

## Renal replacement therapy in Europe—a summary of the 2009 ERA–EDTA Registry Annual Report

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### Abstract

**Introduction.** This study provides a summary of the 2009 ERA–EDTA Registry Report, with a focus on the differences in the incidence and prevalence of haemodialysis (HD), peritoneal dialysis (PD) and renal transplantation between countries and over time.

**Methods.** For this report, 56 data sets on renal replacement therapy (RRT) from national and regional registries in 30 countries in Europe and bordering the Mediterranean Sea were available. Data sets with individual patient data were received from 26 registries, whereas 19 registries contributed data in aggregated form. For both types of registries, we present incidence, prevalence and transplant rates. Survival analysis is based on individual patient records.

**Results.** In 2009, the overall incidence rate of RRT for end-stage renal disease (ESRD) among all registries reporting to the ERA–EDTA Registry was 125 per million population (p.m.p.). Incidence rates varied from 259 p.m.p. in Turkey to 19 p.m.p. in Ukraine and the mean age of patients starting RRT in 2009 ranged from 47.6 years in Russia to 69.5 year in Dutch-speaking Belgium. When examining the relative change of the HD, PD and transplantation distribution (at Day 91 after the start of RRT) between 2005 and 2009, we found overall a 0.5% decrease in HD, 1.4% decrease in PD utilization and an 1.8% increase of the share of patients living on a functioning graft. The overall prevalence of RRT for ESRD as of 31 December 2009 was 730 p.m.p. The highest prevalence was reported by Portugal (1507 p.m.p.) and the lowest by Ukraine (101 p.m.p.). In Norway, 70% of the patients on RRT were living with a functioning graft (591 p.m.p.) at 31 December 2009. The number of transplants performed p.m.p. in 2009 was highest in Spain (Cantabria) (78 p.m.p.). For the cohort 2000–04, the adjusted 1-, 2- and 5-year survival of patients on RRT was 87.4% (95% confidence interval: 87.2–87.7), 78.5% (95% confidence interval: 78.2–78.8) and 56.3% (95% confidence interval: 55.9–56.7), respectively.

**Keywords:** incidence; prevalence; survival; dialysis; transplantation

### Introduction

This summary of the 2009 ERA–EDTA (European Renal Association–European Dialysis and Transplant Association) Registry Report includes data on renal replacement therapy (RRT) using 56 data sets from national and regional registries in 30 countries in Europe and bordering the Mediterranean Sea (Figure 1). Data sets with individual patient data for analysis were received from 26 national and regional registries in 14 countries, whereas 19 national registries from 19 countries contributed data only in aggregated form.

For both types of registries, we present incidence and prevalence data as well as transplant rates. In this article, we focus on differences in the incidence and prevalence of treatment modality, i.e. haemodialysis (HD), peritoneal dialysis (PD) and renal transplantation, between countries and over time. Survival analysis used the data from countries and regions that provided individual patient records.

More detailed data than those presented in the paper can be found in the 2009 ERA–EDTA Registry Report [1] that is also available on [www.era-edta-reg.org](http://www.era-edta-reg.org).

### The incidence of RRT for end-stage renal disease across Europe

In 2009, the overall incidence rate of RRT for end-stage renal disease (ESRD) among all registries reporting to the ERA–EDTA Registry was 125 per million population (p.m.p.). Figure 2 shows that the highest incidence rates at Day 1 were reported by Turkey (259 p.m.p.), Portugal (240 p.m.p.) and Greece (205 p.m.p.), whereas incidence rates <100 p.m.p. were reported by Ukraine (19 p.m.p.), Montenegro (30 p.m.p.), Russia (33 p.m.p.), Estonia (51 p.m.p.), Finland (83 p.m.p.), Iceland (88 p.m.p.), Latvia (89 p.m.p.), UK, Northern Ireland (90 p.m.p.), Spain, Castille-La Mancha (94 p.m.p.) and the FYR of Macedonia (97 p.m.p.). The

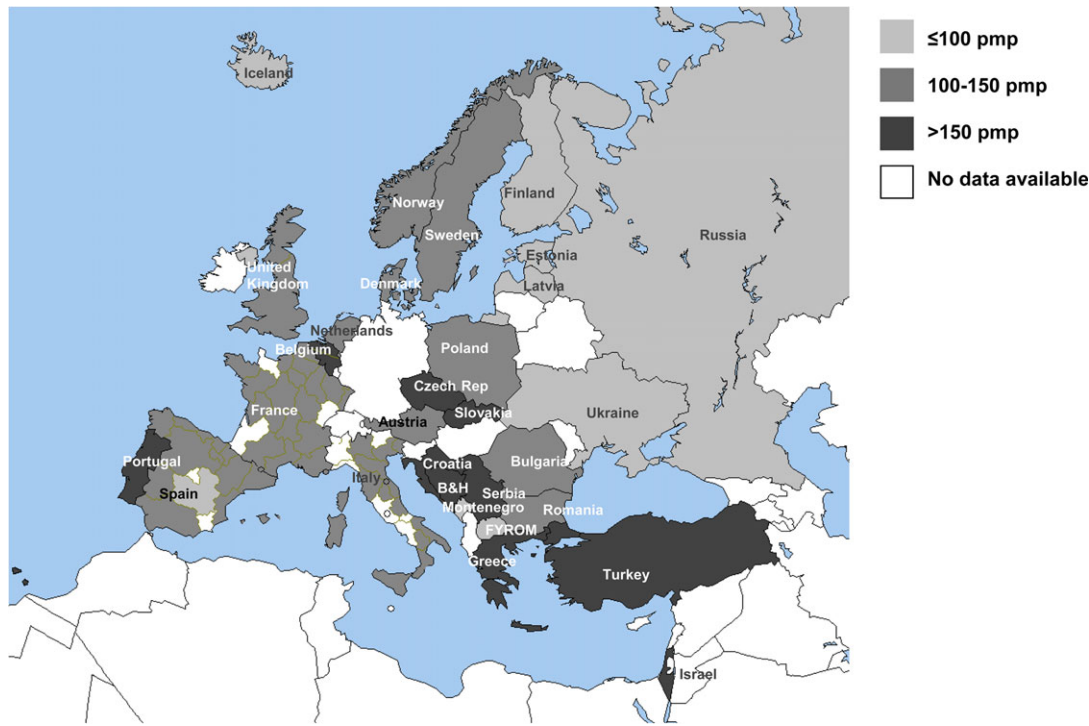


Fig. 1. Incidence of RRT p.m.p. at Day 1, 2009. B&H, Bosnia–Herzegovina; FYROM, former Yugoslav Republic of Macedonia.

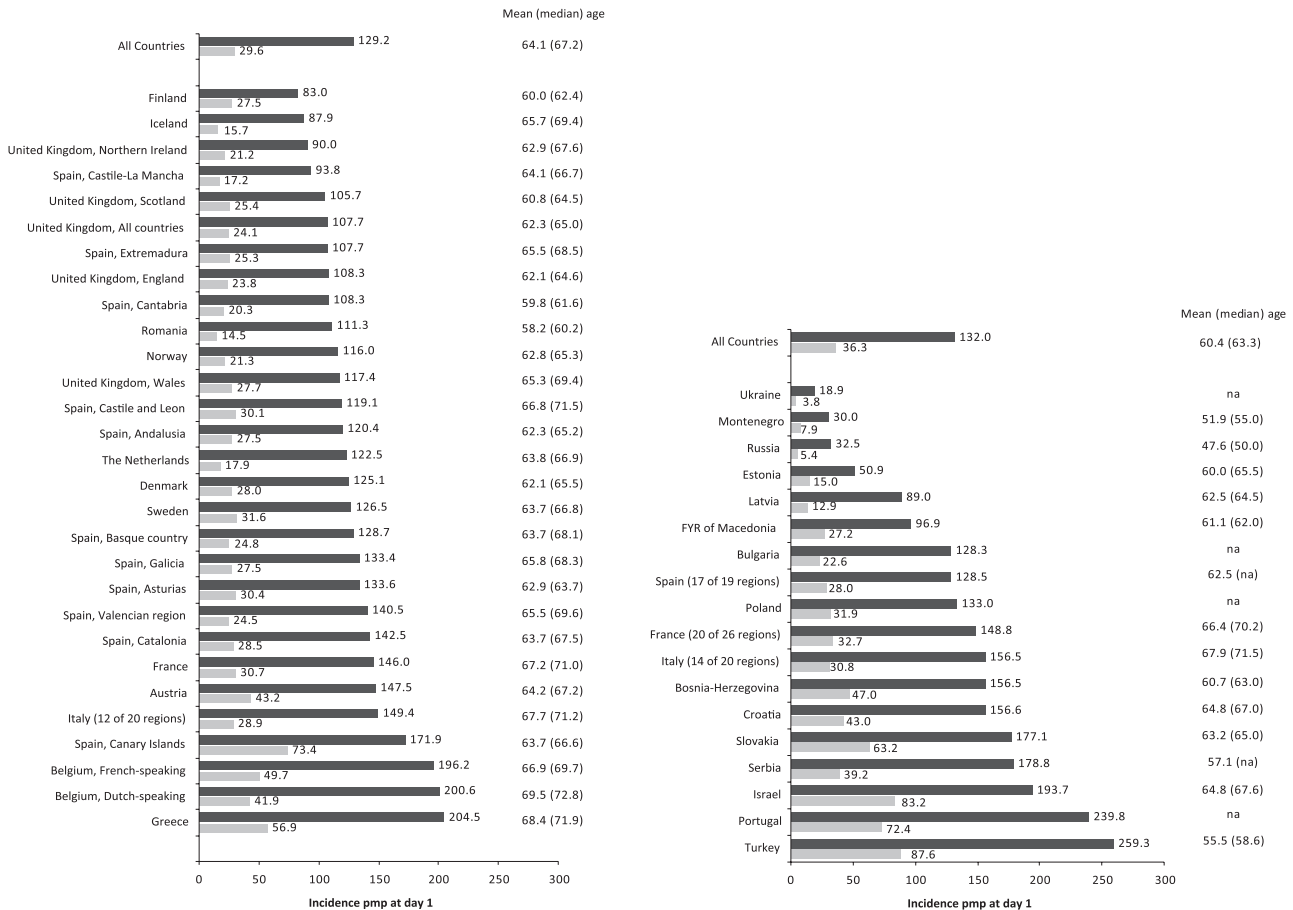


Fig. 2. Incidence of RRT p.m.p. at Day 1 in 2009 for all patients and for patients with diabetes mellitus as PRD and mean age (years), unadjusted. Figures include data from renal registries providing individual patient data (left figure) and aggregated data (right figure).

**Table 1.** Incidence of RRT p.m.a.r.p. at Day 1 by age group, unadjusted

Country/region providing individual patient data	0–19 (p.m.a.r.p.)	20–44 (p.m.a.r.p.)	45–64 (p.m.a.r.p.)	65–74 (p.m.a.r.p.)	75+ (p.m.a.r.p.)
Austria	11.3	38.6	185.9	458.3	497.4
Belgium					
Dutch speaking <sup>a</sup>		45.4	164.0	606.2	958.7
French speaking <sup>a</sup>		57.5	234.7	616.8	840.0
Denmark	14.6	54.4	144.1	367.5	457.6
Finland	5.7	38.7	118.5	242.6	172.5
France (16 of 26 regions) <sup>b</sup>	8.3	43.9	147.1	398.7	626.0
Greece	8.2	40.8	196.1	588.4	888.1
Iceland	0	35.0	78.7	516.9	437.8
Italy (12 of 20 regions) <sup>c</sup>	4.2	40.4	143.0	385.6	556.4
Norway	9.7	44.3	155.9	363.7	429.9
Romania	7.4	50.3	197.0	325.6	215.6
Spain					
Andalusia	6.5	40.6	180.4	400.7	412.3
Asturias	13.1	47.0	172.9	276.3	317.9
Basque country	18.8	35.5	139.7	430.7	350.6
Canary Islands	2.3	47.3	232.7	739.9	682.1
Cantabria <sup>a</sup>		36.3	187.9	367.9	133.5
Castille and Leon <sup>a</sup>		37.0	118.4	319.8	343.4
Castille-La Mancha <sup>a</sup>		30.8	134.9	254.1	322.0
Catalonia	13.0	49.0	171.0	431.6	534.6
Extremadura	4.4	22.6	148.1	304.6	347.7
Galicia	4.5	31.9	160.0	360.1	357.8
Valencian region	6.0	37.9	165.9	396.1	638.7
Sweden	11.0	47.7	147.8	358.8	425.9
The Netherlands	10.9	40.7	143.1	365.7	529.9
UK, all countries <sup>a</sup>		52.0	142.2	309.6	349.7
UK, England <sup>a</sup>		52.2	146.8	310.5	344.3
UK, Northern Ireland <sup>a</sup>		44.7	96.4	315.4	417.8
UK, Scotland	13.6	52.0	124.3	297.9	321.2
UK, Wales <sup>a</sup>		51.8	122.5	311.4	447.5

<sup>a</sup>Patients <20 years of age are not reported.

<sup>b</sup>Data based on the regions Alsace, Auvergne, Bourgogne, Bretagne, Champagne-Ardenne, Corse, Haute Normandie, Languedoc Roussillon, Limousin, Midi-Pyrénées, Pays de Loire, Picardie, Poitou-Charentes, Provence-Alpes-Côte d Azur, Rhône Alpes.

<sup>c</sup>Data based on the regions Abruzzi, Apulia, Basilicata, Calabria, Emilia-Romagna, Friuli-Venezia Giulia, Lombardy, Marche, Sardinia, Tuscany, Umbria, and Veneto.

**Table 2.** Incidence of RRT p.m.p. at Day 1 over the period 2005–09 for countries and regions providing individual patient data, adjusted for age and gender distribution

Country/region providing individual patient data	2005 (p.m.p.)	2006 (p.m.p.)	2007 (p.m.p.)	2008 (p.m.p.)	2009 (p.m.p.)
All countries	130.8	131.7	129.5	129.1	127.0
Austria	155.2	160.9	154.8	150.8	145.0
Belgium					
Dutch speaking	172.8	178.5	174.3	173.5	181.3
French speaking	180.6	190.9	190.5	194.0	198.7
Denmark	124.1	122.5	147.9	125.3	126.0
Finland	96.2	86.0	90.2	92.3	79.7
Greece	181.8	182.4	174.5	181.4	182.4
Iceland	85.2	83.9	94.2	89.1	111.5
Italy (Calabria)	135.9	133.4	145.5	151.2	138.4
Norway	105.9	106.7	119.6	119.4	121.6
Spain					
Andalusia	146.2	143.7	131.4	135.9	128.6
Asturias	104.9	112.1	108.7	109.3	112.1
Basque country	112.5	103.2	104.9	100.5	117.5
Cantabria	151.0	118.0	99.7	103.3	102.3
Castille and Leon	99.2	104.5	104.2	108.5	96.3
Castille-La Mancha	121.4	107.1	98.5	98.3	93.1
Catalonia	149.5	133.6	142.3	140.7	142.3
Extremadura	116.4	127.7	97.8	127.2	100.4
Valencian region	147.5	153.1	147.1	136.3	139.3
Sweden	116.1	124.0	122.6	116.9	119.3
The Netherlands	115.5	119.9	122.9	128.5	125.3
UK, all countries	115.3	116.8	112.7	111.6	108.8
UK, England	111.5	115.0	110.7	111.9	109.5
UK, Northern Ireland	161.6	142.1	129.6	123.0	100.6
UK, Scotland	126.4	117.0	113.7	106.8	104.1
UK, Wales	128.0	131.6	136.2	111.0	110.6

incidence rate of RRT for diabetic ESRD was highest in Turkey (88 p.m.p.), Israel (83 p.m.p.) and Spain, Canary Islands (73 p.m.p.), while the registries of Iceland, Spain, Castille-La Mancha, Romania, the Netherlands, Ukraine, Montenegro, Russia, Estonia and Latvia reported incidence rates for ESRD due to diabetes mellitus <20 p.m.p. In addition, both the mean and median age of patients starting RRT in 2009 is presented in Figure 2. The mean age ranged from 47.6 years in Russia to 69.5 years in Belgium (Dutch-speaking), while the overall mean age was 62.9 years.

Table 1 shows the unadjusted incidence rate of RRT per million age-related population (p.m.a.r.p.) at Day 1 by age group. For the age group 0–19 years at the start of RRT, data were available for 20 registries from 13 countries. For an overview of paediatric RRT, data collected from those registries please visit [www.espn-reg.org](http://www.espn-reg.org).

In Table 2, we present the incidence of RRT at Day 1 over the period from 2005 to 2009 for countries and regions providing individual patient data, adjusted for age and gender distribution. Only those countries and regions with complete data from 2005 onwards are presented in this table.

The incidence of the different treatment modalities (HD, PD and transplantation) in 2009 was measured as the number of patients p.m.p. on a treatment modality at Day 91 of RRT (Table 3). Whereas incidence rates of HD were highest in Turkey (176 p.m.p.), Greece (167 p.m.p.), Israel (155 p.m.p.) and in Dutch-speaking and French-speaking Belgium (154 and 153 p.m.p., respectively), the incidence rates for PD were highest in Sweden (39 p.m.p.), Denmark (35 p.m.p.) and Spain, Basque country (29 p.m.p.). The highest incidence rates of patients living on a functioning graft at Day 91 of RRT were observed in Norway

**Table 3.** Incidence of RRT p.m.p. at Day 91 in 2009 by treatment modality, unadjusted<sup>a</sup>

Country/region providing individual patient data	All (p.m.p.)	HD (p.m.p.)	PD (p.m.p.)	Tx (p.m.p.)	Unknown/missing (p.m.p.)	Country/region providing aggregated data	All (p.m.p.)	HD (p.m.p.)	PD (p.m.p.)	Tx (p.m.p.)	Missing (p.m.p.)
Austria	135.5	116.5	14.0	5.0	0	Bosnia and Herzegovina	139.7	130.8	8.3	0.3	0.3
Belgium						Bulgaria	105.2	103.2	2.0		0
Dutch speaking	179.7	153.8	24.3	1.5	0	Croatia	133.6	118.5	13.5	1.6	0
French speaking	181.8	153.3	25.0	3.5	0	Czech Republic	150.8	142.0	8.8		0
Denmark	118.2	74.4	35.2	8.5	0	Estonia	49.4	25.4	17.2	6.7	0
Finland	81.0	54.8	26.0	0.2	0	France (20 of 26 regions) <sup>b</sup>	135.3	112.6	13.4	9.3	0
France (16 of 26 regions) <sup>c</sup>	135.7	112.6	17.4	5.8	0	FYR of Macedonia	81.6	78.6	1.5	1.5	0
Greece	183.6	166.9	16.0	0.6	0	Israel	177.9	155.4	16.4	6.1	0
Iceland	84.8	62.8	12.6	9.4	0	Italy (14 of 20 regions) <sup>d</sup>	151.3	131.6	18.4		1.3
Italy (12 of 20 regions) <sup>e</sup>	139.3	116.4	20.6	2.2	0	Latvia	71.7	64.5	6.7	0.4	0
Norway	109.1	67.1	22.8	19.3	0	Montenegro	26.9	20.5	0	6.3	0
Romania	103.9	90.4	11.0	2.5	0	Poland					
Spain						Portugal					
Andalusia	116.9	99.6	14.2	3.2	0	Russia					
Asturias	121.3	97.4	21.8	2.1	0	Serbia	135.8	110.3	20.4	0	5.1
Basque country	124.6	92.9	29.4	2.3	0	Slovakia	140.9	134.8	6.1		
Canary Islands	162.5	141.6	20.4	0.5	0	Spain (17 of 19 regions) <sup>f</sup>					
Cantabria	101.6	67.7	28.8	5.1	0	Turkey	196.9	175.8	21.0		0
Castile and Leon	113.6	89.0	23.8	0.8	0	Ukraine	15.6	13.1	2.6		0
Castile-La Mancha	91.9	79.0	9.1	3.8	0						
Catalonia	136.0	109.0	15.6	11.5	0						
Extremadura	102.9	82.4	20.8	0	0						
Galicia	131.0	106.1	22.3	2.6	0						
Valencian region	135.6	120.7	12.8	2.2	0						
Sweden	114.4	67.0	39.1	8.3	0						
The Netherlands	112.8	80.3	20.8	11.7	0						
UK, all countries	100.4	74.2	19.2	6.7	0.4						
England	101.3	73.4	20.2	7.2	0.4						
Northern Ireland	87.0	76.8	7.5	3.4	0						
Scotland	94.5	74.9	16.0	3.7	0						
Wales	110.2	87.9	17.8	4.6	0						

<sup>a</sup>When cells are left empty, complete data are unavailable. HD, haemodialysis; PD, peritoneal dialysis; Tx, kidney transplantation.

<sup>b</sup>Data based on the regions Alsace, Auvergne, Bourgogne, Bretagne, Centre, Champagne-Ardenne, Corse, Haute-Normandie, Ile de France, Languedoc-Roussillon, Limousin, Lorraine, Midi-Pyrénées, Nord-Pas de Calais, Pays de Loire, Picardie, Poitou-Charentes, Provence-Alpes Côte d'Azur et Rhône-Alpes and the overseas department of Reunion.

<sup>c</sup>Data based on the regions Alsace, Auvergne, Bourgogne, Bretagne, Champagne-Ardenne, Corse, Haute Normandie, Languedoc Roussillon, Limousin, Midi-Pyrénées, Pays de Loire, Picardie, Poitou-Charentes, Provence-Alpes-Côte d'Azur, Rhône Alpes and the overseas department of Reunion.

<sup>d</sup>Data based on the regions Abruzzi, Apulia, Basilicata, Calabria, Emilia-Romagna, Friuli-Venezia Giulia, Lombardy (part), Marche, Sardinia (part), Sicily, Trentino-Alto Adige, Tuscany (part), Umbria and Veneto.

<sup>e</sup>Data based on the regions Abruzzi, Apulia, Basilicata, Calabria, Emilia-Romagna, Friuli-Venezia Giulia, Lombardy, Marche, Sardinia, Tuscany, Umbria and Veneto.

<sup>f</sup>Data based on the regions Andalusia, Aragon, Asturias, Balearic Islands, Basque country, Canary Islands, Cantabria, Castile and Leon, Castile-La Mancha, Catalonia, Extremadura, Galicia, La Rioja, Navarre, Valencian region and the overseas cities Ceuta and Melilla.

(19 p.m.p.) and the Netherlands and Spain, Catalonia (both 12 p.m.p.).

Finally, Figure 3 presents the distribution of the different treatment modalities in 2005 and the change in this distribution over the subsequent 5 years (2005–09). Overall, we found a 0.5% decrease in HD and 1.4% decrease in PD utilization at Day 91, whereas the share of patients living on a functioning graft increased with 1.8% between 2005 and 2009. The increase over time in HD utilization was highest in Iceland (+13%), UK, Northern Ireland (+9.9%), UK, Wales (+7.5%) and UK, Scotland (+7.4%), while in Norway a decrease of –7.4% was observed. The largest decreases in PD utilization were found in the Netherlands (–5.0%) and the UK, Northern Ireland (–12.8%), Wales (–7.2%) and Scotland (–8.0%), whereas PD utilization increased in Sweden (+4.4%). The share of patients living on a functioning graft at Day 91 after the start of RRT decreased between 2005 and 2009 with 11% in Iceland and increased with 4% in Norway and the Netherlands.

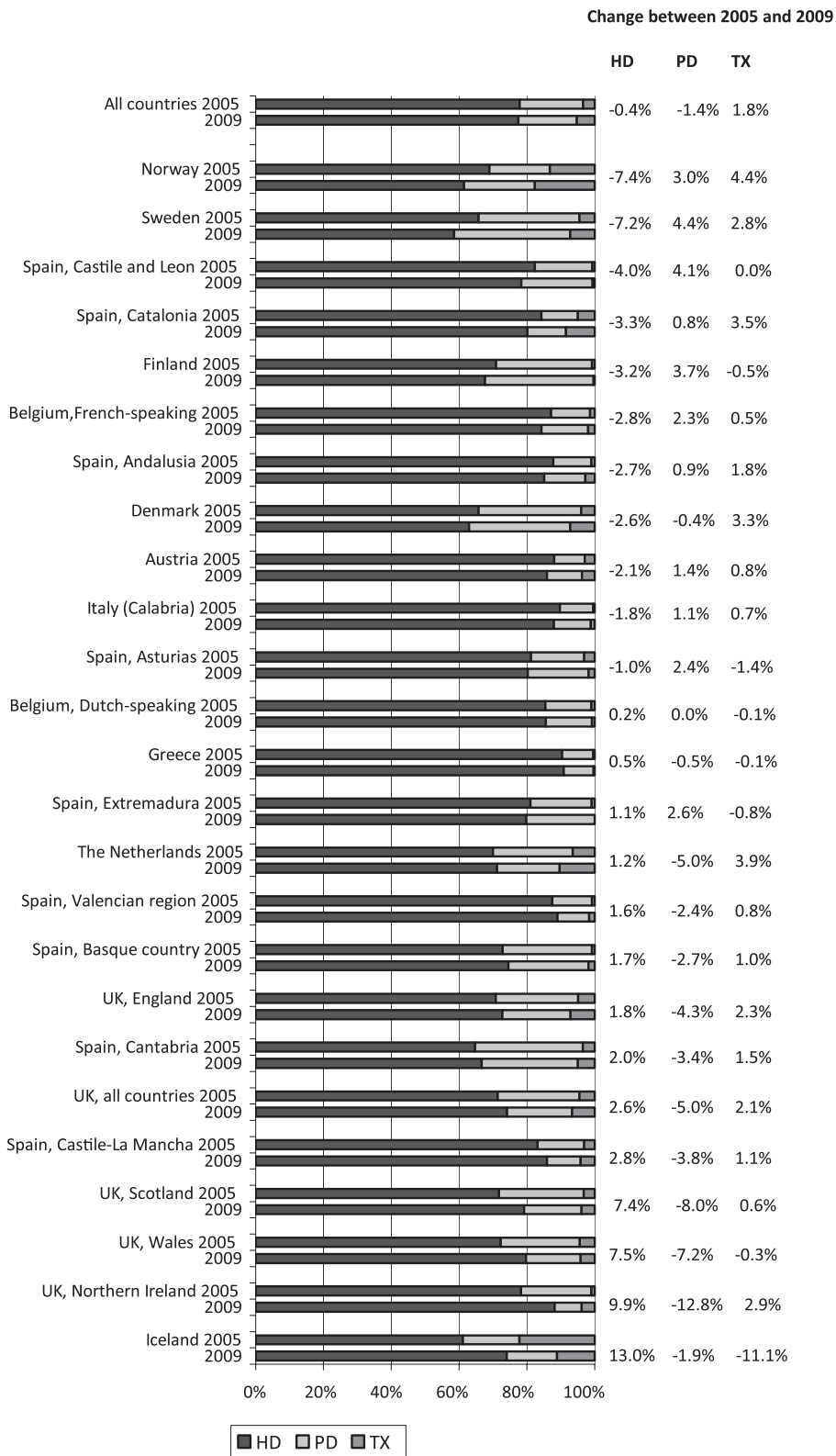
### The prevalence of RRT for ESRD across Europe

The overall prevalence among all registries reporting to the ERA–EDTA Registry was 730 p.m.p. Figure 4 shows that

the prevalence of RRT p.m.p. at 31 December 2009 was highest in Portugal (1507 p.m.p.), Belgium (French-speaking) (1193 p.m.p.) and Spain, Catalonia (1160 p.m.p.). The lowest prevalence was reported by Ukraine (101 p.m.p.) and Russia (170 p.m.p.). Additionally, the mean and median age of prevalent patients on RRT at 31 December 2009 are presented in Figure 2. The mean age ranged from 46.9 in Russia to 64.6 in Belgium (Dutch-speaking), while the overall mean age was 58.8 years.

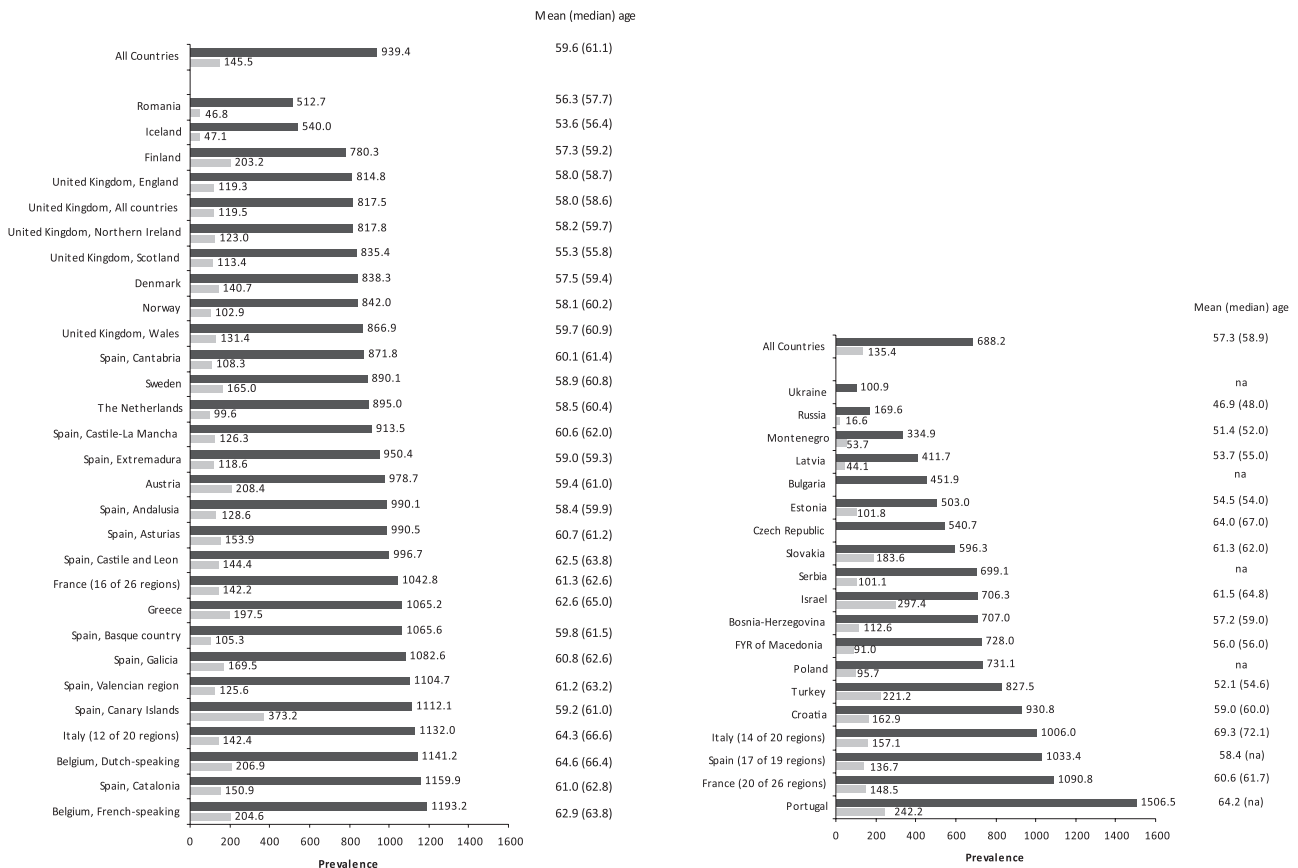
Table 4 shows the unadjusted prevalence of RRT p.m.a.r.p. on 31 December 2009, by age group and in Table 5, we present the prevalence of RRT at 31 December per year over the period from 2005 to 2009 for countries and regions providing individual patient data, adjusted for age and gender distribution. Only those countries and regions with complete data from 2005 onwards are presented in this table.

As presented in Table 6, the prevalence of HD at 31 December 2009 was highest in Portugal (908 p.m.p.), Italy (14 of 20 regions, 905 p.m.p.) and Greece (782 p.m.p.) and lowest in Ukraine (76 p.m.p.), Russia (121 p.m.p.) and Estonia (154 p.m.p.). The prevalence of PD was highest in UK, Wales (104 p.m.p.), Denmark (102 p.m.p.) and Sweden (93 p.m.p.), whereas the lowest prevalence of this treatment was reported in Montenegro (5 p.m.p.),



**Fig. 3.** Relative change in HD, PD and Tx at Day 91 in 2009 compared to 2005. HD, haemodialysis; PD, peritoneal dialysis; Tx, kidney transplantation.





**Fig. 4.** Prevalence of RRT p.m.p. at Day 1 in 2009 for all patients and for patients with diabetes mellitus as PRD and mean age (years), unadjusted. Figures include data from renal registries providing individual patient data (left figure) and aggregated data (right figure). Data from Czech Republic, Israel, Italy (14 of 20 regions) and Slovakia include dialysis patients only. In Italy, the prevalence of RRT is underestimated by ~11%, due to an estimated 25–30% under-reporting of patients living on a functioning graft.

Ukraine and Russia (both 12 p.m.p.). Finally, the prevalence of patients living on a functioning graft was highest in Spain, Basque country (628 p.m.p.), Spain, Catalonia and Norway (both 591 p.m.p.), representing 59, 51 and 70% of the patients on RRT, respectively.

## Renal transplants performed in 2009

Table 7 shows that the highest transplant rates were reported by Spain, Cantabria (78 p.m.p.), Spain, Catalonia (70 p.m.p.) and Norway (61 p.m.p.). Countries with the highest transplant rates with living donor kidneys included Spain, Castile-La Mancha (40 p.m.p.), the Netherlands (25 p.m.p.), Norway (22 p.m.p.), Iceland (22 p.m.p.) and Turkey (21 p.m.p.).

## Patient and graft survival

Survival analysis used the data from 19 registries in 12 countries that provided individual patient records for the period from 2000 to 2004. Three Spanish regions were also included in the analyses based on the cohort 2003–07 because for these registries, complete data were available from 2002. Data are presented for all countries and regions together (Figures 5–7). In Table 8, we present the results of the unadjusted and adjusted survival analyses. The adjusted analyses, as well as the comparisons of

survival by treatment modality, were adjusted for fixed values of age, gender and distribution of primary renal disease (PRD) (Appendix 1). Similar adjustments have been applied to survival comparisons by PRD. The precise methodology of the survival analyses is described in the Appendix 1.

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**Table 4.** Prevalence of RRT p.m.a.r.p. on 31 December 2009 by age group, unadjusted

Country/region providing individual patient data	0–19 (p.m.a.r.p.)	20–44 (p.m.a.r.p.)	45–64 (p.m.a.r.p.)	65–74 (p.m.a.r.p.)	75+ (p.m.a.r.p.)
Austria	63.5	453.0	1570.4	2534.8	1952.2
Belgium					
Dutch speaking <sup>a</sup>		413.5	1453.6	2967.8	3778.9
French speaking <sup>a</sup>		496.7	1794.9	3358.9	3709.7
Denmark	73.8	545.4	1266.5	1973.7	1776.1
Finland	96.4	433.2	1265.9	1811.3	1207.6
France (16 of 26 regions) <sup>b</sup>	51.1	529.4	1513.7	2553.7	2713.2
Greece	49.3	430.7	1419.8	2704.7	2981.4
Iceland	44.3	489.9	787.5	1499.0	1258.6
Italy (12 of 20 regions) <sup>c</sup>	33.3	419.7	1420.0	2674.6	3199.2
Norway	67.2	488.0	1364.5	2390.4	1801.7
Romania	26.5	288.5	962.1	1268.8	765.2
Spain					
Andalusia	55.8	506.2	1691.8	2691.8	2389.4
Asturias	45.7	454.7	1408.6	2115.2	1756.2
Basque country	83.4	470.5	1599.8	2699.7	1939.8
Canary Islands	18.8	521.9	1817.7	3546.2	3089.8
Cantabria <sup>a</sup>		408.1	1371.6	2432.2	1451.4
Castille and Leon <sup>a</sup>		433.5	1428.0	2179.0	2011.4
Castille-La Mancha <sup>a</sup>		422.2	1574.3	2498.5	2011.2
Catalonia	63.6	476.3	1811.0	3346.1	3027.0
Extremadura	8.9	551.8	1533.0	2152.3	1800.7
Galicia	27.2	511.8	1582.8	2503.7	1874.7
Valencian region	60.7	455.6	1674.3	2943.4	3208.5
Sweden	70.5	466.8	1463.9	2166.4	1631.0
The Netherlands	67.4	496.1	1345.9	2299.5	2179.9
UK, all countries <sup>a</sup>		542.8	1325.2	1895.0	1700.8
England <sup>a</sup>		534.6	1329.6	1918.0	1695.2
Northern Ireland <sup>a</sup>		552.2	1278.5	2258.1	2245.4
Scotland	85.8	612.1	1323.3	1623.4	1385.2
Wales <sup>a</sup>		564.9	1281.4	1813.1	2033.2

<sup>a</sup>Patients <20 years of age are not reported.

<sup>b</sup>Data based on the regions Alsace, Auvergne, Bourgogne, Bretagne, Champagne-Ardenne, Corse, Haute Normandie, Languedoc Roussillon, Limousin, Midi-Pyrénées, Pays de Loire, Picardie, Poitou-Charentes, Provence-Alpes-Côte d'Azur, Rhône Alpes and the overseas department of Reunion.

<sup>c</sup>Data based on the regions Abruzzi, Apulia, Basilicata, Calabria, Emilia-Romagna, Friuli-Venezia Giulia, Lombardy, Marche, Sardinia, Tuscany, Umbria and Veneto.

**Table 5.** Prevalence of RRT at 31 December 2009 over the period 2005–09 p.m.p., adjusted for age and gender distribution

Country/regions providing individual patient data	2005 (p.m.p.)	2006 (p.m.p.)	2007 (p.m.p.)	2008 (p.m.p.)	2009 (p.m.p.)
All countries	827.1	847.3	867	889.2	910.1
Austria	887.4	909.8	928.4	972.4	958.7
Belgium					
Dutch speaking	948.6	978.9	1003.5	1027.6	1054.9
French speaking	1056.4	1101.9	1137.5	1175.2	1217.0
Denmark	778.2	786.4	823.8	830.2	833.2
Finland	704.2	710.8	724.0	740.2	747.3
Greece	912.4	926.0	941.6	956.9	974.7
Iceland	540.5	541.0	577.6	587.5	613.0
Italy (Calabria)	947.1	954.1	971.1	971.0	965.4
Norway	770.8	790.7	819.7	852.4	876.7
Spain					
Andalusia	1033.2	1029.5	1011.6	1027.6	1046.2
Asturias	826.7	834.6	830.2	840.0	850.4
Basque country	911.0	922.6	937.1	945.8	975.7
Cantabria	801.2	795.5	785.3	796.2	815.7
Castille and Leon	820.7	828.4	823.6	844.0	853.4
Castille-La Mancha	934.7	939.9	938.1	935.7	929.7
Catalonia	1079.5	1079.8	1117.0	1142.6	1169.1
Extremadura	850.7	871.1	873.8	892.9	915.2
Valencian region	1087.6	1095.1	1099.6	1090.4	1099.0
Sweden	805.6	828.5	841.7	848.2	860.8
The Netherlands	761.2	794.9	818.8	857.5	897.7
UK, all countries	720.1	746.8	778.3	804.7	829.5
England	709.6	737.6	769.7	799.9	827.0
Northern Ireland	847.2	874.3	890.6	905.3	898.8
Scotland	767.3	785.8	809.6	817.6	829.4
Wales	730.6	759.2	814.8	817.3	840.5

**Table 6.** Prevalence of RRT p.m.p. on 31 December 2009 by treatment modality, unadjusted<sup>a</sup>

Country/region providing individual patient data	All (p.m.p.)	HD (p.m.p.)	PD (p.m.p.)	Tx (p.m.p.)	Unknown/missing (p.m.p.)	Country/region providing aggregated data	All (p.m.p.)	HD (p.m.p.)	PD (p.m.p.)	Tx (p.m.p.)	Missing (p.m.p.)
Austria	979	457	45	476	0	Bosnia and Herzegovina	707	627	33	47	0
Belgium						Bulgaria	452	372	20	60	0
Dutch speaking	1141	607	68	466	0	Croatia	931	610	61	261	0
French speaking	1193	649	60	484	0	Czech Republic	541	496	45		0
Denmark	838	369	102	364	3	Estonia	503	154	55	294	0
Finland	780	252	69	460	0	France (20 of 26 regions) <sup>b</sup>	1091	542	41	507	0
France (16 of 26 regions) <sup>c</sup>	1043	526	43	473	0.3	FYR of Macedonia	728	639	14	75	0
Greece	1065	782	67	215	0	Israel	706	658	48		0
Iceland	540	166	25	349	0	Italy (14 of 20 regions) <sup>d</sup>	1006	905	98		3
Italy (12 of 20 regions) <sup>e</sup>	1132	766	93	273	0	Latvia	412	159	47	206	0
Norway	842	204	47	591	0	Montenegro	335	283	5	47	0
Romania	513	404	74	35	0	Poland	731	452	29	250	0
Spain						Portugal	1507	908	54	545	0
Andalusia	990	479	42	468	0.1	Russia	170	121	12	37	0
Asturias	991	365	54	570	0.9	Serbia	699	519	68	112	0
Basque country	1066	353	86	628	0	Slovakia	596	572	25		0
Canary Islands	1112	592	58	461	0.5	Spain (17 of 19 regions) <sup>f</sup>	1033	488	50	495	0
Cantabria	872	335	61	476	0	Turkey	828	649	75	103	0
Castile and Leon	997	438	62	490	7	Ukraine	101	76	12	13	0
Castille-La Mancha	914	385	34	491	5						
Catalonia	1159	526	43	591	0						
Extremadura	950	464	59	427	0						
Galicia	1083	501	93	489	0						
Valencian region	1105	619	40	445	1						
Sweden	890	301	93	497	0.1						
The Netherlands	895	318	69	508	0						
UK, all countries	818	377	72	348	21						
UK, England	815	375	72	343	24						
UK, Northern Ireland	818	414	468	356	3						
UK, Scotland	835	362	59	414	0.8						
UK, Wales	867	417	104	337	9						

<sup>a</sup>Categories may not add up because of rounding off. When cells are left empty, (complete) data are unavailable. Tx, kidney transplantation.

<sup>b</sup>Data based on the regions Alsace, Auvergne, Bourgogne, Bretagne, Centre, Champagne-Ardenne, Corse, Haute-Normandie, Ile de France, Languedoc-Roussillon, Limousin, Lorraine, Midi-Pyrénées, Nord-Pas de Calais, Pays de Loire, Picardie, Poitou-Charentes, Provence-Alpes Côte d'Azur et Rhône-Alpes and the overseas department of Reunion.

<sup>c</sup>Data based on the regions Alsace, Auvergne, Bourgogne, Bretagne, Champagne-Ardenne, Corse, Haute Normandie, Languedoc Roussillon, Limousin, Midi-Pyrénées, Pays de Loire, Picardie, Poitou-Charentes, Provence-Alpes-Côte d'Azur, Rhône Alpes and the overseas department of Reunion.

<sup>d</sup>Data based on the regions Abruzzi, Apulia, Basilicata, Calabria, Emilia-Romagna, Friuli-Venezia Giulia, Lombardy (part), Marche, Sardinia (part), Sicily, Trentino-Alto Adige, Tuscany (part), Umbria and Veneto.

<sup>e</sup>Data based on the regions Abruzzi, Apulia, Basilicata, Calabria, Emilia-Romagna, Friuli-Venezia Giulia, Lombardy, Marche, Sardinia, Tuscany, Umbria and Veneto.

<sup>f</sup>Data based on the regions Andalusia, Aragon, Asturias, Balearic Islands, Basque country, Canary Islands, Cantabria, Castile and Leon, Castile-La Mancha, Catalonia, Extremadura, Galicia, La Rioja, Navarre, Valencian region and the overseas cities Ceuta and Melilla.

A.M. Pinna; Italy (14 of 20 regions): A. Rustici, J.H. Levaldi Ghiron and M. Nichelatti; Latvia: H. Cerneviskis and V. Kuzema; Montenegro: M. Ratkovic and S. Ivanovic; Norway: T. Leivestad; Poland: B. Rutkowski, G. Korejwo and P. Jagodziński; Portugal: F. Macário, R. Filipe and F. Nolasco; Romania: G. Mircescu, L. Garneata and E. Podgoreanu; Russia: N.A. Tomilina and B.T. Bikbov; Serbia: L. Djukanović and N. Dimković; Slovakia: V. Spustová, I. Lajdova and J. Fekete; Spain, Andalusia: P. Castro de la Nuez and M.A. Pérez Valdivia; Spain, Asturias: R. Alonso de la Torre, Á. Rocas and E. Sánchez; Spain, Basque country: A. Magaz, J. Aranzabal, I. Lampreabe, J. Arrieta, M. Rodrigo and I. Moina; Spain, Canary Islands: V. Lorenzo Sellarés, N. Vega Díaz and A.P. Rodríguez Hernández; Spain, Cantabria: J. González Cotorruelo and O. García Ruíz; Spain, Castile and Leon: R. González and C. García-Renedo Spain, Castile-La Mancha: G. Gutiérrez Ávila and I. Moreno Alía; Spain, Catalonia: E. Arcos, J. Comas, R. Deulofeu and J. Twose; Spain, Extremadura: J.M. Ramos Aceitero and M.A. García Bazaga; Spain, Galicia: E. Bouzas-Caamaño and J. Sánchez-Ibáñez; Spain, Valencian region: O. Zurriaga Llorens and M. Ferrer Alamar; Spain (17 of 19 regions): Spanish RRT National Registry at ONT, Spanish Regional Registries and Spanish Society of Nephrology; Sweden: K.G. Prütz, L. Bäckman, S. Schön, A. Seeberger and B. Rippe; the Netherlands: A. Hoitsma and A. Hemke; Turkey: K. Serdengeçti and G. Süleymanlar; Ukraine: M. Kulyzkyi, G. Vladzijevska and M. Kolesnyk; UK, England/Northern Ireland/Wales: all the staff of the UK Renal Registry and of the renal units submitting data

([www.renalreg.com](http://www.renalreg.com)); UK, Scotland: all the Scottish renal units. ([www.srr.scot.nhs.uk](http://www.srr.scot.nhs.uk)).

ERA-EDTA Registry Committee Members: R. Vanholder, Belgium (ERA-EDTA President); C.Wanner., Germany (Chairman); D. Ansell, UK; C. Combe, France; L. Garneata, Romania; F. Jarraya, Tunisia; P. Ravani, Italy; R. Saracho, Spain; F. Schaefer, Germany; S. Schön, Sweden and E. Verrina, Italy.

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*Conflict of interest statement.* None declared.

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**Table 7.** Renal transplantations performed p.m.p. in 2009 by donor type, unadjusted<sup>a</sup>

Country/region providing individual patient data	All (p.m.p.)	Living donor (p.m.p.)	Deceased donor (p.m.p.)	Unknown type donor (p.m.p.)	Country/region providing aggregated data	All (p.m.p.)	Living donor (p.m.p.)	Deceased donor (p.m.p.)	Unknown type donor (p.m.p.)
Austria	47.5	7.2	40.3	0	Bosnia and Herzegovina	5.7	4.8	0.3	0.6
Belgium					Bulgaria	4.4	2.0	2.3	0
Dutch speaking	37.2	1.6	35.5	0.2	Croatia	37.6	2.7	25.9	9.0
French speaking	36.6	3.9	29.3	3.3	Czech Republic	33.0	2.6	30.5	0
Denmark	40.3	15.8	24.6	0	Estonia	39.7	3.0	36.7	0
Finland	32.8	0.7	32.0	0	France (20 of 26 regions) <sup>b</sup>	44.7	3.6	41.1	0
France (16 of 26 regions) <sup>c</sup>	40.6	2.4	38.1	0.1	FYR of Macedonia	5.4	5.4	0	0
Greece	14.9	3.1	11.8	0	Israel	49.4	16.0	25.6	7.7
Iceland	22.0	22.0	0	0	Italy (14 of 20 regions) <sup>d</sup>	46.1	3.5	42.6	0
Italy (12 of 20 regions) <sup>e</sup>	20.1	1.4	18.7	0	Latvia	25.8	2.7	23.1	0
Norway	60.5	21.5	38.9	0	Montenegro	17.4	12.6	4.7	0
Romania	6.5	3.6	1.5	1.4	Poland	20.6	0.6	20.0	0
Spain					Portugal	55.8	5.9	49.9	0
Andalusia	46.4			46.4	Russia	5.8	1.1	4.7	0
Asturias	42.4	0.9	41.5	0	Serbia	12.9	8.7	4.2	0
Basque country	52.4	0	52.4	0	Slovakia	38.8	4.3	34.6	0
Canary Islands	46.9	0	46.9	0	Spain (17 of 19 regions) <sup>f</sup>	49.8	5.0	44.8	0
Cantabria	77.9	0	77.9	0	Turkey	26.6	20.9	5.7	0
Castille and Leon	35.1	0	35.1	0	Ukraine	2.4			2.4
Castille-La Mancha	40.7	40.2	0	0					
Catalonia	70.1	17.7	52.4	0					
Extremadura	40.7	0.9	30.8	9.1					
Galicia	45.4	5.7	39.7	0					
Valencian region	41.4	1.2	40.2	0					
Sweden	42.0	17.4	24.6	0					
The Netherlands	50.0	24.7	24.1	1.1					
UK, all countries	41.9	15.9	26.0	0					
UK, England	43.6	17.0	26.7	0					
UK, Northern Ireland	24.6	7.3	17.3	0					
UK, Scotland	34.8	10.0	24.8	0					
UK, Wales	33.7	12.7	21.0	0					

<sup>a</sup>Categories may not add up because of rounding off. When cells are left empty, (complete) data are unavailable.

<sup>b</sup>Data based on the regions Alsace, Auvergne, Bourgogne, Bretagne, Centre, Champagne-Ardenne, Corse, Haute-Normandie, Ile de France, Languedoc-Roussillon, Limousin, Lorraine, Midi-Pyrénées, Nord-Pas de Calais, Pays de Loire, Picardie, Poitou-Charentes, Provence-Alpes Côte d'Azur et Rhône-Alpes and the overseas department of Reunion.

<sup>c</sup>Data based on the regions Alsace, Auvergne, Bourgogne, Bretagne, Champagne-Ardenne, Corse, Haute Normandie, Languedoc Roussillon, Limousin, Midi-Pyrénées, Pays de Loire, Picardie, Poitou-Charentes, Provence-Alpes-Côte d'Azur, Rhône Alpes and the overseas department of Reunion.

<sup>d</sup>Data based on the regions Abruzzi, Apulia, Basilicata, Calabria, Emilia-Romagna, Friuli-Venezia Giulia, Lombardy (part), Marche, Sardinia (part), Sicily, Trentino-Alto Adige, Tuscany (part), Umbria and Veneto.

<sup>e</sup>Data based on the regions Abruzzi, Apulia, Basilicata, Calabria, Emilia-Romagna, Friuli-Venezia Giulia, Lombardy, Marche, Sardinia, Tuscany, Umbria and Veneto.

<sup>f</sup>Data based on the regions Andalusia, Aragon, Asturias, Balearic Islands, Basque country, Canary Islands, Cantabria, Castile and Leon, Castile-La Mancha, Catalonia, Extremadura, Galicia, La Rioja, Navarre, Valencian region and the overseas cities Ceuta and Melilla.

## Appendix 1 Statistical methods

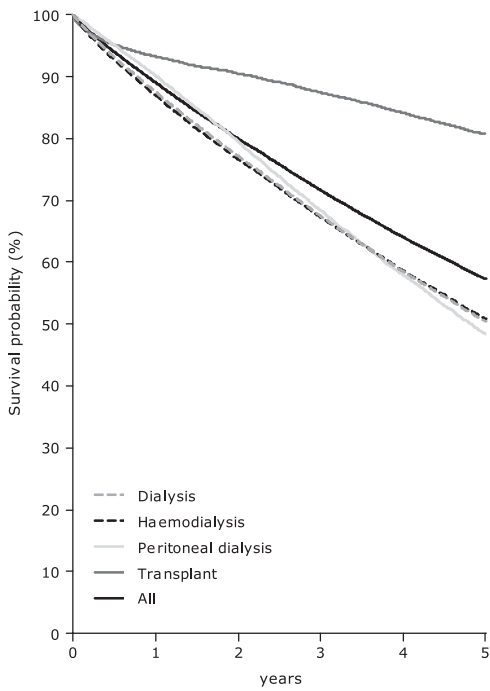
### Statistical methods to Table 8

Data presented include the survival of incident patients on RRT and of patients receiving a first transplant between 2000 and 2004 or between 2003 and 2007 with their 95% confidence intervals. Patients were followed until 31 December 2009. Statistical analysis of unadjusted survival was performed by the Kaplan–Meier method, while for the adjusted survival analyses, the Cox regression model was used. For the analysis of patient survival on RRT, the day at the start of RRT was taken as the starting point and the event studied was death. Censored observations were recovery of renal function, loss to follow-up and end of follow-up time. Regarding the analysis of patient survival on dialysis, the first day on dialysis was the starting point, the event was death and reasons for censoring were recovery of renal function, loss to follow-up, end of follow-up time and renal transplantation. In the Cox regression model, we adjusted for the fixed values of age (60 years), gender (60% men) and PRD (20% diabetes mellitus, 17% hypertension/renal vascular disease,

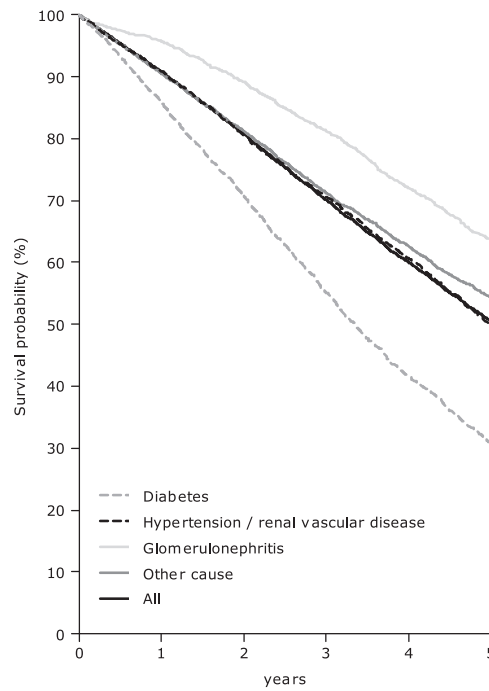
15% glomerulonephritis and 48% other cause). For the analysis of patient and graft survival after transplantation, the date of the first renal transplantation was defined as the first day of follow-up. The event studied for the patient survival after transplantation was death, while for the graft survival, the events were graft failure and death. Reasons for censoring were loss to follow-up and end of follow-up time. In the adjusted analyses, we adjusted for the fixed values of age (45 years), gender (60% men) and PRD (10% diabetes mellitus, 8% hypertension/renal vascular disease, 28% glomerulonephritis and 54% other cause). Patients for whom age, gender or PRD was missing were excluded.

### Statistical methods to Figure 5

For the analyses of patient survival on dialysis, the starting point was Day 91 on dialysis. Analyses were adjusted for the fixed values of age (60 years), gender (60% men) and PRD (20% diabetes mellitus, 17% hypertension/renal vascular disease, 15% glomerulonephritis and 48% other cause). For the analyses of patient survival after transplantation, the starting point was the time of the first transplant. Analyses

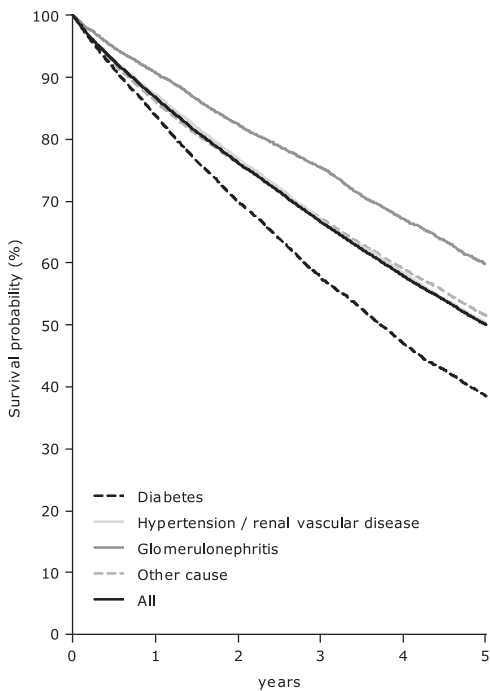


**Fig. 5.** Survival of incident dialysis patients and of patients receiving a first transplant between 2000 and 2004, by treatment modality, adjusted for age, gender and PRD. Analyses regarding incident dialysis patients were adjusted for the fixed values: age (60 years), gender (60% men) and PRD (20% diabetes mellitus, 17% hypertension/renal vascular disease, 15% glomerulonephritis and 48% other cause). Analyses regarding first transplant recipients were adjusted for the fixed values: age (45 years), gender (60% men) and PRD (10% diabetes mellitus, 8% hypertension/renal vascular disease, 28% glomerulonephritis and 54% other cause).



**Fig. 7.** Survival of incident PD patients in 2000-04, from Day 91, by PRD, adjusted for age and gender. Analyses were adjusted for the fixed values: age (60 years) and gender (60% men).

were adjusted for the fixed values of age (45 years), gender (60% men) and PRD (10% diabetes mellitus, 8% hypertension/renal vascular disease, 28% glomerulonephritis and 54% other cause).



**Fig. 6.** Survival of incident HD patients in 2000-04, from Day 91, by PRD, adjusted for age and gender. Analyses were adjusted for the fixed values: age (60 years) and gender (60% men).

*Statistical methods to Figures 6 and 7*

For the analyses presented in each figure, the starting point was Day 91 on dialysis. Analyses were adjusted for the fixed values of age (60 years) and gender (60% men).

**Table 8.** The 1- 2- and 5-year survival probabilities (95% confidence interval) from the first day of RRT for patients who started RRT between 2000 and 2004 and 1- and 2-year survival probabilities for patients who started RRT between 2003 and 2007

	Cohort 2000–04			Cohort 2003–07	
	1 year	2 years	5 years	1 year	2 years
Patient survival on RRT <sup>a</sup>					
Unadjusted	80.6 (80.4–80.8)	69.0 (68.8–69.2)	46.0 (45.9–46.2)	81.9 (81.7–82.1)	70.8 (70.6–71.0)
Adjusted	87.4 (87.2–87.7)	78.5 (78.2–78.8)	56.3 (55.9–56.7)	88.3 (88.1–88.5)	80.0 (79.7–80.2)
Patient survival on dialysis <sup>a</sup>					
Unadjusted	80.2 (80.0–80.5)	67.2 (66.9–67.4)	38.2 (38.0–38.3)	81.1 (80.9–81.3)	68.8 (68.6–69.1)
Adjusted	85.6 (85.3–85.9)	75.1 (74.8–75.5)	48.0 (47.5–48.5)	87.1 (86.9–87.4)	77.9 (77.6–78.2)
Patient survival after first transplant (deceased donor) <sup>b</sup>					
Unadjusted	95.6 (95.3–95.9)	93.8 (93.3–94.1)	87.0 (86.5–87.5)	95.8 (95.5–96.1)	93.9 (93.5–94.2)
Adjusted	97.1 (96.8–97.4)	95.8 (95.5–96.2)	91.0 (90.4–91.5)	97.3 (97.1–97.6)	96.1 (95.8–96.4)
Patient survival after first transplant (living donor) <sup>b</sup>					
Unadjusted	97.5 (96.9–97.9)	96.6 (96.0–97.2)	94.1 (93.3–94.8)	98.0 (97.6–98.4)	97.1 (96.6–97.6)
Adjusted	97.5 (96.9–97.0)	96.6 (95.9–97.2)	94.0 (93.1–94.9)	98.3 (97.9–98.7)	97.5 (97.0–98.0)
Graft survival after first transplant (deceased donor) <sup>b</sup>					
Unadjusted	90.1 (89.7–90.6)	87.3 (86.8–87.8)	77.7 (77.1–78.3)	90.0 (89.6–90.4)	87.1 (86.6–87.6)
Adjusted	91.0 (90.5–91.5)	88.4 (87.8–89.0)	79.3 (78.6–80.1)	91.0 (90.6–91.5)	88.4 (87.9–88.9)
Graft survival after first transplant (living donor) <sup>b</sup>					
Unadjusted	93.8 (93.0–94.5)	91.9 (91.0–92.7)	85.7 (84.6–86.7)	94.7 (94.1–95.3)	92.9 (92.1–93.5)
Adjusted	93.5 (92.6–94.4)	91.5 (90.5–92.6)	84.9 (83.6–86.3)	94.4 (93.7–95.2)	92.5 (91.7–93.3)

<sup>a</sup>Analyses were adjusted using fixed values: age (60 years), gender (60% men) and PRD (20% diabetes mellitus, 17% hypertension/renal vascular disease, 15% glomerulonephritis and 48% other cause).

<sup>b</sup>Analyses were adjusted using fixed values: age (45 years), gender (60% men) and PRD (10% diabetes mellitus, 8% hypertension/renal vascular disease, 28% glomerulonephritis and 54% other cause).