Renal replacement therapy in Europe—a summary of the 2010 ERA–EDTA Registry Annual Report

Anneke Kramer1, Vianda S. Stel1, José Maria Abad Diez2, Ramón Alonso de la Torre3, Encarnación Bouzas Caamaño4, Svetlana Cada5, Higiani Cao Baduell6, Pablo Castro de la Nuez7, Harijs Cernevskis8, Frederic Collart9, Cécile Couchoud10, Johan of Meester11, Ljubica Dukunovic12, Manuel Ferrer-Alamar13, Patrik Firne14,15, Damjan Fogarty16, Maria de los Ángeles García Bazaga17, Liliana Garneata18, Elizier Golan19, Raquel Gonzalez Fernandez20, James G. Hear21, Andrés Hoitsma22, George A. Ioannidis23, Mykola Kolesnyk24, Reinhard Kramar25, Torbjørn Leivestad26, Aurelio Limido27, Frantisek Lopot28, Fernando Macario29, Ángela Magaz30, Eduardo Martin-Escobar31, Wendy Metcalfe32, Marlies Noordzi3, Mai Ots-Rosenberg33, Runolfur Palsson34, Celestino Pinera35, Maurizio Postorino36, Karl G. Prutz37, Marina Ratkovic38, Holima Resic39, Aurelio Rodriguez Hernandez40, Boleslaw Rutkowski41, Kamil Serdenecti42, Tomas Sierra Yebenes43, Viera Spustova44, Olivia Stajceva-Taneva45, Natalia A. Tomilina46,47, Moniek W.M. van de Luijtgaarden48, Karl J. van Stralen49, Christoph Wanner48 and Kitty J. Jager1

1ERA–EDTA Registry, Department of Medical Informatics, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands, 2Dirección General de Planificación y Aseguramiento, Gobierno de Aragón, Spain, 3Dirección General de Salud Pública, Principado de Asturias, Spain, 4Oficina de Coordinación de Trasplantes, Servicio Gallego de Salud (SERGAS), Galicia, Spain, 5Nephrology and Dialysis Division, University Clinic for Internal Diseases, Sestre Milosrdnice Clinical Hospital Centre, School of Medicine, University of Zagreb, Zagreb, Croatia, 6Nephrology Service, Hospital del Mar, Barcelona, Catalonia, Spain, 7Coordinación Autonómica de Trasplantes, Servicios de Apoyo del SAS, Sevilla, Andalusia, Spain, 8Department of Internal Medicine, P.Straðins Clinical University Hospital, Riga, Latvia, 9French-Belgian ESRD Registry, Brussels, Belgium, 10REIN registry, Agence de la biomédecine, Saint Denis La Plaine Cedex, Paris, France, 11Dept of Nephrology, Dialysis & Hypertension, AZ Nikolaos, Sint-Niklaas, Belgium, 12School of Medicine, University of Belgrade, Belgrade, Serbia, 13Valencian Region Renal Registry (REMRENAL), Dir. Gral. Investigacion y Salud Publica, Conselleria de Sanitat, Valencia, Spain, 14Department of Nephrology, Helsinki University Central Hospital, Helsinki, Finland, 15Finnish Registry for Kidney Diseases, Helsinki, Finland, 16Nephrology Research Group, Centre for Public Health, Queen's University and Regional Nephrology Unit, Belfast City Hospital, Belfast, UK, 17Servicio Extremo de Salud, Consejería de Salud y Política Social, Gobierno de Extremadura, Spain, 18Dr Carol Davila University of Medicine and Pharmacy, Dr Carol Davila Teaching Hospital of Nephrology, Bucharest, Romania, 19Israel Society of Nephrology & Hypertension, Dept. of Nephrology & Hypertension, Meir Medical Center, Kfar-Saba, Israel, 20Técnico de la Coordinación Autonómica de Trasplantes de Castilla y León, Spain, 21Department of Nephrology, Copenhagen University Hospital at Herlev, Herlev, Denmark, 22Department of Nephrology, Radboud University, Nijmegen Medical Centre, Nijmegen, The Netherlands, 23Hellenic Renal Registry, General Hospital of Athens “G.Gennimatas”, Athens, Greece, 24Institute of Nephrology, Kiev, Ukraine, 25Austrian Dialysis and Transplant Registry, Rohr, Austria, 26The Norwegian Renal Registry, Dept. of Transplantation Medicine, Oslo University Hospital, Oslo, Norway, 27Nephrology and Dialysis Unit, Azienda OSPedaliera Fatebenefratelli e Ospedaliero di Carità, Bergamo, Italy, 28General University Hospital, Department of Medicine - Strovah and Charles University Medical School, Institute of Biophysics and Informatics, Prague, Czech Republic, 29Portuguese Renal Disease Registry, Portuguese Society of Nephrology, Coimbra, Portugal, 30UNIPAR, Bilbao, Basque Country, Spain, 31Coordinador del Registro Español de Enfermos Renales, Spain, 32Scottish Renal Registry, Cirrus House, Abbotsinch, Paisley, Scotland, UK, 33Department of Internal Medicine, Tartu University, Tartu, Estonia, 34Division of Nephrology, Landsdalfi, The National University Hospital of Iceland and Faculty of Medicine, School of Health Sciences, University of Iceland, Reykjavik, Iceland, 35Servicio de Nefrología, Hospital Universitario Valdecilla, Cantabria, Spain, 36CNR-IBIM Clinical Epidemiology and Pathophysiology of Renal Diseases and Hypertension, Renal and Transplantation Unit, Ospedali Riuniti, Reggio Calabria, Italy, 37Department of Internal Medicine, Hospital of Helsingborg, Helsingborg, Sweden, 38Nephrology and Haemodialysis Department, Clinical Center of Montenegro, Podgorica, Montenegro, 39Clinic for Hemodialysis, Clinical Center University of Sarajevo, Sarajevo, Bosnia and Herzegovina, 40Coordinador Autonómico de Trasplante de Órganos y Tejidos, Canarias, Spain, 41Polish Renal Registry, Department of Nephrology, Transplantology and Internal Disease, Medical University Gdañsk, Gdansk, Poland, 42Division of Nephrology, Department of Internal Medicine, Istanbul University, Cerrahpaşa Medical Faculty, Istanbul, Turkey, 43Registro de Enfermos Renales de Castilla la Mancha, Spain, 44Slovak Medical University, Bratislava, Slovakia, 45Macedonian Renal Registry, University Clinic of Nephrology, University of Macedonia “Sts. Cyril and Methodius” Skopje, Skopje, Republic of Macedonia, 46Academico V.I. Shumakov Federal Research Center of Transplantology and Artificial Organs, Moscow, Russia, 47Moscow State University of Medicine and Dentistry, Moscow, Russia and 48Division of Nephrology, University Clinic, University of Würzburg, Würzburg, Germany

Correspondence and offprint requests to: Anneke Kramer; E-mail: a.kramer@amc.uva.nl

© The Author 2013. Published by Oxford University Press on behalf of ERA–EDTA
This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc/4.0/), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact journals.permissions@oup.com
Abstract

Background. This study provides a summary of the 2010 European Renal Association–European Dialysis and Transplant Association (ERA–EDTA) Registry Annual Report (available at www.era-edta-reg.org).

Methods. This report includes data on renal replacement therapy (RRT) using data from the national and regional renal registries in 29 countries in Europe and bordering the Mediterranean Sea. Individual patient data were received from 27 registries, whereas 18 registries contributed data in aggregated form. We present incidence and prevalence of RRT, transplant rates, survival probabilities and expected remaining lifetimes. The latter two are solely based on individual patient records.

Results. In 2010, the overall incidence rate of RRT for end-stage renal disease (ESRD) among all registries reporting to the ERA–EDTA Registry was 123 per million population (pmp) (n = 91,798). The highest incidence rate was reported by Turkey (252 pmp) and the lowest reported by Montenegro (21 pmp). The overall prevalence of RRT for ESRD at 31 December 2010 among all registries reporting to the ERA–EDTA Registry was 741 pmp (n = 551,005). The prevalence varied from 124 pmp in Ukraine to 1580 pmp in Portugal. The overall number of renal transplantations performed in 2010 among all registries was 29.2 pmp (n = 21,740). The highest overall transplant rate was reported from Spain, Cantabria (73 pmp), whereas the highest transplant rate for living donor kidneys was reported from the Netherlands (28 pmp). For patients who started RRT between 2001 and 2005, the unadjusted 5-year patient survival on RRT was 46.2% [95% confidence interval (CI) 46.0–46.3], and on dialysis 38.6% [95% CI 38.5–38.8]. The unadjusted 5-year patient survival after the first renal transplantation performed between 2001 and 2005 was 86.6% (95% CI 86.1–87.1) for deceased donor kidneys and 94.1% (95% CI 93.4–94.8) for living donor kidneys.

Introduction

The summary of the 2010 ERA–EDTA (European Renal Association–European Dialysis and Transplant Association) Registry Report includes data on renal replacement therapy (RRT) using 52 datasets from the national and regional renal registries of 29 countries in Europe and bordering the Mediterranean Sea (Figure 1). Datasets with individual patient data for analysis were received from 27 national and regional registries in 14 countries, whereas 18 national registries from 18 countries contributed data in aggregated form.
Fig. 2. Incidence of RRT pmp at Day 1 in 2010, unadjusted and standardized to the age and gender distribution of the EU27 population, and the mean and median age (years) at RRT initiation. Figures include data from renal registries providing individual patient data (left figure) and aggregated data (right figure). The aggregated data from the Czech Republic, Italy, Slovakia and Turkey include dialysis patients only.

Table 1. Incidence of RRT at Day 1 by age group, as counts (N) and pmpar, unadjusted

| Country/region providing individual patient data | 0–19 years N (pmpar) | 20–44 years N (pmpar) | 45–66 years N (pmpar) | 65–74 years N (pmpar) | 75+ years N (pmpar) |
|-------------------------------------------------|----------------------|-----------------------|-----------------------|-----------------------|---------------------|
| Austria                                         | 11 (6.3)             | 111 (38.2)            | 355 (156.5)           | 358 (444.3)           | 327 (486.4)         |
| Belgium                                         |                      |                       |                       |                       |                     |
| Dutch-speaking<sup>a</sup>                      | 92 (45.5)            | 288 (166.0)           | 292 (507.0)           | 554 (975.0)           | 339 (893.5)         |
| French-speaking<sup>a</sup>                     | 76 (48.1)            | 275 (229.4)           | 195 (560.5)           | 339 (182.4)           |                     |
| Denmark                                         | 9 (6.6)              | 83 (45.9)             | 233 (155.0)           | 170 (319.6)           | 178 (456.1)         |
| Finland                                         | 11 (9.0)             | 49 (29.2)             | 163 (105.9)           | 131 (265.0)           | 83 (192.4)          |
| France (20 of 26 regions)                       | 88 (7.8)             | 623 (41.8)            | 1859 (149.4)          | 1580 (412.7)          | 2841 (660.8)        |
| Greece                                          | 20 (19.1)            | 156 (38.2)            | 532 (180.2)           | 595 (501.4)           | 829 (488.4)         |
| Iceland                                         | 1 (11.1)             | 4 (35.6)              | 8 (103.8)             | 9 (448.1)             | 11 (593.4)          |
| Italy (8 of 20 regions)                         | 19 (6.7)             | 185 (34.9)            | 547 (129.0)           | 585 (367.4)           | 817 (503.1)         |
| Norway                                          | 7 (5.6)              | 88 (52.8)             | 143 (114.7)           | 131 (344.6)           | 140 (357.4)         |
| Romania                                         | 34 (7.6)             | 426 (50.2)            | 1166 (220.6)          | 686 (378.7)           | 356 (237.0)         |
| Spain                                           | 14 (7.6)             | 148 (45.5)            | 319 (157.3)           | 239 (365.3)           | 269 (439.6)         |
| Aragon                                          | 3 (12.3)             | 20 (40.8)             | 50 (144.9)            | 50 (426.4)            | 45 (339.3)          |
| Asturias                                        | 213 (3.0)            | 19 (50.6)             | 36 (113.9)            | 35 (358.5)            | 45 (339.3)          |
| Basque country                                  | 4 (10.6)             | 30 (38.8)             | 85 (139.7)            | 67 (315.1)            | 49 (222.6)          |
| Canary Islands                                  | 1 (2.4)              | 42 (48.0)             | 125 (233.0)           | 73 (654.7)            | 90 (702.0)          |
| Cantabria<sup>a</sup>                           | 6 (27.6)             | 26 (159.9)            | 26 (529.3)            | 18 (254.0)            |                     |
| Castile and León<sup>a</sup>                    | 31 (55.4)            | 99 (144.1)            | 62 (248.9)            | 106 (319.3)           |                     |
| Castille-La Mancha<sup>a</sup>                  | 29 (35.9)            | 68 (138.8)            | 67 (406.8)            | 61 (296.2)            |                     |
| Catalonia                                        | 9 (6.0)              | 101 (34.4)            | 290 (157.1)           | 231 (386.3)           | 324 (505.3)         |
| Extremadura                                     | 1 (4.5)              | 19 (48.0)             | 49 (176.9)            | 44 (450.9)            | 36 (313.6)          |
| Galicia                                         | 2 (4.5)              | 53 (53.6)             | 117 (157.5)           | 94 (325.7)            | 118 (351.2)         |
| Valencian region                                | 9 (8.9)              | 82 (41.6)             | 224 (176.0)           | 173 (386.7)           | 220 (538.6)         |
| Sweden                                          | 29 (13.3)            | 139 (45.3)            | 348 (144.4)           | 259 (326.8)           | 320 (400.4)         |
| The Netherlands                                 | 38 (3.7)             | 232 (42.4)            | 613 (131.7)           | 535 (379.1)           | 542 (469.1)         |
| UK, All countries<sup>a</sup>                   | 1073 (50.4)          | 2236 (40.7)           | 1608 (297.8)          | 1693 (265.2)          |                     |
| England<sup>a</sup>                             | 907 (50.5)           | 1922 (45.2)           | 1317 (293.5)          | 1400 (339.9)          |                     |
| Northern Ireland<sup>a</sup>                    | 72 (35.1)            | 53 (122.6)            | 45 (314.2)            | 55 (468.9)            |                     |
| Scotland                                        | 7 (6.0)              | 92 (52.6)             | 161 (113.4)           | 134 (282.8)           | 125 (308.1)         |
| Wales<sup>a</sup>                                | 50 (25.3)            | 100 (125.3)           | 112 (279.0)           | 113 (403.3)           |                     |
| All countries                                   | 319 (8.0)            | 3915 (44.4)           | 10252 (153.7)         | 8295 (371.2)          | 10473 (490.0)       |

<sup>a</sup>Patients <20 years of age are not reported.
Table 2. Incidence of RRT at Day 1 over the period 2009–2010 among patients aged 0–19, by age group, as counts (N) and pmp, unadjusted

| Cohort | 0–4 years N (pmp) | 5–9 years N (pmp) | 10–14 years N (pmp) | 15–19 years N (pmp) | 0–19 years N (pmp) |
|--------|-------------------|-------------------|---------------------|---------------------|-------------------|
| All countries | 143 (8.0) | 87 (4.9) | 146 (8.3) | 257 (13.5) | 633 (8.8) |

Table 3. Incidence of RRT at Day 1 by PRD for countries/regions providing individual patient data and for countries/regions providing aggregated data, as counts (N) and pmp, unadjusted

| Region | GN N (pmp) | Type I N (pmp) | Type II N (pmp) | Both N (pmp) | HT/RVD N (pmp) | Other N (pmp) | Unkn/Miss N (pmp) |
|--------|------------|----------------|----------------|-------------|---------------|--------------|-----------------|
| Austria | 123 (14.7) | 34 (4.1) | 316 (37.7) | 350 (41.7) | 238 (28.4) | 296 (35.3) | 155 (18.5) |
| Andalusia | 119 (14.2) | 225 (26.8) | 167 (19.9) | 264 (31.4) | 214 (25.5) |
| Aragon | 20 (14.9) | 5 (3.7) | 36 (26.7) | 41 (30.4) | 26 (19.3) | 43 (32.0) | 36 (26.7) |
| Asturias | 7 (6.5) | 10 (9.2) | 20 (18.4) | 30 (27.7) | 23 (21.2) | 29 (26.7) | 48 (43.3) |
| Basque country | 42 (19.3) | 15 (6.9) | 24 (11.0) | 39 (17.9) | 41 (18.8) | 68 (31.3) | 45 (20.6) |
| Canary Islands | 19 (7.2) | 16 (7.2) | 28 (12.0) | 39 (17.9) | 41 (18.8) |
| Cantabria | 10 (12.6) | 14 (13.6) | 19 (11.7) | 30 (25.2) | 29 (22.9) | 26 (23.6) |
| Castile and León | 42 (15.0) | 20 (7.2) | 79 (28.2) | 99 (35.4) | 48 (17.2) | 88 (31.4) | 107 (38.3) |
| Galicia | 10 (10.7) | 170 (18.1) | 270 (28.8) | 209 (22.3) | 290 (30.9) | 217 (23.1) |
| Girona | 149 (15.9) | 56 (3.4) | 221 (13.3) | 277 (16.7) | 452 (27.2) | 477 (28.7) | 604 (36.4) |
| UK | 797 (12.8) | 1396 (22.4) | 692 (11.0) | 8179 (30.2) | 1847 (27.0) | 1864 (29.7) | 1667 (25.1) |
| England | 641 (12.3) | 1135 (21.7) | 551 (10.5) | 1572 (30.1) | 1647 (31.5) |
| Northern Ireland | 22 (12.2) | 46 (25.6) | 19 (10.6) | 58 (32.2) | 30 (16.7) |
| Scotland | 74 (14.2) | 121 (23.2) | 72 (13.8) | 162 (31.0) | 90 (17.3) |
| Wales | 60 (20.0) | 94 (31.3) | 51 (17.0) | 92 (30.6) | 80 (26.6) |
| All countries | 3698 (14.5) | 2627 (10.3) | 3202 (12.5) | 7149 (28.0) | 5818 (22.8) | 8863 (34.6) | 7726 (30.2) |

Regions providing aggregated data

| Region | GN N (pmp) | Type I N (pmp) | Type II N (pmp) | Both N (pmp) | HT/RVD N (pmp) | Other N (pmp) | Unkn/Miss N (pmp) |
|--------|------------|----------------|----------------|-------------|---------------|--------------|-----------------|
| Bosnia and Herzegovina | 51 (14.5) | 27 (7.7) | 97 (27.7) | 124 (35.3) | 82 (23.4) | 184 (52.9) | 69 (19.7) |
| Croatia | 73 (16.5) | 168 (37.9) | 114 (25.7) | 172 (38.8) | 95 (21.4) |
| Estonia | 11 (8.2) | 15 (11.2) | 6 (4.5) | 21 (15.7) | 28 (20.9) | 60 (29.9) | 0 (0) |
| France (23 of 26 regions) | 1018 (16.1) | 2037 (32.2) | 2282 (36.1) | 2490 (39.4) | 1612 (25.5) |
| FYR of Macedonia | 24 (11.9) | 4 (2.0) | 45 (22.3) | 49 (24.2) | 83 (41.1) | 52 (25.7) | 41 (20.3) |
| Israel | 92 (12.2) | 460 (60.3) | 175 (23.0) | 635 (83.3) | 212 (27.8) | 216 (28.3) | 268 (35.0) |
| Italy (14 of 20 regions) | 919 (24.0) | 1252 (32.6) | 1314 (34.2) | 1085 (28.3) | 1597 (41.4) |
| Latvia | 36 (16.2) | 5 (2.2) | 33 (14.8) | 38 (17.0) | 40 (20.6) | 125 (56.1) | 24 (10.8) |
| Montenegro | 5 (8.1) | 4 (6.5) | 0 (0) | 4 (6.5) | 2 (3.2) |
| Poland | 915 (25.3) | 1189 (32.8) | 775 (21.3) | 625 (17.3) | 1607 (46.0) |
| Portugal | 207 (19.5) | 783 (74.7) | 378 (35.6) | 582 (56.4) | 559 (54.0) |
| Russia | 1887 (13.3) | 431 (3.0) | 454 (3.2) | 885 (6.2) | 487 (3.4) | 2061 (14.5) | 266 (2.0) |
| Serbia | 138 (18.3) | 98 (13.0) | 239 (31.6) | 373 (44.6) | 475 (63.2) | 99 (13.2) |
| Slovakia | 89 (16.9) | 329 (62.6) | 110 (20.9) | 339 (64.1) | 15 (2.8) |
| Spain (18 of 19 regions) | 640 (13.6) | 1556 (29.8) | 788 (17.3) | 1516 (33.3) | 1218 (26.7) |
| Turkey | 1088 (17.7) | 993 (16.2) | 4001 (65.0) | 4994 (81.1) | 4218 (68.7) | 3086 (50.2) | 2125 (34.4) |
| Ukraine | 371 (8.2) | 229 (5.2) | 65 (1.4) | 334 (7.3) | 42 (0.9) |
| All countries | 7562 (15.8) | 2073 (4.3) | 5050 (10.6) | 14440 (30.3) | 11355 (23.8) | 13383 (28.0) | 9721 (20.4) |

GN, glomerulonephritis/sclerosis; DM, diabetes mellitus; HT/RVD, hypertension/renal vascular disease; Unkn/Miss, unknown/missing.

Patients <20 years of age are not reported.

The type of diabetes is given by the comorbidity and not by the cause of renal failure.

Data include dialysis patients only.

Renal vascular disease is not reported separately, but is included in the category Other.
The incidence and prevalence data as well as transplant rates were based on the data from countries and regions that provided individual patient data or aggregated data. Survival analysis and the calculation of expected remaining lifetimes were solely based on individual patient records. More detailed data than those presented in the paper were published in the full 2010 ERA–EDTA Registry Annual Report [1] which is also available on www.era-edta-reg.org.

The incidence of RRT for end-stage renal disease

In 2010, the overall number of patients starting RRT for end-stage renal disease (ESRD) among all registries reporting to the ERA–EDTA Registry was 91 798. The total population covered by these registries was 743.7 million resulting in an unadjusted incidence rate of 123 per million population (pmp). The highest unadjusted incidence rates were reported from Turkey (252 pmp), Portugal (237 pmp) and the Czech Republic (198 pmp). The incidence rate standardized for the EU 27 population was also highest in Turkey (411 pmp). Unadjusted incidence rates <50 pmp were reported by Montenegro (21 pmp), Ukraine (23 pmp) and Russia (40 pmp). The mean age was 64.8 years for countries/regions providing individual patient data and 57.6 years for countries/regions providing aggregated data. It varied across countries ranging from 48.9 years in Russia to 69.8 years in Belgium (Dutch-speaking) (Figure 2).

Table 4. Incidence of RRT at Day 91 by treatment modality for countries/regions providing individual patient data and for countries/regions providing aggregated data, as counts (N) and pmp, unadjusted

| Country                  | All N (pmp) | HD N (pmp) | PD N (pmp) | Tx N (pmp) | Unkn/Miss N (pmp) |
|--------------------------|-------------|------------|------------|------------|------------------|
| Regions providing individual patient data |             |            |            |            |                  |
| Austria                  | 1034 (123.2) | 884 (105.4) | 106 (12.6) | 44 (5.2)   | 0 (0)            |
| Belgium                  | 1097 (174.7) | 967 (154.0) | 116 (18.5) | 14 (2.2)   | 0 (0)            |
| Denmark                  | 819 (177.4)  | 699 (151.4) | 97 (21.0)  | 23 (5.0)   | 0 (0)            |
| Finland                  | 622 (111.0)  | 391 (69.8)  | 195 (34.8) | 35 (6.2)   | 1 (0.2)          |
| France (20 of 26 regions)| 6487 (138.7) | 5388 (115.2)| 806 (17.2) | 281 (6.0)  | 12 (0.2)         |
| Greece                   | 1923 (170.1) | 1755 (155.2)| 155 (13.7) | 13 (1.1)   | 0 (0)            |
| Iceland                  | 32 (100.6)   | 23 (72.3)   | 7 (22.0)   | 2 (6.3)    | 0 (0)            |
| Italy (8 of 20 regions)  | 1982 (127.2) | 1670 (107.1)| 303 (19.5) | 9 (0.6)    | 0 (0)            |
| Norway                   | 482 (98.6)   | 315 (64.4)  | 98 (20.0)  | 69 (14.1)  | 0 (0)            |
| Romania                  | 2206 (102.9) | 1968 (91.8) | 214 (10.0) | 24 (1.1)   | 0 (0)            |
| Spain                    |             |            |            |            |                  |
| Andalusia                | 951 (113.2)  | 818 (97.4)  | 101 (12.0) | 32 (3.8)   | 0 (0)            |
| Aragon                   | 158 (117.3)  | 137 (101.7) | 18 (13.4)  | 3 (2.2)    | 0 (0)            |
| Asturias                 | 121 (111.6)  | 93 (86.1)   | 18 (16.3)  | 10 (9.2)   | 0 (0)            |
| Basque country           | 220 (100.8)  | 175 (80.2)  | 40 (18.3)  | 5 (2.3)    | 0 (0)            |
| Canary Islands           | 308 (145.3)  | 269 (126.9) | 38 (17.7)  | 1 (0.6)    | 0 (0)            |
| Cantabria                | 71 (119.8)   | 45 (75.9)   | 20 (33.7)  | 1 (0.6)    | 0 (0)            |
| Castile and León         | 292 (114.1)  | 233 (91.1)  | 53 (20.7)  | 4 (1.9)    | 0 (0)            |
| Castille-La Mancha       | 225 (106.8)  | 186 (88.3)  | 35 (16.6)  | 4 (1.9)    | 0 (0)            |
| Catalonia                | 911 (121.3)  | 722 (96.2)  | 119 (15.9) | 69 (9.2)   | 0 (0)            |
| Extremadura              | 140 (126.0)  | 117 (105.9)| 21 (18.9)  | 1 (1.2)    | 0 (0)            |
| Galicia                  | 372 (133.0)  | 268 (96.0)  | 90 (32.1)  | 14 (5.0)   | 0 (0)            |
| Italian region           | 699 (136.7)  | 591 (115.6)| 92 (18.0)  | 16 (3.1)   | 0 (0)            |
| Sweden                   | 1034 (110.3) | 625 (66.6)  | 326 (34.8) | 83 (8.9)   | 0 (0)            |
| The Netherlands          | 1794 (108.0)| 1212 (72.9)| 365 (22.0)| 218 (13.1)| 0 (0)            |
| UK, All countries        | 6203 (99.6)  | 4483 (72.0)| 1203 (19.3)| 509 (8.2)| 9 (0.1)          |
| England                  | 5206 (99.7)  | 3704 (72.0)| 1031 (19.7)| 487 (8.9)| 3 (0.1)          |
| Northern Ireland         | 166 (92.1)   | 145 (80.4)  | 13 (7.0)   | 8 (4.6)    | 0 (0)            |
| Scotland                 | 485 (92.9)   | 378 (72.4)  | 88 (16.9)  | 15 (2.9)   | 4 (0.8)          |
| Wales                    | 352 (117.0)  | 260 (86.4)  | 71 (23.6)  | 20 (6.5)   | 1 (0.4)          |
| All countries            | 30 615 (119.7)| 24 350 (92.2)| 4747 (18.6)| 1494 (5.8)| 21 (0.1)         |

HD, haemodialysis; PD, peritoneal dialysis; Tx, transplant; Unkn/Miss, unknown/missing.

aPatients <20 years of age are not reported.
bThe incident counts at Day 91 are estimated.
cData include dialysis patients only.
Table 1 reports the unadjusted incidence rate of RRT per million age-related population (pmarp) at Day 1 by age group. Especially in the highest age category (75+ years at the start of RRT), there is a substantial variation in incidence rates, ranging from 192 pmarp in Finland to 975 pmarp in Dutch-speaking Belgium.

For children we performed a separate analysis including data from a limited number of registries: Austria, Denmark, Finland, France, Greece, Iceland, Norway, Romania, Spain (Andalusia), Spain (Aragon), Spain (Asturias), Spain (Basque country), Spain (Canary Islands), Spain (Catalonia), Spain (Extremadura), Spain (Galicia), Spain (Valencian region), Sweden, the Netherlands and UK (Scotland) (Table 2). As numbers of children starting RRT were low, we present averages for 2009–10. Please visit www.espn-reg.org for a more detailed overview of paediatric RRT data in Europe.

Table 3 shows that the number of patients pmarp starting RRT in 2010 for ESRD due to diabetes mellitus varied across countries from 5.2 pmarp in Ukraine to 83.3 pmarp in Israel. For those renal registries making the distinction between diabetes mellitus type I and II, the number of patients pmarp starting RRT for ESRD due to diabetes mellitus type I varied from 2 pmarp in the FYR of Macedonia to 60 pmarp in Israel and for that due to diabetes mellitus type II from 3 pmarp in Russia to 65 pmarp in Turkey.

The incidence of the different treatment modalities [haemodialysis (HD), peritoneal dialysis (PD) and transplantation (Tx)] in 2010 was measured as the number of patients pmarp on a treatment modality at Day 91 of RRT (Table 4). Whereas the incidence rates of HD were highest in Turkey (194 pmarp), Israel (156 pmarp) and Greece (155 pmarp), the incidence rates of PD were highest in Sweden and Denmark (both 35 pmarp), and Spain, Cantabria (34 pmarp). The highest incidence rates of patients living on a functioning graft at Day 91 of RRT were observed in Norway (14 pmarp), the Netherlands (13 pmarp) and Spain, Cantabria (10 pmarp).

The prevalence of RRT for ESRD

The overall prevalence count at 31 December 2010 among all registries reporting to the ERA-EDTA Registry was 551,005, corresponding to a prevalence of 741 pmarp. Figure 3 shows that the unadjusted prevalence of RRT pmarp was highest in Portugal (1580 pmarp), Belgium (French-speaking) (1237 pmarp) and Spain, Catalonia (1188 pmarp). The lowest unadjusted prevalence was reported by Ukraine (124 pmarp) and Russia (186 pmarp). Figure 3 also shows the prevalence of RRT standardized for the EU 27 population. Furthermore, the mean age of the prevalent patients on RRT at 31 December 2010 ranged from 47.5 years in Russia to 67.4 years in Italy, whereas the overall mean age was 60.2 years among the countries providing individual patient data and 55.0 years among the countries providing aggregated data (Figure 3). Table 5 shows the unadjusted prevalence of RRT pmarp at 31 December 2010 by age group. Especially in the highest age category (75+ years at the start of RRT), there is a remarkable variation in prevalence,
ranging from 952 pmp in Romania to 3902 pmp in Dutch-speaking Belgium. Table 6 shows the prevalence for the age group 0–19 years, averaged for 2009 and 2010.

As presented in Table 7, the prevalence of HD at 31 December 2010 was highest in Portugal (955 pmp) and Greece (800 pmp) and lowest in Ukraine (92 pmp) and Russia (132 pmp). The prevalence of PD was highest in Spain, Galicia (99 pmp) and Denmark (98 pmp), whereas the lowest prevalence of this treatment was reported in Russia (12 pmp) and FYR of Macedonia (13 pmp). Finally, the prevalence of patients living on a functioning graft was highest in Spain, the Basque country (623 pmp) and Spain, Catalonia (613 pmp).

Renal transplants

The overall number of renal transplantations performed in 2010 among all registries reporting to the ERA-EDTA Registry was 21 740 (29.2 pmp). Of these, 14 261 (19.2 pmp) renal transplantations were performed with a kidney obtained from a deceased donor, 4 312 (5.8 pmp) with a kidney from a living donor and for 6 137 (4.3 pmp) transplantations the type of donor was unknown. Figure 4 shows that the highest overall transplant rates were reported from Spain, Cantabria (73 pmp), Spain, Catalonia (62 pmp), and Spain, Basque country (56 pmp). Countries with the highest transplant rates with living donor kidneys included the Netherlands (28 pmp), UK, Northern Ireland (23 pmp), Sweden (18 pmp) and Denmark (18 pmp).

Patient and graft survival

Survival analysis used the data from 19 registries in 12 countries that provided individual patient records for the period from 2001 to 2008. Four Spanish regions were also included in the analyses based on the cohort 2004–08...
because for these registries, complete data were available from 2002. In Table 8, we present the results of the unadjusted and adjusted survival analyses for all countries together. The adjusted analyses used fixed values for age, gender and distribution of primary renal disease (PRD). The precise methodology of the survival analyses is described in the Appendix.

To calculate the expected remaining lifetimes, we used data from 19 national and regional renal registries in 12 countries that provided individual patient records from 2001 until 2010 (Table 9). The expected remaining lifetimes for patients on RRT are much lower than for the general population, whereas those of dialysis patients are even more reduced than those of transplant recipients. The size of the reduction does, however, depend on the patient's age category: the younger the patient, the more his/her remaining lifetime in years will be reduced.

### Table 7. Prevalence of RRT on 31 December 2010 by treatment modality for countries/regions providing individual patient data/and for countries/regions providing aggregated data, as counts (N) and per million population (pmp), unadjusted

| Country | HD (N pmp) | PD (N pmp) | Tx (N pmp) | Unkn/Miss (N pmp) |
|---------|------------|------------|------------|-------------------|
| **Regions providing individual patient data** | | | | |
| Austria | 3872 (461.5) | 384 (45.8) | 4099 (488.6) | 0 (0) |
| Belgium | 2042 (364.4) | 550 (98.1) | 2130 (380.1) | 23 (4.1) |
| Denmark | 1411 (263.1) | 320 (59.7) | 2511 (468.2) | 0 (0) |
| Finland | 25 744 (550.6) | 2139 (45.7) | 21 110 (451.5) | 355 (7.6) |
| France (20 of 26 regions) | 9048 (800.2) | 755 (66.8) | 2409 (213.0) | 0 (0) |
| Greece | 60 (188.7) | 12 (37.7) | 118 (371.0) | 0 (0) |
| Iceland | 10 583 (678.9) | 1208 (77.5) | 4798 (307.8) | 6 (0.4) |
| **Norway** | 1000 (204.5) | 220 (45.0) | 2975 (608.5) | 0 (0) |
| **Romania** | 9707 (452.8) | 1525 (71.1) | 853 (39.8) | 0 (0) |
| **Spain** | | | | |
| Andalusia | 4102 (488.5) | 361 (43.0) | 4095 (487.6) | 0 (0) |
| Aragon | 636 (472.3) | 39 (29.0) | 804 (597.0) | 1 (0.7) |
| Asturiasb | 406 (374.4) | 63 (58.1) | 608 (560.7) | 0 (0) |
| Basque country | 769 (343.3) | 187 (85.7) | 1360 (623.4) | 0 (0) |
| Canary Islands | 1268 (597.4) | 132 (62.2) | 1036 (488.1) | 1 (0.5) |
| Cantabriaa | 190 (320.6) | 60 (67.5) | 304 (512.9) | 0 (0) |
| Castile and Leóna | 1100 (429.9) | 162 (63.3) | 1325 (517.8) | 22 (8.6) |
| Castille-La Mancha | 857 (406.8) | 95 (45.1) | 1074 (508.9) | 9 (4.3) |
| Catalonia | 3970 (528.5) | 357 (67.5) | 4601 (625.2) | 0 (0) |
| Extremadura | 560 (505.3) | 65 (58.6) | 482 (434.9) | 0 (0) |
| Galicia | 1145 (516.7) | 278 (99.4) | 1437 (513.8) | 0 (0) |
| Valencian region | 3214 (628.8) | 241 (47.1) | 2323 (454.4) | 0 (0) |
| Sweden | 29150 (312.4) | 848 (30.4) | 4764 (306.1) | 1 (0.1) |
| The Netherlands | 5222 (314.3) | 1135 (68.3) | 9025 (543.2) | 1 (0.1) |
| **UK, All countries** | 22 970 (368.9) | 3960 (63.6) | 23 235 (373.2) | 922 (14.8) |
| England | 19 215 (367.9) | 3392 (64.9) | 19 166 (366.9) | 902 (17.3) |
| Northern Ireland | 749 (374.4) | 187 (85.7) | 1360 (623.4) | 0 (0) |
| Wales | 1113 (370.2) | 218 (72.5) | 1236 (411.1) | 11 (3.7) |
| **All countries** | 120 114 (469.7) | 15 777 (61.7) | 102 857 (402.2) | 1341 (5.2) |

| Regions providing aggregated data | | | | |
| Bosnian and Herzegovina | 2305 (657.1) | 111 (31.6) | 166 (47.3) | 9 (2.6) |
| Croatia | 2692 (606.7) | 234 (52.7) | 1250 (281.7) | 0 (0) |
| Czech Republic | 5820 (552.5) | 498 (47.3) | 3900 (370.3) | 0 (0) |
| Estonia | 337 (166.9) | 76 (56.7) | 398 (297.0) | 0 (0) |
| France (23 of 26 regions) | 63 850 (550.8) | 2579 (40.8) | 29 841 (471.6) | 0 (0) |
| FYR of Macedonia | 3132 (648.9) | 26 (12.9) | 140 (69.2) | 0 (0) |
| Israelb | 5175 (678.9) | 361 (44.7) | 0 (0) | |
| Italy (14 of 20 regions)b | 28 663 (751.1) | 2535 (66.0) | 3413 (88.8) | |
| Latvia | 414 (185.7) | 110 (49.3) | 458 (205.5) | 0 (0) |
| Montenegro | 112 (180.6) | 13 (21.0) | 81 (130.6) | 0 (0) |
| Poland | 17 193 (474.7) | 1099 (30.3) | 8042 (222.0) | 0 (0) |
| Portugal | 101 50 (955.3) | 660 (62.1) | 5976 (562.2) | 0 (0) |
| Russia | 18 722 (131.9) | 1757 (12.4) | 5868 (412.2) | 0 (0) |
| Serbia | 4081 (542.1) | 468 (62.2) | 997 (132.4) | 0 (0) |
| Slovakab | 2918 (553.4) | 102 (19.3) | 0 (0) | |
| Spain (18 of 19 regions) | 21680 (475.8) | 2450 (52.9) | 23 140 (507.9) | 0 (0) |
| Turkey | 41 296 (671.5) | 4393 (71.4) | 6422 (104.4) | 0 (0) |
| Ukraine | 4181 (92.2) | 650 (14.3) | 772 (17.0) | 0 (0) |
| **All countries** | 202 001 (414.0) | 18 062 (37.0) | 87 431 (200.2) | 3422 (7.0) |
Acknowledgements. The ERA–EDTA Registry would like to thank the patients and staff of all the dialysis and transplant units who have contributed data via their national and regional renal registries. In addition, we would like to thank the persons and organizations listed in Appendix 1 for their contribution to the work of the ERA–EDTA Registry. The ERA–EDTA Registry is funded by the European Renal Association–European Dialysis and Transplant Association (ERA–EDTA).

Conflict of interest statement. None declared.

Appendix

Statistical methods

Table 8 presents data on the survival of incident patients on RRT and of patients receiving a first transplant between 2001 and 2005 or between 2004 and 2008 with 95% CIs. Patients were followed until 31 December 2010. 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 of 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 fixed values of age (60 years), gender (60% men) and PRD (20% diabetes mellitus, 17% hypertension/renal vascular disease, 15% glomerulonephritis and 48% other causes).

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. The reasons for censoring were loss to follow-up and end of follow-up time. In the adjusted analyses, we adjusted for fixed values of age (45 years), gender (60% men) and PRD (10% diabetes mellitus, 8% hypertension/renal vascular disease, 28% glomerulonephritis and 54% other causes). Patients for whom age, gender or PRD was missing were excluded.

Affiliated registries

Belgium, Dutch-speaking: B. De Moor and H. Augustijn; Belgium, French-speaking: J.M. des Grottes; Bosnia-
### Table 8. The 1-, 2- and 5-year survival probabilities (95% CI) for patients who started RRT/dialysis or underwent renal transplantation between 2000 and 2004 and between 2004 and 2008

| Cohort 2001–2005 | Cohort 2004–2008 |
|------------------|------------------|
| 1 year | 2 year | 5 year | 1 year | 2 year |
| Patient survival on dialysis | | | | |
| Unadjusted | 80.6 (80.4–80.8) | 69.1 (68.9–69.3) | 66.2 (46.0–46.3) | 82.2 (82.0–82.4) | 71.3 (71.1–71.5) |
| Adjusted | 87.7 (87.5–87.9) | 79.0 (78.7–79.3) | 57.1 (56.7–57.5) | 88.7 (88.5–88.9) | 80.7 (80.5–81.0) |
| Patient survival after first transplant (deceased donor) | | | | |
| Unadjusted | 95.5 (95.2–95.8) | 93.4 (93.0–93.8) | 86.6 (81.6–81.7) | 95.9 (95.6–96.2) | 94.0 (93.7–94.4) |
| Adjusted | 97.1 (96.9–97.4) | 91.0 (90.5–91.5) | 91.0 (90.5–91.5) | 97.4 (97.1–97.6) | 96.1 (95.8–96.4) |
| Patient survival after first transplant (living donor) | | | | |
| Unadjusted | 97.5 (97.0–98.0) | 96.6 (96.0–97.1) | 94.1 (93.4–94.8) | 98.3 (97.9–98.6) | 97.5 (97.0–97.9) |
| Adjusted | 97.7 (97.2–98.2) | 96.8 (96.2–97.4) | 94.2 (93.4–95.1) | 98.3 (98.2–98.9) | 97.8 (97.4–98.3) |
| Graft survival after first transplant (deceased donor) | | | | |
| Unadjusted | 89.6 (89.2–90.1) | 86.6 (86.1–87.1) | 76.9 (76.4–77.5) | 90.2 (89.7–90.6) | 87.4 (86.9–87.8) |
| Adjusted | 90.7 (90.2–91.2) | 87.9 (87.4–88.5) | 78.9 (78.2–79.7) | 91.1 (90.7–91.6) | 88.6 (88.1–89.1) |
| Graft survival after first transplant (living donor) | | | | |
| Unadjusted | 93.8 (93.0–94.4) | 91.8 (91.0–92.6) | 85.9 (84.9–86.8) | 94.8 (94.2–95.3) | 92.9 (92.2–93.5) |
| Adjusted | 91.5 (92.7–94.3) | 91.4 (90.5–92.4) | 85.2 (83.9–86.4) | 94.4 (93.8–95.1) | 92.5 (91.7–93.2) |

*aBased on the data from Austria, Belgium (Dutch-speaking), Belgium (French-speaking), Denmark, Finland, Greece, Iceland, Italy (Calabria), Norway, Spain (Andalusia), Spain (Asturias), Spain (Basque country), Spain (Cantabria), Spain ( Catalania), Spain (Volcanic region), Sweden, the Netherlands, UK (England and Wales) and UK (Scotland).

*bBased on the data from Austria, Belgium (Dutch-speaking), Belgium (French-speaking), Denmark, Finland, Greece, Iceland, Italy (Calabria), Norway, Spain (Andalusia), Spain (Aragon), Spain (Asturias), Spain (Basque country), Spain (Cantabria), Spain (Castile and Leon), Spain (Castile-La Mancha), Spain ( Catalania), Spain (Extremadura), Spain (Volcanic region), Sweden, the Netherlands, UK (England and Wales) and UK (Scotland).

**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 causes).

***Analyses were adjusted using fixed values: age (65 years), gender (60% men) and PRD (10% diabetes mellitus, 8% hypertension/renal vascular disease, 28% glomerulonephritis and 54% other causes).**

### Table 9. Expected remaining lifetimes (years) of the general population in 2005, and of prevalent dialysis and transplant patients in 2009 and 2010 (includes mortality in the first 90 days)

| General population | Dialysis patients | Transplant patients |
|-------------------|-------------------|-------------------|
| Age | All | Men | Women | Age | All | Men | Women | Age | All | Men | Women |
| 0 | 79.4 | 76.7 | 81.9 | 0–19 | 36.5 | 37.9 | 34.4 | 0–19 | 61.4 | 61.0 | 62.1 |
| 5 | 74.8 | 72.2 | 77.3 | | | | | | | | |
| 10 | 69.8 | 67.2 | 72.3 | | | | | | | | |
| 15 | 64.9 | 62.2 | 67.4 | | | | | | | | |
| 20 | 60.0 | 57.4 | 62.4 | 20–24 | 19.9 | 20.6 | 18.9 | 20–24 | 43.5 | 42.8 | 44.9 |
| 25 | 55.1 | 52.6 | 57.5 | 25–29 | 17.1 | 17.5 | 16.4 | 25–29 | 39.2 | 38.5 | 40.4 |
| 30 | 50.3 | 47.8 | 52.6 | 30–34 | 14.6 | 14.8 | 14.2 | 30–34 | 35.1 | 34.3 | 36.4 |
| 35 | 45.4 | 43.0 | 47.7 | 35–39 | 12.4 | 12.5 | 12.3 | 35–39 | 31.0 | 30.2 | 32.5 |
| 40 | 40.6 | 38.3 | 42.9 | 40–44 | 10.7 | 10.6 | 10.7 | 40–44 | 27.0 | 26.2 | 28.3 |
| 45 | 35.9 | 33.6 | 38.1 | 45–49 | 9.2 | 9.2 | 9.3 | 45–49 | 23.1 | 22.4 | 24.5 |
| 50 | 31.3 | 29.1 | 33.4 | 50–54 | 7.8 | 7.7 | 7.9 | 50–54 | 15.7 | 15.0 | 16.8 |
| 55 | 26.9 | 24.7 | 28.8 | 55–59 | 6.6 | 6.6 | 6.9 | 55–59 | 14.3 | 13.8 | 15.0 |
| 60 | 22.6 | 20.6 | 24.4 | 60–64 | 5.6 | 5.5 | 5.8 | 60–64 | 13.0 | 12.6 | 14.0 |
| 65 | 18.6 | 16.7 | 20.1 | 65–69 | 4.9 | 4.8 | 5.1 | 65–69 | 10.1 | 10.1 | 10.9 |
| 70 | 14.8 | 13.1 | 16.1 | 70–74 | 4.2 | 4.1 | 4.3 | 70–74 | 7.8 | 7.8 | 8.1 |
| 75 | 11.3 | 10.0 | 12.3 | 75–79 | 3.4 | 3.4 | 3.5 | 75–79 | 9.0 | 9.0 | 9.0 |
| 80 | 8.4 | 7.4 | 9.0 | 80–84 | 2.5 | 2.5 | 2.5 | 80–84 | 8.0 | 8.0 | 8.0 |
| 85 | 6.2 | 5.5 | 6.5 | | | | | | | | |

*aBased on the data from Austria, Belgium (Dutch-speaking), Belgium (French-speaking), Denmark, Finland, Greece, Iceland, Italy (Calabria), Norway, Spain (Andalusia), Spain (Asturias), Spain (Basque country), Spain (Cantabria), Spain ( Catalania), Spain (Volcanic region), Sweden, the Netherlands, UK (England and Wales) and UK (Scotland).
Sellarés and N. Vega Díaz; Spain, Cantabria: M. Arias; Spain, Castile and León: C. García-Renedo; Spain, Castile-La Mancha: G. Gutiérrez Ávila and I. Moreno Alía; Spain, Catalonia: E. Arcos, J. Comas and P. A. Montserrat; Spain, Extremadura: J.M. Ramos Aceituro; Spain, Galicia: J. Sánchez-Ibáñez; Spain, Valencian region: O. Zurriaga Llorens; Spain (18 of 19 regions): Spanish RRT National Registry at ONT, Spanish Regional Registries and Spanish Society of Nephrology; Sweden: L. Bäckman, M. Evans, S. Schön, M. Stendahl and B. Rippe; The Netherlands: A. Hemke; Turkey: G. Süleymanlar; Ukraine: G. Vladzievska and M. Kulyzkyi; UK, England/Northern Ireland/Wales: All the staff of the UK Renal Registry and of the renal units submitting data; UK, Scotland: The staff of the Scottish Renal Registry and all of the Scottish renal units.

**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.

**ERA–EDTA Registry Office Staff**

K.J. Jager (Managing Director), R. Cornet, F.W. Dekker, A. Kramer, M.W.M. van de Luijtgaarden, M. Noordzij, V.S. Stel, K.J. van Stralen and A.J. Weerstra.

**Reference**

1. ERA-EDTA Registry: ERA-EDTA Registry Annual Report 2010. Amsterdam, The Netherlands: Academic Medical Center, Department of Medical Informatics, 2012

Received for publication: 19.10.12; Accepted in revised form: 24.10.12