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ORIGINAL ARTICLE

The ERA-EDTA Registry Annual Report 2018: a summary

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ABSTRACT

Background. The European Renal Association – European Dialysis and Transplant Association (ERA-EDTA) Registry collects data on kidney replacement therapy (KRT) via national and regional renal registries in Europe and countries bordering the Mediterranean Sea. This article summarizes the 2018 ERA-EDTA Registry Annual Report, and describes the epidemiology of KRT for kidney failure in 34 countries.

Methods. Individual patient data on patients undergoing KRT in 2018 were provided by 34 national or regional renal registries and aggregated data by 17 registries. The incidence and prevalence of KRT, the kidney transplantation activity and the survival probabilities of these patients were calculated.

Results. In 2018, the ERA-EDTA Registry covered a general population of 636 million people. Overall, the incidence of KRT for kidney failure was 129 per million population (p.m.p.), 62% of patients were men, 51% were ≥65 years of age and 20% had

diabetes mellitus as cause of kidney failure. Treatment modality at the onset of KRT was haemodialysis (HD) for 84%, peritoneal dialysis (PD) for 11% and pre-emptive kidney transplantation for 5% of patients. On 31 December 2018, the prevalence of KRT was 897 p.m.p., with 57% of patients on HD, 5% on PD and 38% living with a kidney transplant. The transplant rate in 2018 was 35 p.m.p.: 68% received a kidney from a deceased donor, 30% from a living donor and for 2% the donor source was unknown. For patients commencing dialysis during 2009–13, the unadjusted 5-year survival probability was 42.6%. For patients receiving a kidney transplant within this period, the unadjusted 5-year survival probability was 86.6% for recipients of deceased donor grafts and 93.9% for recipients of living donor grafts.

Keywords: dialysis, epidemiology, kidney failure, kidney transplantation, survival analysis

INTRODUCTION

This article summarizes the European Renal Association – European Dialysis and Transplant Association (ERA-EDTA) Registry's 2018 Annual Report, providing the most recent data on the epidemiology of kidney replacement therapy (KRT) for kidney failure in Europe, and countries bordering the Mediterranean Sea [1]. In total, 51 national or regional renal registries from 34 countries provided data to the ERA-EDTA Registry, of which 34 renal registries from 18 countries provided individual patient data, and another 17 renal registries provided aggregated data from 17 countries (Supplementary Appendix S1). In total, these registries cover a general population of 636 million people, which is lower than the 694 million people covered in the 2017 Annual Report [2], as this year Croatia, Georgia, Poland and Sfax region (Tunisia) could not be included. When excluding Israel, the remaining countries cover a general population of 627 million people, representing 74.2% of the total 2018 European general population. On the other hand, compared with our 2017 Annual Report, Montenegro and the Valencian region (Spain) are now included with individual patient data.

This article presents the 2018 incidence and prevalence of KRT, kidney transplantation activity and both patient and graft survival in Europe. More information on the methods used to analyse the data, as well as the complete results, can be found in the ERA-EDTA Registry 2018 Annual Report [1].

RESULTS

Incidence of KRT

In 2018, 81 714 individuals out of a population of 636 million people started KRT for kidney failure, resulting in an overall unadjusted incidence of 129 per million population (p.m.p.; Table 1). The unadjusted incidence ranged from 37, 73 and 74 p.m.p. in Ukraine, Estonia and Montenegro, respectively, to 256 p.m.p. in Portugal and Cyprus and 264 p.m.p. in Greece (Table 1 and Figures 1 and 2). Of the patients starting KRT, 62% were men, 51% were aged ≥65 years and 20% had diabetes mellitus (DM) as cause of kidney failure (Figure 3). The median age of the patients starting KRT was 66.5 years, and differed by almost 20 years between Ukraine (55.0 years) and the Dutch-speaking part of Belgium (74.4 years; Table 1). The majority (84%) of patients started KRT with haemodialysis (HD), another 11% started with peritoneal dialysis (PD) and 5% of patients received a pre-emptive kidney transplant (Figure 4). While the distribution of initial treatment modalities was similar for men and women, there were considerable differences between age groups, with decreasing proportions of patients receiving either PD or a pre-emptive transplant with increasing age (Figure 4). In addition, compared with patients without DM as cause of kidney failure, those with DM as cause of kidney failure more often started KRT on HD (85% versus 80%), and less frequently received a pre-emptive kidney transplant (2% versus 6%). Among the incident patients receiving KRT at Day 91 after the onset of treatment, 82% were receiving HD, 13% were receiving PD and 5% were living with a functioning kidney transplant (Figure 5). When compared with Day 1, the percentage of patients receiving HD decreased, a finding that was particularly evident in the younger age groups.

Prevalence of KRT

On 31 December 2018, 569 678 patients were receiving KRT for kidney failure, corresponding to an overall unadjusted prevalence of 897 p.m.p. (Table 2). Among the individual countries or regions the unadjusted prevalence ranged from 229, 313 and 411 p.m.p. in Ukraine, Montenegro and Russia, respectively, to 1469, 1547 and 2011 p.m.p. in Catalonia (Spain), Valencian region (Spain) and Portugal, respectively (Table 2 and Figures 6 and 7). Of the prevalent patients, 60% were men, 43% were aged ≥65 years and 15% had DM as cause of kidney failure (Figure 8). The median age of prevalent patients receiving KRT was 63.0 years, ranging from 52.0 years in Albania and Ukraine to 68.6 years in Israel (Table 2). Of the prevalent patients, 57% were receiving HD and 5% were receiving PD, while 38% were living with a kidney transplant (Figure 9). Compared with prevalent patients with a cause of kidney failure other than DM, those with DM as cause of kidney failure were less likely to be living with a functioning kidney transplant (51% versus 29%).

Kidney transplantation

In 2018, a total of 22 260 kidney transplantations were performed, corresponding to an overall unadjusted transplant rate of 35 p.m.p. (Figure 10). In the individual countries or regions, the unadjusted kidney transplant rates ranged from 3 p.m.p. in Ukraine and 4 p.m.p. in Bulgaria and Serbia, to 76, 77 and 102 p.m.p. in Asturias (Spain), Cantabria (Spain) and Catalonia (Spain), respectively. Overall, the unadjusted deceased donor kidney transplant rate was more than twice that of living donor transplants (24 p.m.p. versus 10 p.m.p.; 68% versus 30%; Figures 11 and 12). The highest unadjusted rates of deceased donor kidney transplants were observed in several Spanish regions (>70 p.m.p.; Figure 12), whereas the highest unadjusted rates of living donor transplants were observed in Northern Ireland (27 p.m.p.), the Netherlands (28 p.m.p.) and Turkey (37 p.m.p.; Figure 12).

Survival of patients receiving KRT

For patients commencing KRT in the period 2009–13, the 5-year unadjusted patient survival probability was 51.1% [95% confidence interval (95% CI) 51.0–51.2; Table 3]. For patients starting

Table 1. Incidence of KRT (as count and p.m.p.) in 2018, at Day 1, by country or region, unadjusted and the mean and median age at the start of KRT, and the incidence of KRT for patients with DM as cause of kidney failure (as count and p.m.p.)

Country/region	General population covered by the registry in thousands	Incidence of KRT in 2018 at Day 1					
		All (*n*)	All (p.m.p.)	Mean age (years)	Median age (years)	DM (*n*)	DM (p.m.p.)
Albania	2841	398	140	59.8	61.0	78	27
Austria	8822	1057	120	64.4	67.1	243	28
Belarus	9475	782	83			176	19
Belgium, Dutch-speaking[a]	6578	1186	180	71.1	74.4	241	37
Belgium, French-speaking[a]	4849	983	203	68.6	70.0	187	39
Bosnia and Herzegovina	3531	440	125	62.0	64.0	127	36
Bulgaria	7000	1091	156			317	45
Cyprus	876	224	256	69.0	73.0	86	98
Czech Republic[b]	9983	2265	227				
Denmark	5850	679	116	63.2	66.8	174	30
Estonia	1322	96	73	57.3	58.5	20	15
Finland	5516	509	92	61.1	64.1	161	29
France	66 966	11 296	169	67.6	70.5	2503	37
Greece	10 733	2833	264	70.9	73.5	682	64
Iceland	353	28	79	59.7	59.6	5	14
Israel	8883	1723	194	65.4	68.1	780	88
Italy (7 of 20 regions)	21 427	3355	157	68.6	71.6	559	26
Kosovo	1688	295	175	62.0	65.0	112	66
Latvia	1312	141	107	62.3	66.0	28	21
Lithuania	2809	316	112	59.9	60.4	46	16
Montenegro[a]	622	46	74	56.5	60.1	10	16
North Macedonia	2022	339	168	62.9	64.0	104	51
Norway	5312	546	103	63.8	67.9	92	17
Portugal	10 309	2634	256			811	79
Romania	19 064	3487	183	62.5	64.5	424	22
Russia[b]	133 570	11 070	83	56.3	61.0	1838	14
Serbia	6284	552	88	61.0	63.6	124	20
Slovakia[b]	5444	898	165	64.5	66.0	325	60
Spain (All)	46 723	6918	148	64.8	68.2	1702	36
Spain, Andalusia	8419	1221	145	62.5	65.5	319	38
Spain, Aragon	1317	141	107	66.8	69.8	33	25
Spain, Asturias	1028	172	167	67.2	68.5	53	52
Spain, Basque country	2174	251	115	65.2	68.4	61	28
Spain, Canary Islands	2192	382	174	64.3	66.4	136	62
Spain, Cantabria[a]	581	88	151	69.4	72.1	12	21
Spain, Castile and León[a]	2409	345	143	66.3	69.4	81	34
Spain, Castile-La Mancha[a]	2034	243	119	66.7	69.5	67	33
Spain, Catalonia	7600	1392	183	65.8	69.6	275	36
Spain, Community of Madrid	6578	915	139	65.6	69.2	241	37
Spain, Extremadura	1073	158	147	64.5	66.4	41	38
Spain, Galicia	2702	397	147	65.3	67.9	103	38
Spain, Murcia	1479	221	149	62.1	65.4	54	37
Spain, Navarre[a]	647	71	110	67.4	70.4	16	25
Spain, Valencian region	4964	783	158	66.2	70.0	166	33
Sweden	10 175	1095	108	64.2	68.1	280	28
Switzerland	8514	875	103	65.5	69.3	192	23
The Netherlands	16 025	1975	123	63.9	67.2	380	24
Turkey[c]	82 004	12 232	149			954	54
Ukraine	42 216	1563	37	52.8	55.0	370	9
UK, England[a,d]	55 977	6530	117	62.0	64.0	1761	31
UK, Northern Ireland[a]	1882	228	121	64.3	67.2	48	26
UK, Scotland	5438	613	113	60.2	62.1	180	33
UK, Wales[a]	3139	416	133	63.4	65.9	125	40
All countries	635 534	81 714	129	63.5	66.5	16 245	29

When cells are left empty, the data are unavailable and could not be used for the calculation of the summary data.

[a]Patients <20 years are not reported. The true incidence counts are therefore slightly higher than the counts reported here.

[b]Data include dialysis patients only.

[c]Data on incidence by cause of kidney failure (DM) is based on 2642 dialysis patients (21.6% of total).

[d]The incidence is underestimated by ~2% due to one centre not submitting data since 2014.

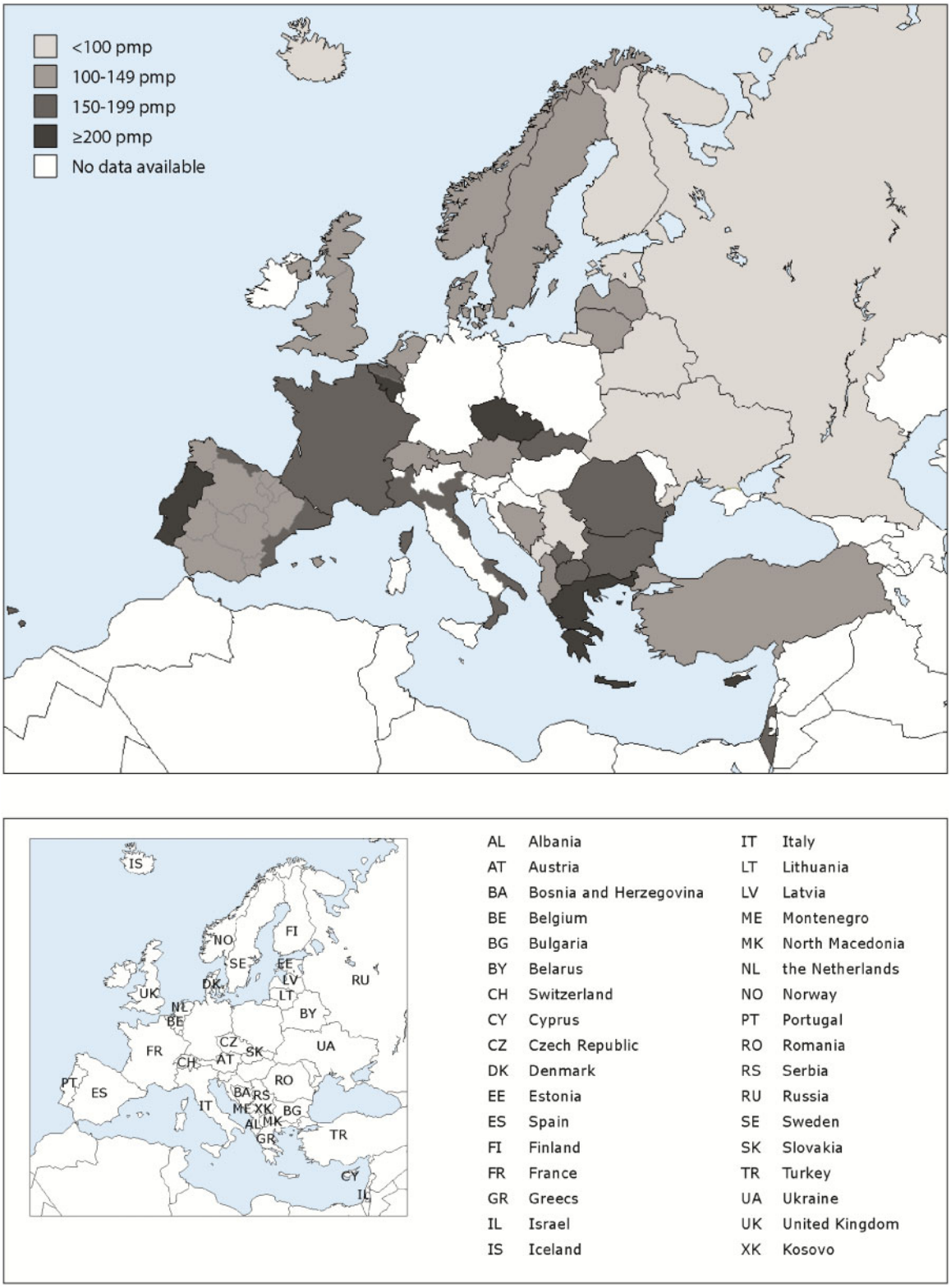

FIGURE 1: Incidence of KRT (p.m.p.) in 2018, at Day 1, by country or region, unadjusted. The incidence for Czech Republic, Russia and Slovakia only includes patients receiving dialysis. For England (UK), the incidence is underestimated by 2% (Table 1).

KRT with dialysis in this period, the unadjusted 5-year patient survival probability was 42.6% (95% CI 42.5–42.7). Adjusted analyses for patient survival on HD and PD revealed higher survival probabilities in the first 3 years for those receiving PD (Figure 13). For patients receiving a kidney transplant in the period 2009–13, living donor transplant recipients experienced a higher adjusted 5-year patient survival than recipients of deceased donor transplants: 94.7% (95% CI 94.3–95.2) versus 92.0%

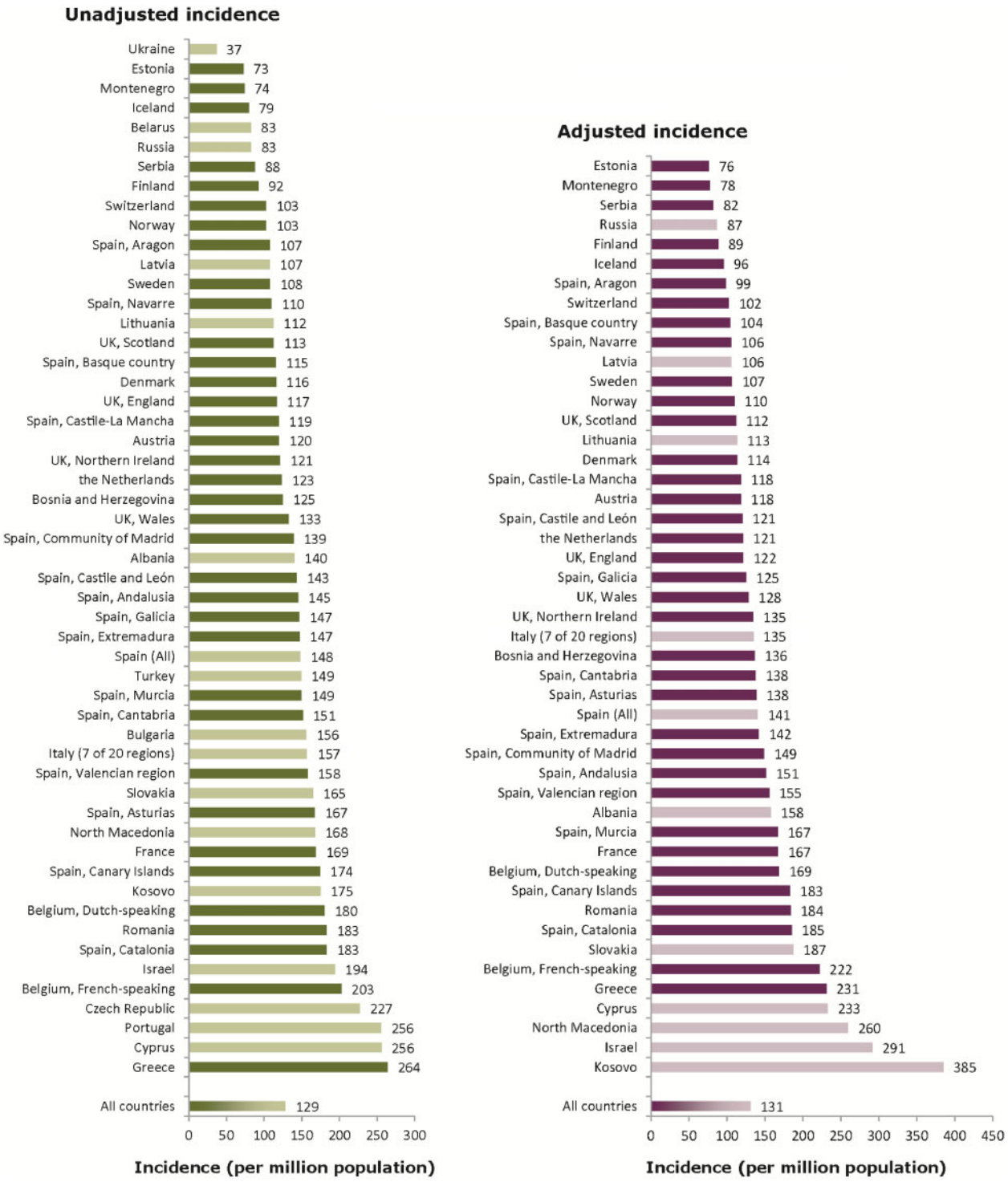

FIGURE 2: Unadjusted (left panel) and adjusted (right panel) incidence of KRT p.m.p. in 2018, at Day 1, by country or region. Registries providing individual patient data are shown as dark bars, and registries providing aggregated data as light bars. Adjustment of incidence was performed by standardizing to the age and sex distribution of the EU27 population. The incidence for Czech Republic, Russia and Slovakia only includes patients receiving dialysis. For England (UK), the incidence is underestimated by 2% (Table 1).

(95% CI 91.7–92.3; Figure 13), as well as a higher adjusted 5-year graft survival: 87.1% (95% CI 86.4–87.8) versus 81.1% (95% CI 80.6–81.5; Table 3). A description of the adjustments made and the countries and regions included in these analyses can be found in Table 3.

Expected remaining lifetime

Patients receiving dialysis between 2014 and 2018 are expected to live only half of the estimated expected remaining lifetime of patients living with a functioning kidney transplant in the same period (Figure 14). When compared with the general population,

FIGURE 3: (**A**) Sex, (**B**) age and (**C**) cause of kidney failure distribution by type of data provided for incident patients accepted for KRT in 2018, at Day 1. See Supplementary Appendix A1 for a list of countries and regions providing individual patient data or aggregated data.

the life expectancy of patients on dialysis was ~70% shorter, while for kidney transplant recipients it was ~40% shorter.

AFFILIATED REGISTRIES

Albanian Renal Registry (A. Idrizi, M. Rroji and E. Likaj); Austrian Dialysis and Transplant Registry (OEDTR) (F. Engler, J. Kerschbaum, R. Kramar, G. Mayer and the Austrian Society of Nephrology); Belarus Renal Registry (K.S. Komissarov, K.S. Kamisarau and A.V. Kalachyk); Dutch speaking Belgian Society of Nephrology (NBVN) (M. Couttenye, F. Schroven and J. De Meester); French speaking Belgian Society of Nephrology (GNFB) (J.M. des Grottes and F. Collart); Renal Registry Bosnia and Herzegovina (H. Resić, B Jakovljevic and Z. Kelava); Bulgaria

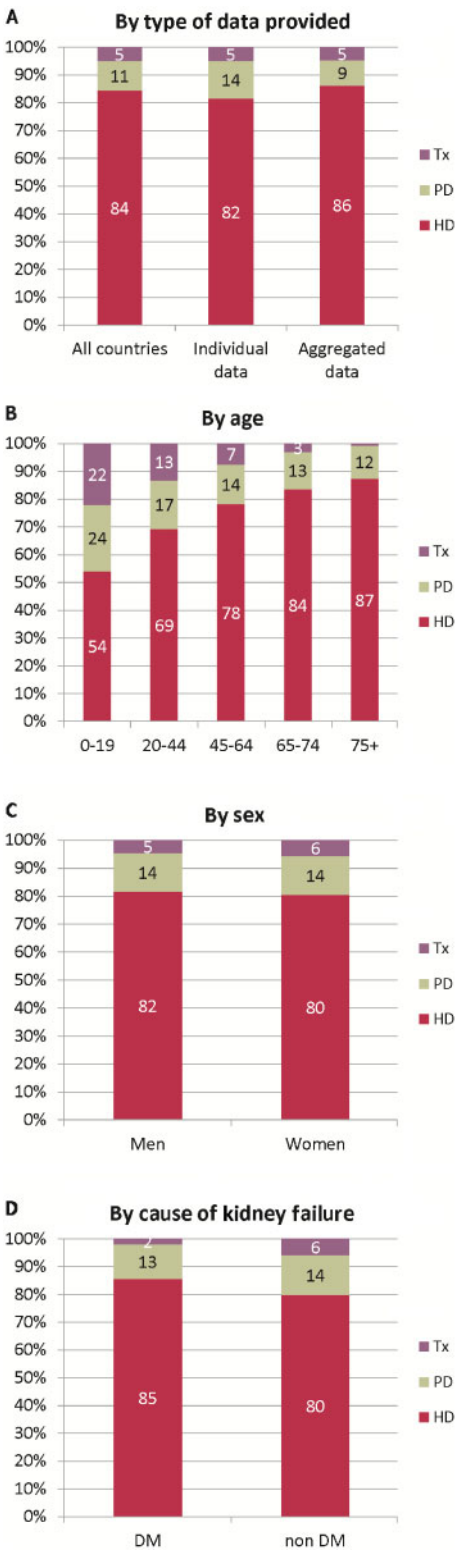

FIGURE 4: Treatment modality distribution, at Day 1, by (A) type of data provided, (B) age, (C) sex and (D) cause of kidney failure (DM and non-DM) for incident patients accepted for KRT in 2018. Parts (B), (C) and (D) are only based on the data from registries providing individual patient data. See Supplementary Appendix A1 for a list of countries and regions providing individual patient data or aggregated data. Tx, kidney transplant

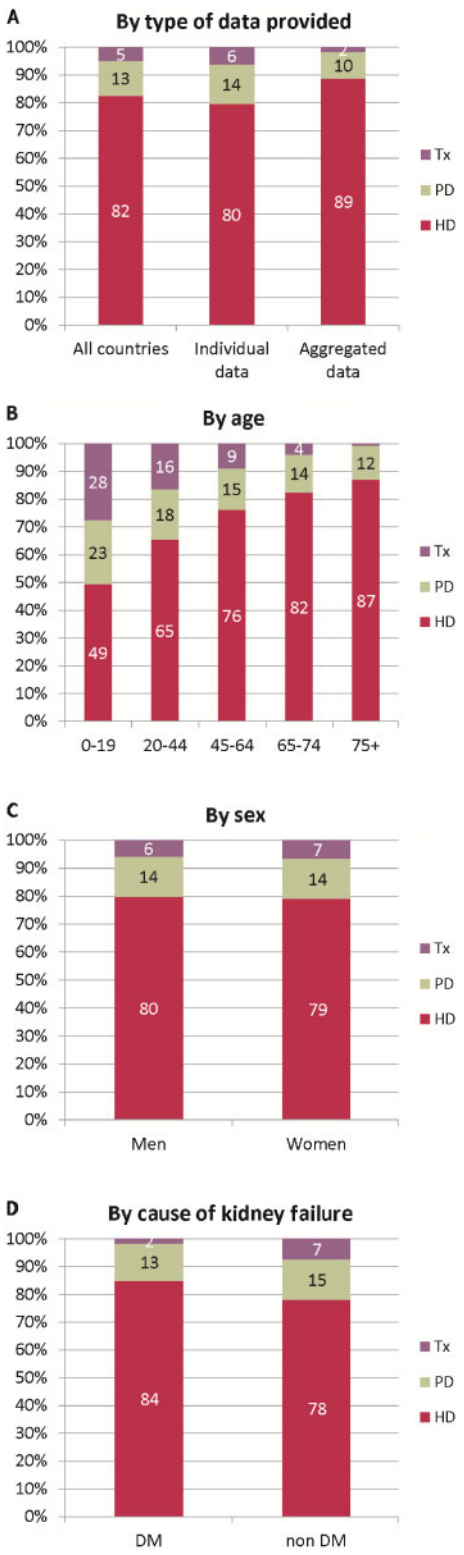

FIGURE 5: Treatment modality distribution, at Day 91, by (A) type of data provided, (B) age, (C) sex and (D) cause of kidney failure (DM and non-DM) for incident patients accepted for KRT in 2018. Parts (B), (C) and (D) are only based on the data from registries providing individual patient data. See Supplementary Appendix A1 for a list of countries and regions providing individual patient data or aggregated data. Tx, kidney transplant

Table 2. Prevalence of KRT (as count and p.m.p.) on 31 December 2018, by country or region, unadjusted and the mean and median age on 31 December 2018 and the prevalence of KRT for patients DM as cause of kidney failure (as count and p.m.p.)

Country/region	General population covered by the registry in thousands	Prevalent patients on KRT in 2018					
		All (*n*)	All (p.m.p.)	Mean age (years)	Median age (years)	DM (*n*)	DM (p.m.p.)
Albania	2841	1602	564	51.3	52.0	322	113
Austria	8822	9577	1086	62.0	63.4	1756	199
Belarus	9475	4096	432			541	57
Belgium, Dutch-speaking[a]	6578	8466	1287	66.4	68.4	1435	218
Belgium, French-speaking[a]	4849	6559	1353	65.2	66.9	1164	240
Bosnia and Herzegovina	3531	2699	764	59.9	61.6	539	153
Bulgaria	7000	4464	638				
Cyprus	876						
Czech Republic	9983	12 194	1221				
Denmark	5850	5541	947	59.1	60.7	938	160
Estonia	1322	983	744	58.3	59.0	176	133
Finland	5516	5106	926	59.6	62.1	1286	233
France	66 966	90 358	1349	63.2	65.3	14 881	222
Greece	10 733	14 665	1366	65.4	67.5	2757	257
Iceland	353	266	754	56.3	57.5	30	85
Israel[b]	8883	6747	760	66.6	68.6	3121	351
Italy (7 of 20 regions)	21 427	26 131	1220	62.8	65.0	2916	136
Kosovo	1688	805	477	62.9	66.0	240	142
Latvia	1312	1020	778	55.5	57.0	103	79
Lithuania	2809	2342	834				
Montenegro[a]	622	195	313	57.0	59.5	28	45
North Macedonia	2022	1756	868	58.8	60.0	304	150
Norway	5312	5256	989	60.0	62.2	724	136
Portugal	10 309	20 730	2011	68.0	68.5	3670	356
Romania	19 064	21 738	1140	62.6	64.3	2220	116
Russia	133 570	54 953	411	56.8	59.0	7913	59
Serbia	6284	4589	730	60.0	62.4	808	129
Slovakia[b]	5444	3589	659	64.1	66.0	1202	221
Spain (All)	46 723	61 773	1322	59.9	63.1	10 014	214
Spain, Andalusia	8419	10 577	1256	60.9	62.2	1675	199
Spain, Aragon	1317	1710	1299	63.8	65.2	307	233
Spain, Asturias	1028	1409	1371	63.9	65.1	252	245
Spain, Basque country	2174	2723	1252	62.2	64.4	328	151
Spain, Canary Islands	2192	3200	1460	61.8	63.1	886	404
Spain, Cantabria[a]	581	689	1185	63.4	64.7	97	167
Spain, Castile and León[a]	2409	3126	1298	65.4	66.5	552	229
Spain, Castile-La Mancha[a]	2034	2485	1222	63.3	64.1	405	199
Spain, Catalonia	7600	11 162	1469	63.3	65.0	1609	212
Spain, Community of Madrid	6578	7816	1188	62.3	63.8	1406	214
Spain, Extremadura	1073	1326	1236	62.4	62.8	207	193
Spain, Galicia	2702	3816	1412	63.1	64.5	649	240
Spain, Murcia	1479	2043	1382	62.4	63.3	299	202
Spain, Navarre[a]	647	865	1337	63.2	65.0	128	198
Spain, Valencian region	4964	7679	1547	63.5	65.5	1095	221
Sweden	10 175	10 206	1003	60.3	62.4	1836	180
Switzerland	8514	8077	949	62.5	64.5	1220	143
The Netherlands	16 542	17 493	1057	60.8	62.8	2336	141
Turkey[c]	82 004	81 055	988			3043	338
Ukraine	42 216	9659	229	50.7	52.0	1511	36
UK, England[a,d]	55 977	54 520	974	59.0	59.6	9645	172
UK, Northern Ireland[a]	1882	1909	1015	59.3	59.5	283	150
UK, Scotland	5438	5324	979	57.1	58.5	901	166
UK, Wales[a]	3139	3235	1031	59.6	60.7	561	179
All countries	636 051	569 678	897	61.1	63.0	80 424	148

When cells are left empty, the data are unavailable and could not be used for the calculation of the summary data.

[a]Patients <20 years are not reported. The true prevalent counts are therefore slightly higher than the counts reported here.

[b]Data on prevalence include dialysis patients only.

[c]Data on the prevalence by cause of kidney failure (DM) is based on 8904 dialysis patients (11.0% of total).

[d]The prevalence is underestimated by ~1% due to one centre not submitting data since 2014.

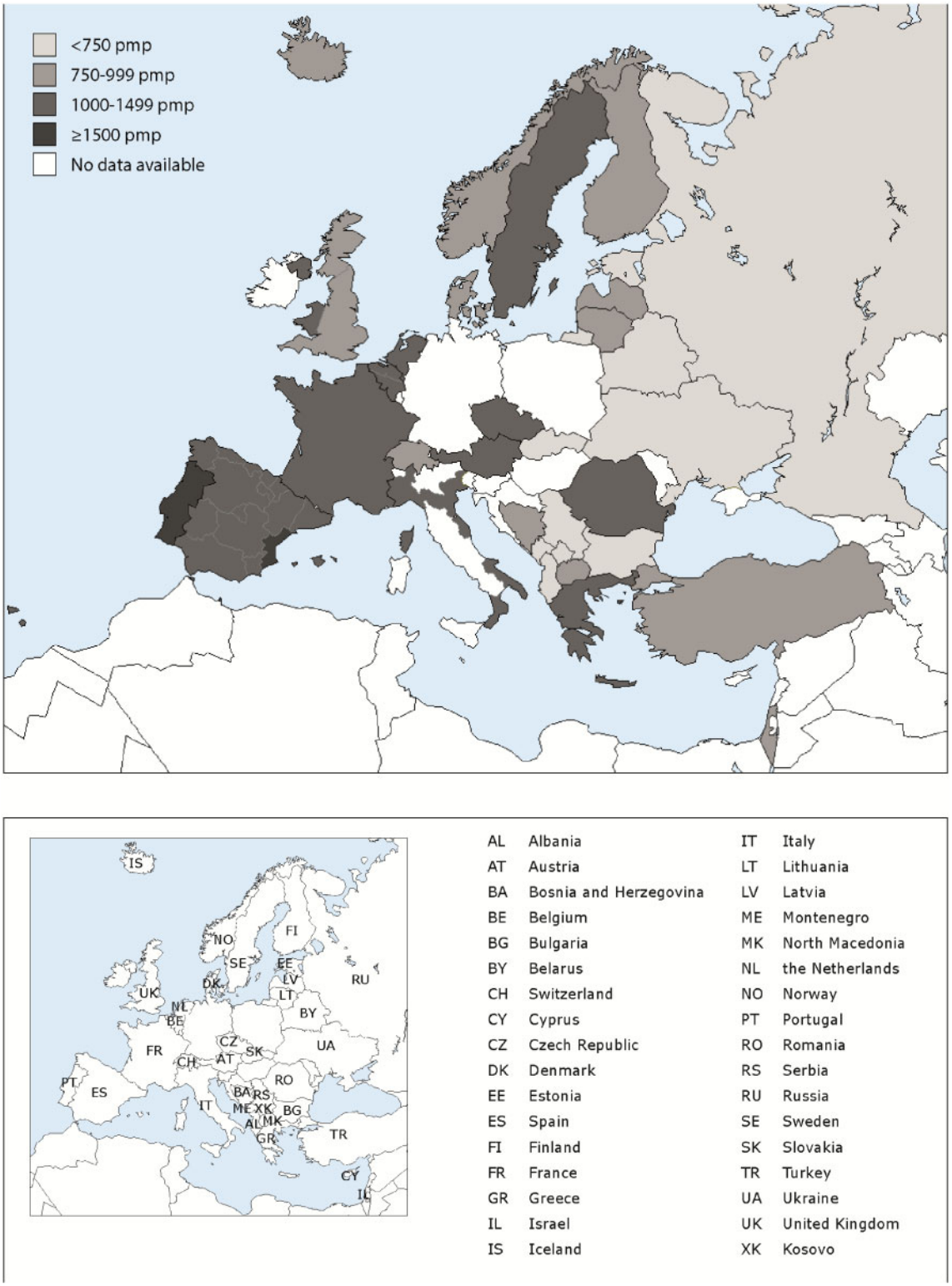

FIGURE 6: Prevalence of KRT (p.m.p.) on 31 December 2018 by country or region. The prevalence for Israel and Slovakia only includes patients receiving dialysis. For England (UK), the prevalence is underestimated by 1% (see Table 2).

(E.S. Vazelov and I. Velinova); Cyprus Renal Registry (K. Ioannou and all of the renal units providing data); Czech Republic: Registry of Dialysis Patients (RDP) (F. Lopot, I. Rychlík and J. Potucek); Danish Nephrology Registry (DNS) (K. Hommel); Estonian Society of Nephrology (Ü. Pechter, K. Lilienthal and M. Rosenberg); Finnish Registry for Kidney Diseases (P. Finne and J. Helve); France: The Epidemiology and Information Network in Nephrology (REIN) (M. Lassalle and C. Couchoud); Hellenic Renal Registry (G. Moustakas); Icelandic End-Stage Renal Disease Registry (R. Pálsson); Montenegro Renal Registry

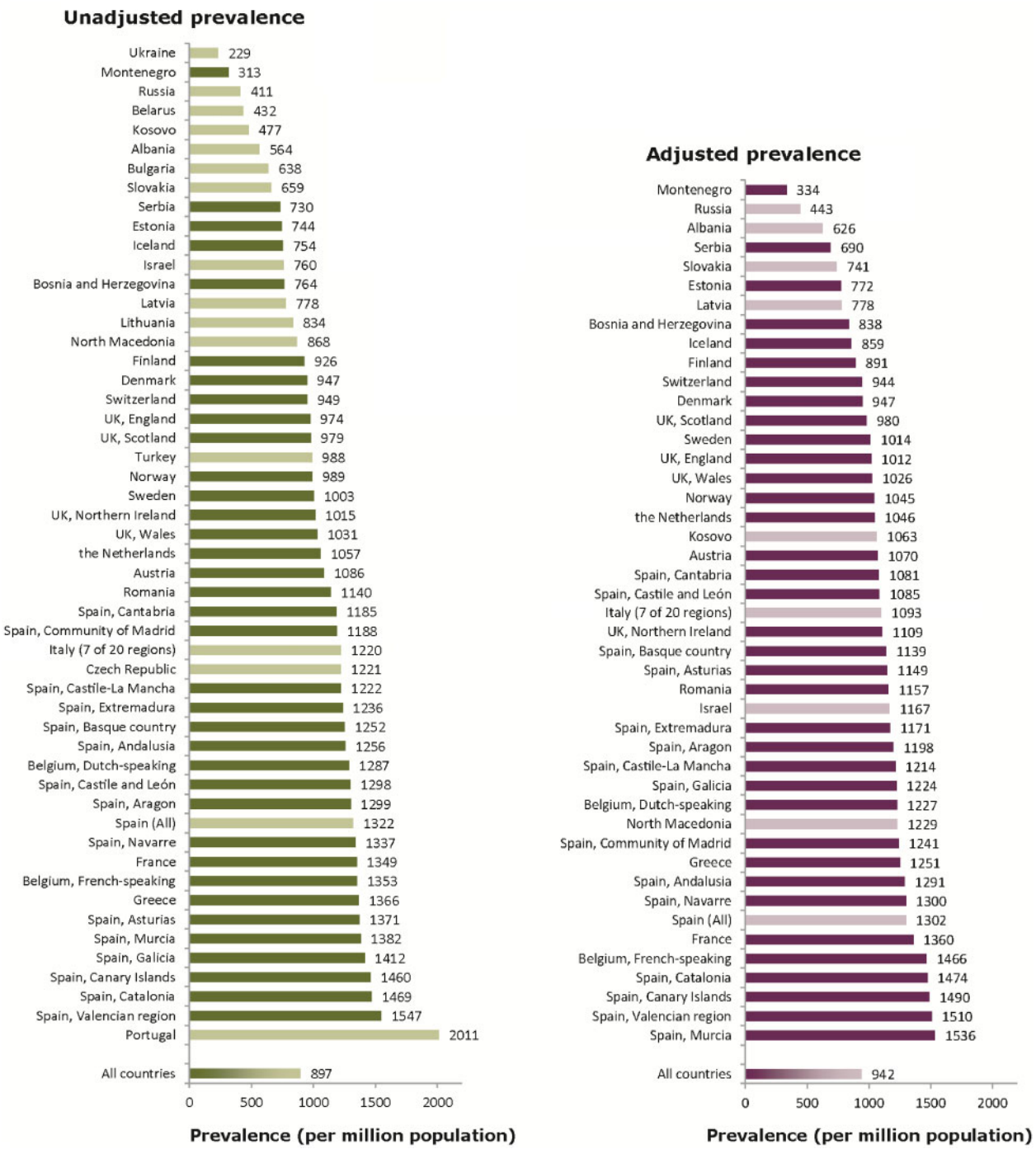

FIGURE 7: Unadjusted (left panel) and adjusted (right panel) prevalence (p.m.p.) of KRT on 31 December 2018 by country or region. Registries providing individual patient data are shown as dark bars, and registries providing aggregated data as light bars. Adjustment of the prevalence was performed by standardizing to the age and sex distribution of the EU27 population. The prevalence for Israel and Slovakia only includes patients receiving dialysis. For England (UK), the prevalence is underestimated by 1% (see Table 2).

(M. Ratkovic, D. Radunović and F. Tomović); Israel National Registry of Renal Replacement Therapy (R. Dichtiar, L. Keinan-Boker and E. Golan); Italian Registry of Dialysis and Transplantation (RIDT) (A. Limido, M. Nordio and M. Postorino); Kosovo Renal Registry (H. Korca, S. Selmani and M. Tolaj-Avdiu); Latvian Renal Registry (V. Kuzema, H. Cernevskis and A. Popova); Lithuanian Renal Registry (V. Vainauskas, K. Petruliene and E. Žiginskienė); North Macedonian Renal Registry (N. Gjorgjievski, O. Stojceva and B.I. Rambabova); Norwegian Renal Registry (A.V. Reisæter and A. Åsberg); Portuguese Renal Registry (A. Galvão and A. Ferreira); Romanian Renal Registry (G. Mircescu, L. Garneata and E. Podgoreanu); Russian Renal Registry (N. Tomilina, H. Zakharova and A. Andrusev); Renal Registry in Serbia (M. Lausevic, R. Naumovic and all of the Serbian renal units and the Serbian Society of Nephrology); Slovakian Renal Registry (V. Spustová, I. Lajdová and M.

FIGURE 8: (**A**) Sex, (**B**) age and (**C**) cause of kidney failure distribution, by type of data provided for prevalent patients on KRT on 31 December 2018. See Supplementary Appendix A1 for a list of countries and regions providing individual patient data or aggregated data.

Karolyova); Spain Renal Registry (B. Mahillo Durán and Spanish Regional Registries); Swedish Renal Registry (K.G. Prütz, M. Stendahl, M. Evans, S. Schön, T. Lundgren, H. Rydell and M. Segelmark); Swiss Dialysis Registry (P. Ambühl and R. Winzeler); Dutch Renal Registry (RENINE) (L. Heuveling, S. Vogelaar and M. Hemmelder); Registry of the Nephrology, Dialysis and Transplantation in Turkey (TSNNR) (G. Süleymanlar, N. Seyahi and K. Ateş); Ukrainian Renal Data System (M. Kolesnyk, O. Razvazhaieva and N. Kozliuk); UK Renal Registry (all the staff of the UK Renal Registry and of the renal units submitting data);

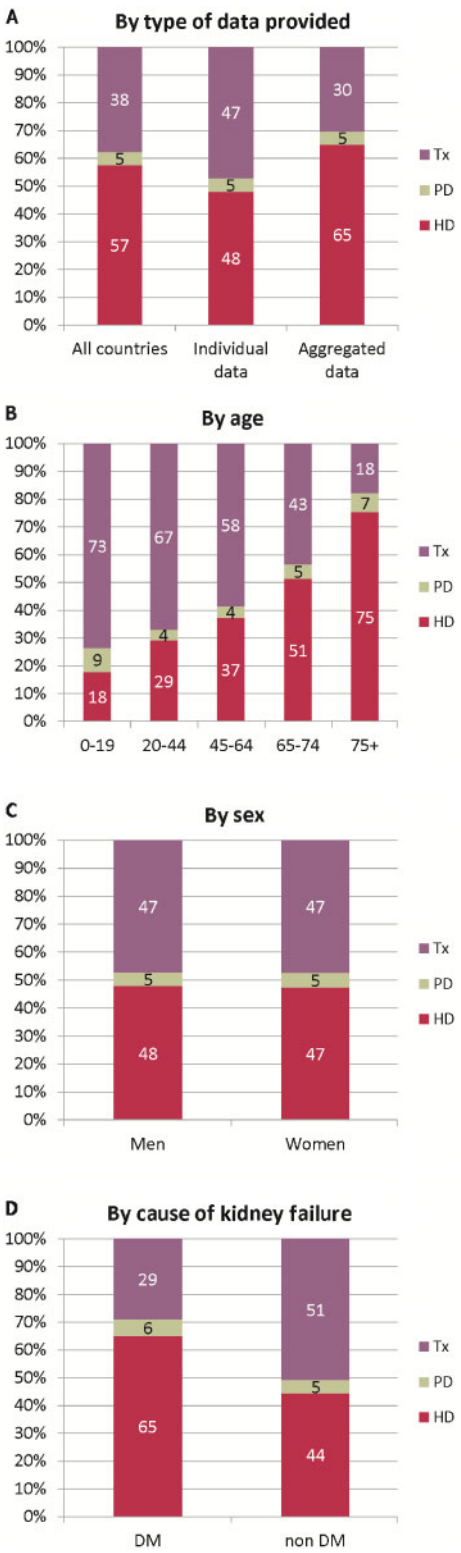

FIGURE 9: Treatment modality distribution by (A) type of data provided, (B) age, (C) sex and (D) cause of kidney failure (DM and non-DM) for prevalent patients on KRT on 31 December 2018. Parts (B), (C) and (D) are only based on the data from registries providing individual patient data. See Supplementary Appendix A1 for a list of countries and regions providing individual patient data or aggregated data. Tx, kidney transplant

Scottish Renal Registry (SRR) (all of the Scottish renal units); and the regional registries of Andalusia (SICATA) (P. Castro de la Nuez (on behalf of all users of SICATA), Aragon (F. Arribas Monzón), Asturias (P. Beltrán, M. Rodríguez, J.R. Quirós and RERCA Working Group), Basque country (UNIPAR) (Á. Magaz, J. Aranzabal, M. Rodrigo and I. Moina), Canary Islands (S. Trujillo Alemán, I. Santana Gil and C. Torres Medina), Cantabria (J.C. Ruiz San Millán), Castile and León (M.A. Palencia García and P. Ucio Mingo), Castile-La Mancha (G. Gutiérrez Ávila and I. Moreno Alía), Catalonia (RMRC) (J. Comas and J. Tort), Community of Madrid (M.I. Aparicio de Madre and F Tornero Molina), Extremadura [all the renal units (Nephrology and Dialysis)], Galicia (E. Bouzas-Caamaño), Renal Registry of the Region of Murcia (I. Marín Sánchez and C. Santiuste de Pablos), Navarre (M.F. Slon Roblero, J. Manrique Escola and J. Arteaga Coloma) and Valencian region (A. Bernat Hoyos and O. Zurriaga).

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SUPPLEMENTARY DATA

Supplementary data are available at ckj online.

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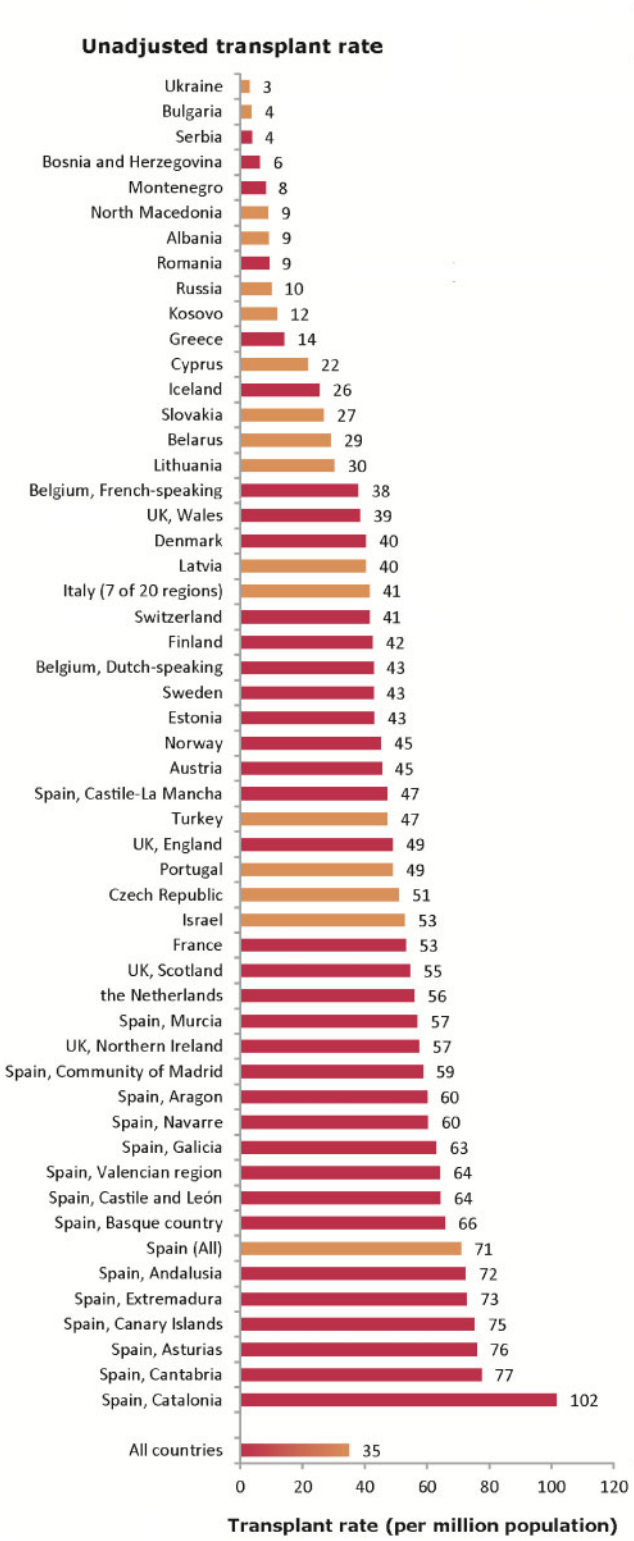
CONFLICT OF INTEREST STATEMENT

None declared.



	All N	% Deceased donor	% Living donor	% Unknown donor type
Ukraine	122	29	71	0
Bulgaria	25	80	20	0
Serbia	23	65	30	4
Bosnia and Herzegovina	22	18	82	0
Montenegro	5	0	100	0
North Macedonia	18	11	89	0
Albania	26	0	100	0
Romania	176	56	32	12
Russia	1335	85	15	0
Kosovo	20	0	100	0
Greece	151	53	47	0
Cyprus	19	21	79	0
Iceland	9	0	100	0
Slovakia	146	92	8	0
Belarus	276	99	1	0
Lithuania	85	87	13	0
Belgium, French-speaking	184	85	10	5
UK, Wales	121	70	30	0
Denmark	236	67	33	0
Latvia	53	75	25	0
Italy (7 of 20 regions)	871	92	8	0
Switzerland	353	68	32	0
Finland	234	86	14	0
Belgium, Dutch-speaking	281	93	7	0
Sweden	435	67	33	0
Estonia	57	93	7	0
Norway	240	70	30	0
Austria	416	83	17	0
Spain, Castile-La Mancha	96	97	3	0
Turkey	3871	22	78	0
UK, England	2740	67	20	14
Portugal	505	88	12	0
Czech Republic	508	91	9	0
Israel	469	39	47	14
France	3567	85	15	0
UK, Scotland	297	65	34	1
the Netherlands	943	50	50	0
Spain, Murcia	84	92	8	0
UK, Northern Ireland	108	53	46	0
Spain, Community of Madrid	386	92	8	0
Spain, Aragon	79	92	8	0
Spain, Navarre	39	100	0	0
Spain, Galicia	170	82	18	0
Spain, Valencian region	318	97	3	0
Spain, Castile and León	155	-	-	100
Spain, Basque country	143	91	9	0
Spain (All)	3313	91	9	0
Spain, Andalusia	610	93	7	0
Spain, Extremadura	78	96	3	1
Spain, Canary Islands	165	96	4	0
Spain, Asturias	78	97	3	0
Spain, Cantabria	45	100	0	0
Spain, Catalonia	773	84	16	0
All countries	22260	68	30	2

FIGURE 10: Kidney transplants performed in 2018, presented as counts and p.m.p. (unadjusted) by country or region. Registries providing individual patient data are shown as red bars, and registries providing aggregated data as orange bars. The total count for Austria is based on residents and non-residents. For Romania, Serbia and England (UK), the overall kidney transplant rate is underestimated by 30, 15 and 7%, respectively.

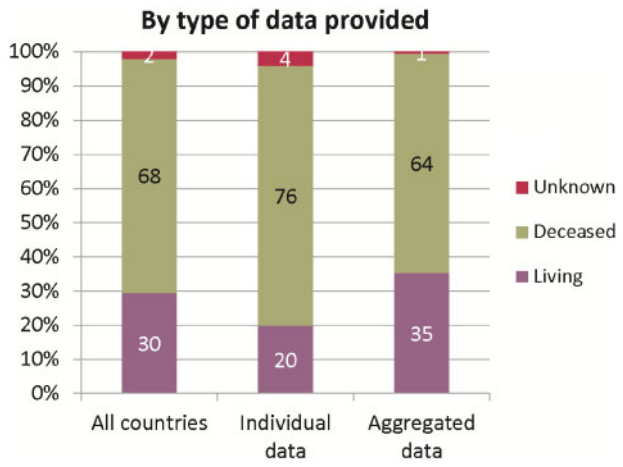


FIGURE 11: Donor-type distribution for kidney transplants performed in 2018, by type of data provided. See Supplementary Appendix A1 for a list of countries and regions providing individual patient data or aggregated data.

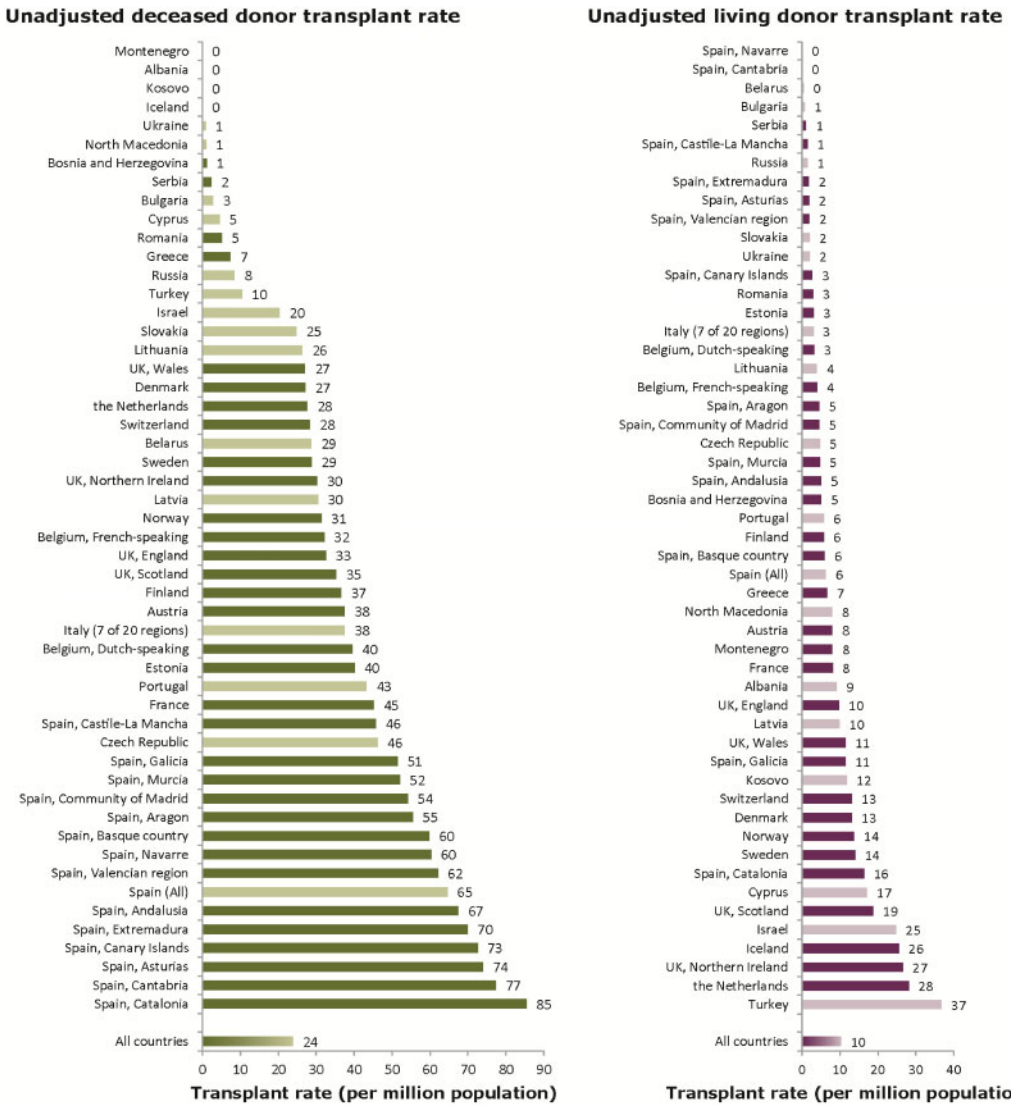


FIGURE 12: Deceased donor (A) and living donor (B) kidney transplants performed in 2018 p.m.p., by country or region, unadjusted. Registries providing individual patient data are shown as dark bars and registries providing aggregated data as light bars. The total count for Austria is based on residents and non-residents. For Romania and England (UK), the kidney transplant rate is underestimated by 30 and 7%, respectively. For Serbia, the transplant rate is underestimated by 16% for deceased donor transplants and by 12% for living donor transplants.

Table 3. The survival probabilities at 1, 2 and 5 years by treatment modality and cohort, from Day 1 of the start of KRT, dialysis or from the day of kidney transplantation

	Survival probabilities as percentage (95% CIs)				
	Cohort: 2009–13			Cohort: 2012–16	
Survival type	1 year	2 years	5 years	1 year	2 years
Patient survival on KRT					
Unadjusted	84.3 (84.2–84.5)	74.3 (74.2–74.5)	51.1 (51.0–51.2)	85.1 (85.0–85.3)	75.1 (75.0–75.3)
Adjusted[a]	87.0 (86.9–87.2)	77.9 (77.6–78.1)	53.1 (52.8–53.4)	87.5 (87.4–87.7)	78.3 (78.1–78.5)
Patient survival on dialysis					
Unadjusted	83.3 (83.1–83.4)	71.8 (71.7–72.0)	42.6 (42.5–42.7)	84.1 (83.9–84.2)	72.6 (72.4–72.7)
Adjusted[a]	85.5 (85.3–85.6)	75.1 (74.9–75.3)	46.4 (46.1–46.8)	86.3 (86.1–86.5)	76.0 (75.8–76.3)
Patient survival after first kidney transplantation (deceased donor)					
Unadjusted	96.1 (95.9–96.3)	94.0 (93.8–94.2)	86.6 (86.3–86.9)	96.3 (96.1–96.4)	94.1 (93.9–94.3)
Adjusted[b]	97.8 (97.7–97.9)	96.5 (96.4–96.7)	92.0 (91.7–92.3)	98.0 (97.8–98.1)	96.8 (96.6–96.9)
Graft survival after first kidney transplantation (deceased donor)					
Unadjusted	90.7 (90.5–91.0)	87.6 (87.3–87.9)	77.5 (77.2–77.9)	91.2 (90.9–91.4)	88.0 (87.7–88.3)
Adjusted[b]	92.4 (92.1–92.6)	89.7 (89.4–90.0)	81.1 (80.6–81.5)	93.0 (92.7–93.2)	90.4 (90.1–90.7)
Patient survival after first kidney transplantation (living donor)					
Unadjusted	98.9 (98.7–99.1)	97.9 (97.6–98.2)	93.9 (93.5–94.3)	98.9 (98.7–99.1)	98.0 (97.8–98.3)
Adjusted[b]	99.1 (98.9–99.2)	98.2 (98.0–98.5)	94.7 (94.3–95.2)	99.1 (98.9–99.2)	98.3 (98.1–98.5)
Graft survival after first kidney transplantation (living donor)					
Unadjusted	96.5 (96.2–96.8)	94.7 (94.3–95.1)	87.8 (87.2–88.3)	96.7 (96.4–97.0)	95.1 (94.8–95.5)
Adjusted[b]	96.3 (95.9–96.6)	94.4 (94.0–94.9)	87.1 (86.4–87.8)	96.5 (96.2–96.8)	94.8 (94.4–95.2)

The findings are based on data from the following renal registries providing individual patient data: Austria, Belgium (Dutch-speaking), Belgium (French-speaking), Bosnia and Herzegovina, Denmark, Finland, France, Greece, Iceland, Norway, Spain (Andalusia), Spain (Aragon), Spain (Asturias), Spain (Basque country), Spain (Cantabria), Spain (Castile and León), Spain (Castile-La Mancha), Spain (Catalonia), Spain (Community of Madrid), Spain (Extremadura), Spain (Galicia), Spain (Valencian region), Sweden, the Netherlands, UK (England/Northern Ireland/Wales) and UK (Scotland). Unadjusted survival probabilities were calculated using the Kaplan–Meier method, and adjusted survival probabilities using the Cox regression model.

[a]Analyses were adjusted using fixed values: age (67 years), sex (63% men) and cause of kidney failure (24% DM, 19% hypertension/renal vascular disease, 11% glomerulonephritis and 46% other causes).

[b]Analyses were adjusted using fixed values: age (50 years), sex (63% men) and cause of kidney failure (14% DM, 10% hypertension/renal vascular disease, 23% glomerulonephritis and 53% other causes).

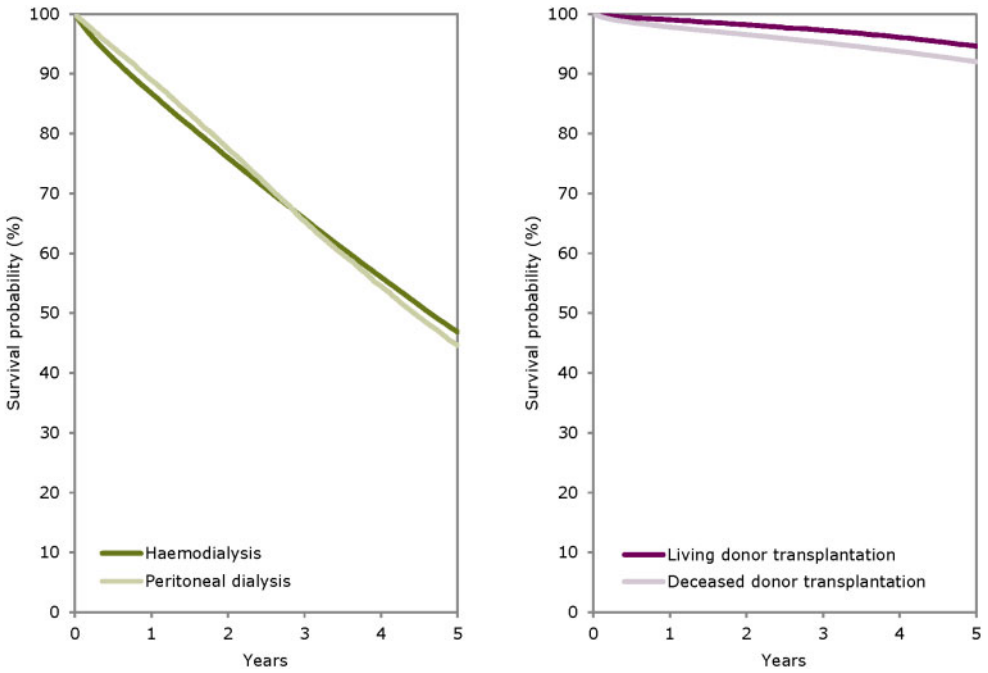


FIGURE 13: Survival of patients starting HD and PD between 2009 and 2013 from Day 91 (**A**) and patients receiving a first kidney transplant from a living or deceased donor between 2009 and 2013 (**B**). Survival on dialysis was censored for kidney transplantation, and adjusted using fixed values for age (67 years), sex (63% men) and cause of kidney failure (24% DM, 19% hypertension/renal vascular disease, 11% glomerulonephritis and 46% other causes). Survival after kidney transplantation was adjusted using fixed values for age (50 years), sex (63% men) and cause of kidney failure (14% DM, 10% hypertension/renal vascular disease, 23% glomerulonephritis and 53% other causes). These figures are based on the data from the following registries providing individual patient data: Austria, Belgium (Dutch-speaking), Belgium (French-speaking), Bosnia and Herzegovina, Denmark, Finland, France, Greece, Iceland, Norway, Spain (Andalusia), Spain (Aragon), Spain (Asturias), Spain (Basque country), Spain (Cantabria), Spain (Castile and León), Spain (Castile-La Mancha), Spain (Catalonia), Spain (Extremadura), Spain (Galicia), Spain (Community of Madrid), Spain (Valencian region), Sweden, the Netherlands, UK (England/Northern Ireland/Wales) and UK (Scotland).

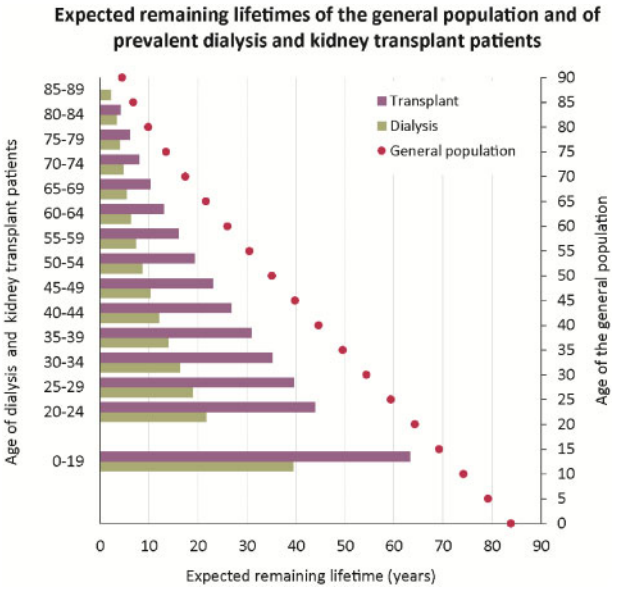


FIGURE 14: Expected remaining lifetimes of prevalent dialysis and kidney transplant patients (Cohort 2013–17) and the general population (Cohort 2013–17), by age. This figure is based on data from the following registries providing individual patient data: Austria, Belgium (Dutch-speaking), Belgium (French-speaking), Bosnia and Herzegovina, Denmark, Finland, France, Greece, Iceland, Norway, Spain (Andalusia), Spain (Aragon), Spain (Asturias), Spain (Basque Country), Spain (Cantabria), Spain (Castile and León), Spain (Castile-La Mancha), Spain (Catalonia), Spain (Extremadura), Spain (Galicia), Spain (Community of Madrid), Spain (Valencian region), Sweden, the Netherlands and the UK (all countries).

REFERENCES

1. ERA-EDTA Registry. ERA-EDTA registry annual report 2018. *Amsterdam UMC, Department of Medical Informatics*, Amsterdam, the Netherlands: Amsterdam UMC, 2020
2. Kramer A, Boenink R, Noordzij M *et al*. The ERA-EDTA registry annual report 2017: a summary. *Clin Kidney J* 2020; 13: 693–709