2	15.8
Median	67.0	69.0	64.0	56.0

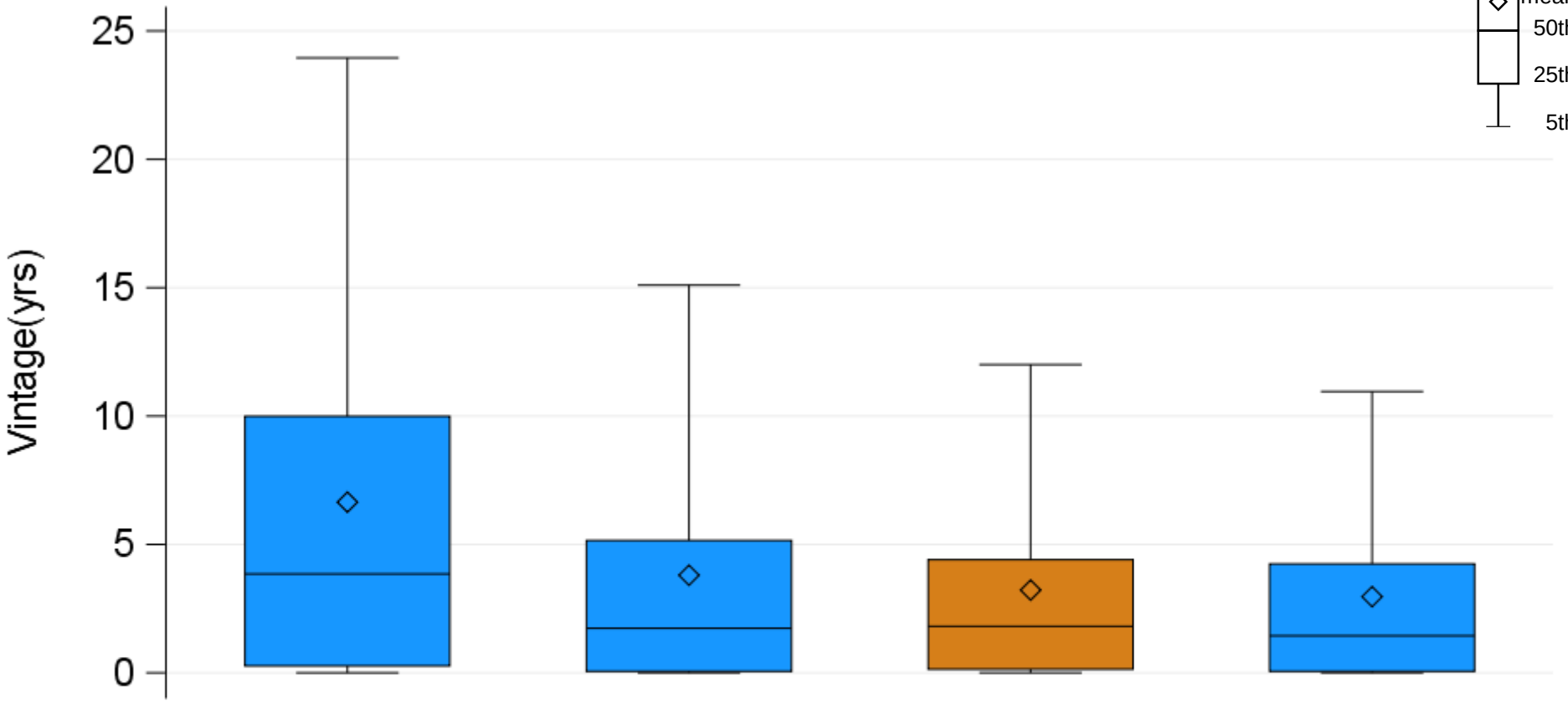
DOPPS 5 (2012,2013)

Gender, by Region (census)



DOPPS 5 (2012,2013)

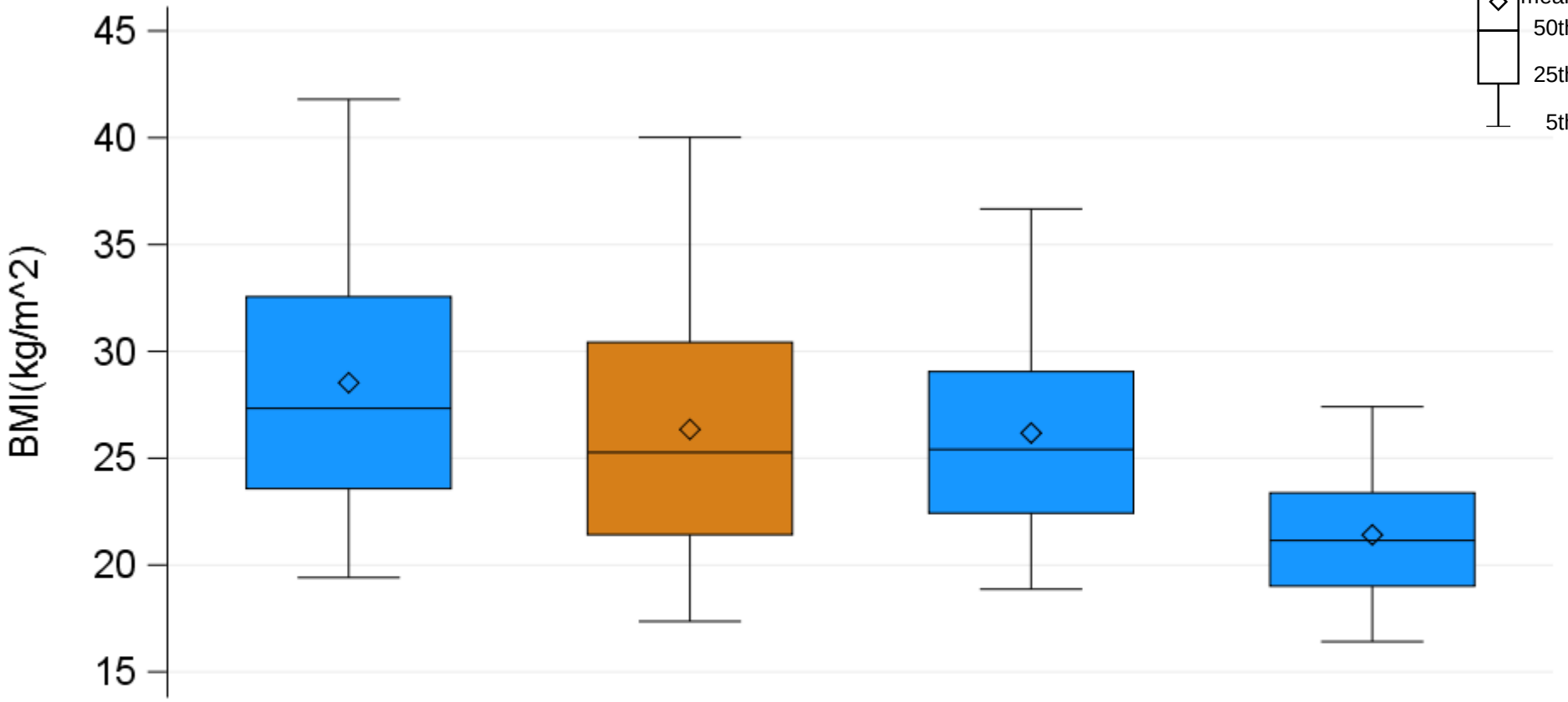
Vintage, by Region (census)



	Japan	Europe	GCC	N. America
N	8,912	20,176	7,709	20,973
Mean	6.7	3.8	3.2	3.0
Std Dev	8.0	5.6	4.3	4.2
Median	3.9	1.7	1.8	1.4

DOPPS 5 (2012,2013)

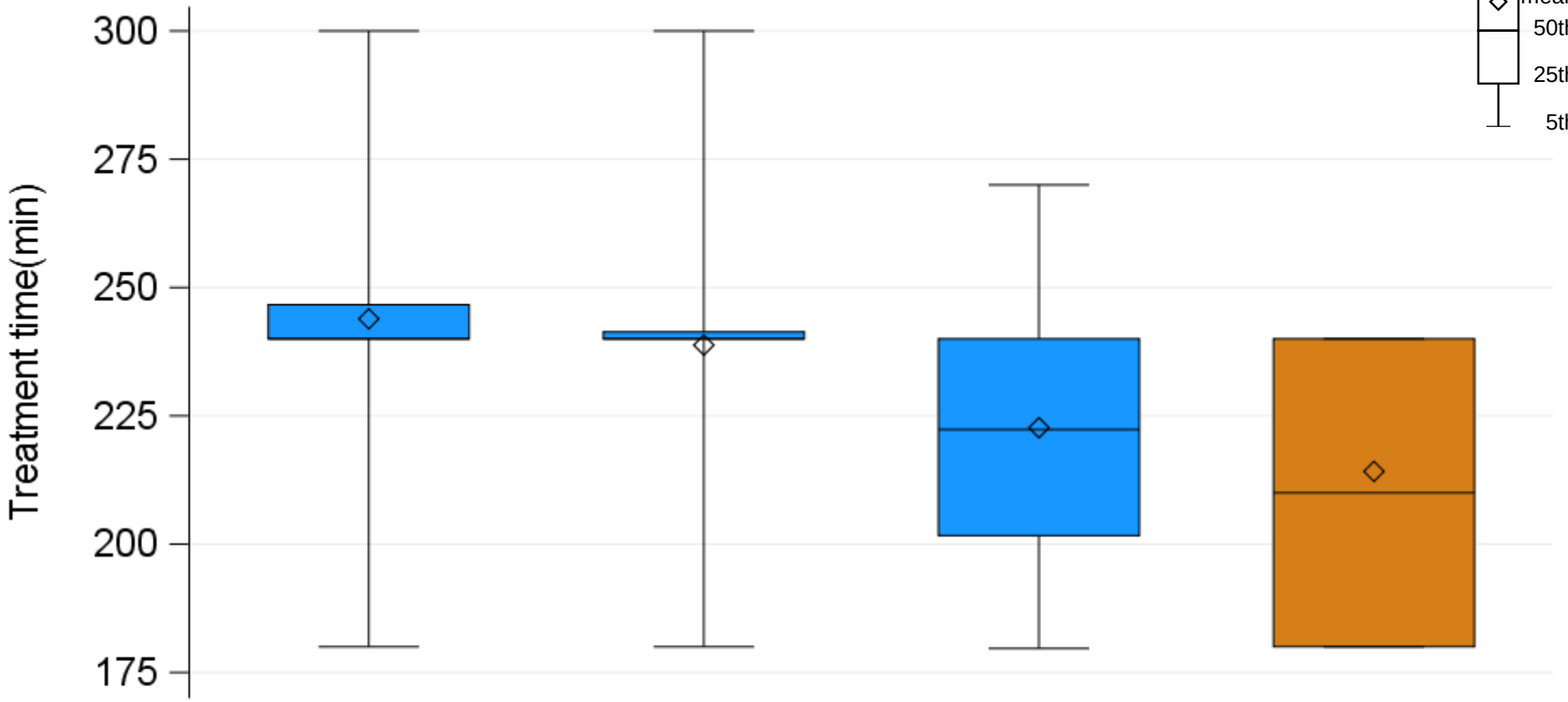
Body Mass Index, by Region



	N. America	GCC	Europe	Japan
N	3,515	748	2,956	1,471
Mean	28.5	26.4	26.2	21.4
Std Dev	10.4	15.2	9.5	6.4
Median	27.3	25.3	25.4	21.2

DOPPS 5 (2012,2013)

Treatment time, by Region

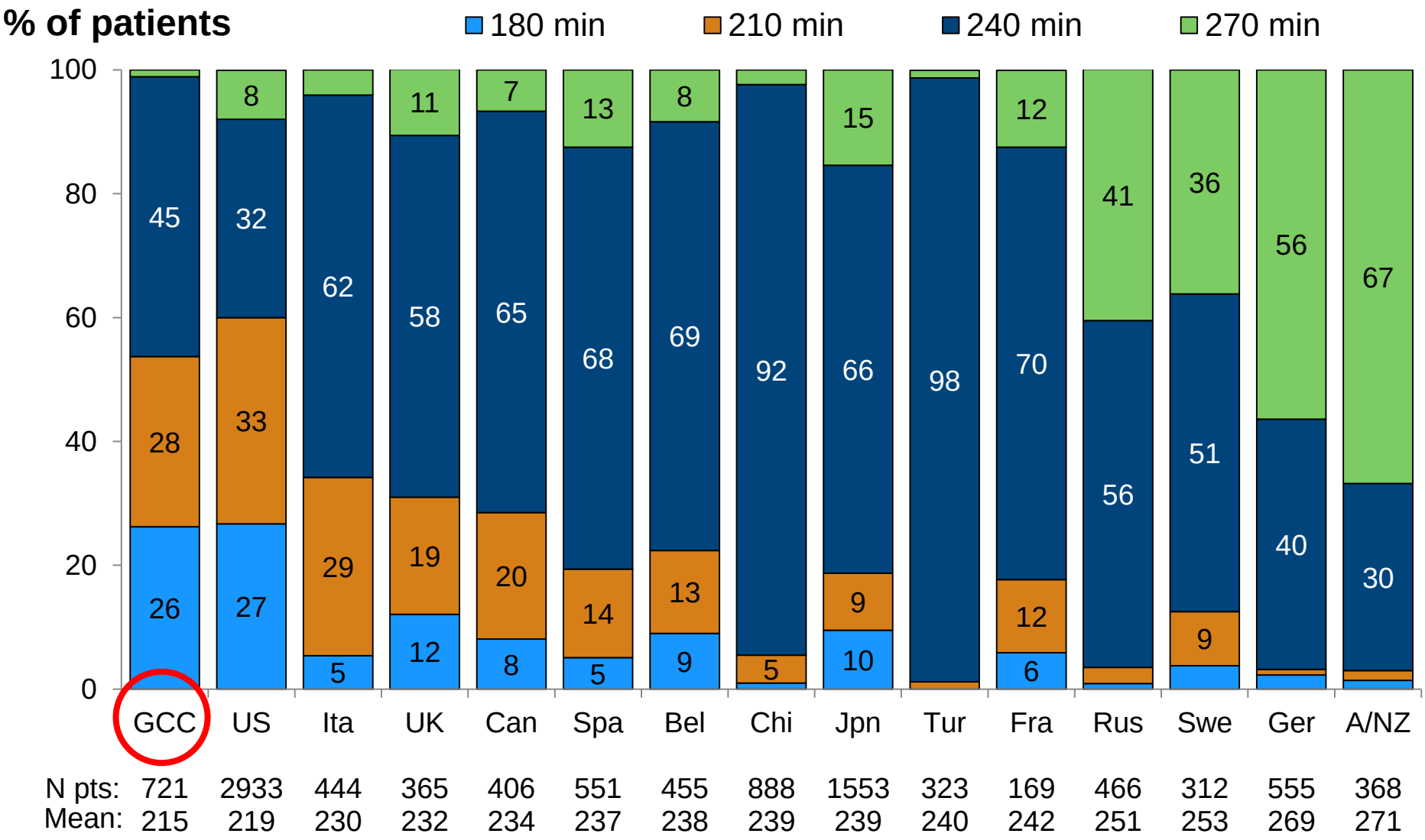


	Europe	Japan	N. America	GCC
N	3,087	1,578	3,511	812
Mean	244	239	223	214
Std Dev	69	49	60	59
Median	240	240	222	210

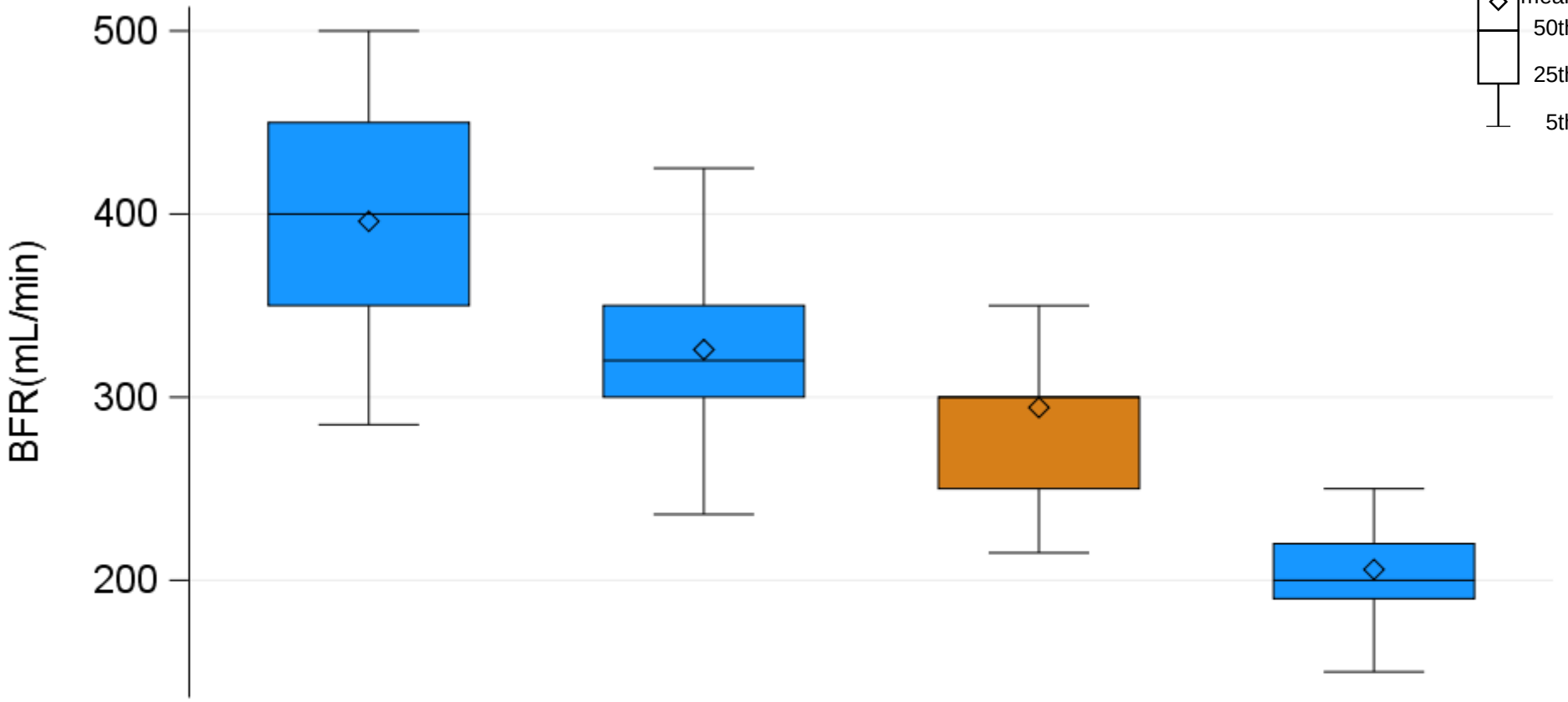
DOPPS 5 (2012,2013)

Treatment time, by country

DOPPS 5 (2012-2015)



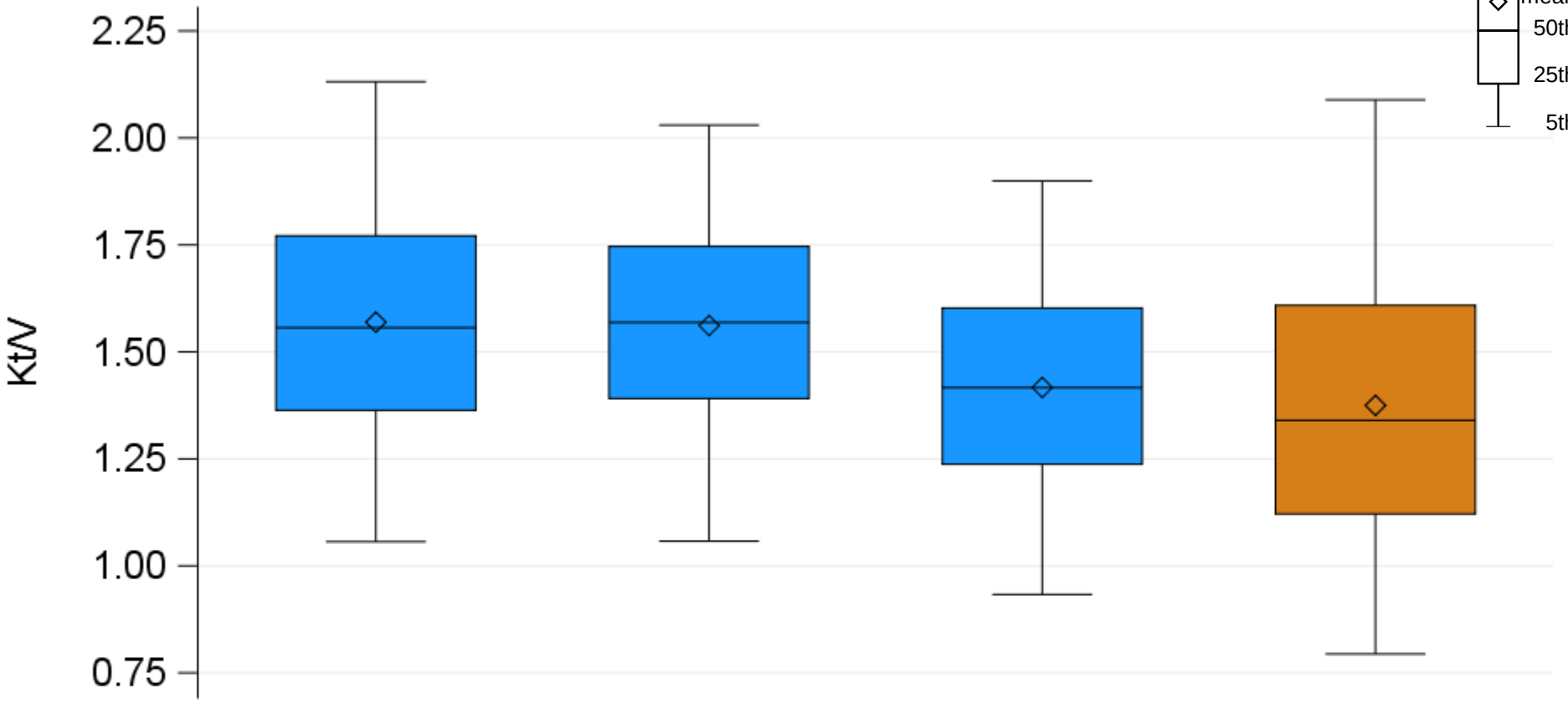
Blood Flow Rate, by Region



	N. America	Europe	GCC	Japan
N	2,052	2,998	836	1,561
Mean	396	326	294	206
Std Dev	126	102	130	59
Median	400	320	300	200

DOPPS 5 (2012,2013)

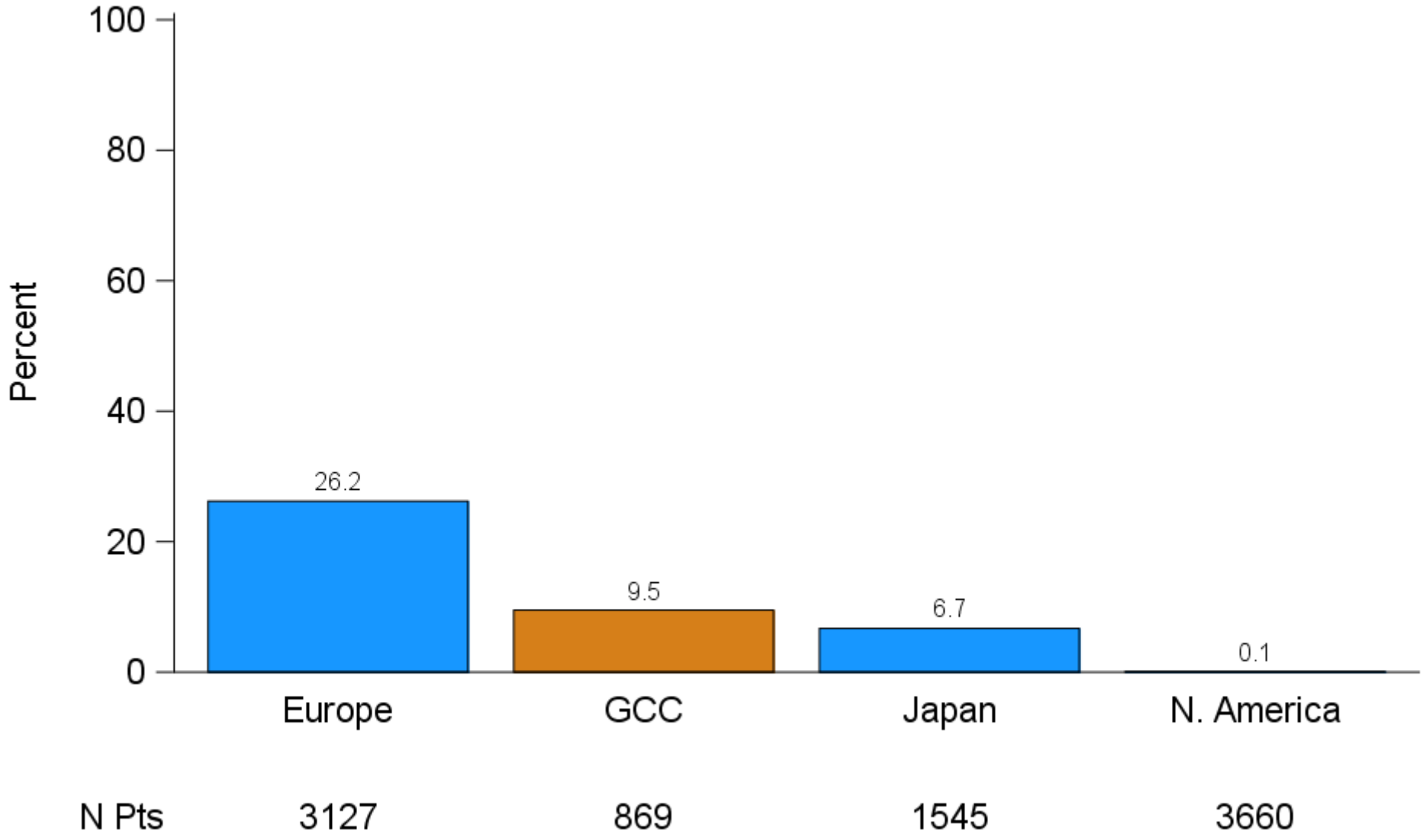
Kt/V, by Region



	Europe	N. America	Japan	GCC
N	2,307	3,015	1,405	527
Mean	1.57	1.56	1.42	1.37
Std Dev	0.56	0.43	0.52	0.83
Median	1.56	1.57	1.42	1.34

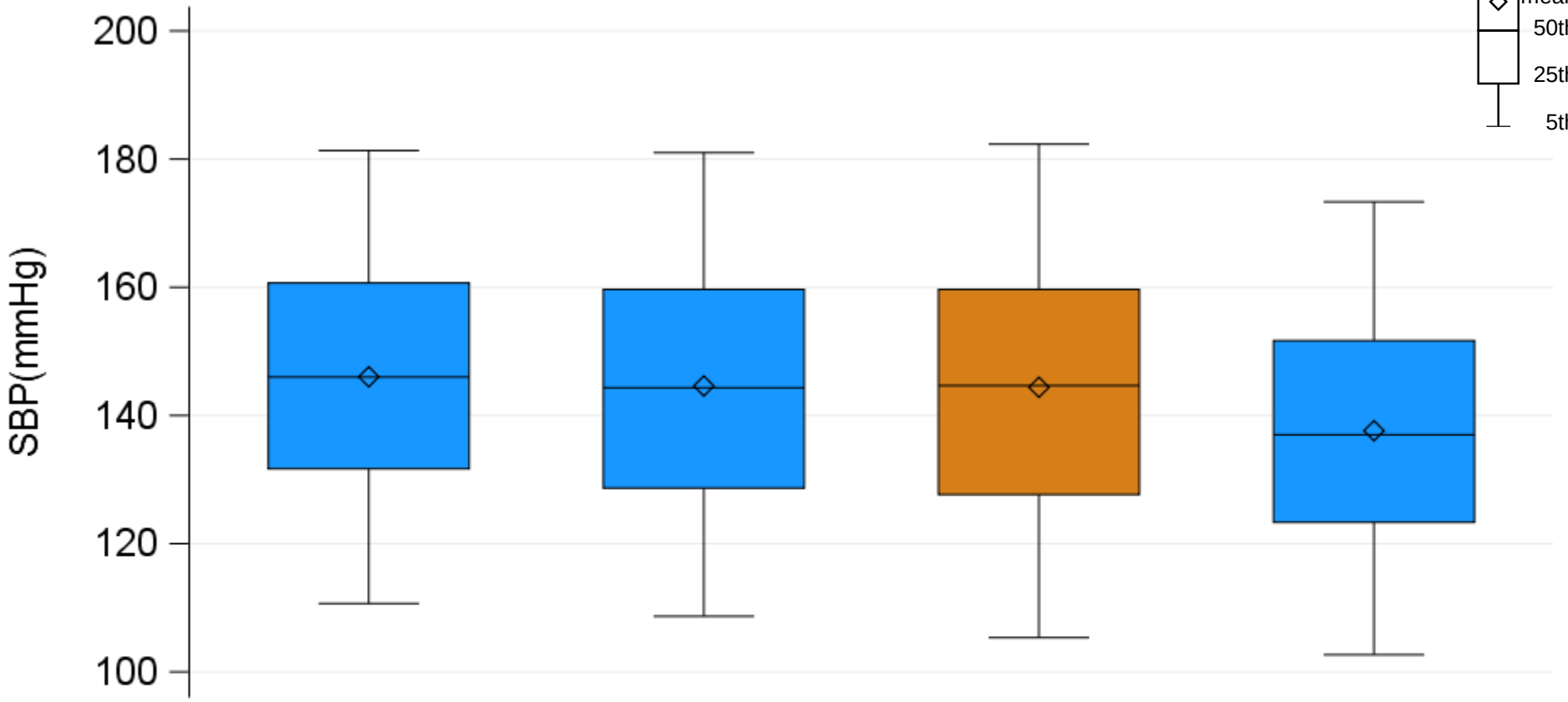
DOPPS 5 (2012,2013)

HDF, by Region



DOPPS 5 (2012,2013)

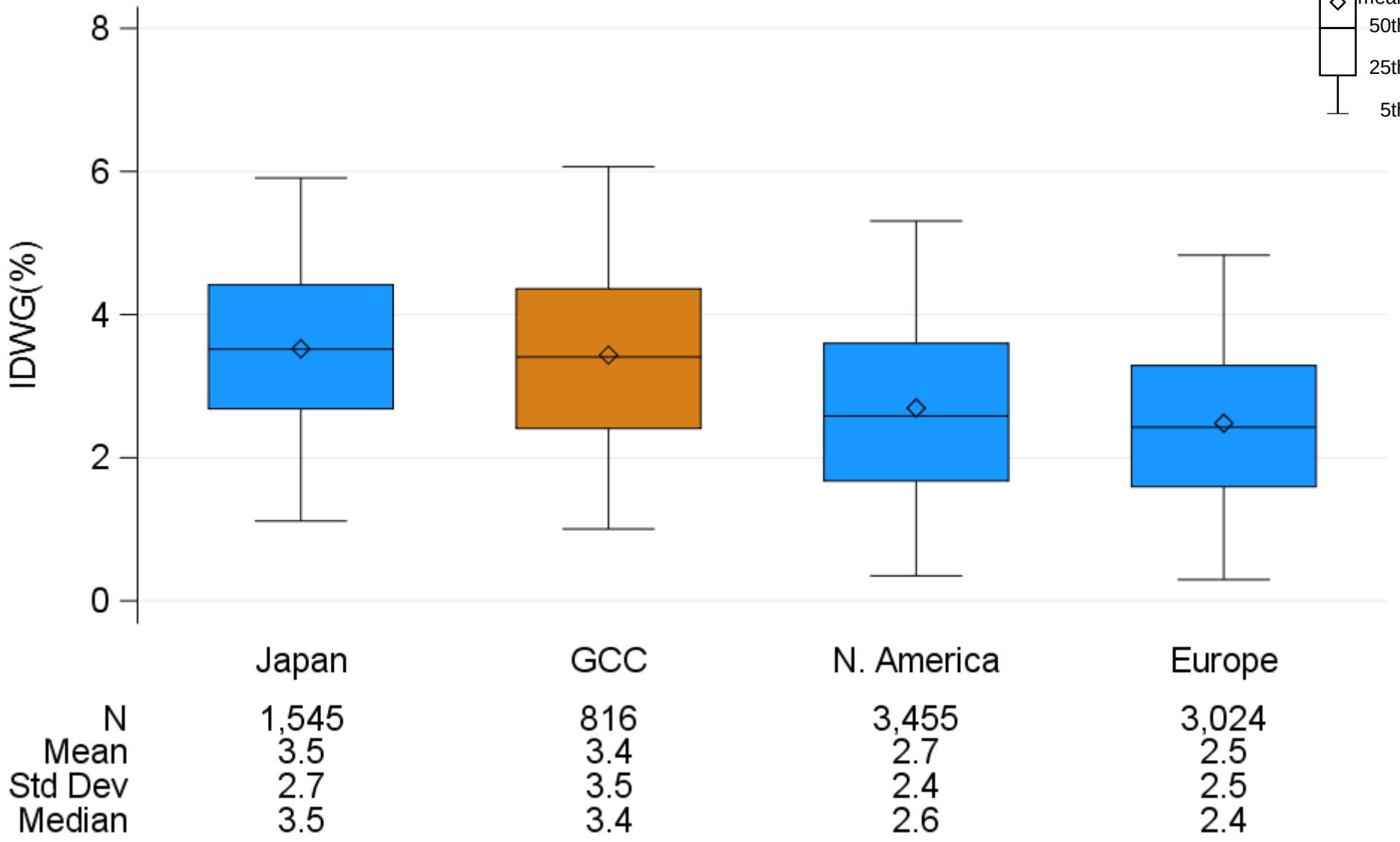
Systolic blood pressure, by Region



	Japan	N. America	GCC	Europe
N	1,565	3,526	842	3,091
Mean	146	145	144	138
Std Dev	40	35	52	37
Median	146	144	145	137

DOPPS 5 (2012,2013)

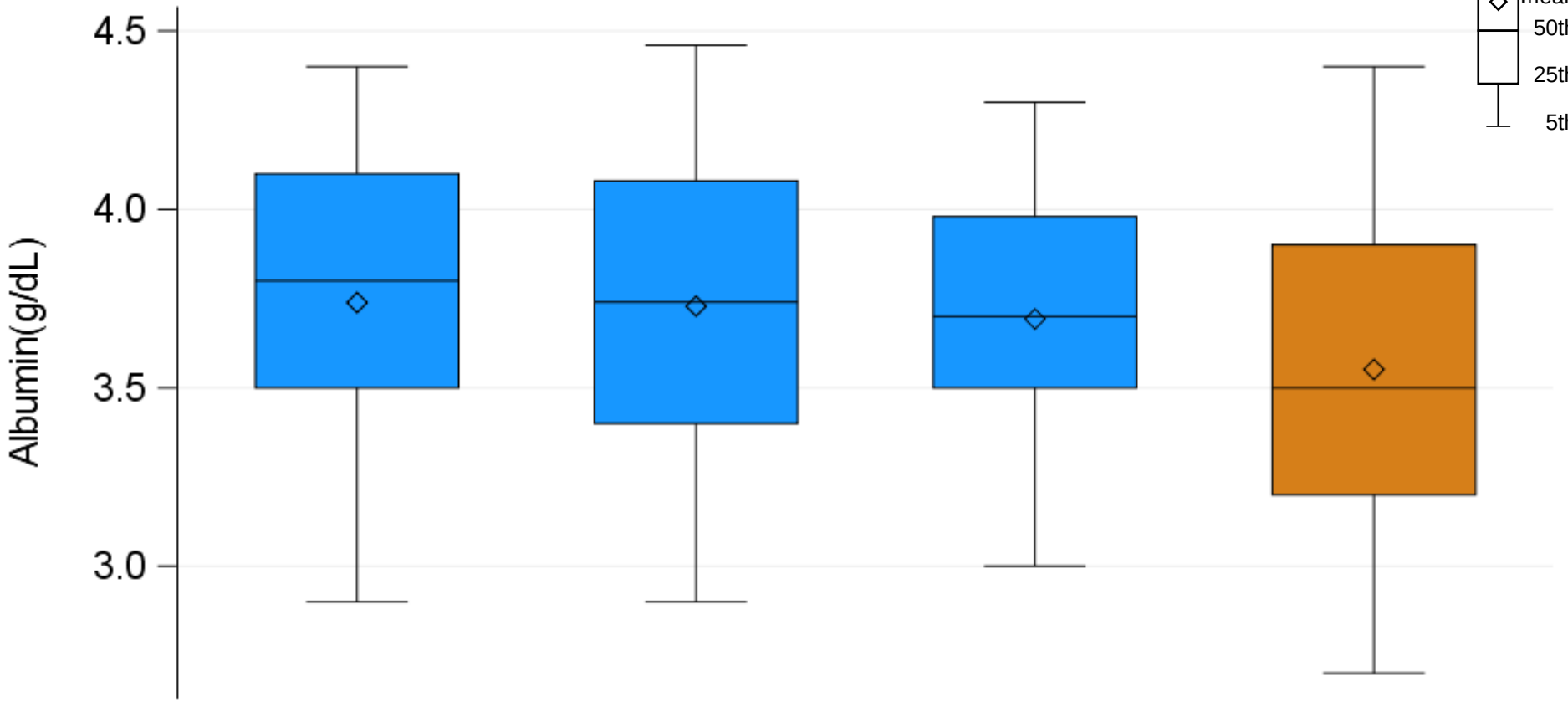
Inter-dialytic weight gain, by Region



	Japan	GCC	N. America	Europe
N	1,545	816	3,455	3,024
Mean	3.5	3.4	2.7	2.5
Std Dev	2.7	3.5	2.4	2.5
Median	3.5	3.4	2.6	2.4

DOPPS 5 (2012,2013)

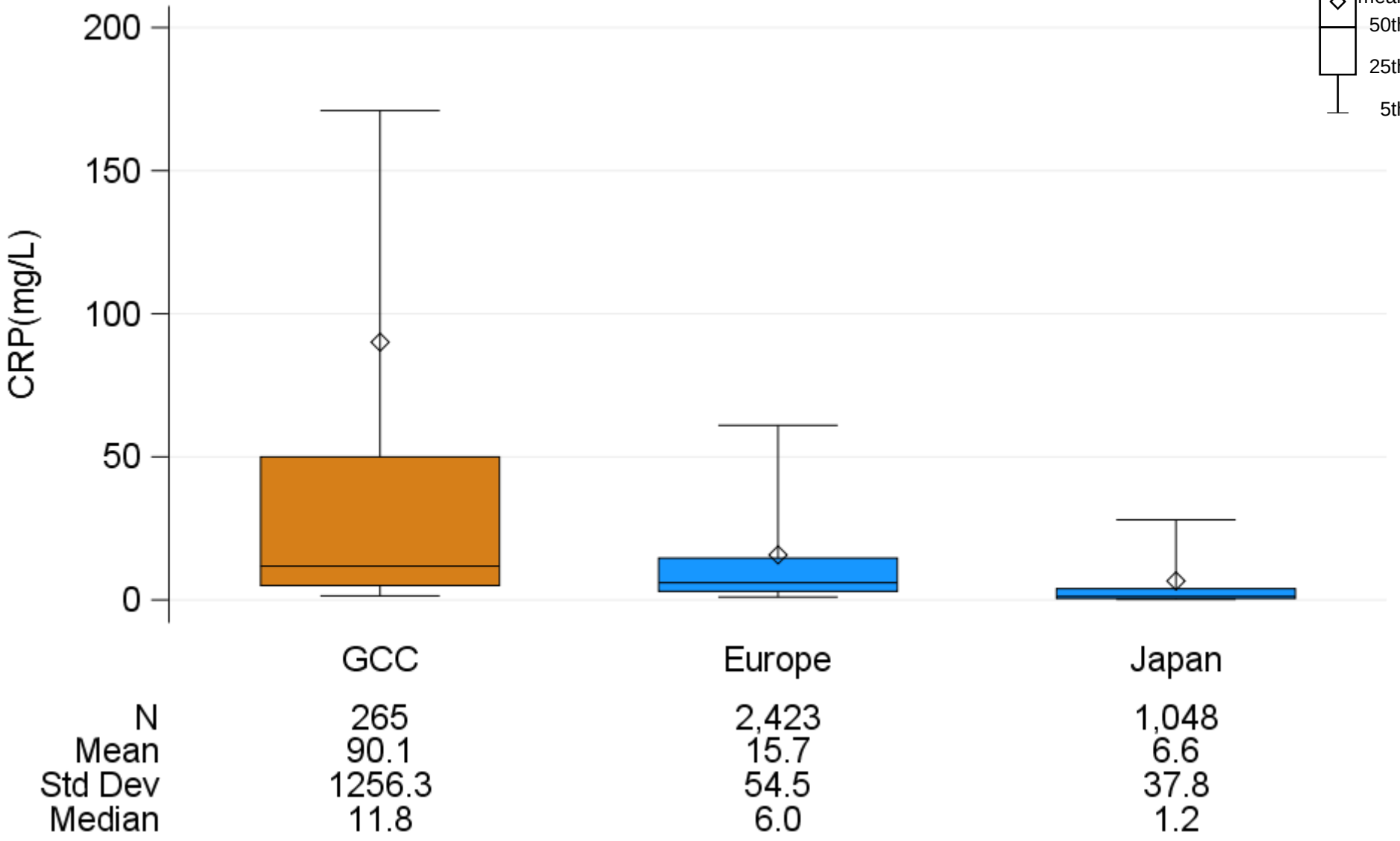
Albumin, by Region



	N. America	Europe	Japan	GCC
N	3,299	2,794	1,546	831
Mean	3.7	3.7	3.7	3.6
Std Dev	0.7	0.9	0.7	1.2
Median	3.8	3.7	3.7	3.5

DOPPS 5 (2012,2013)

CRP, by Region



DOPPS 5 (2012,2013)

Patient Characteristics, GCC

variable	Bahrain	Kuwait	Oman	Qatar	Saudi_Arabia	UAE
Pts. Number	28	116	64	58	393	219
Female	46.4%	46.1%	49.4%	38.6%	42.4%	39.8%
Male	53.6%	53.9%	50.6%	61.4%	57.6%	60.2%
Vintage	2.84(6.91)	2.67(6.09)	4.87(17.23)	3.31(7.59)	4.70(10.56)	3.99(10.8)
BMI	28.0(25.2)	28.9(17.9)	23.7(18.8)	26.7(16.0)	25.5(13.6)	26.4(13.3)
<3x/week		2.0%	18.0%	1.3%	3.7%	21.1%
3x/week		98.0%	80.8%	91.8%	94.9%	78.7%
>3x/week			1.2%	6.9%	1.4%	0.1%
Rx Time	214(89)	219(54)	213(44)	230(41)	199(57)	226(42)
BFR	302(172)	288(70)	267(100)	290(69)	303(145)	283(98)

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DIALYSIS OUTCOMES AND PRACTICE PATTERNS STUDY

Missed Hemodialysis (HD) Treatments:

International Variation, Predictors and Outcomes in the DOPPS

Issa Al Salmi, Maria Larkina, Lalita Subramanian, Hal Morgenstern, Stefan Jacobson, Raymond Hakim, Francesca Tentori, Rajiv Saran, Takashi Akiba, Natalia A. Tomilina, Friedrich Port, Bruce Robinson, and Ronald Pisoni

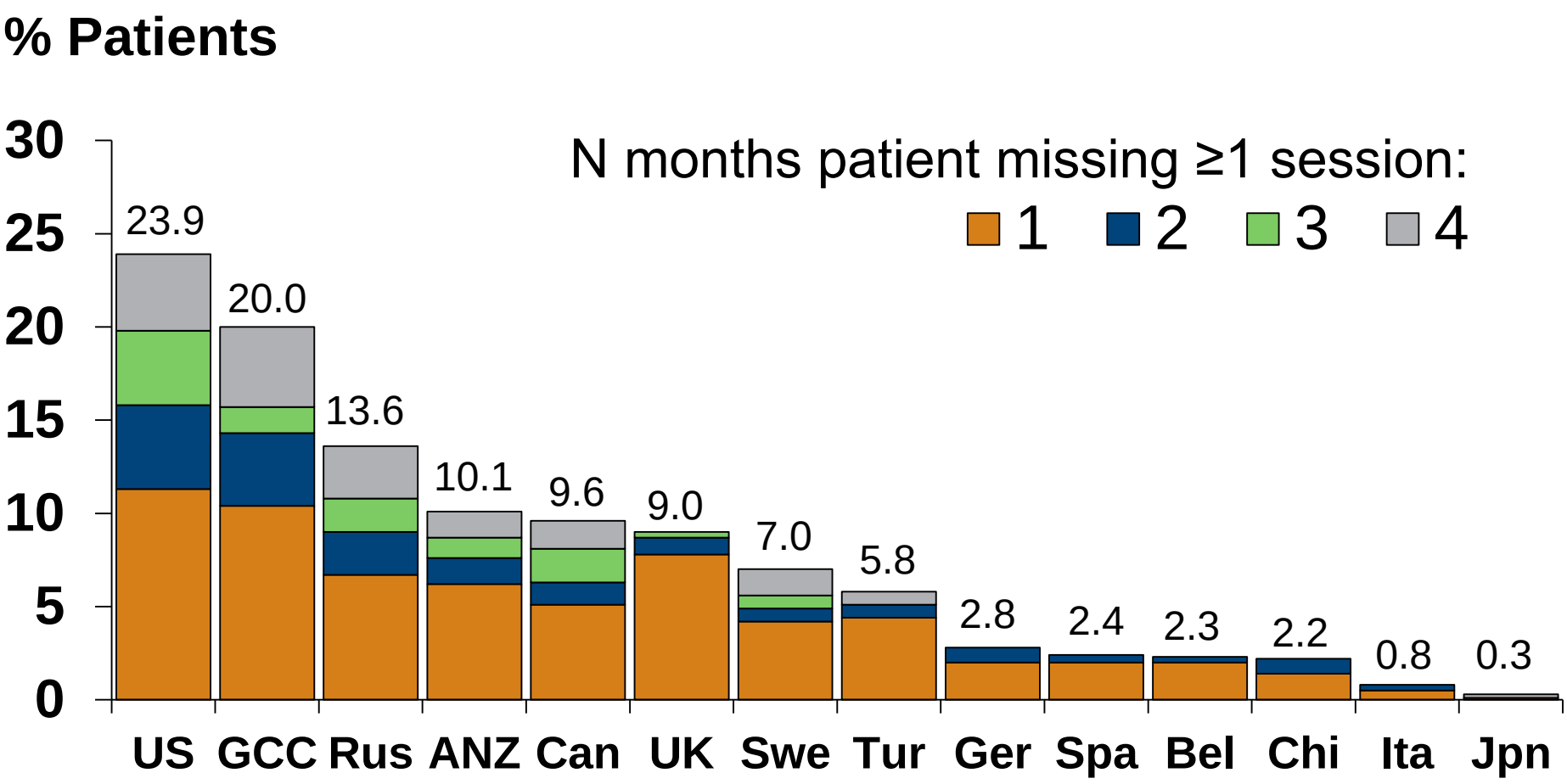
Under Review at *Kidney International*

Study Sample

- **Survey question:** How many dialysis treatments did the patient miss? (Do not count time in the hospital as missed)
  - Response categories: 0, 1, 2-3, and ≥4 missed treatments per month
- **Studied measure:** patients missed any of their scheduled HD treatment sessions in the 4-month period immediately prior to DOPPS 5 (2012-2015) study enrollment
- **Inclusions:** dialysis for ≥120 days, dialyzing 3 times per week, with 4 months of attendance information
- **Focus:** countries where >5% of patients missed at least one HD treatment session during the 4-month period: US, GCC, Russia, Australia-New Zealand, Canada, UK, Sweden, Turkey

Al Salmi, 2016, Under Review

Number of months patients missed ≥1 session* during 4 month period



*Not counting missed sessions due to hospitalization

DOPPS 5(2012-14) n=8,501, vintage >120 days, dialyzing 3x/wk with 4 months of attendance information

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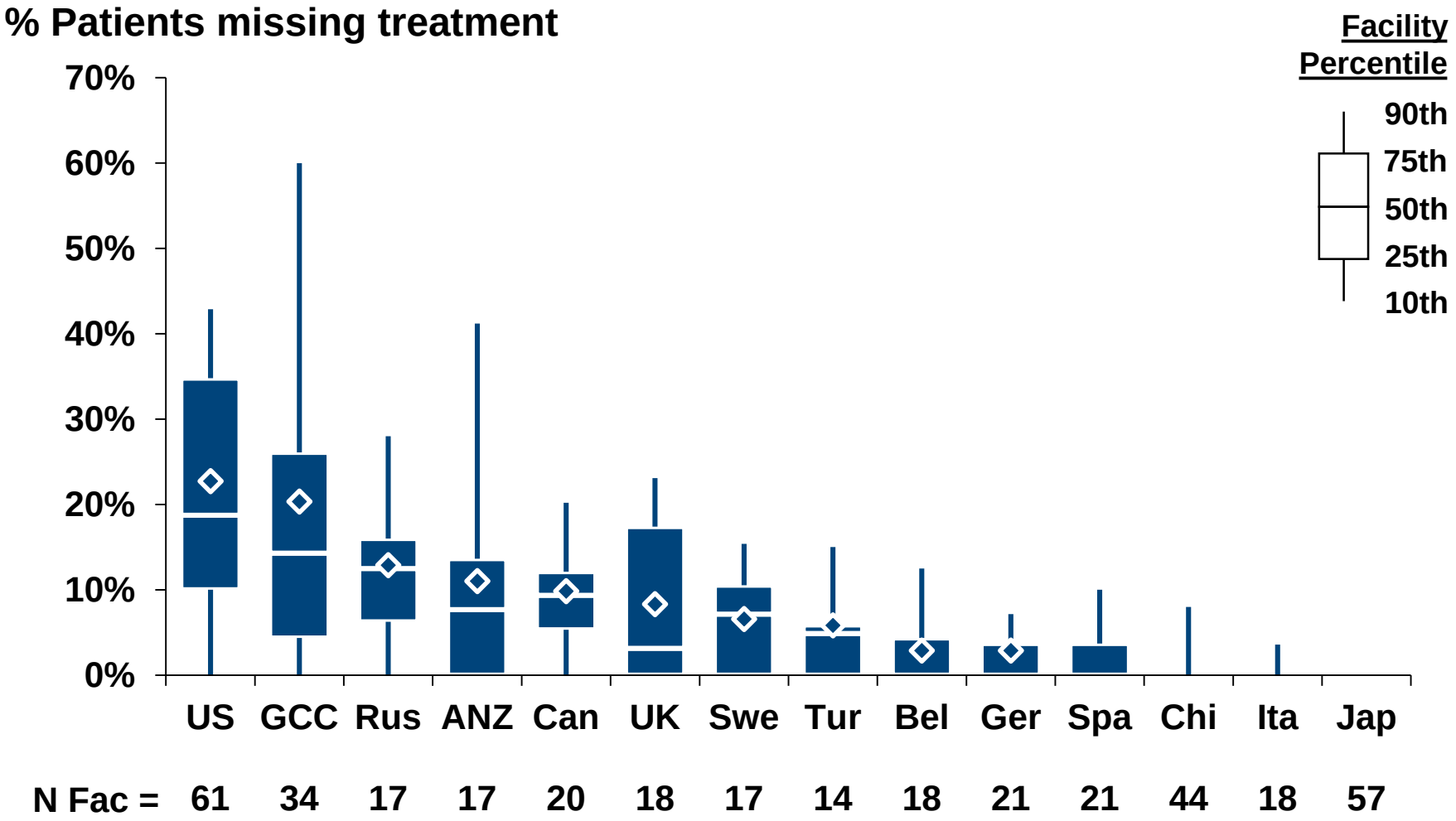
Al Salmi, 2016, Under Review

Missed HD Treatment Distribution by Country

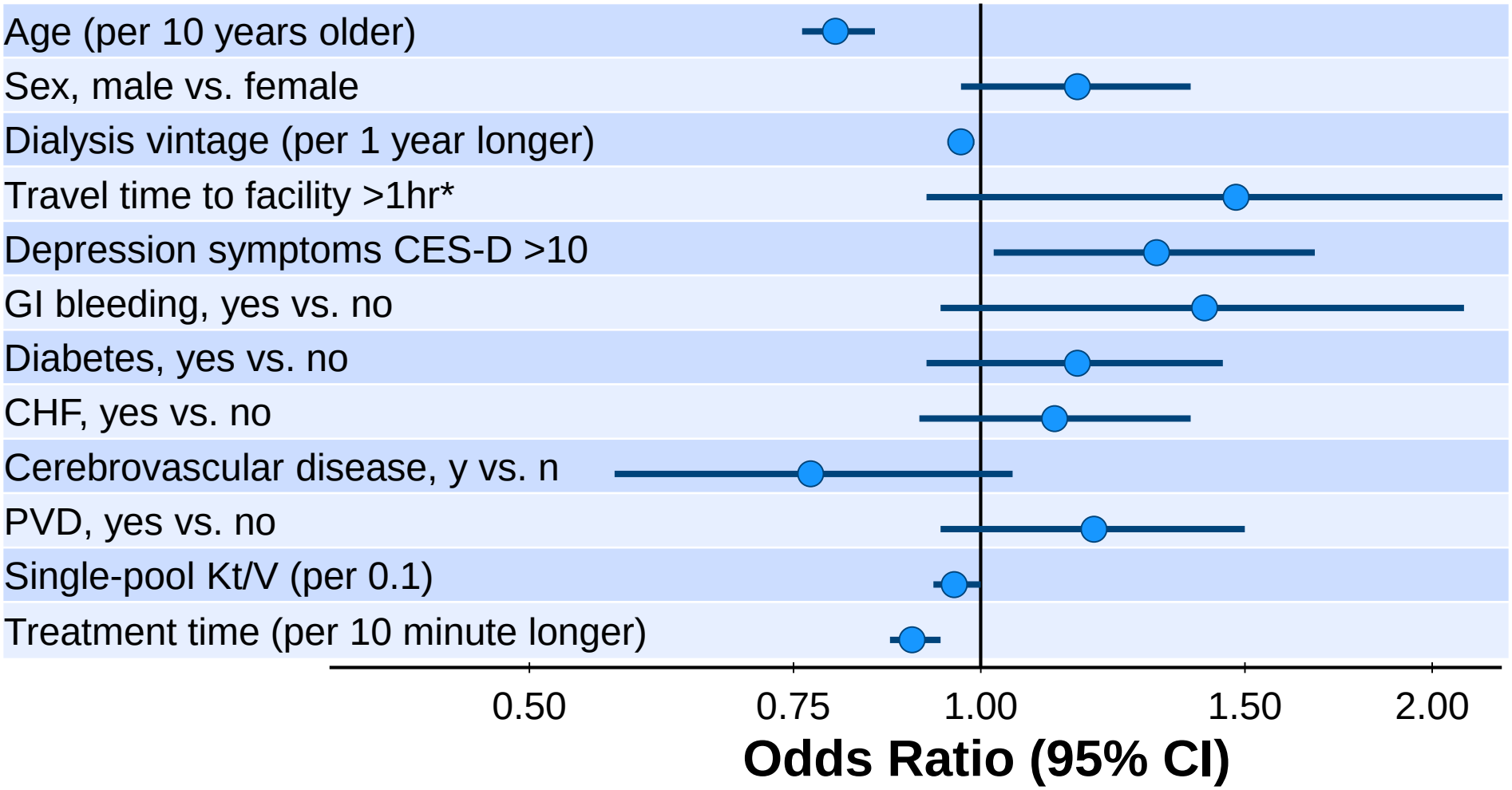
– DOPPS 5 (2012) –



* DOPPS 5 patients on dialysis > 120 days, dialyzing 3x/week; Percent of patients that missed at least one session over the last four months among facilities with >6 patients; ◊ represents the facility mean

Al Salmi, 2016, Under Review

Patient & Treatment Characteristics, and Odds of missing vs not missing ≥1 HD treatment over 4 months



Logistic regression of missing ≥1 treatment over 4 months (yes vs no); adjusted for all variables listed and country. Restricted to countries with >5% pts missing an HD session in 4 months (US, GCC, Russia, ANZ, Canada, UK, Sweden, Turkey); *Travel time measure only available for pts who completed a PQ (n available=2457).

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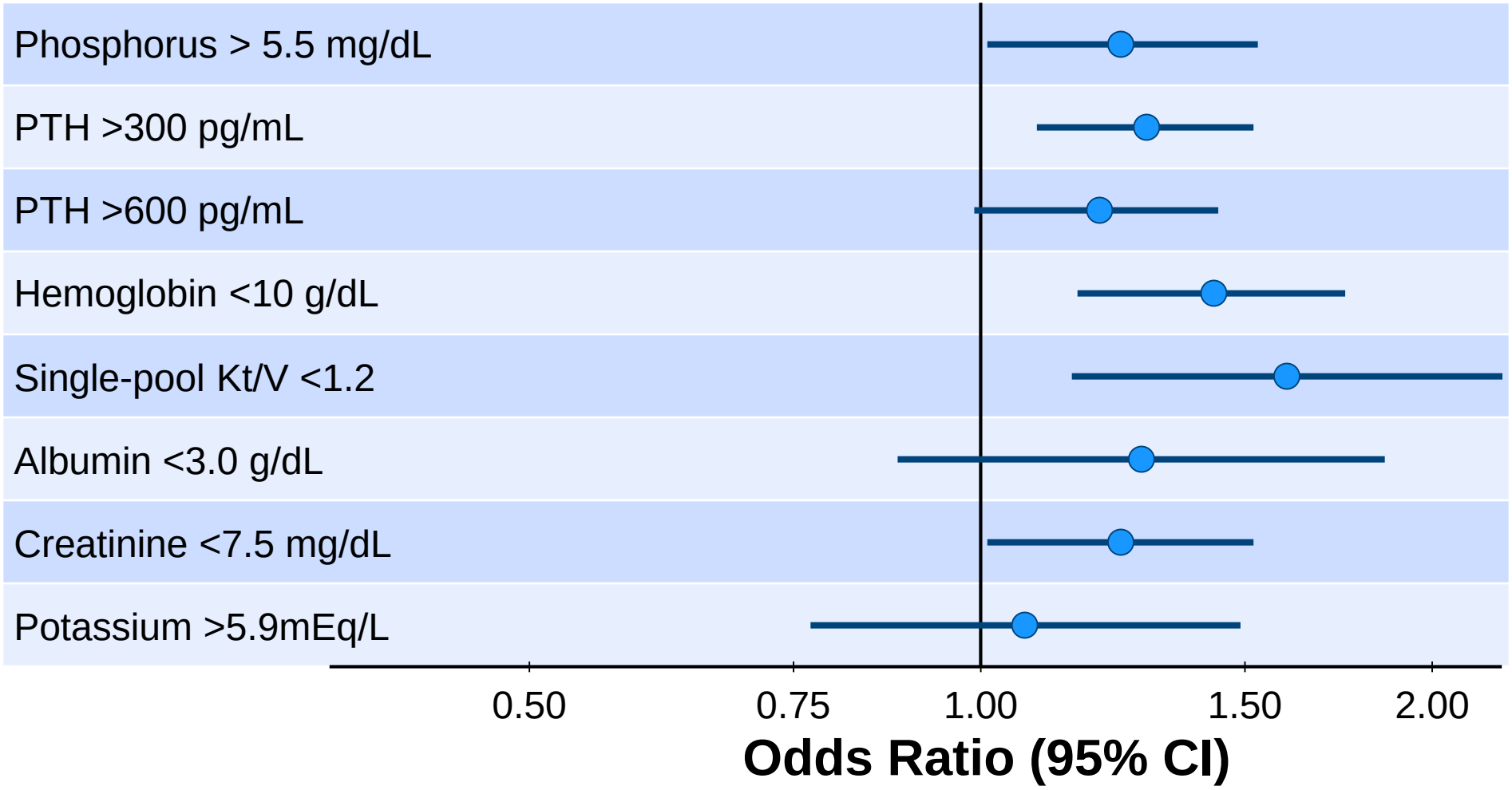
Odds of selected lab outcomes for patients missing, vs not missing ≥1 HD treatment over 4 months



Logistic regression adjusted for age, vintage, sex, 13 comorbidities, country; in countries with >5% pts missing an HD session in 4 months (US, GCC,Russia, ANZ, Canada, UK, Sweden, Turkey).

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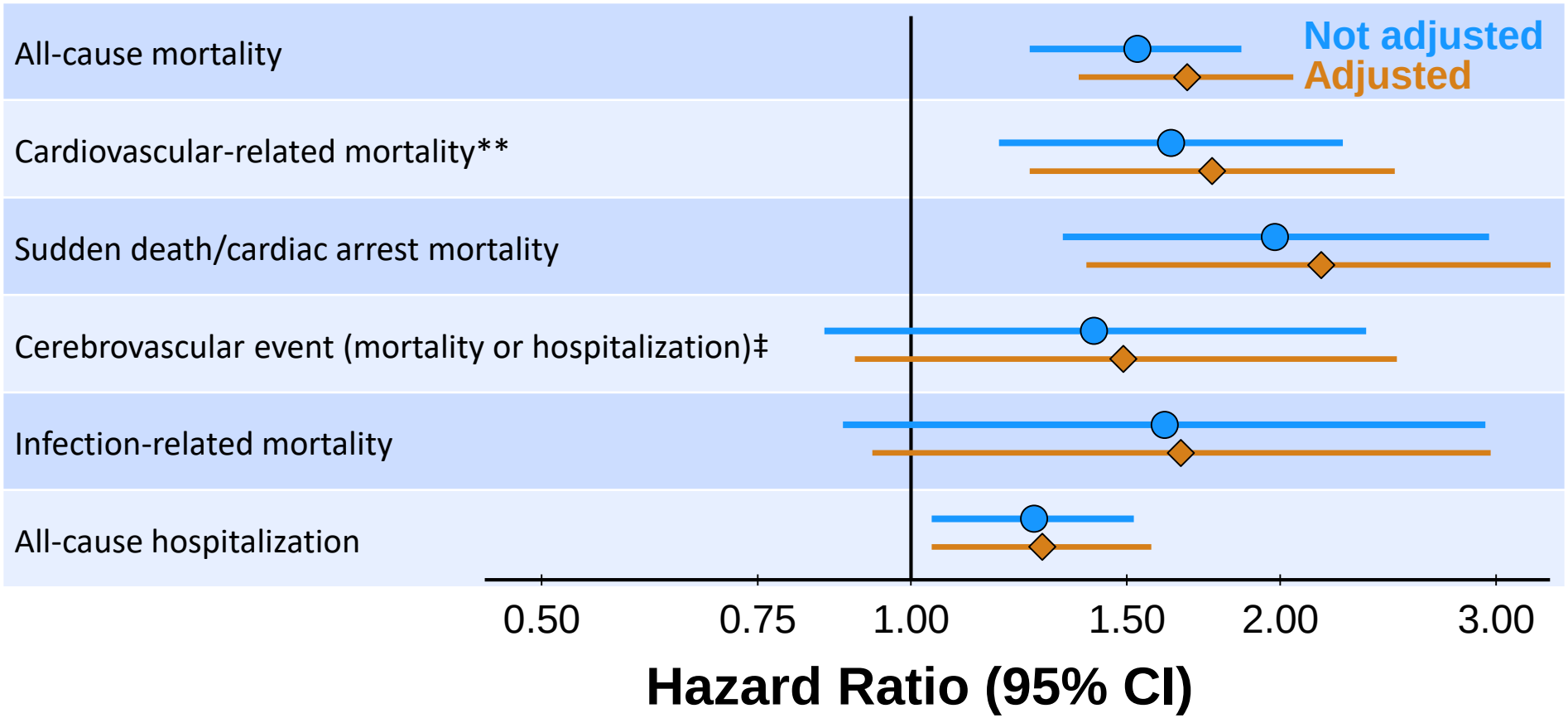
HR for subsequent mortality and hospitalization for patients who missed vs did not miss an HD treatment in 4-months



Cause-specific mortality analyses exclude US large dialysis organizations due to data-reporting issue;
mortality cause categories are not mutually exclusive. Restricted to countries with >5% patients missing an HD treatment in 4 months (US, GCC, Russia, ANZ, Canada, UK, Sweden, Turkey). **Cardiovascular mortality includes sudden death/cardiac arrest cases.
‡ Cerebrovascular events (either hospitalization or death) were limited to occurrence of a stroke.
[A] "Not Adjusted" models were stratified by country only.
[B] "Adjusted" models were stratified by country and adjusted for age, sex, vintage, patient weight, and 13 comorbidities.

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Al Salmi, 2016, Under Review

Conclusion

- **These data consistently demonstrate substantially poorer health-related outcomes associated with missing scheduled HD treatments**

- **Large variability in the prevalence of missed treatments was seen across countries and across facilities in individual countries, strongly suggesting that the occurrence of missed treatments may be modifiable**

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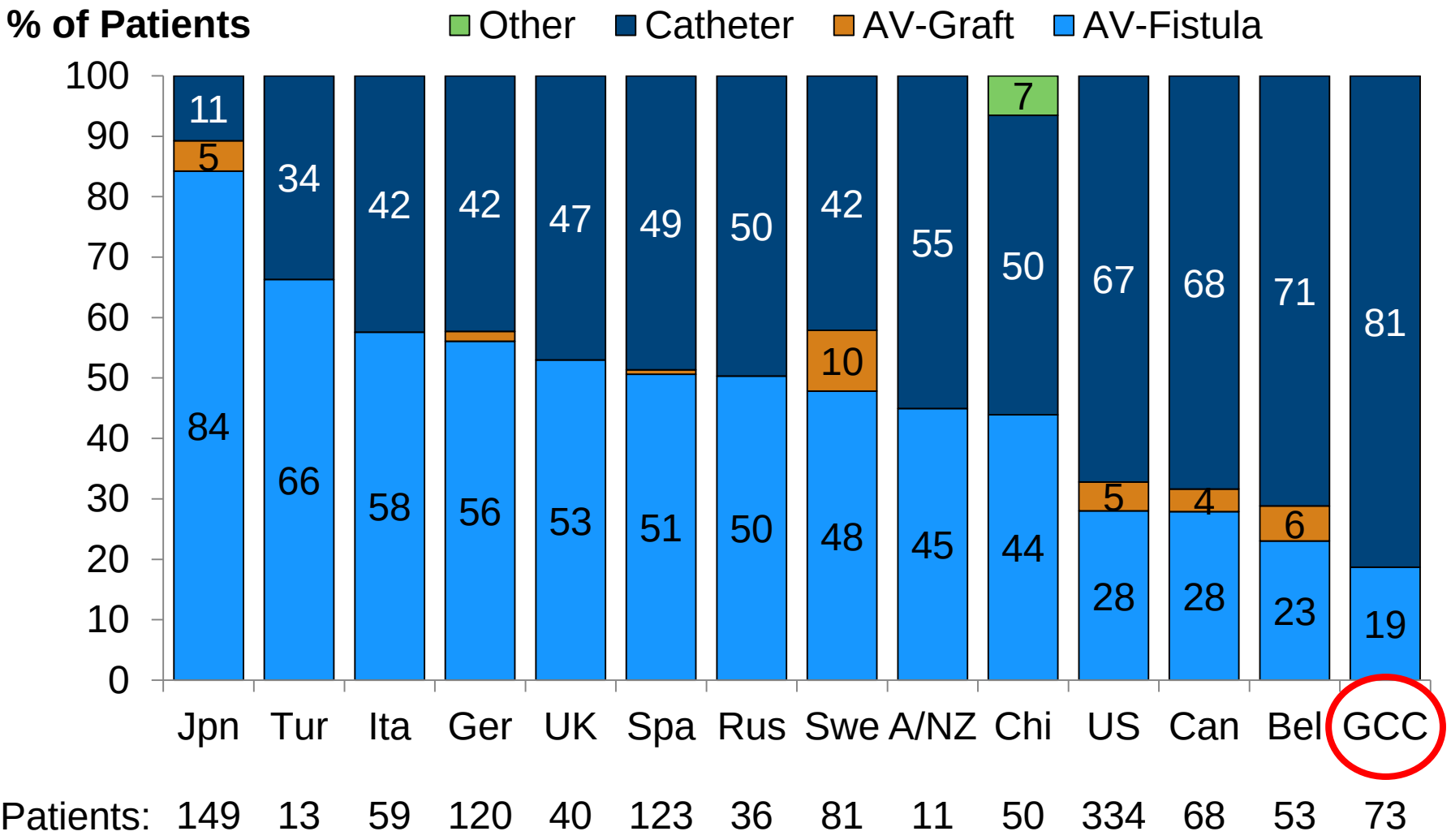
Vascular Access

Vascular access use[a] – incident patients

DOPPS 5 (2012-2014)



[a] At study entry for patients on dialysis ≤60 days at DOPPS enrollment

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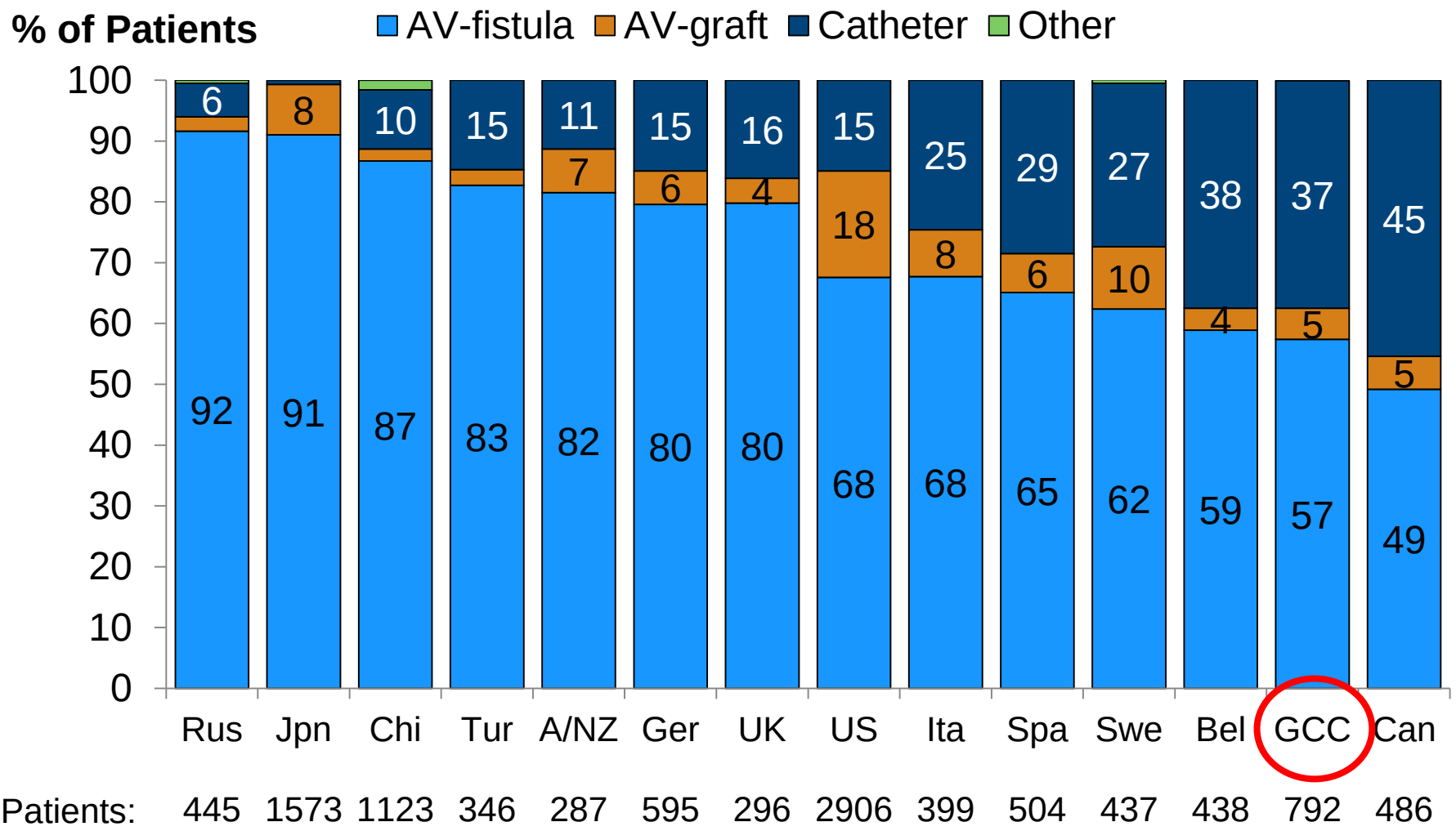
Pisoni et al. *Am J Kidney Dis.* 2015;65(6):905-915

Vascular access use[a] – prevalent patients

DOPPS 5 (2012-2014)



[a] At study entry regardless of time on dialysis since at DOPPS enrollment

DOPPS

Pisoni et al. *Am J Kidney Dis.* 2015;65(6):905-915

DOPPS

DIALYSIS OUTCOMES AND PRACTICE PATTERNS STUDY

International Differences in Bacteremia Rates in Hemodialysis Patients in the DOPPS

H Rayner, L Zepel, M Jadoul, C Lok, D Mendelssohn, J Perl, R Fluck, L Spergel, H Kawanishi, A Karkar, B Gillespie, B Bieber, F Port, B Robinson, and R Pisoni

ASN Abstract 2014

Background

- **There has been a focus in recent years by many countries to reduce infection rates in HD patients**

- **Previously, DOPPS has seen a strong relationship of infection-related hospitalization with greater catheter use in countries and in HD facilities**

- **<u>Objective</u>: describe bacteremia rates and associations with vascular access use across countries**

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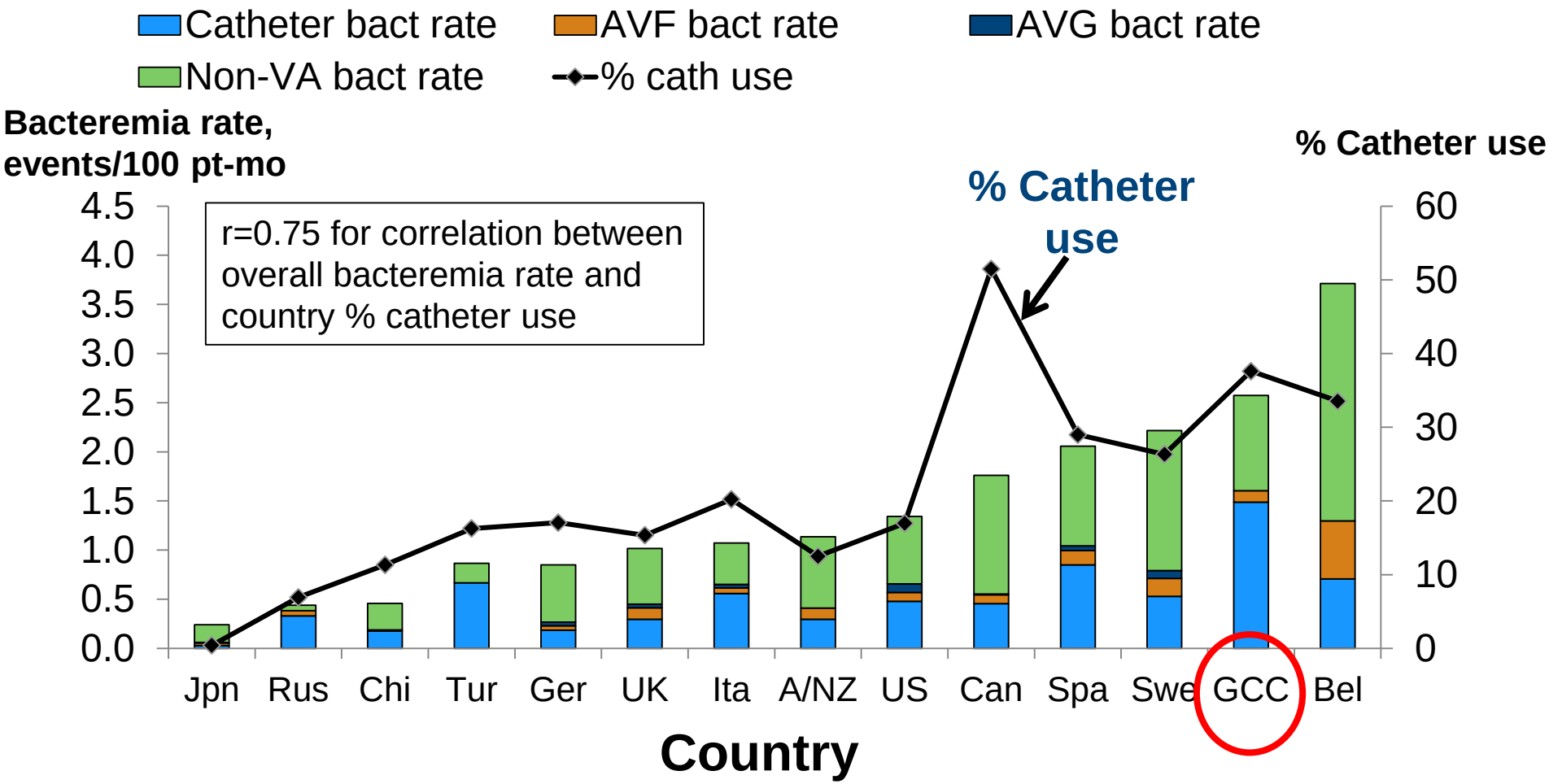
Rayner et al, ASN abstract (2014)

Bacteremia Rate, Fraction Related to Type of Vascular Access, and Relationship to Country % Catheter Use

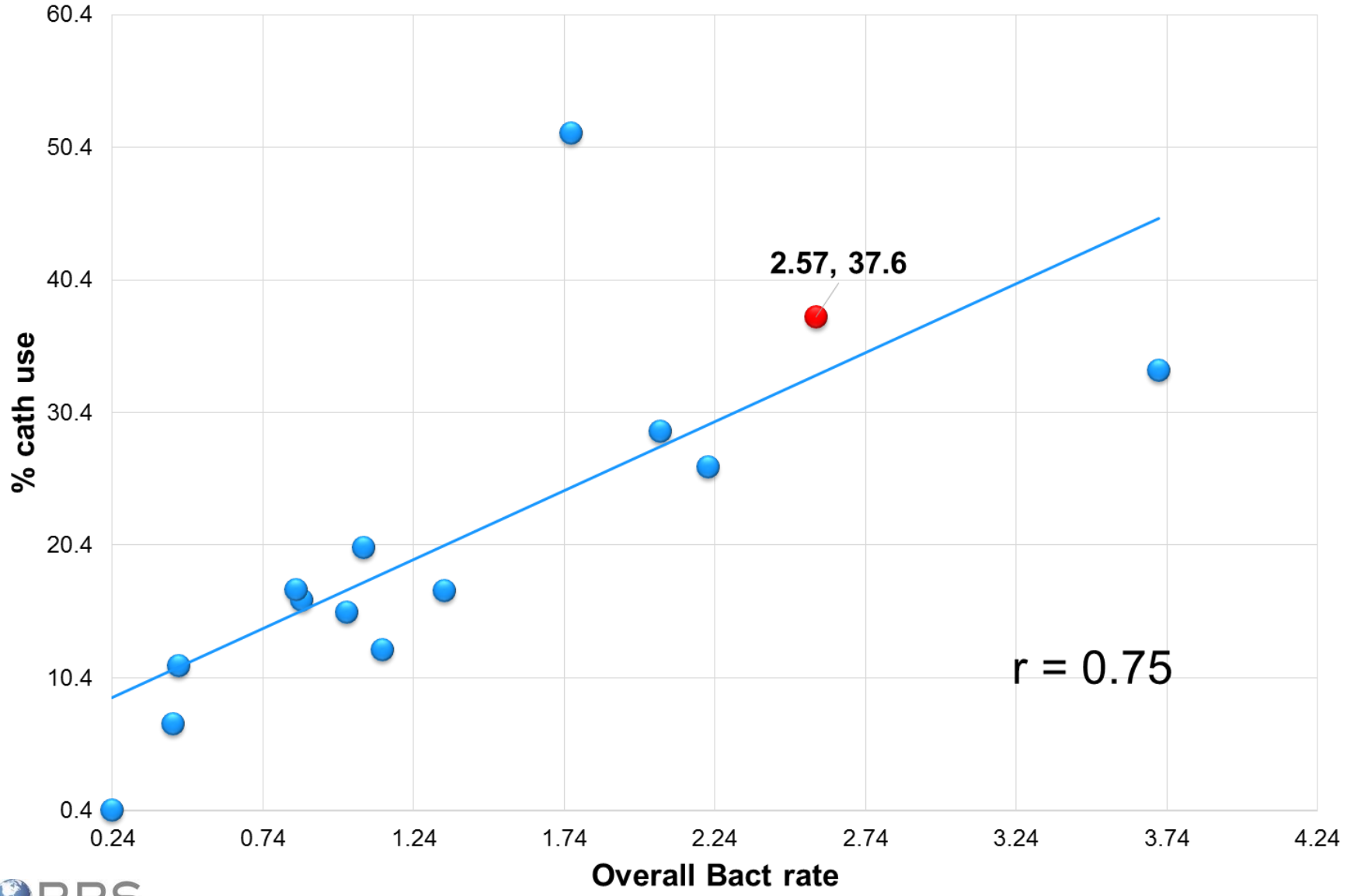


Country % catheter use based on initial DOPPS 5 cross-section

AVF, arteriovenous fistula; AVG, arteriovenous graft; Bact, bacteremia; Cath, catheter; pt-mo, patient-month; VA, vascular access-associated

Rayner HC et al. ASN 13–16 November 2014,

Relationship of bacteremia rates with catheter use



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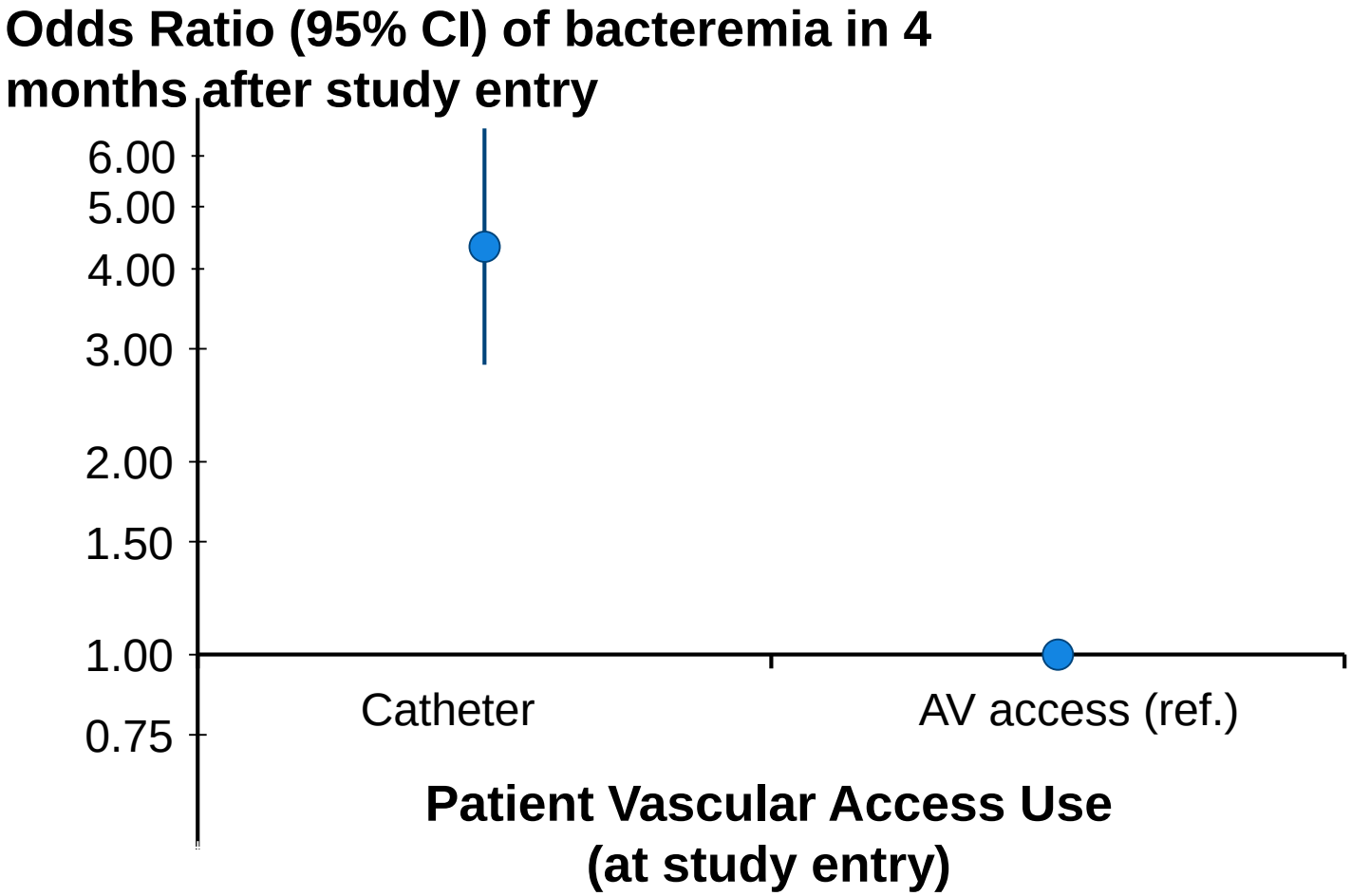
Rayner et al, ASN abstract (2014)

Odds of Bacteremia Much Greater for Patients Dialyzing with a Catheter vs AV Access



Adjusted for country, age, sex, race, vintage, diabetes, 13 summary comorbidities, and accounting for facility clustering. Bacteremia defined as any patient bacteremia (yes/no) in the 4 months after study entry. Model restricted to patients in Canada, Italy, Spain, Germany, UK, and US.

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Rayner et al, ASN abstract (2014)

Summary & Conclusions

- In 2012-2014, bacteremia rates varied >10 fold across countries
- In agreement with numerous prior studies, bacteremia is seen to be strongly associated with catheter use
- Countries with low bacteremia rates serve to exemplify what has been possible to achieve in minimizing bacteremia in HD patients
- These international comparisons serve to help inform the worldwide community regarding efforts to improve infection control among HD patients and in particular for quality improvement initiatives such as the proposed bloodstream infection QIP measure in the US, and infection control measures in the UK

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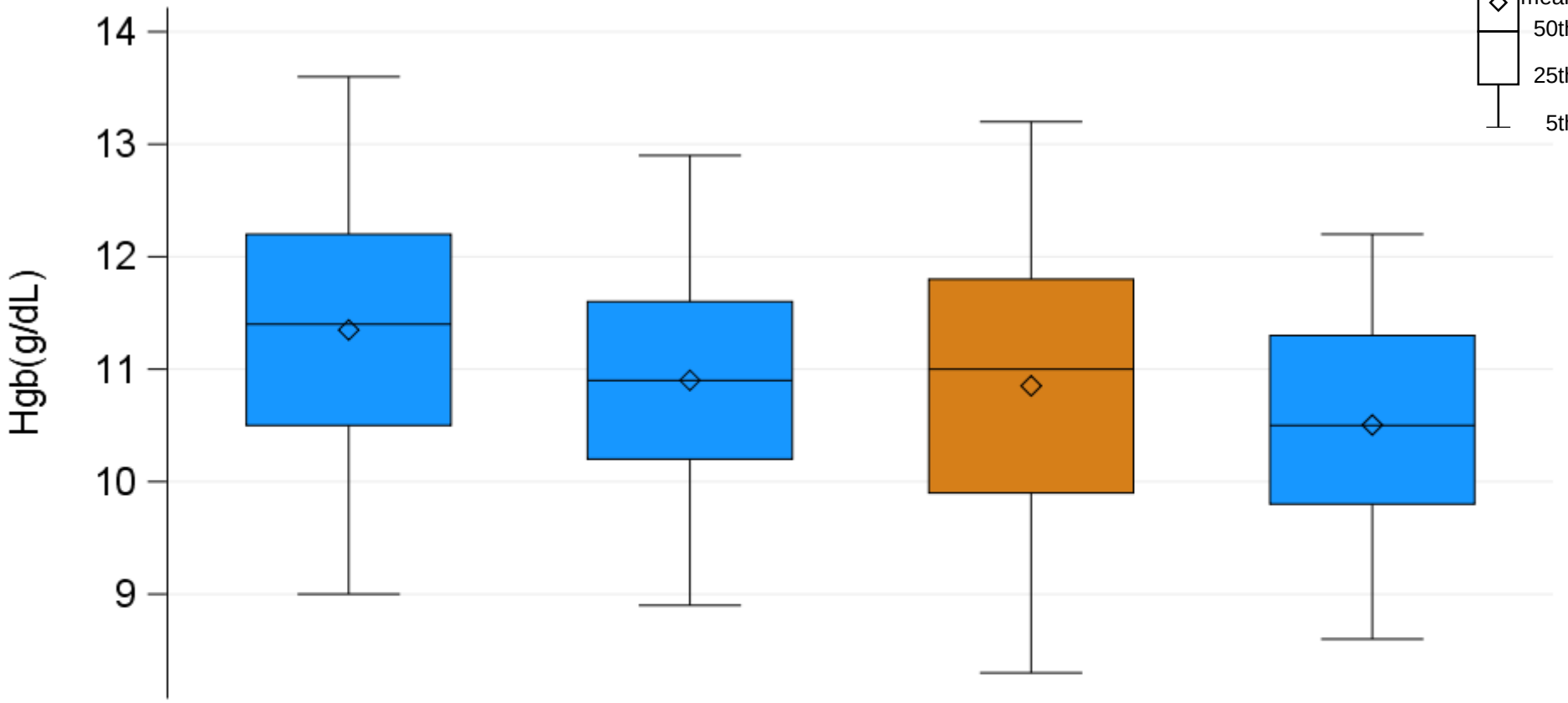
Rayner et al, ASN abstract (2014)

Anemia Management

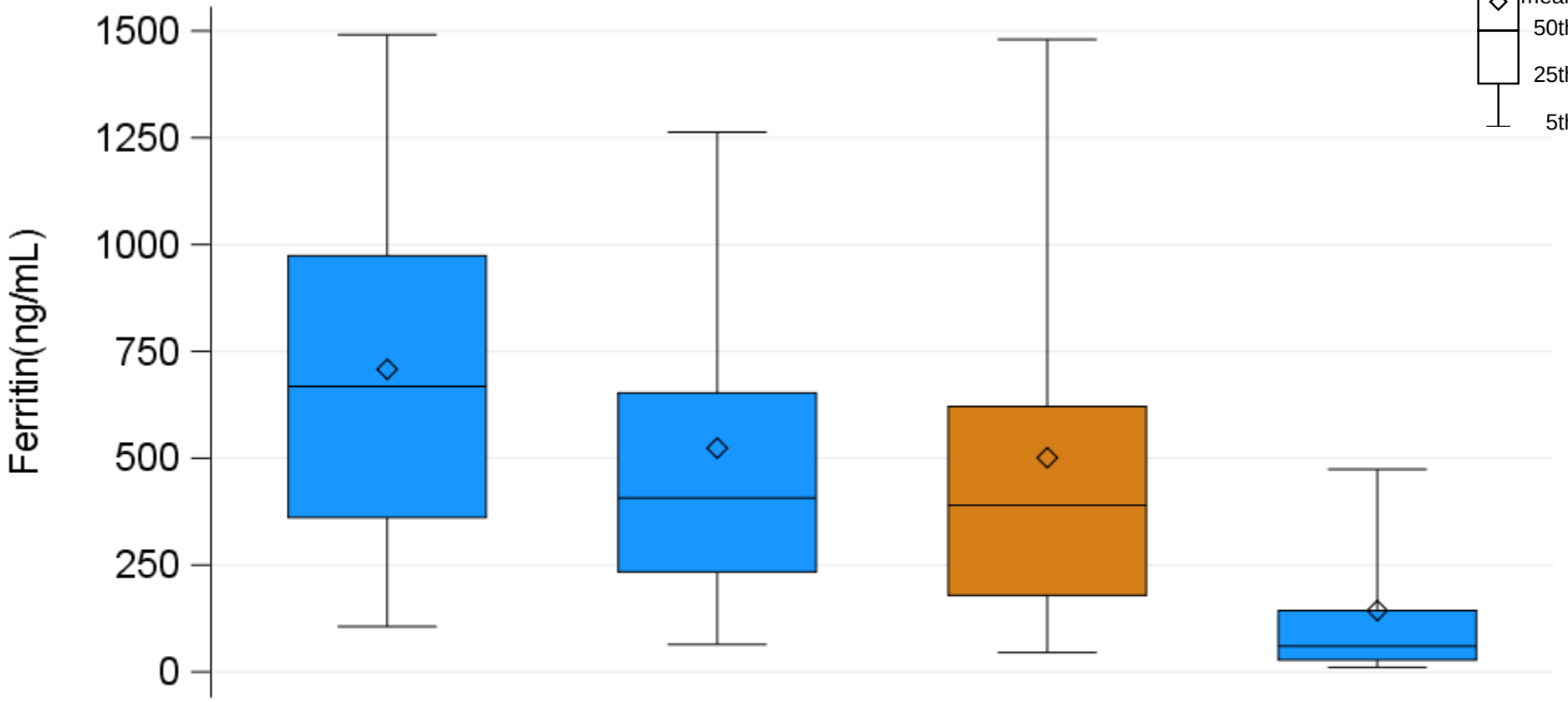
Hemoglobin, by Region



	Europe	N. America	GCC	Japan
N	3,134	3,313	858	1,586
Mean	11.4	10.9	10.9	10.5
Std Dev	2.4	2.0	3.4	2.1
Median	11.4	10.9	11.0	10.5

DOPPS 5 (2012,2013)

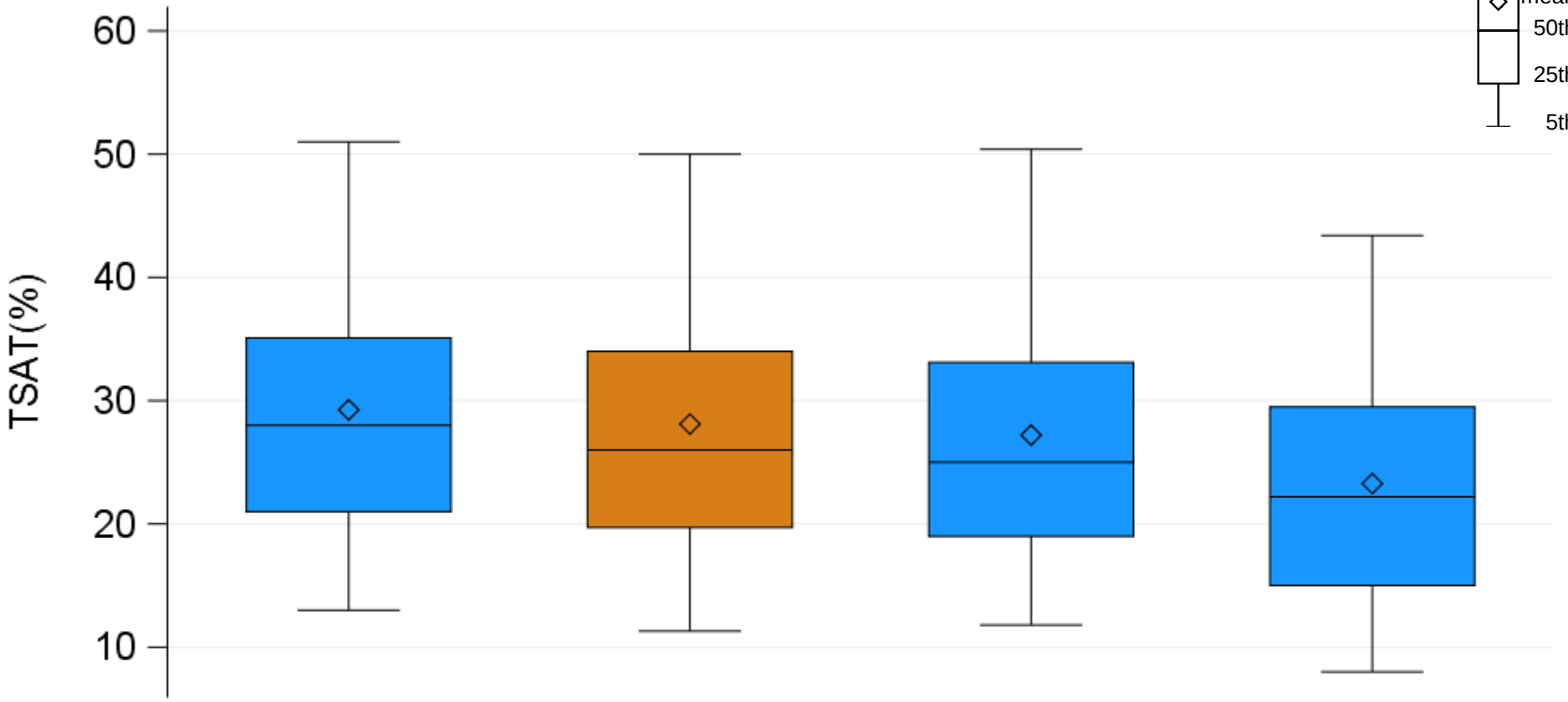
Ferritin, by Region



	N. America	Europe	GCC	Japan
N	3,163	2,787	593	1,238
Mean	708	524	501	143
Std Dev	708	905	1111	522
Median	668	407	390	60

DOPPS 5 (2012,2013)

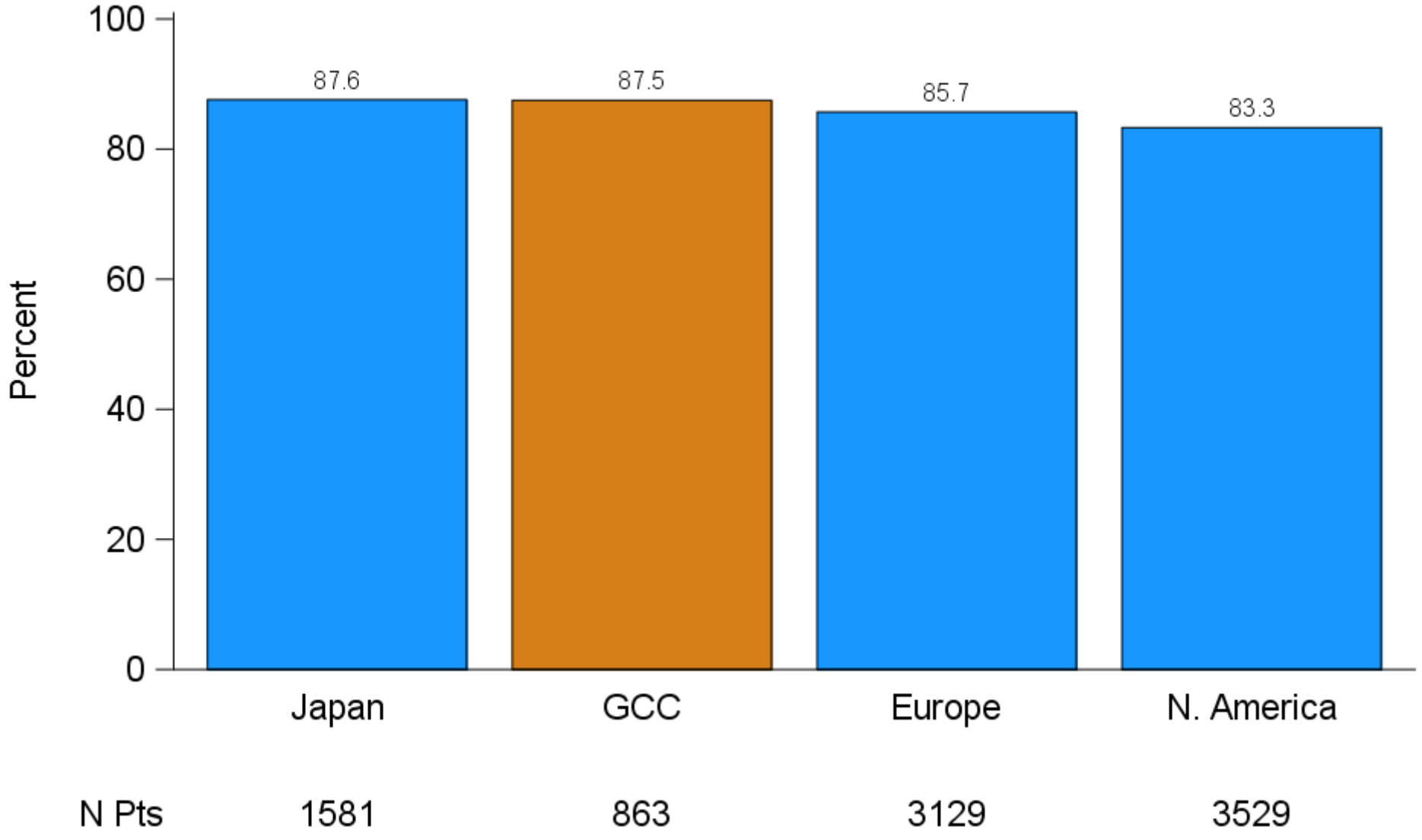
TSAT, by Region



	N. America	GCC	Europe	Japan
N	2,356	540	2,226	478
Mean	29.3	28.1	27.2	23.3
Std Dev	18.9	29.3	21.1	21.3
Median	28.0	26.0	25.0	22.2

DOPPS 5 (2012,2013)

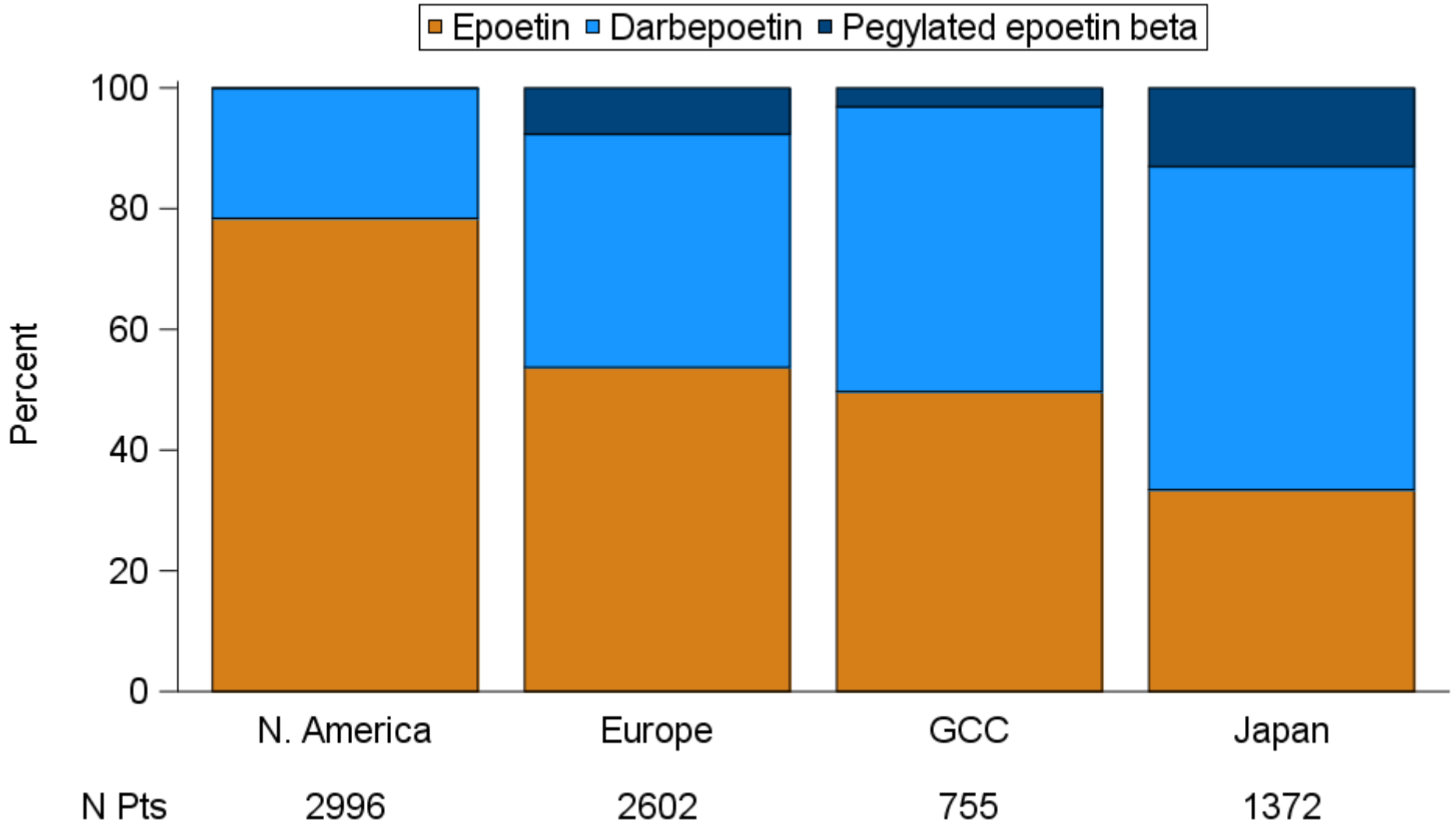
ESA Rx, by Region



Active prescription at baseline

DOPPS 5 (2012,2013)

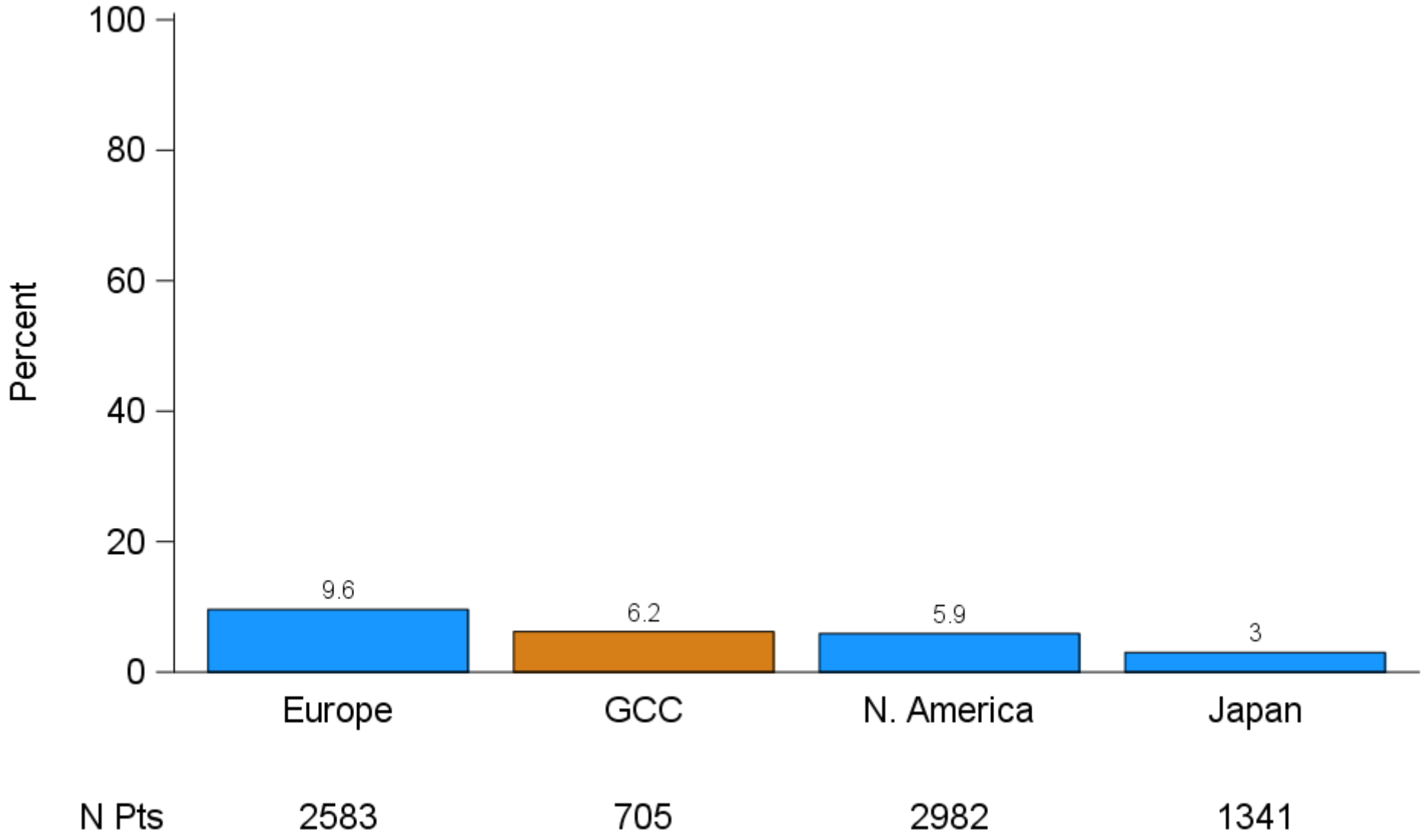
ESA Type, by Region



Among patients with active ESA prescription at baseline

DOPPS 5 (2012,2013)

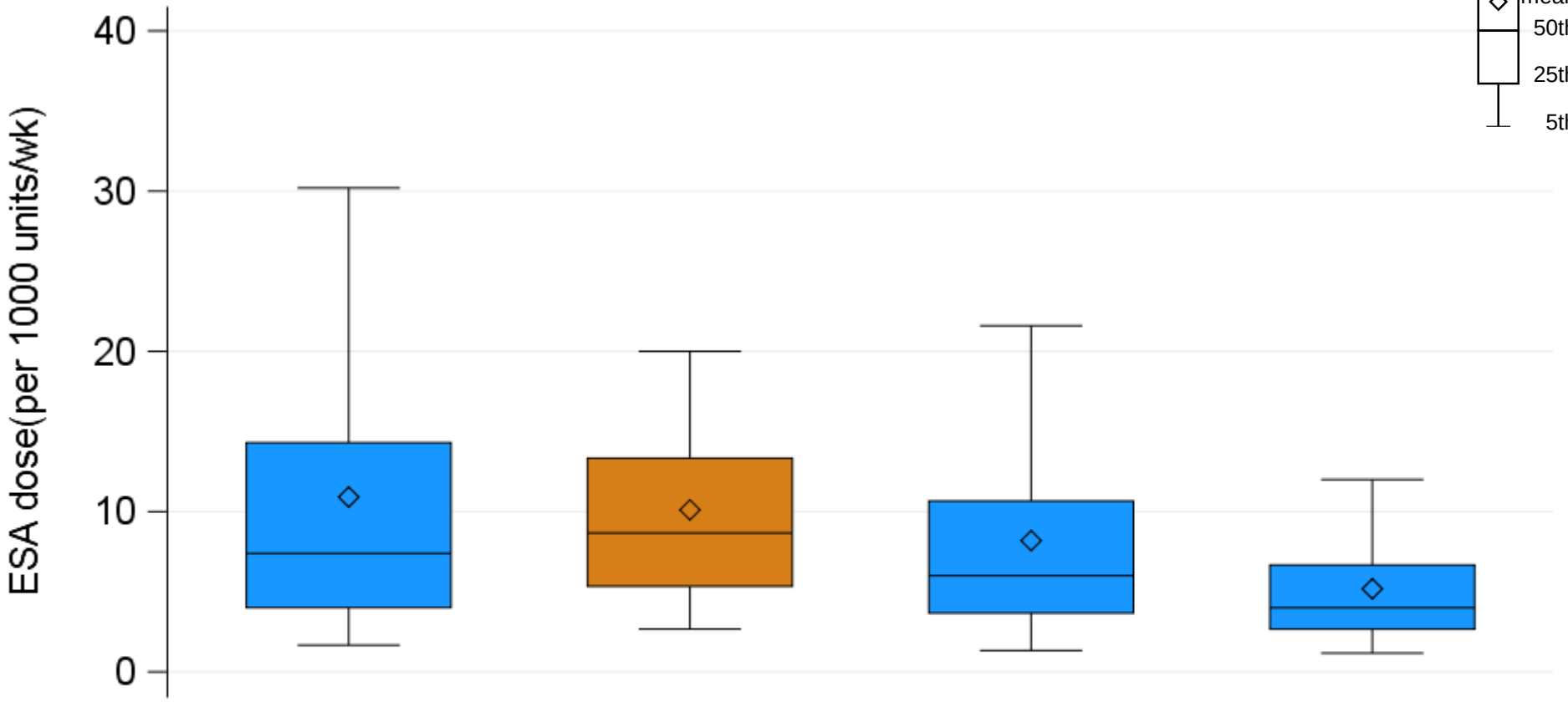
Subcutaneous ESA Use, by Region



Among patients with active ESA prescription at baseline

DOPPS 5 (2012,2013)

ESA Dose, by Region

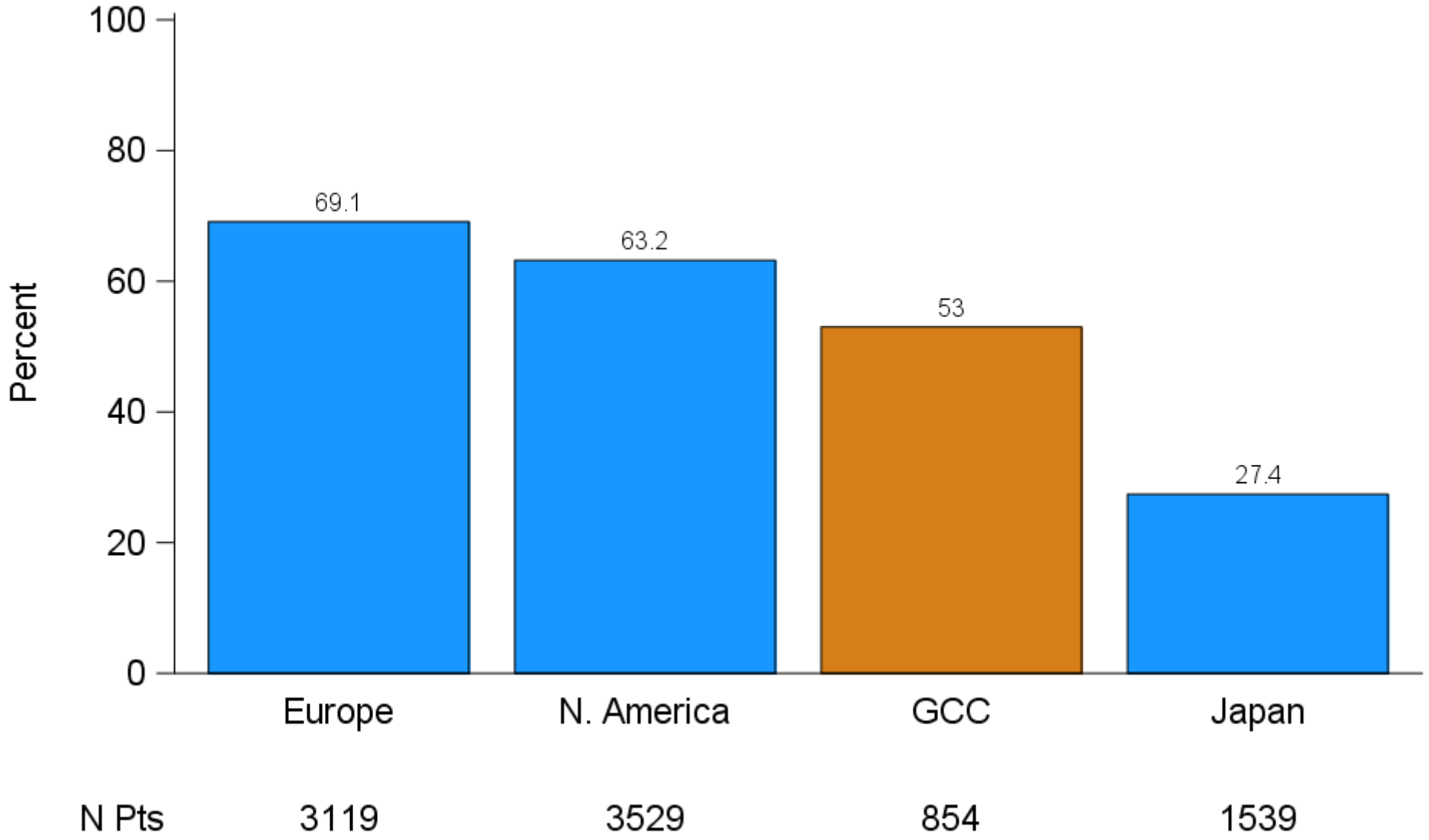


	N. America	GCC	Europe	Japan
N	2,771	646	2,054	1,068
Mean	10.9	10.1	8.2	5.2
Std Dev	16.5	16.2	11.6	7.2
Median	7.4	8.7	6.0	4.0

Among patients prescribed an ESA; darbepoetin doses converted 200:1, subcutaneous doses converted. 1.15:1; pegylated epoetin beta (Mircera) excluded

DOPPS 5 (2012,2013)

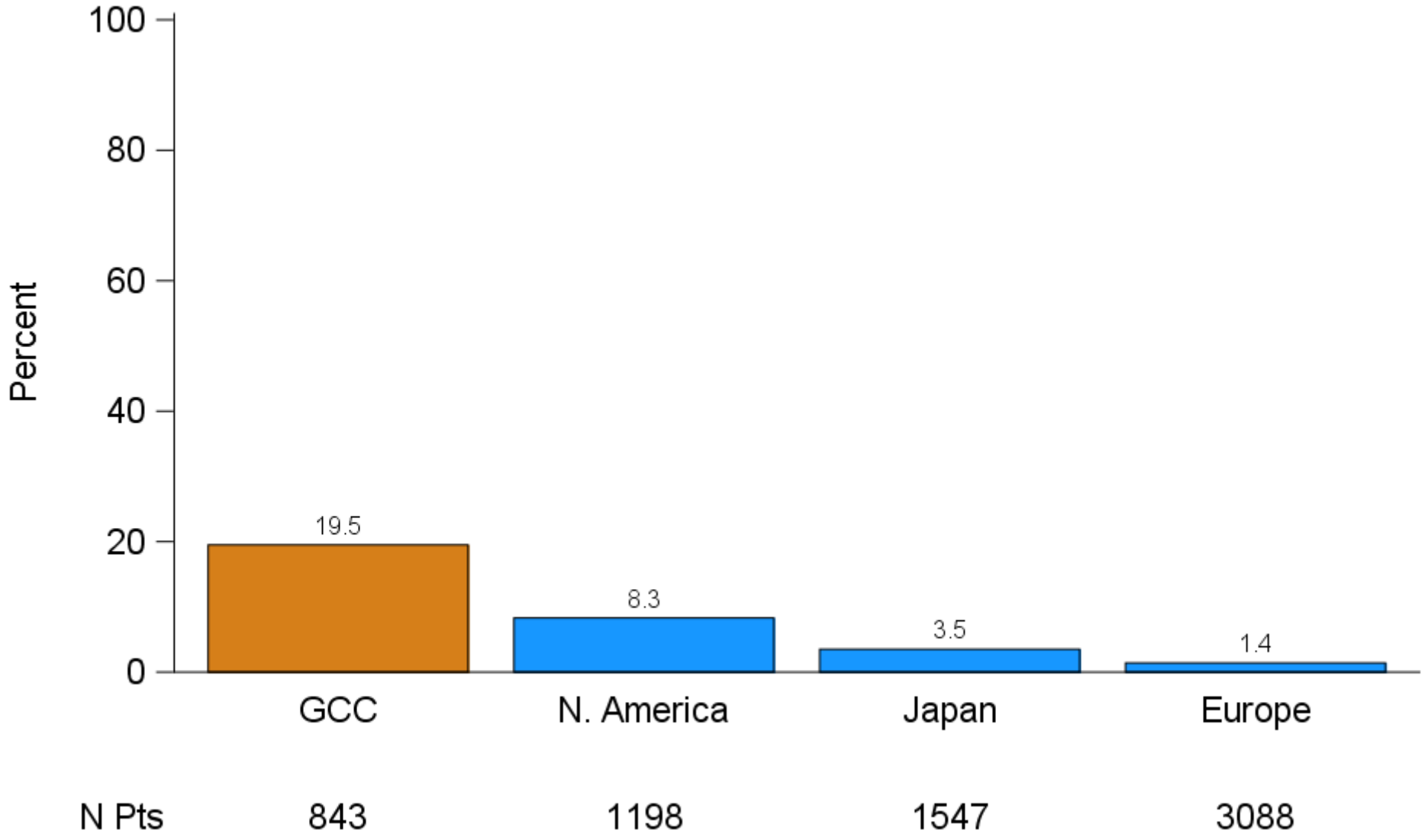
IV Iron Rx, by Region



Active prescription at baseline

DOPPS 5 (2012,2013)

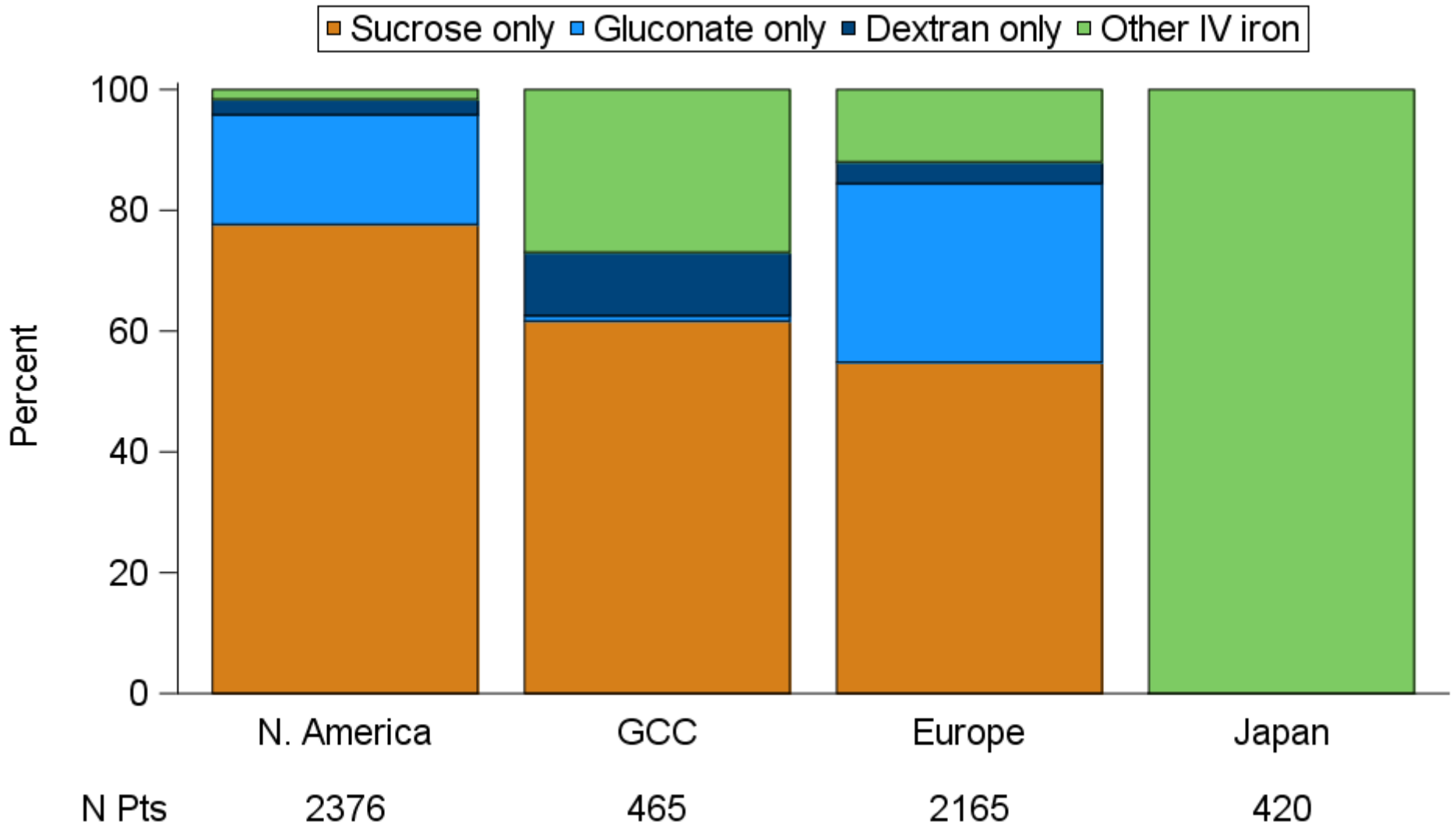
Oral Iron Rx, by Region



Active prescription at baseline

DOPPS 5 (2012,2013)

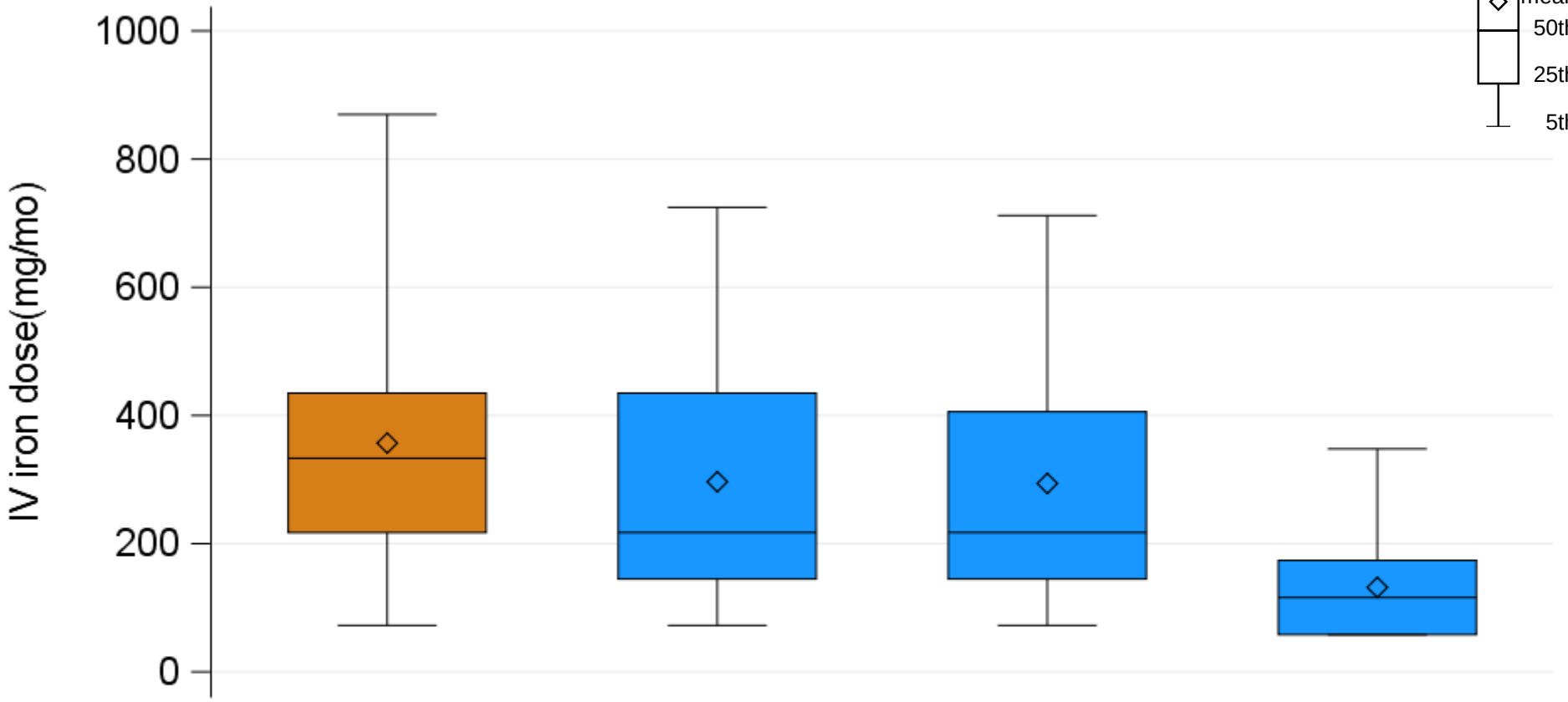
IV Iron Type, by Region



Among patients with active IV iron prescription at baseline

DOPPS 5 (2012,2013)

IV Iron Dose, by Region



	GCC	Europe	N. America	Japan
N	549	2,099	2,435	592
Mean	357	296	294	132
Std Dev	511	349	317	152
Median	333	217	217	116

Among patients with active IV iron prescription at baseline

DOPPS 5 (2012,2013)

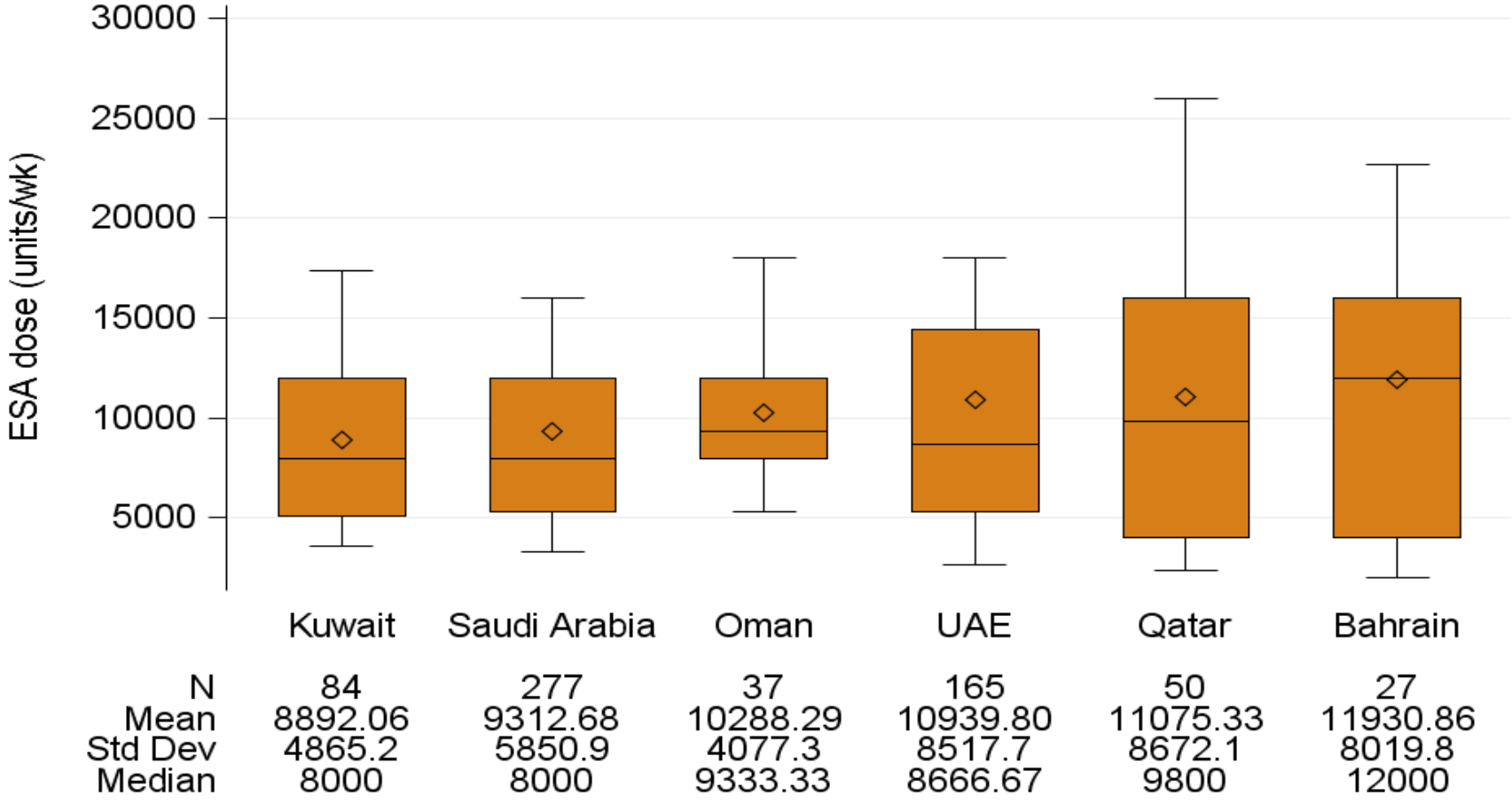
Anemia profile by region

	N. America	Europe	Turkey	GCC	Russia	Japan
Mean Hb	10.9 ± 1.2	11.3± 1.4	11.5 ±1.4	10.8±1.5	10.8±1.6	10.5±1
ESA Rx	85	85	58	89	79	88
ESA dose	12660	8384	7972	9981	5568	5253
Mean TSAT	31± 12.6	27.6 ±12.5	33.8± 15	28 ±12.6	34±15	23 ±11
Mean ferritin	792 ±470	517± 494	824.7± 586	507± 476	563±475	150.5±292
IV iron	67	69	61	56	56	27
Po iron	6	1	0.3	25	0.7	4
ESA S/C	5	10	79	8	55	3

Anemia profile for GCC

	Saudi Arabia	Kuwait	UAE	Oman	Qatar	Bahrain
Mean Hb	10.8±1.6	11±1.4	10.6±1.6	10.6±1.5	11.2±1.4	10.4±1.5
ESA Rx	87	88	89	93	98	100
ESA dose	9312	8982	10939	10288	11075	11930
Mean TSAT	30.5±13.7	26.5±11	25.6±10	28±12	29±12	16±7
Mean ferritin	477±435	537±457	569±569	432±501	503±357	475±466
IV iron	47	69	59	47	67	71
Po iron	43	11	13	9	0	18
ESA S/C	13	6	5	0	0	0

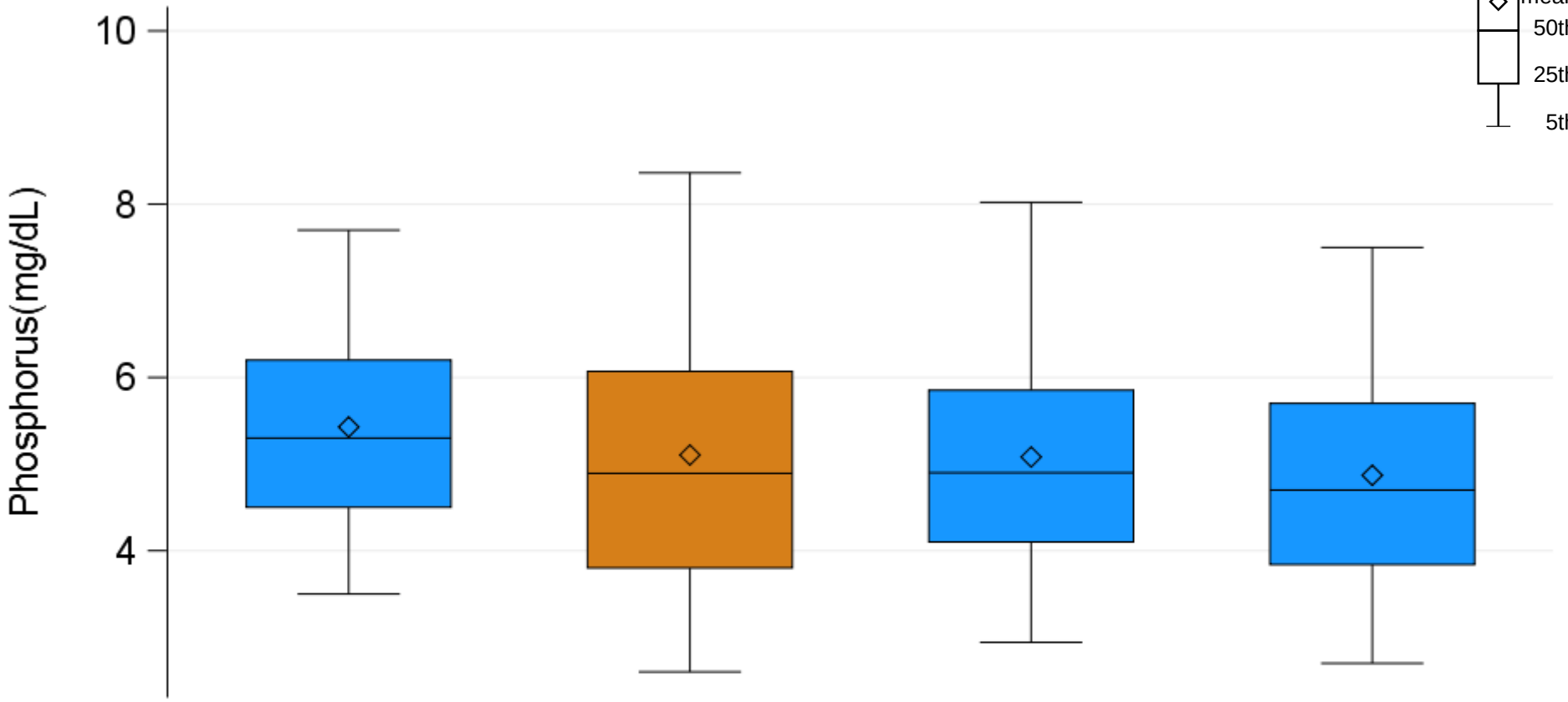
ESA dose, by GCC country



Among patients prescribed an ESA; darbepoetin doses converted 200:1, subcutaneous doses converted. 1.15:1; pegylated epoetin beta (Mircera) excluded

CKD-MBD Management

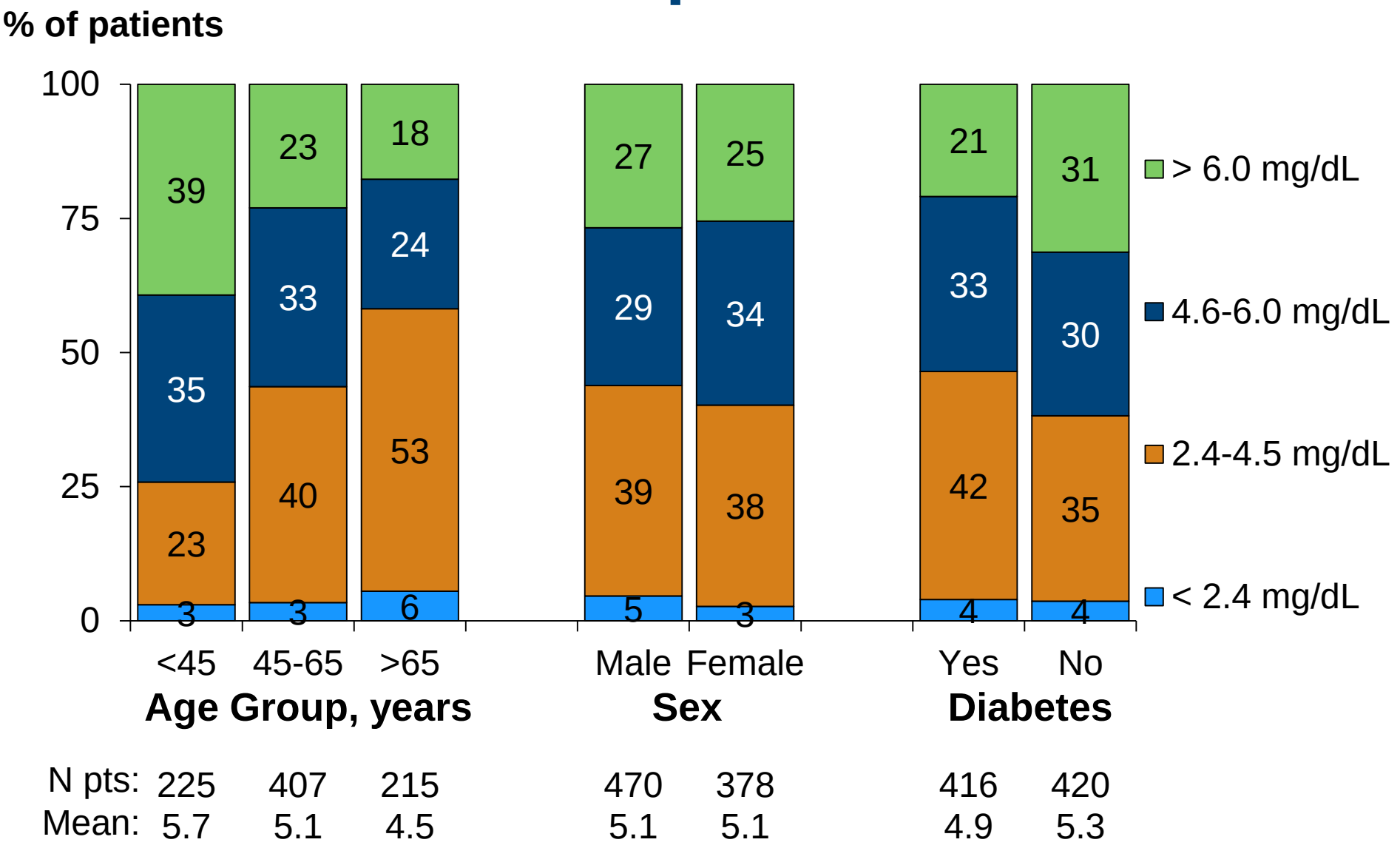
Phosphorus, by Region



	Japan	GCC	N. America	Europe
N	1,588	851	3,314	3,108
Mean	5.4	5.1	5.1	4.9
Std Dev	2.5	4.4	2.4	2.6
Median	5.3	4.9	4.9	4.7

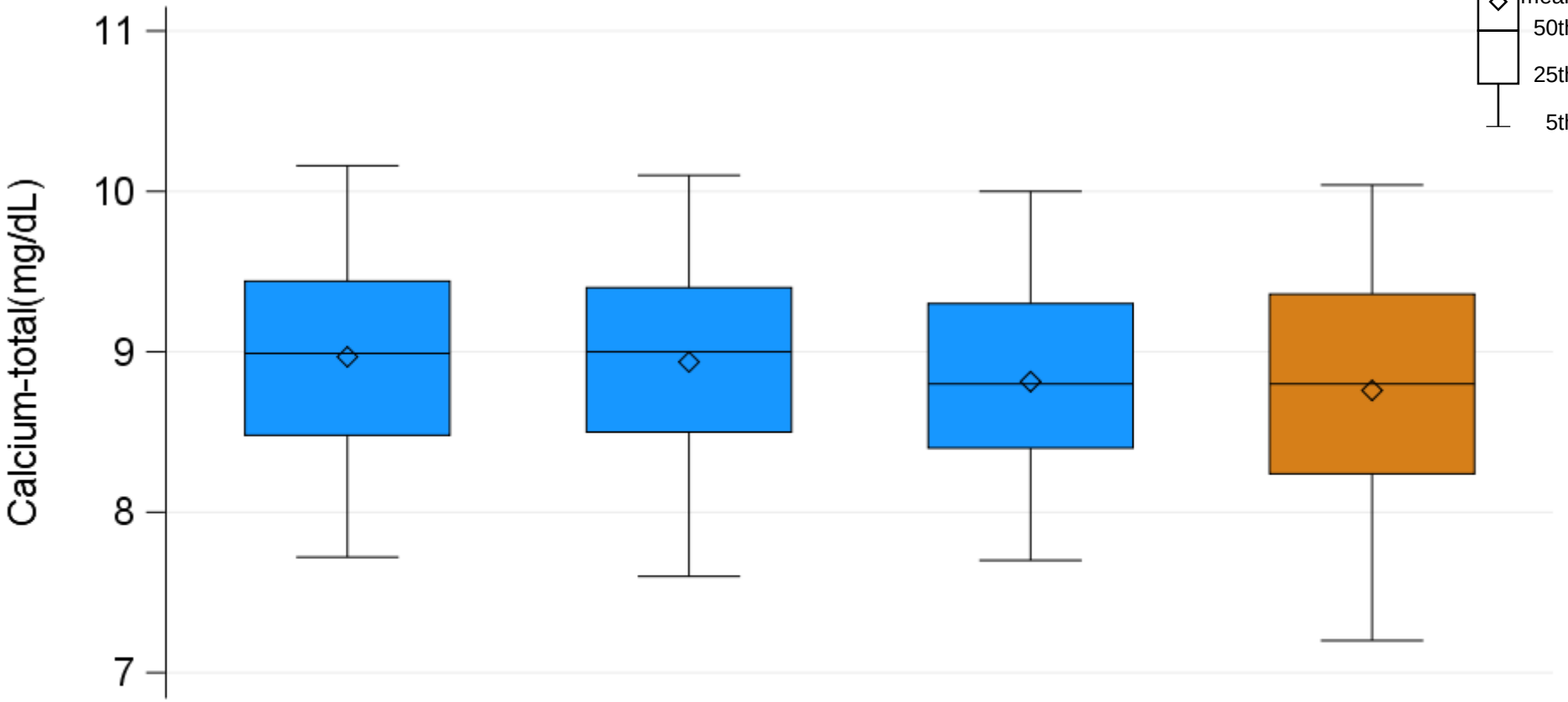
DOPPS 5 (2012,2013)

Phosphorus



DOPPS

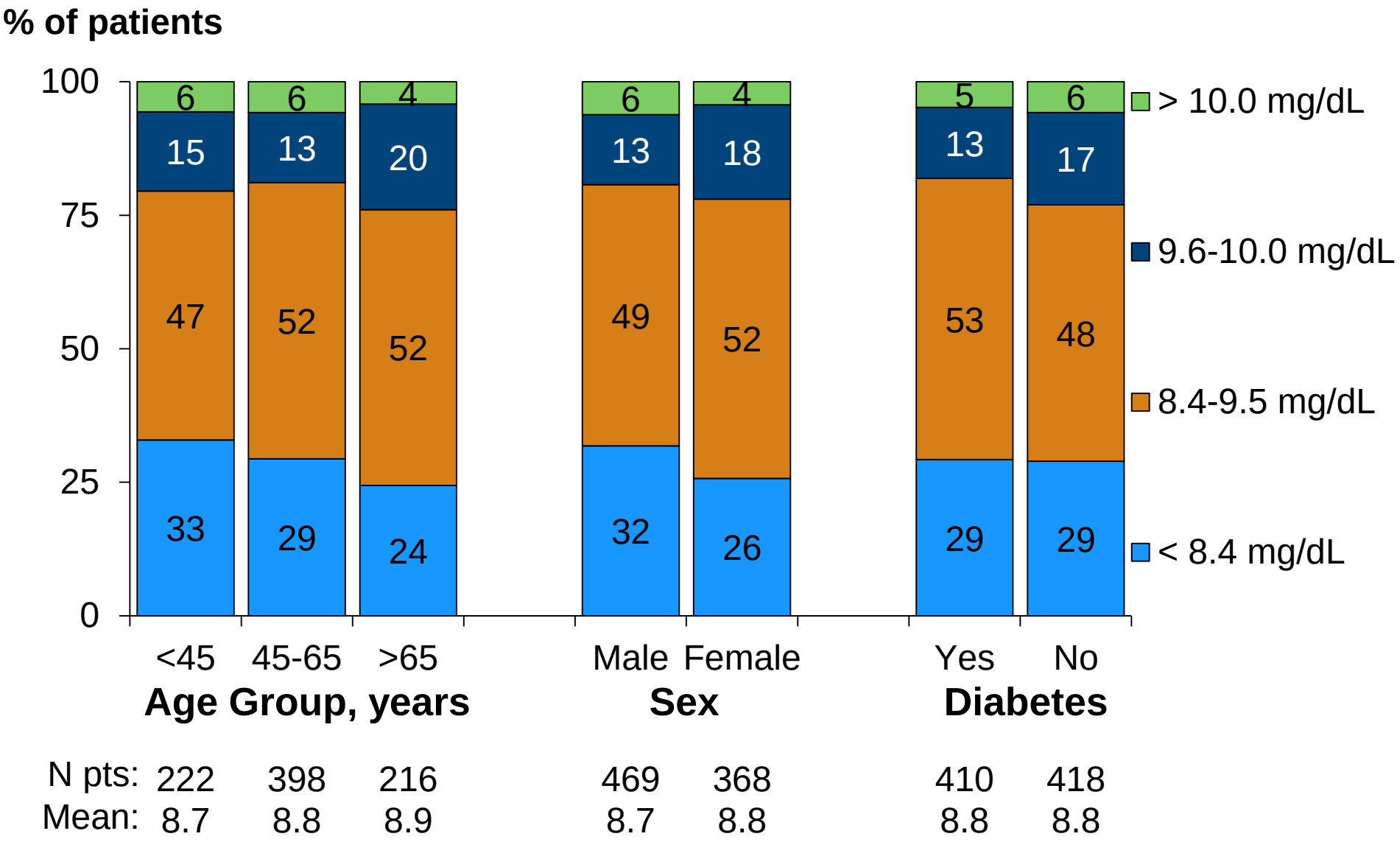
Total Calcium, by Region



	Europe	N. America	Japan	GCC
N	3,096	3,519	1,584	840
Mean	9.0	8.9	8.8	8.8
Std Dev	1.3	1.2	1.3	2.0
Median	9.0	9.0	8.8	8.8

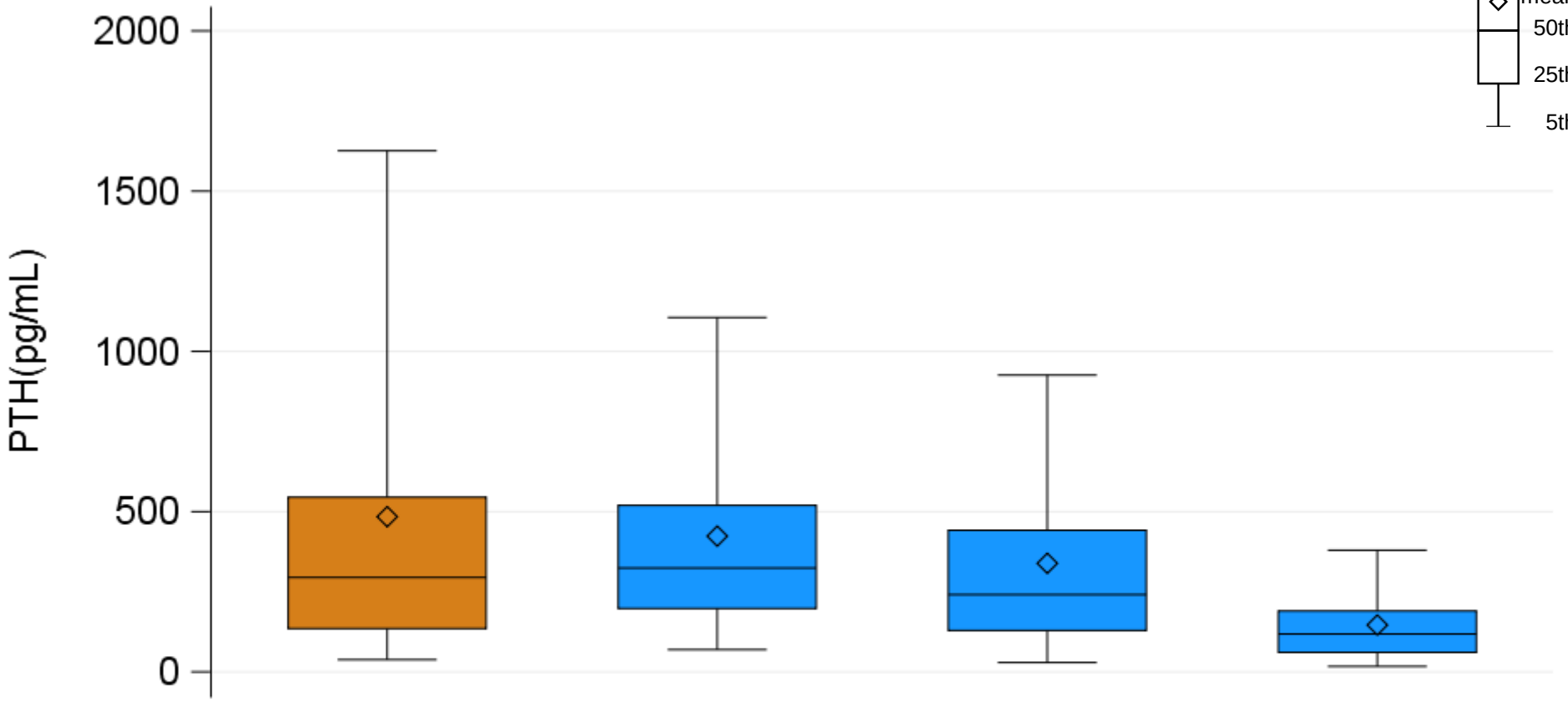
DOPPS 5 (2012,2013)

Calcium



DOPPS

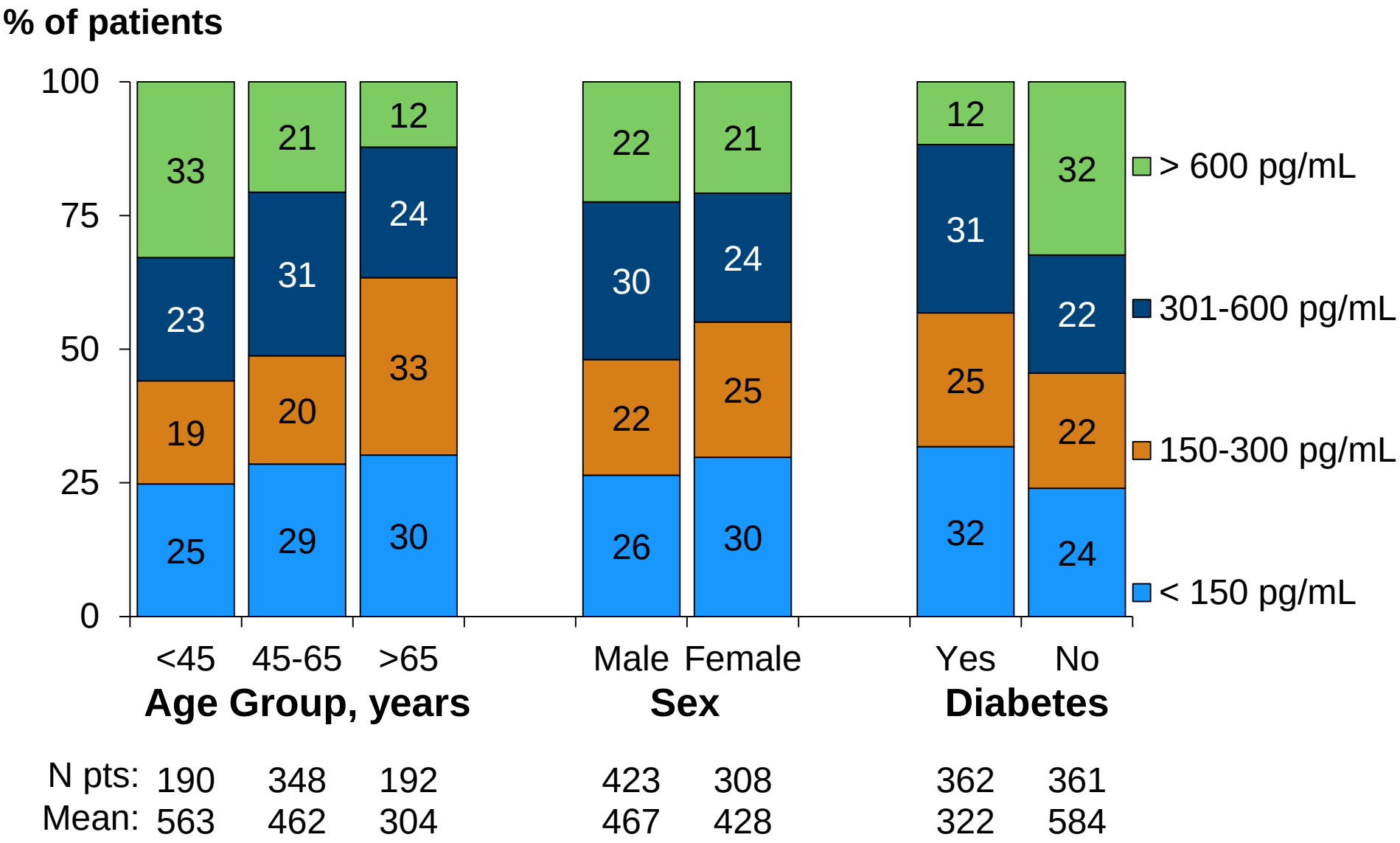
PTH, by Region



	GCC	N. America	Europe	Japan
N	739	3,163	2,776	1,271
Mean	484	423	338	146
Std Dev	1501	606	592	235
Median	295	324	241	118

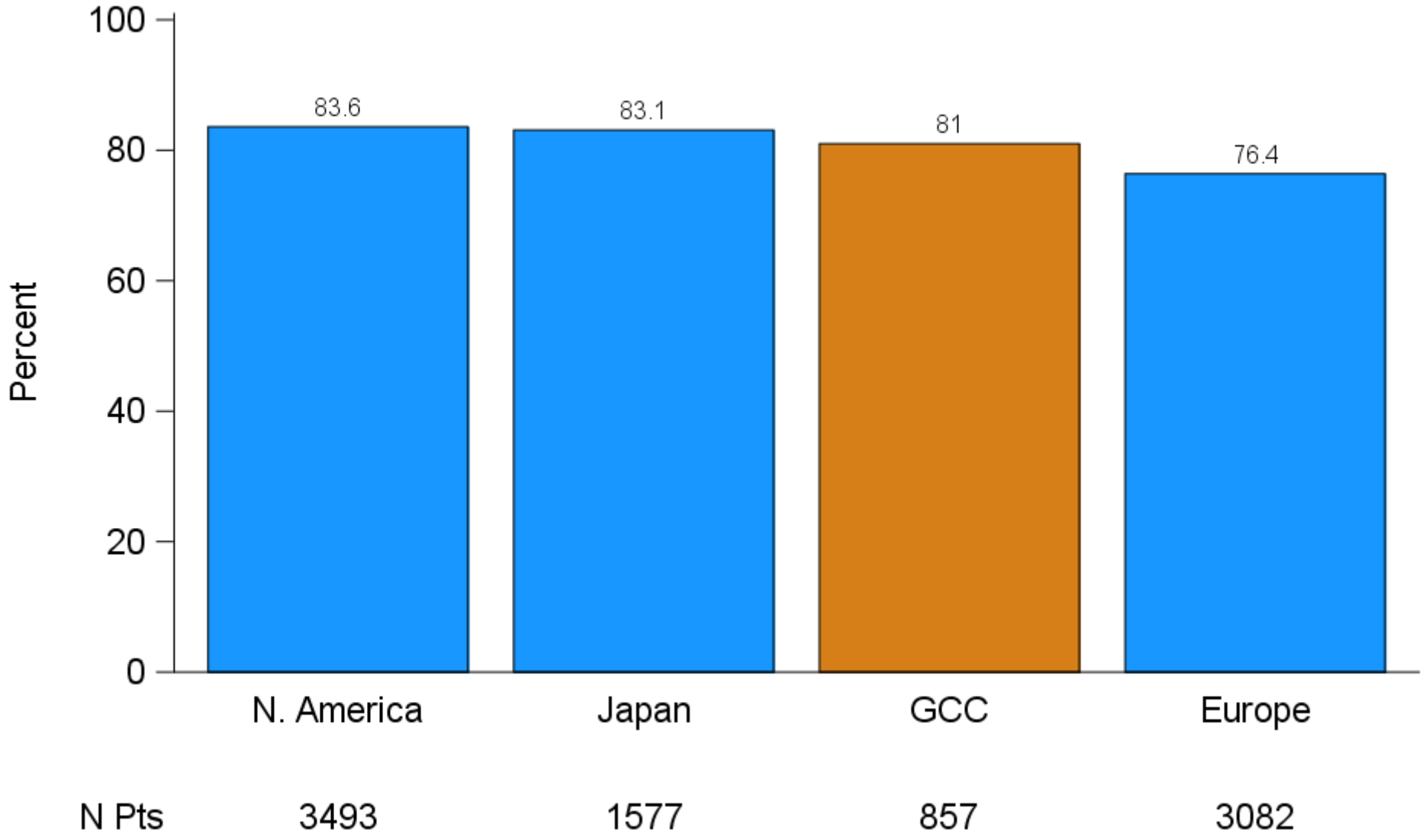
DOPPS 5 (2012,2013)

PTH


% of patients
100
75
50
25
0
33
23
19
25
21
31
20
29
12
24
33
30
22
30
22
21
24
25
26
30
12
31
25
32
32
22
22
24
> 600 pg/mL
301-600 pg/mL
150-300 pg/mL
< 150 pg/mL
<45
45-65
>65
Age Group, years
Male
Female
Sex
Yes
No
Diabetes
N pts: 190 348 192 423 308 362 361
Mean: 563 462 304 467 428 322 584

DOPPS

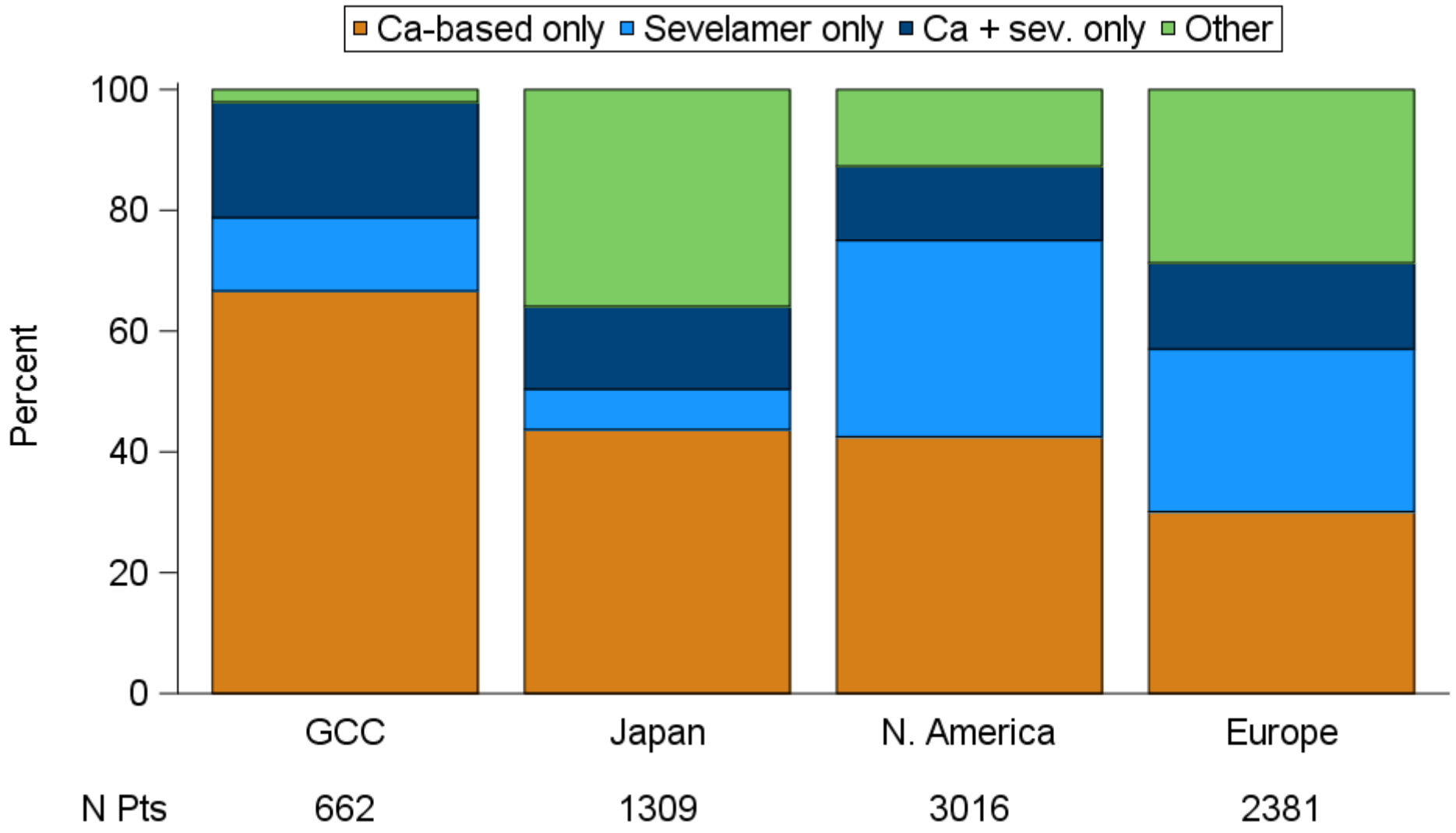
Phosphate binder Rx, by Region



Active prescription at baseline

DOPPS 5 (2012,2013)

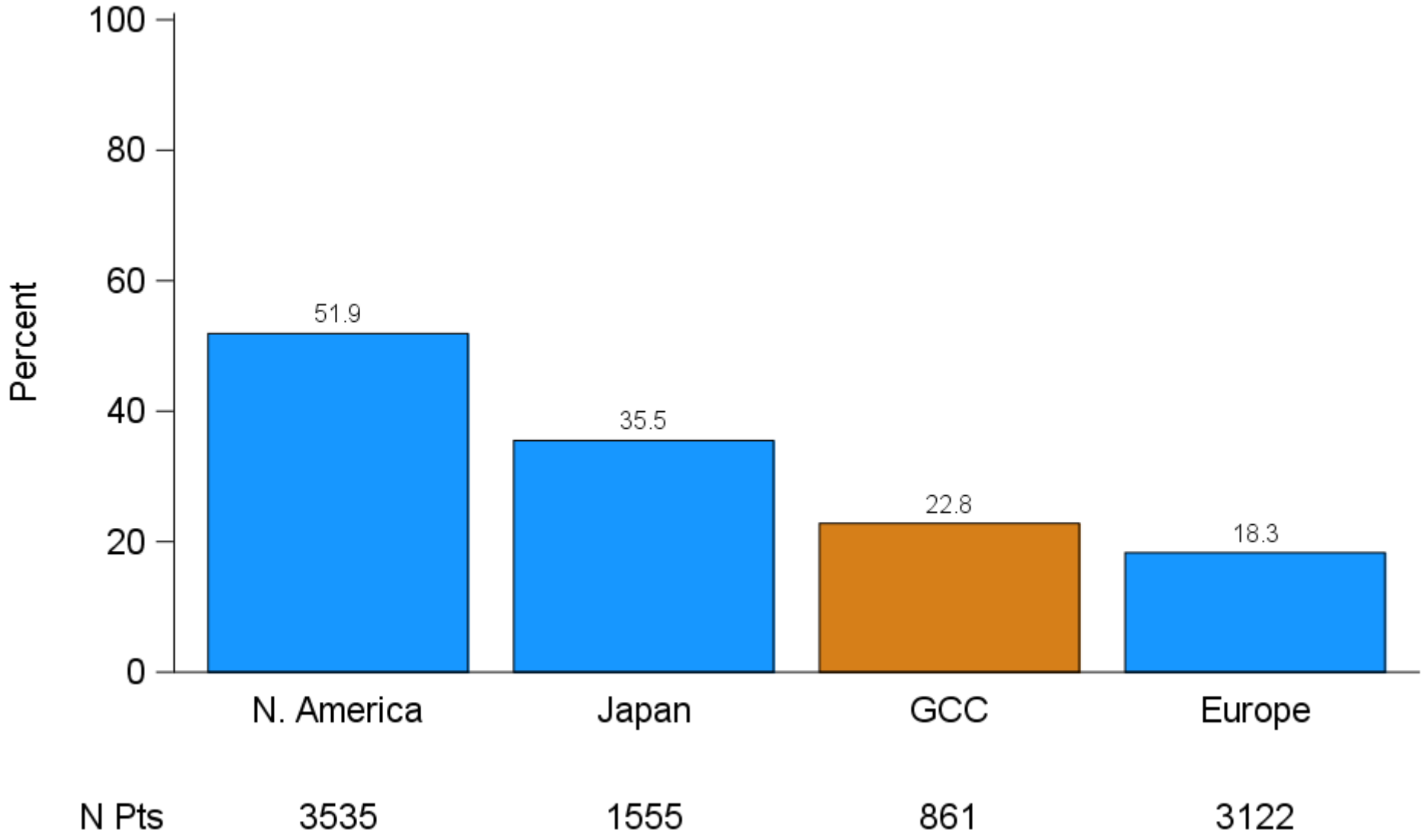
Phosphate binder type, by Region



Among patients with active phosphate binder prescription at baseline

DOPPS 5 (2012,2013)

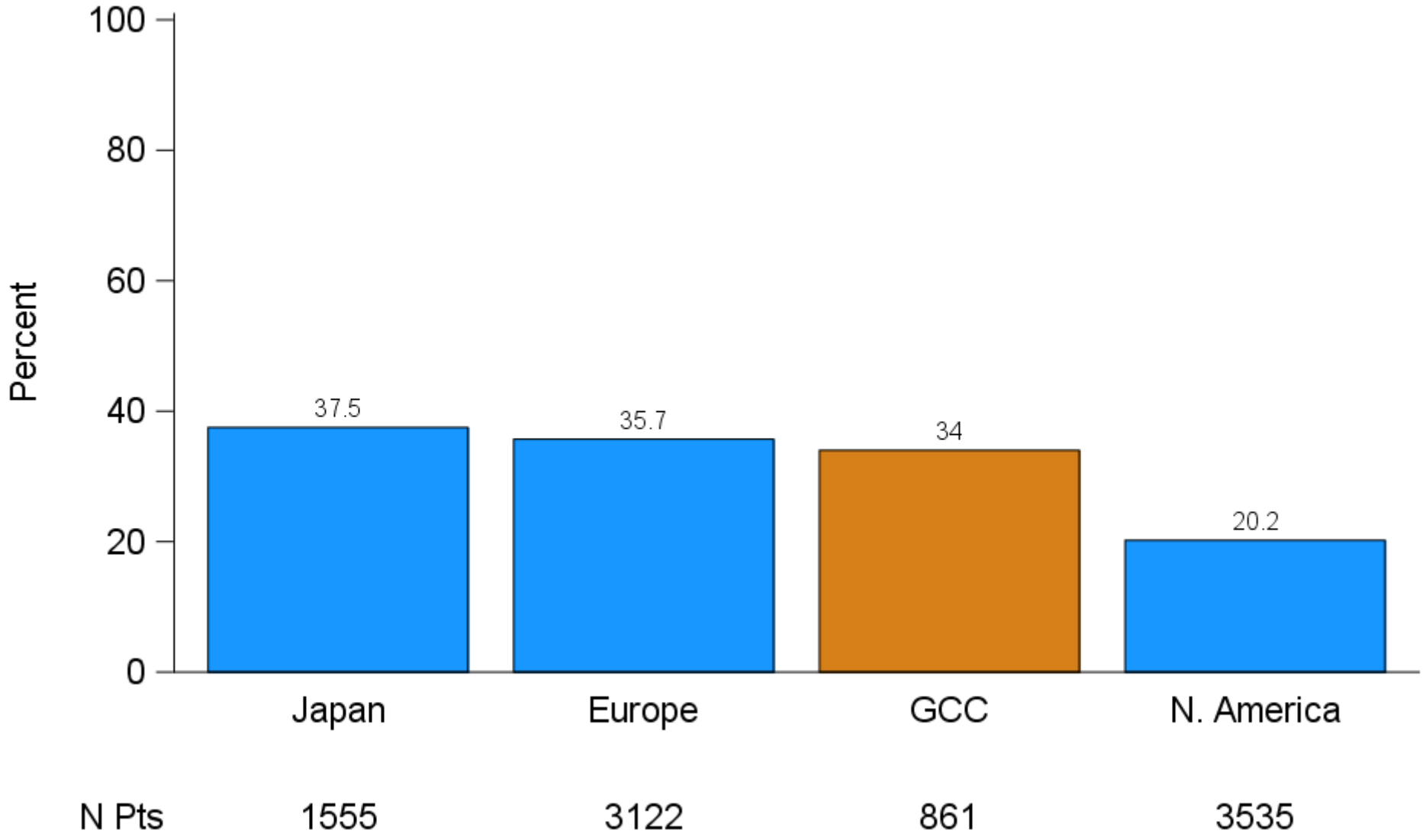
IV Vitamin D Rx, by Region



Active prescription at baseline

DOPPS 5 (2012,2013)

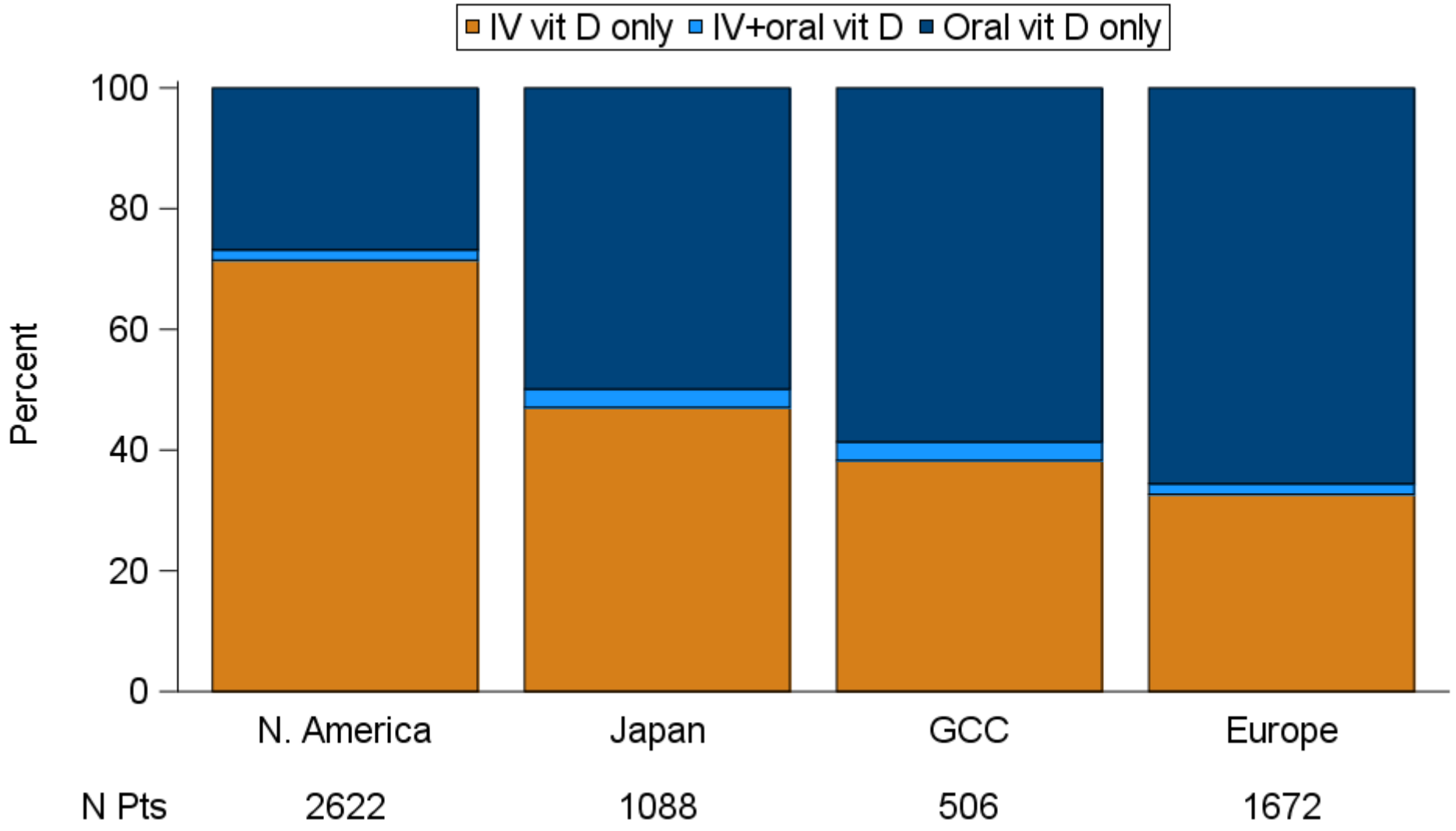
Oral Vitamin D Rx, by Region



Active prescription at baseline

DOPPS 5 (2012,2013)

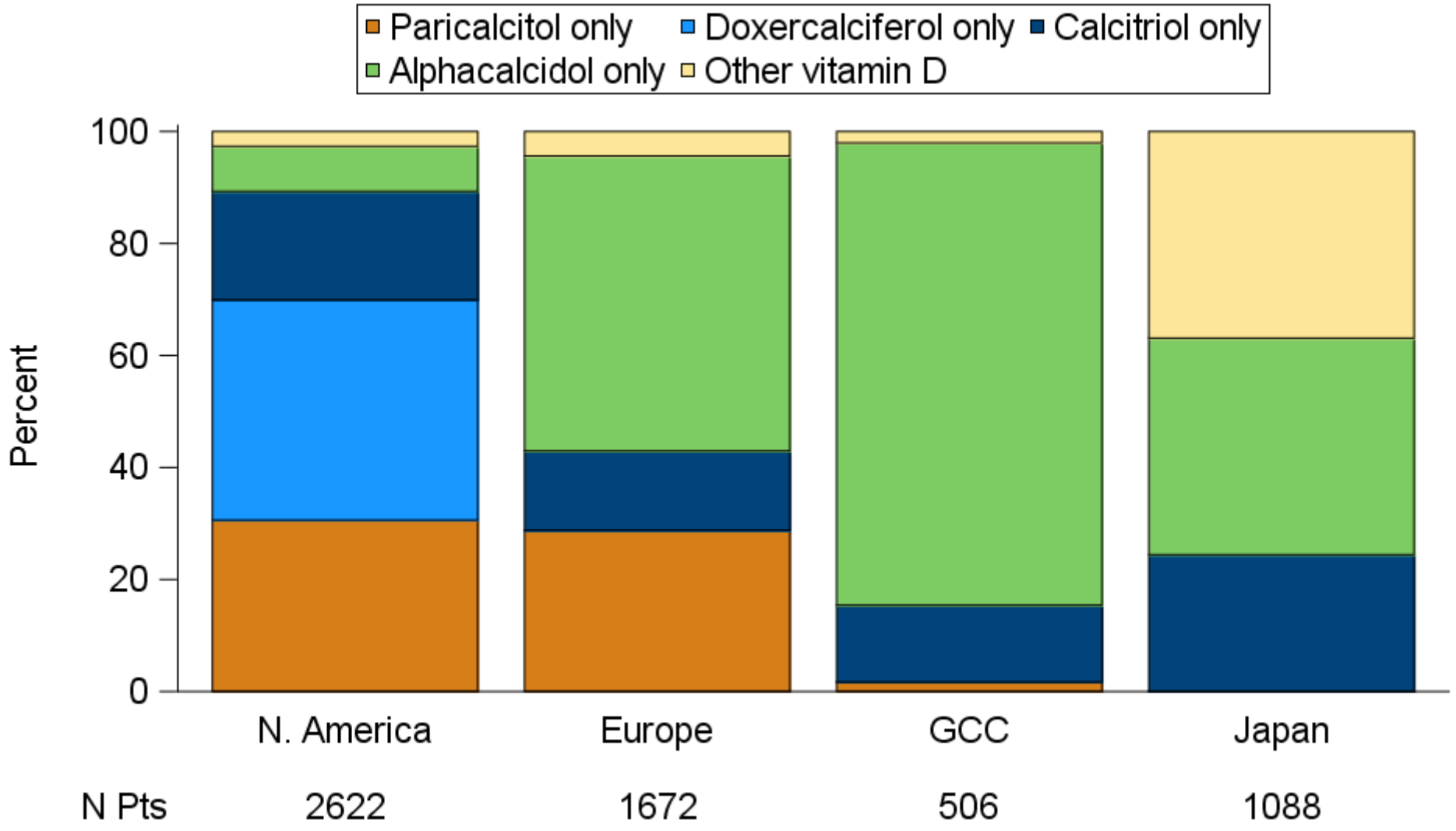
Vitamin D route, by Region



Among patients with active vitamin D prescription at baseline

DOPPS 5 (2012,2013)

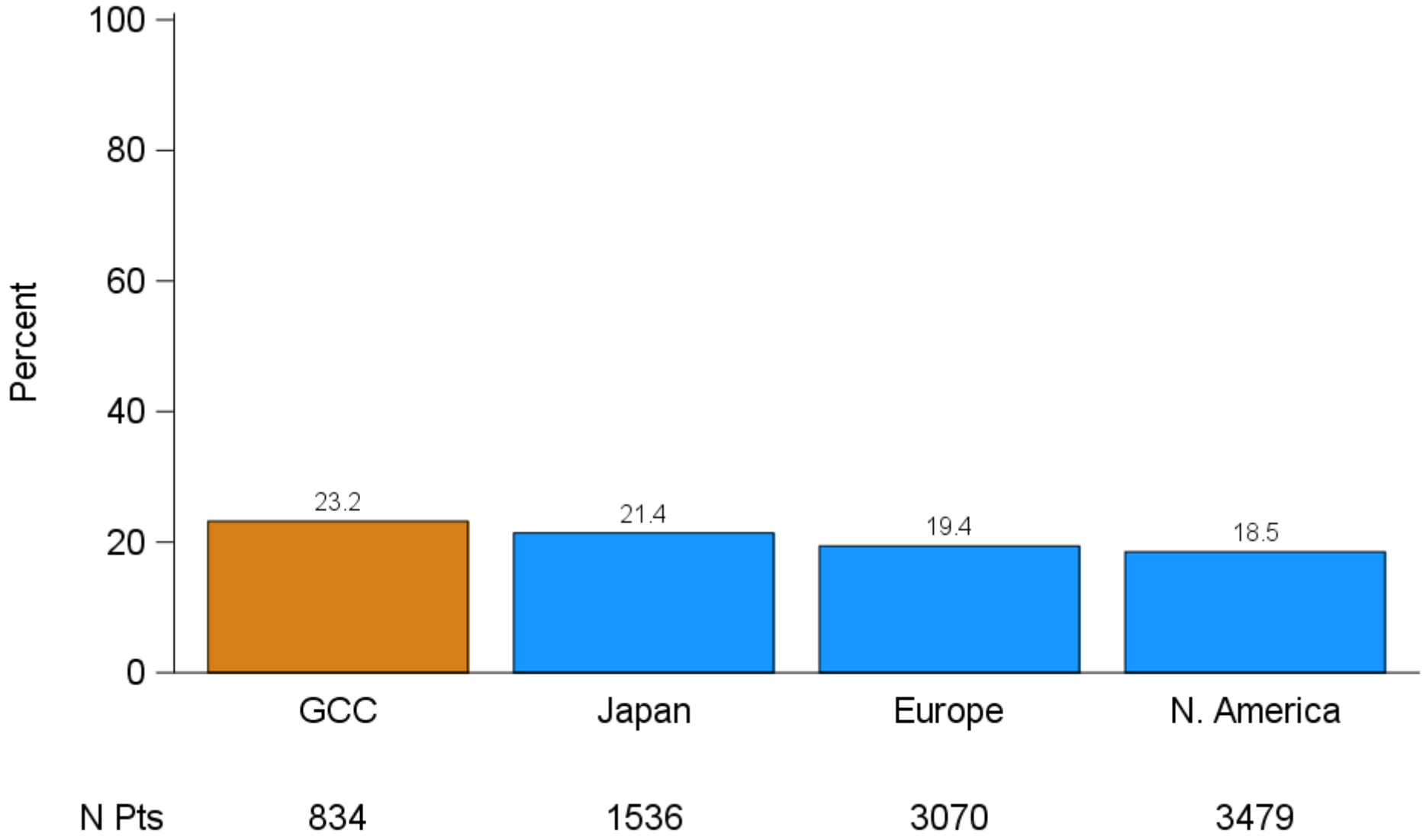
IV Vitamin D type, by Region



Among patients with active vitamin D prescription at baseline

DOPPS 5 (2012,2013)

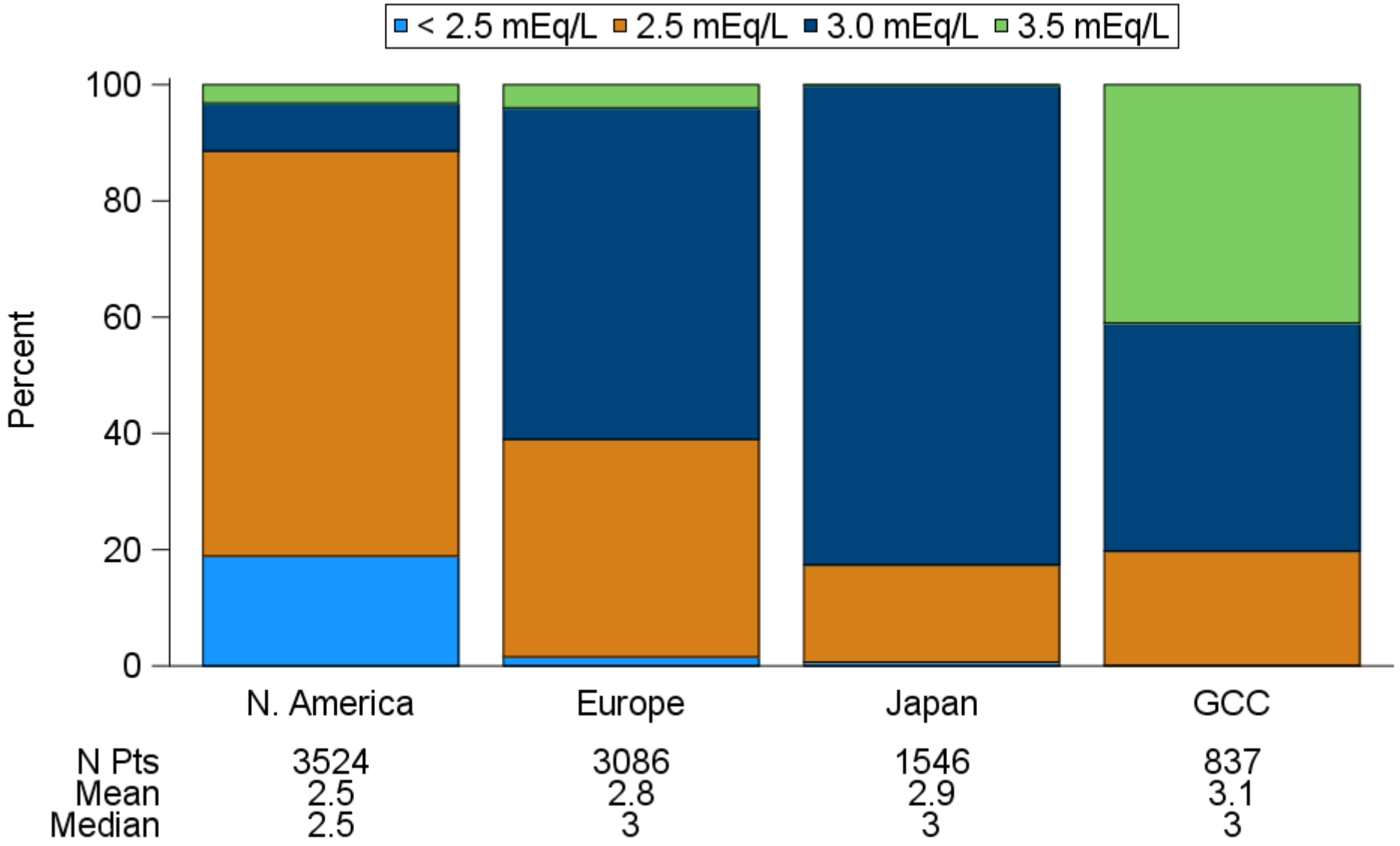
Cinacaclet Rx, by Region



Active prescription at baseline

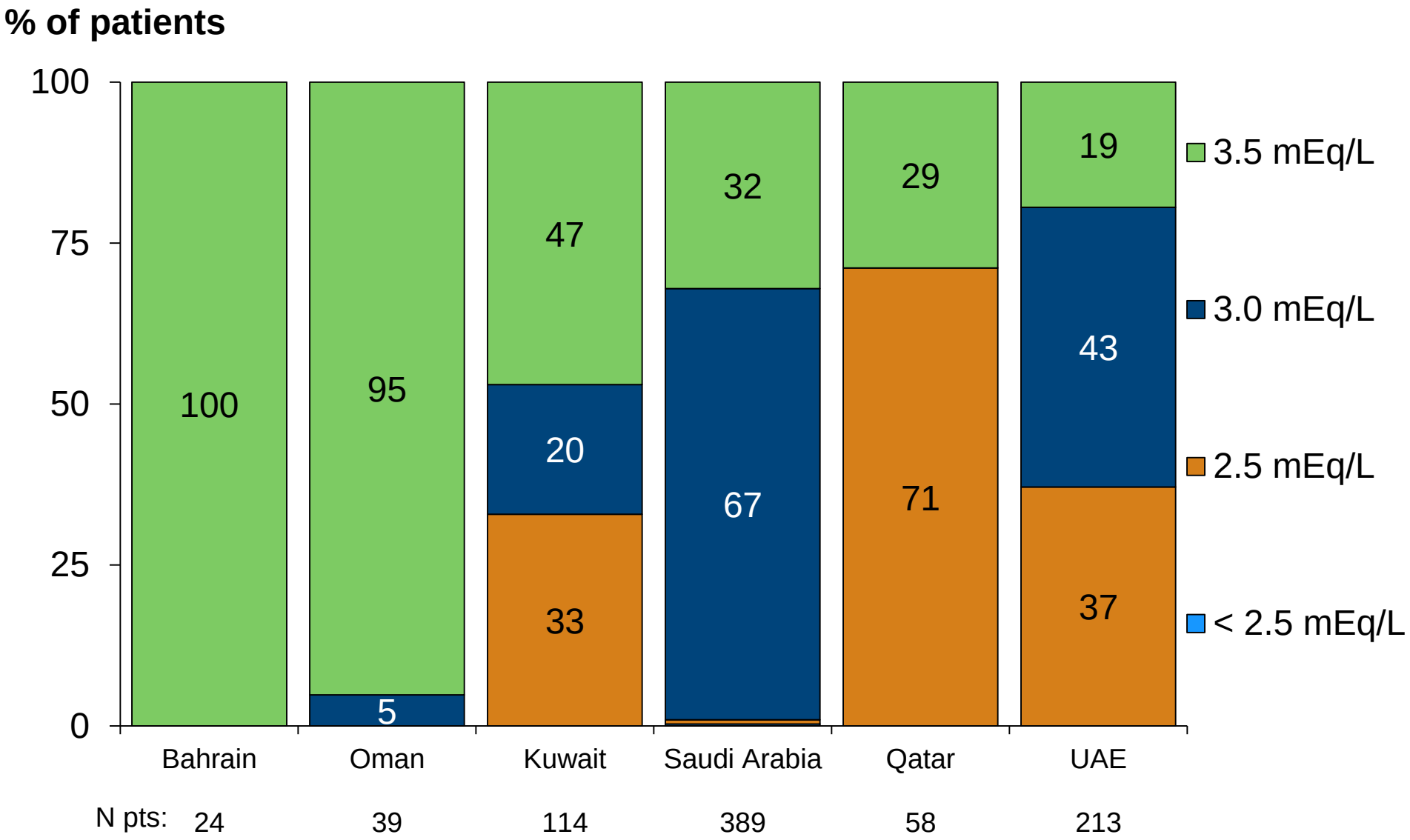
DOPPS 5 (2012,2013)

Dialysate Calcium, by Region



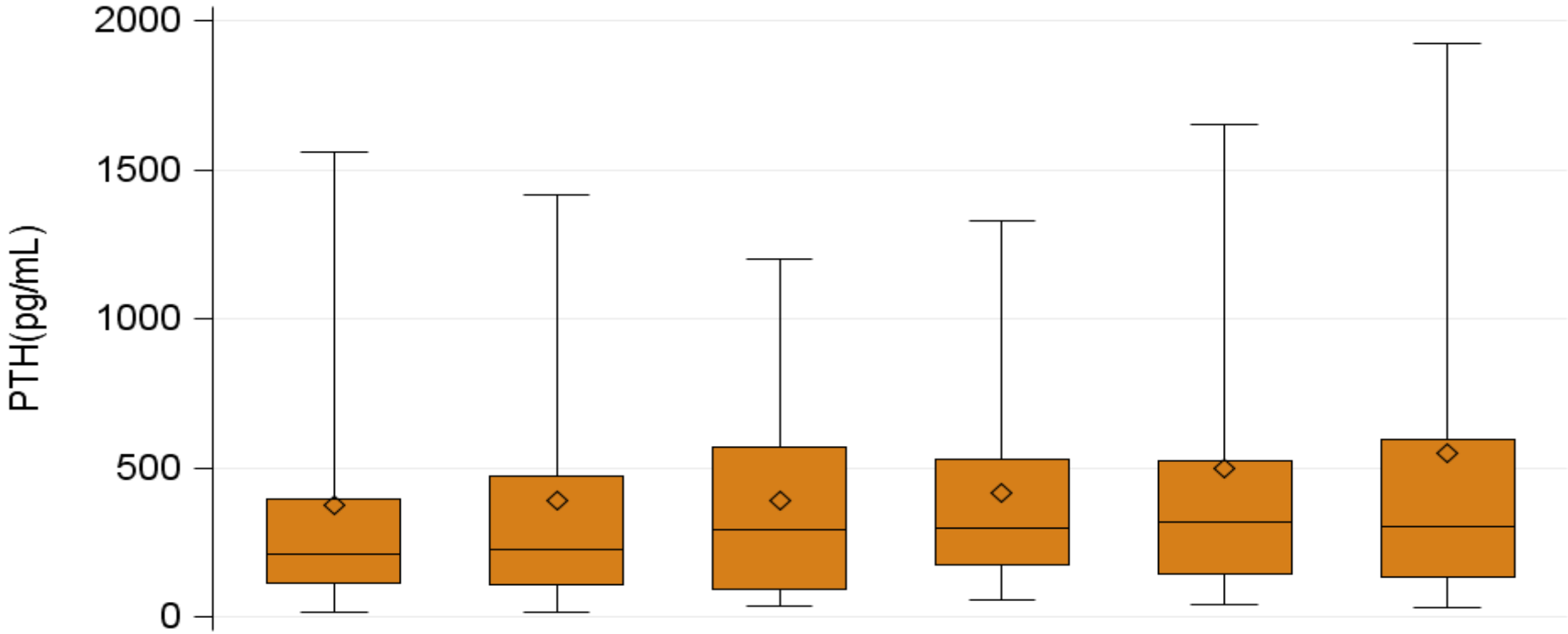
DOPPS 5 (2012,2013)

Calcium bath



DOPPS

PTH, by GCC country

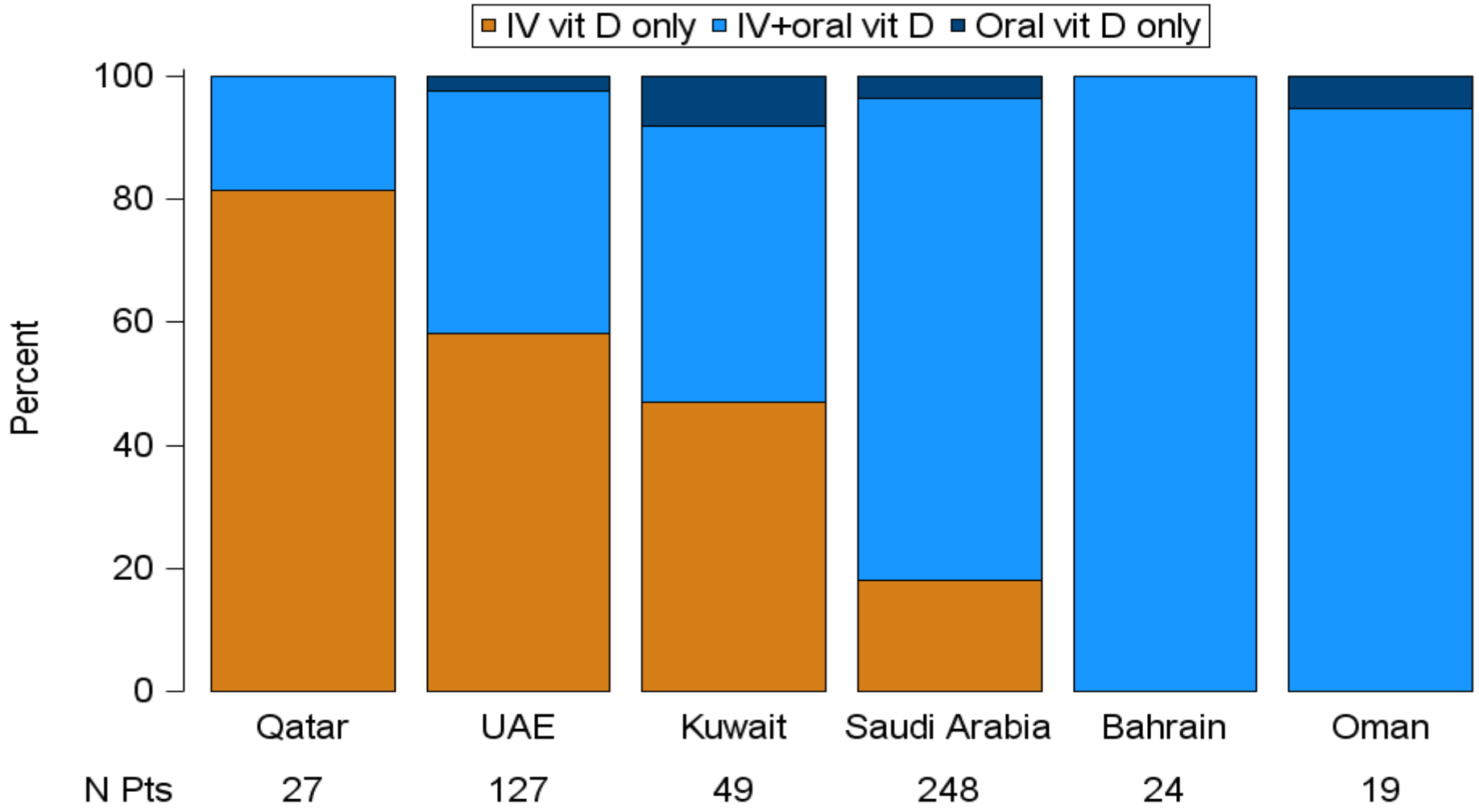


	Bahrain	UAE	Oman	Qatar	Kuwait	Saudi Arabia
N	28	188	40	58	99	306
Mean	373.76	389.59	391.80	415.34	499.50	549.48
Std Dev	506.12	434.29	411.16	412.16	660.85	968.02
Median	211.85	227.35	291.18	298	318.25	303.53

DOPPS

DOPPS 5 (2012,2013)

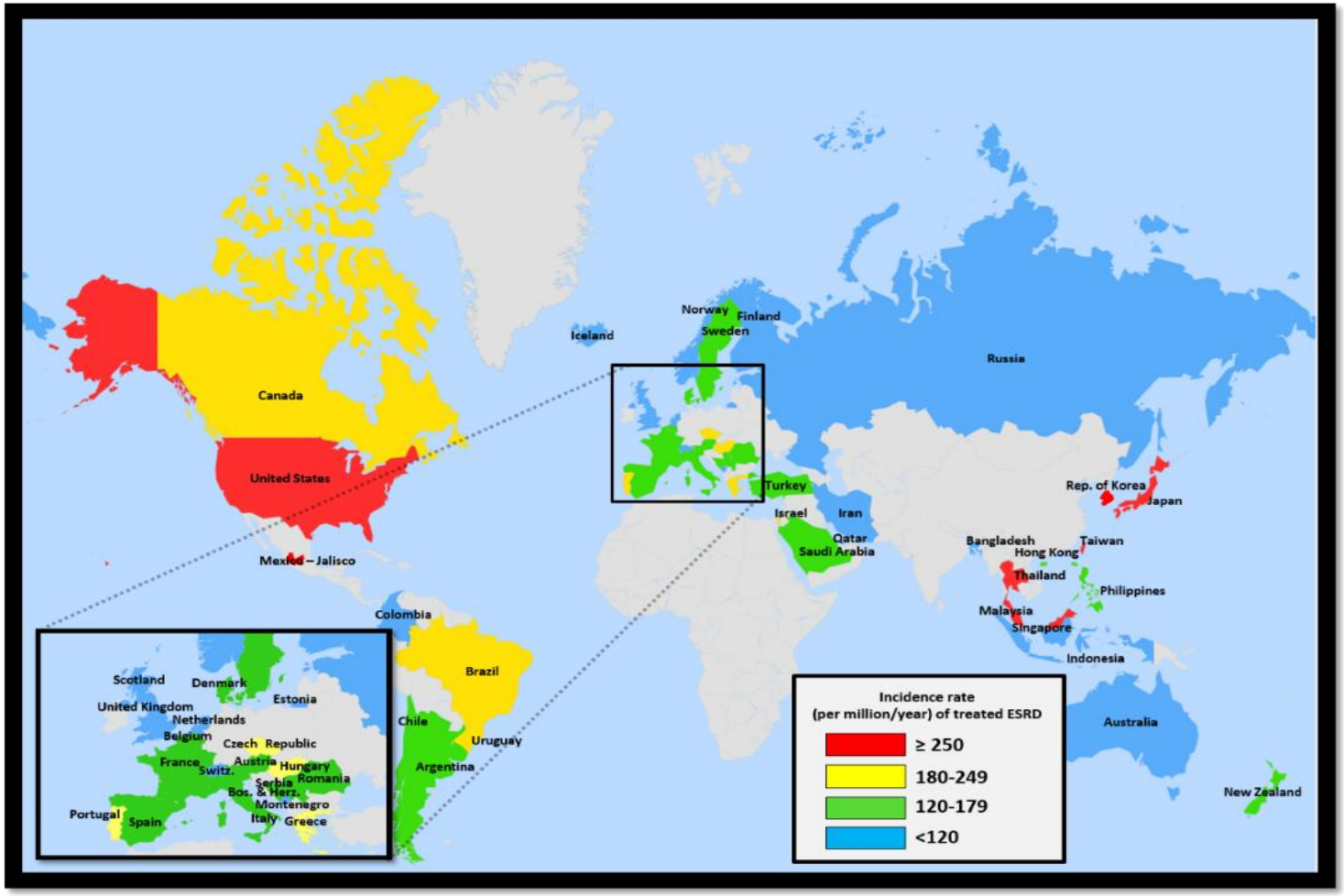
Vitamin D route, by GCC country



Among patients prescribed vitamin D at baseline; excludes nutritional vitamin D

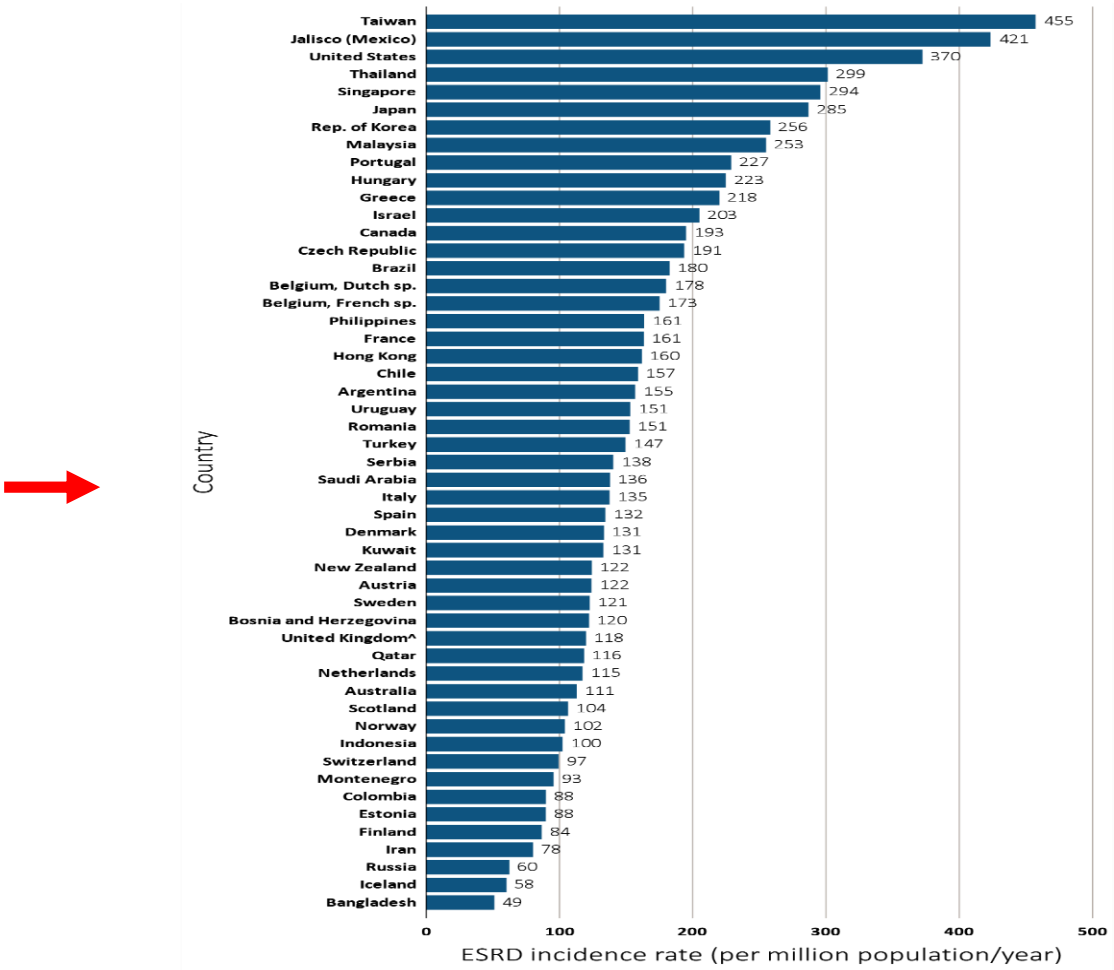
DOPPS 5 (2012,2013)

Figure 13.1 Geographic variations in the incidence rate of treated ESRD (per million population/year), by country, 2014



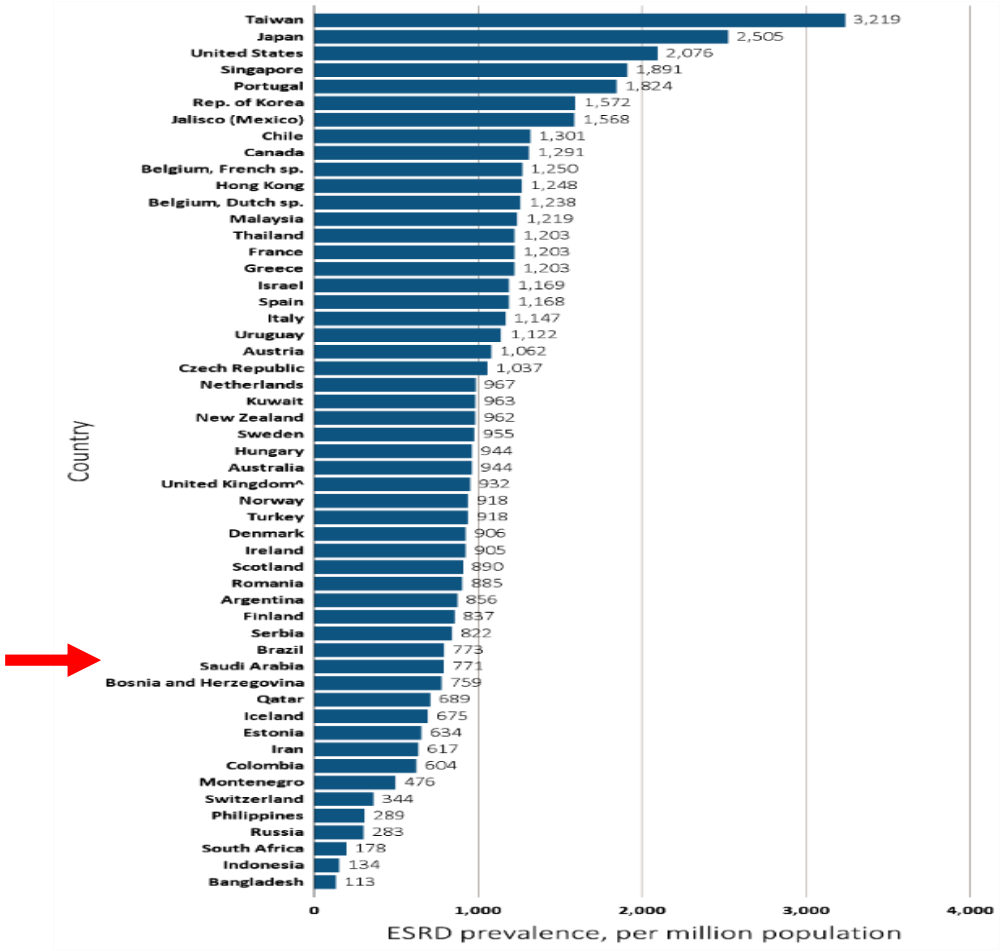
Data Source: Special analyses, USRDS ESRD Database. Data presented only for countries from which relevant information was available. All rates are unadjusted. ^United Kingdom: England, Wales, Northern Ireland (Scotland data reported separately). Data for Italy include 6 regions. Data for Indonesia represent the West Java region. Data for France include 22 regions. Data for Spain include 18 of 19 regions. Data for Canada excludes Quebec. Japan includes dialysis patients only. Abbreviations: ESRD, end-stage renal disease .

Figure 13.2 Incidence rate of treated ESRD (per million population/year), by country, 2014



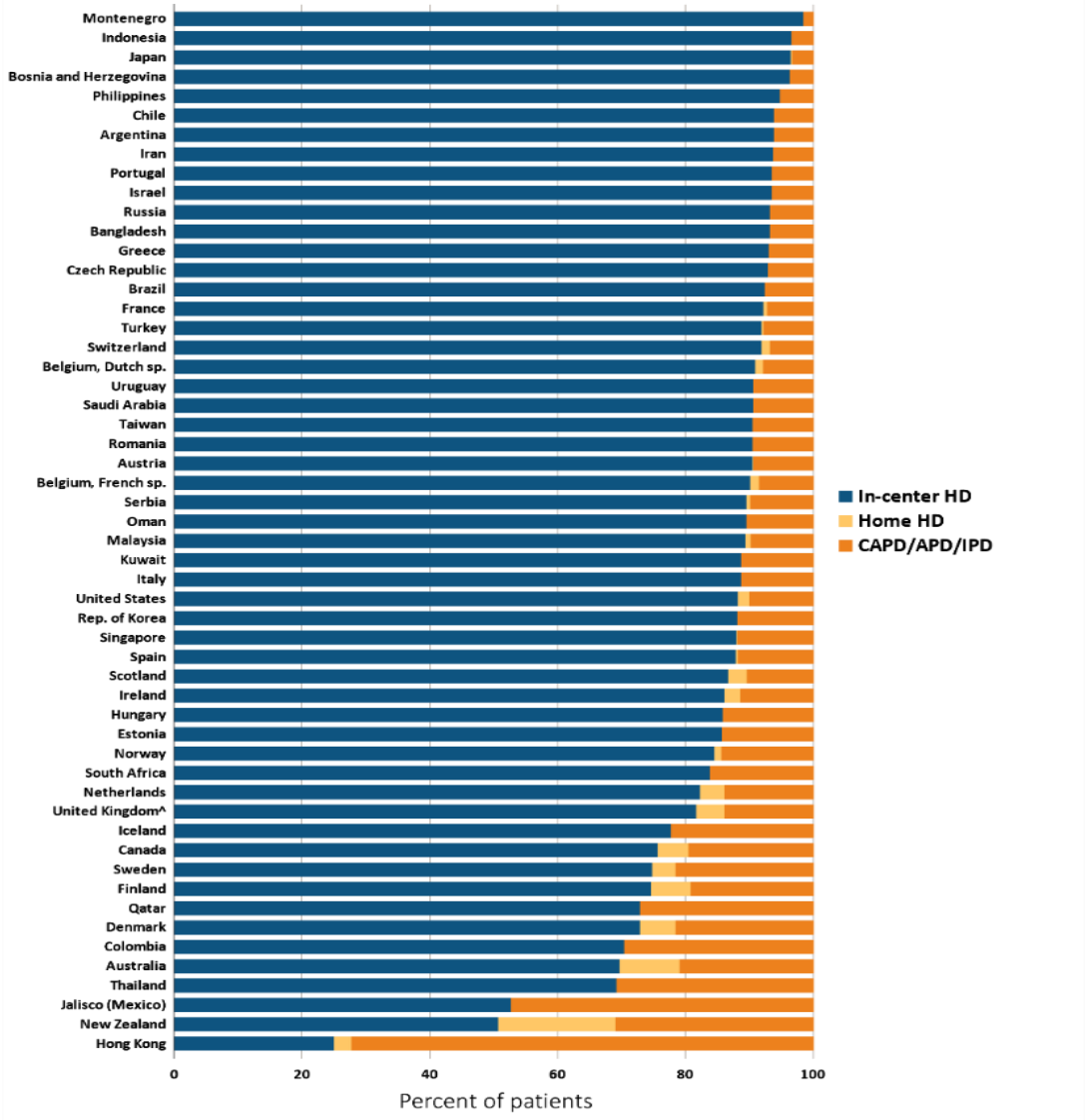
Data Source: Special analyses, USRDS ESRD Database. Data presented only for countries from which relevant information was available. All rates are unadjusted. ^United Kingdom: England, Wales, Northern Ireland (Scotland data reported separately). Data for Italy include 6 regions. Data for Indonesia represent the West Java region. Data for France include 22 regions. Data for Spain include 18 of 19 regions. Data for Canada excludes Quebec. Japan includes dialysis patients only. Abbreviations: ESRD, end-stage renal disease; sp., speaking.

Figure 13.9 Prevalence of treated ESRD per million population, by country, 2014



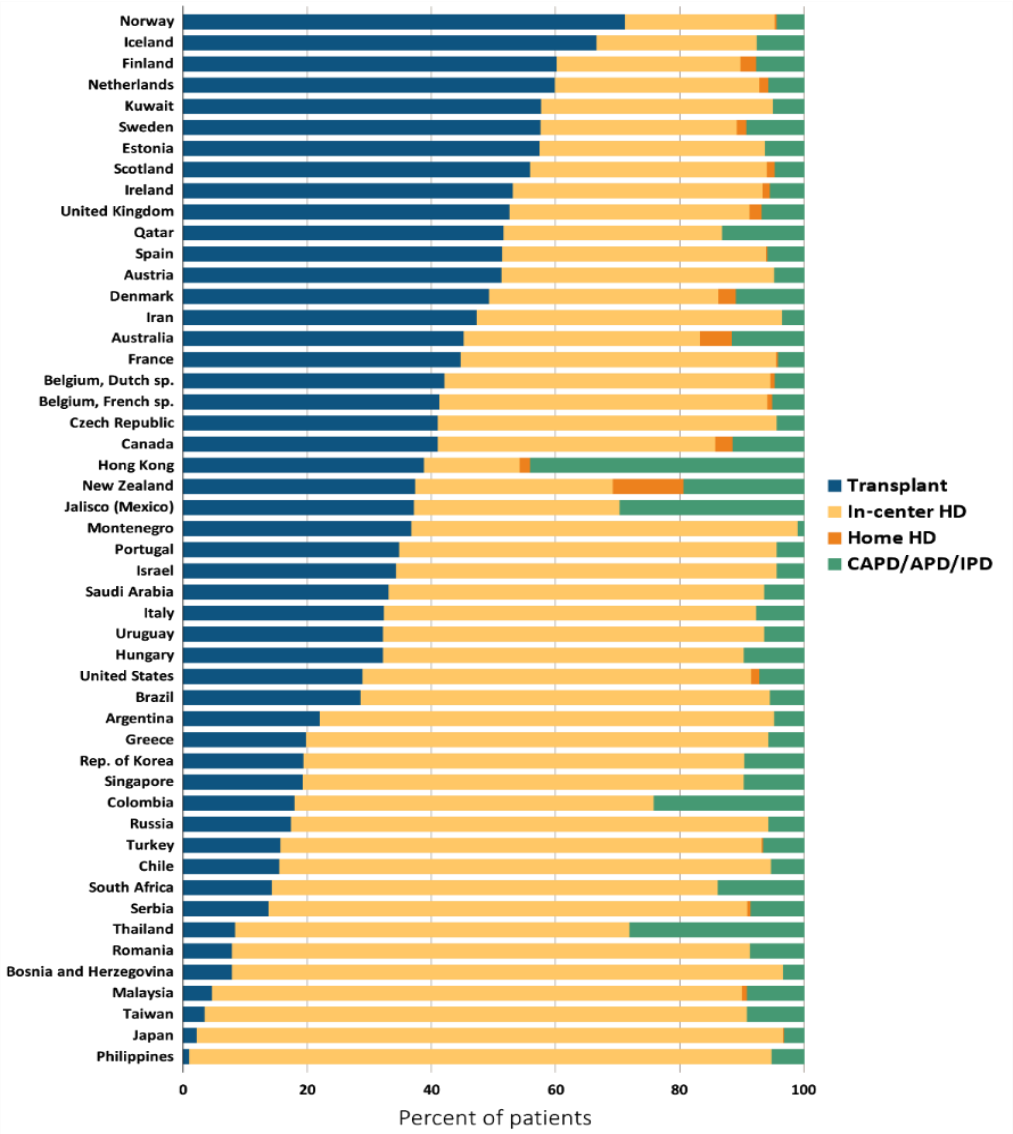
Data Source: Special analyses, USRDS ESRD Database. Data presented only for countries from which relevant information was available. ^United Kingdom: England, Wales, Northern Ireland (Scotland data reported separately). The prevalence is unadjusted and reflects prevalence at the end of 2014. Switzerland includes dialysis patients only. Data for Indonesia represent the West Java region. Data for Spain include 18 of 19 regions. Data for France include 22 regions. Data for Italy includes 6 regions. Data for Canada excludes Quebec. Abbreviations: ESRD, end-stage renal disease; sp., speaking.

Figure 13.15 Distribution of the percentage of prevalent dialysis patients using in-center HD, home HD, or peritoneal dialysis (CAPD/APD/IPD), 2014



Data Source: Special analyses, USRDS ESRD Database. Denominator is calculated as the sum of patients receiving HD, PD, Home HD; does not include patients with other/unknown modality. ^United Kingdom: England, Wales, & Northern Ireland (Scotland data reported separately). Data for Spain include 18 of 19 regions. Data for France include 22 regions. Data for Italy include 6 regions. Data for Canada excludes Quebec. Abbreviations: CAPD, continuous ambulatory peritoneal dialysis; APD, automated peritoneal dialysis; IPD, intermittent peritoneal dialysis.

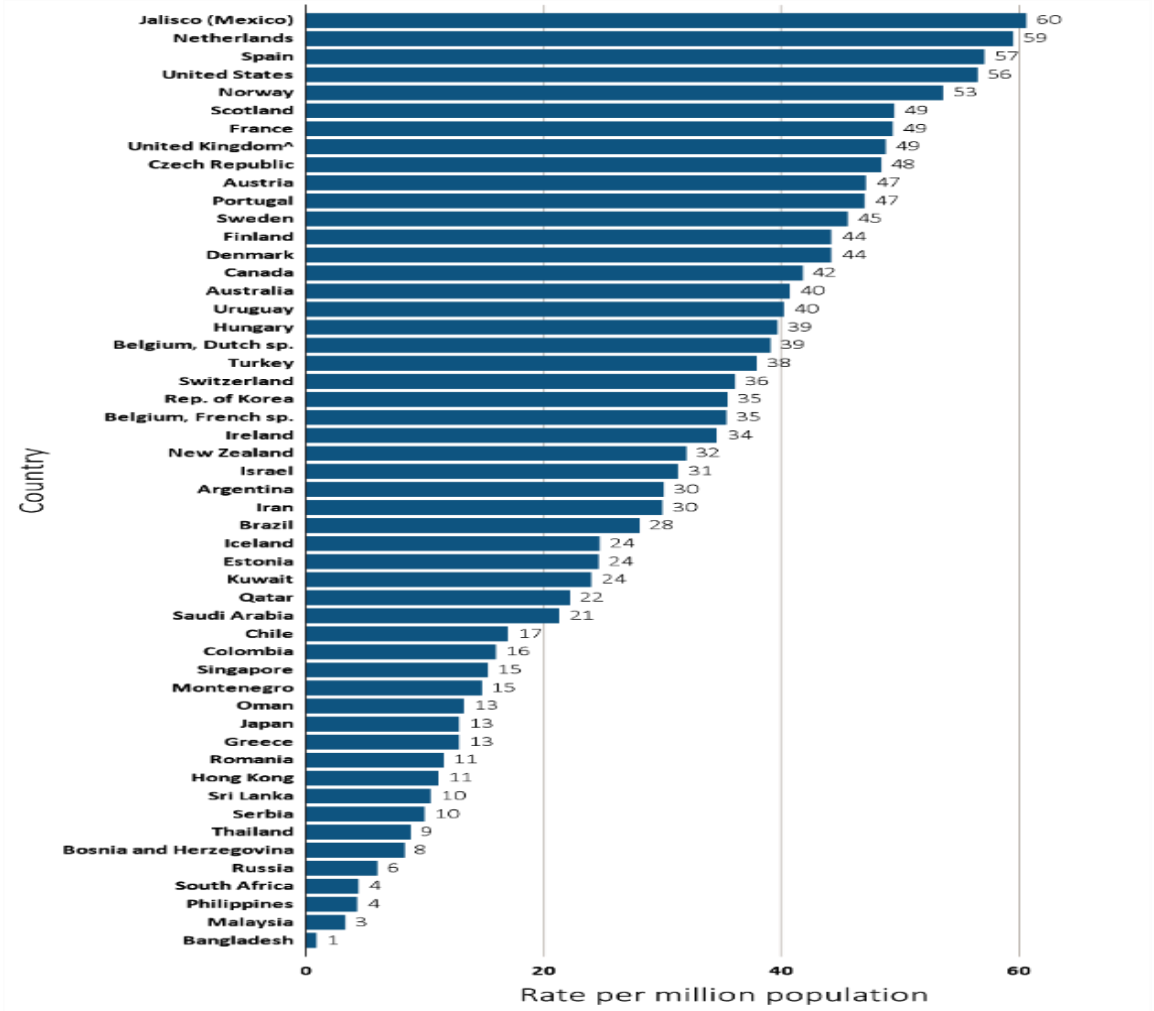
Figure 13.12 Percent distribution of type of renal replacement therapy modality used by ESRD patients, by country, 2014



Data Source: Special analyses, USRDS ESRD Database. Denominator is calculated as the sum of patients receiving HD, PD, Home HD, or treated with a functioning transplant; does not include patients with other/unknown modality. Data for Spain include 18 of 19 regions. Data for France include 22 regions. Data for Italy include 6 regions. Data for Canada excludes Quebec. Abbreviations: CAPD, continuous ambulatory peritoneal dialysis; APD, automated peritoneal dialysis; IPD, intermittent peritoneal dialysis; ESRD, end-stage renal disease; HD, hemodialysis; PD, peritoneal dialysis; sp., speaking

Figure 13.16 Kidney transplantation rate, by country, 2014

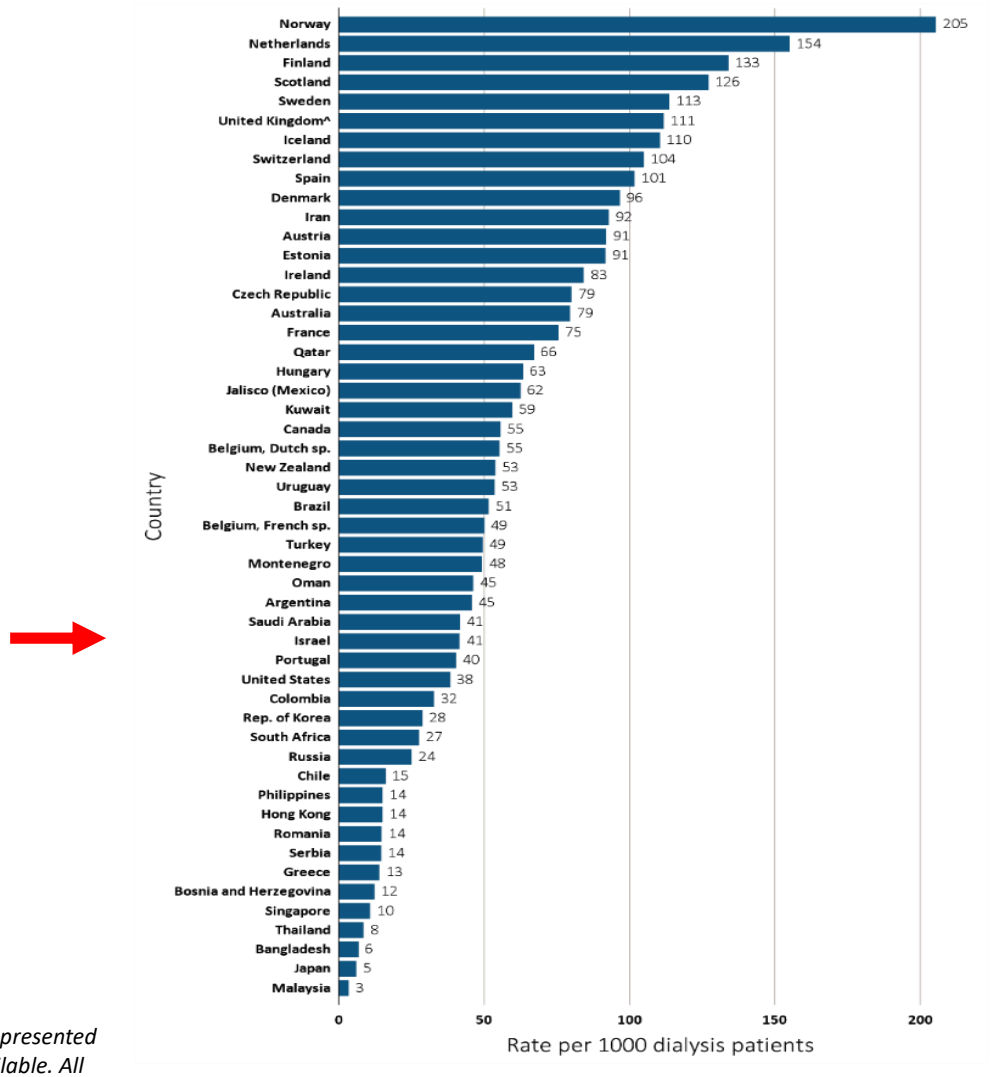
(a) Per million population



Data Source: Special analyses, USRDS ESRD Database. Data presented only for countries from which relevant information was available. All rates are unadjusted. ^United Kingdom: England, Wales, & Northern Ireland (Scotland data reported separately). Data for France include 22 regions. Data for Sri Lanka is from 7 government hospitals. Data for Spain include all regions. Data for Canada excludes Quebec. Abbreviations: sp., speaking.

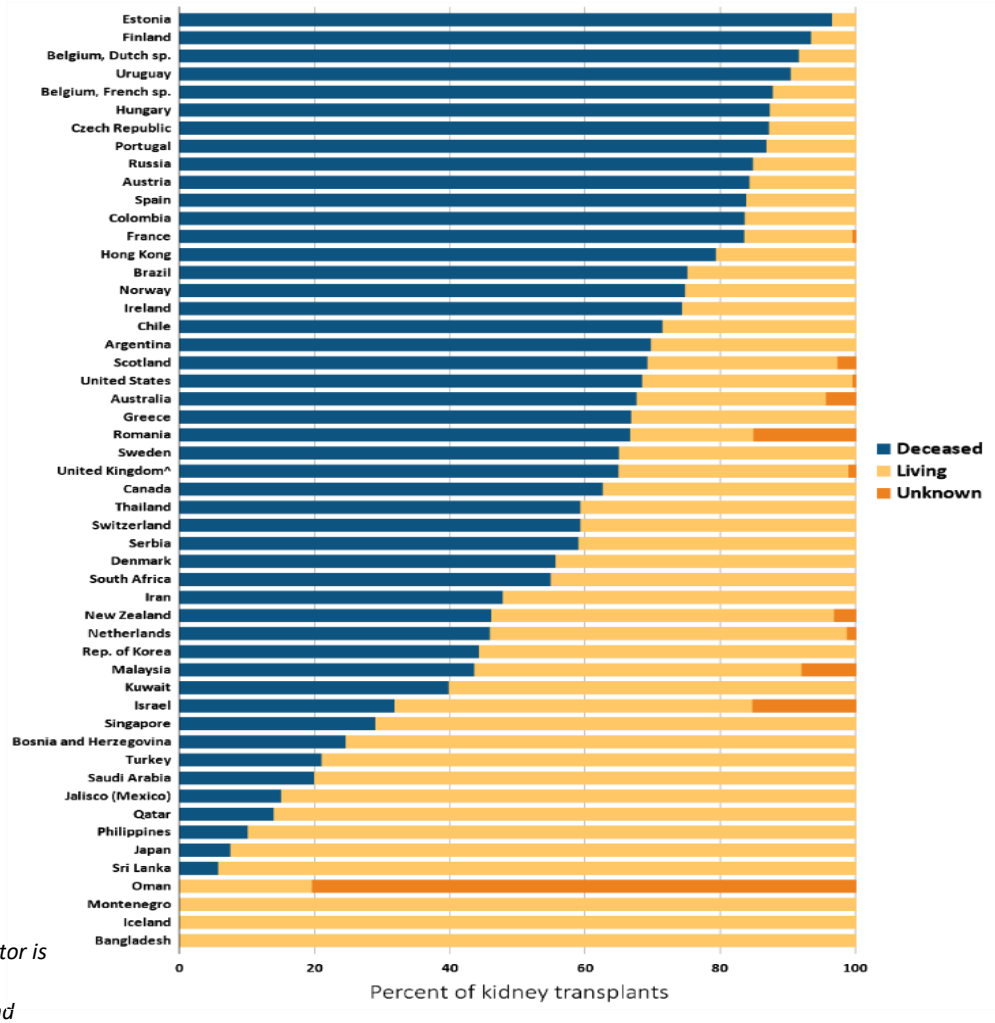
Figure 13.16 Kidney transplantation rate, by country, 2014

(a) Per 1000 dialysis patients



Data Source: Special analyses, USRDS ESRD Database. Data presented only for countries from which relevant information was available. All rates are unadjusted. ^United Kingdom: England, Wales, & Northern Ireland (Scotland data reported separately). Data for France include 22 regions. Data for Sri Lanka is from 7 government hospitals. Data for Spain include all regions. Data for Canada excludes Quebec. Abbreviations: sp., speaking.

Figure 13.18 Distribution of the percentage of kidney transplantations by kidney donor type and country, 2014



Data Source: Special analyses, USRDS ESRD Database. Denominator is calculated as the sum of deceased, living donor, and unknown transplants. ^United Kingdom: England, Wales, & Northern Ireland (Scotland data reported separately). Data for France include 22 regions. Data for Sri Lanka is from 7 government hospitals. Data from Canada excludes Quebec. Abbreviations: ESRD, end-stage renal disease.

Conclusions

- GCC patients are younger patients than the rest of the world
- GCC countries initiate dialysis at lower GFR with probably late presentations and the highest temporary access
- GCC counties has the lowest Kt/v and probably due to highest temporary access, with low blood flow, lowest treatment time and high missed treatment
- GCC patients are more inflamed with lower albumin level

Conclusions

- GCC patients had equivalent hemoglobulin level to the rest of the world with lower TSAT

- GCC countries had highest PTH level with 24% had very high PTH despite high calcium bath and equivalent phosphate binders, this probably due to low use of iv vitamin D
- There is remarkable variability in dialysis prescription and treatment of Anemia and CKD-MBD
- GCC countries still lag behind on transplant rate