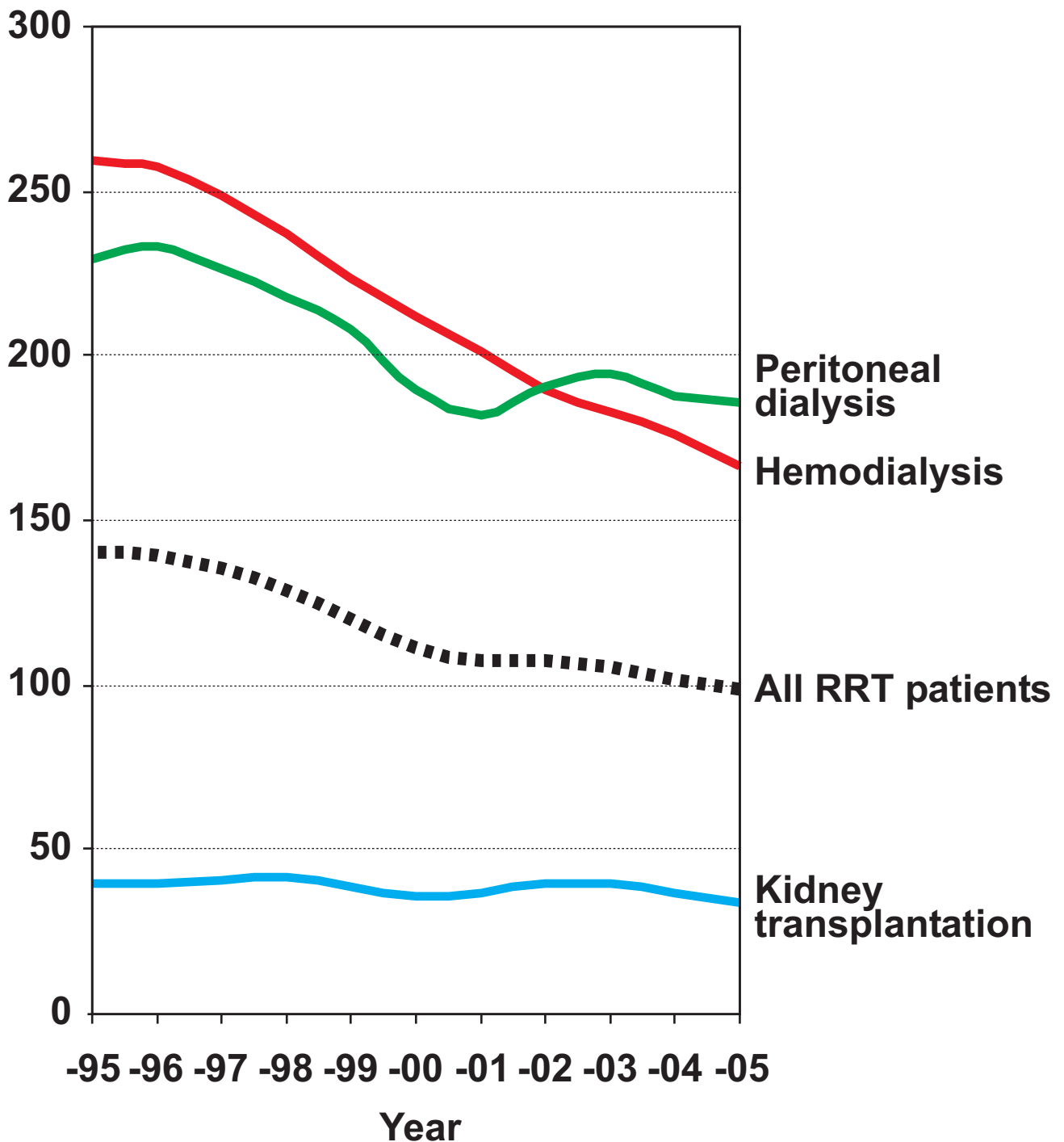


Finnish Registry for Kidney Diseases

Report 2005

Deaths/1000 patient-years



Finnish Registry for Kidney Diseases – Report 2005

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Finnish Registry for Kidney Diseases – Report 2005

Report 2005 gives up-to-date information on the incidence and prevalence of renal replacement therapy (RRT), as well as on RRT patients' mortality. The Finnish Registry for Kidney Diseases is estimated to cover 97–99% of all Finnish patients receiving RRT since 1964. At the end of 2005, the registry contained data on 9888 patients, 3733 of whom were still alive.

The incidence of RRT has remained unchanged since the year 2000, although the Finnish population has become older. In Sweden and Denmark, the incidence has also not increased in recent years, but nonetheless is 30–40% higher than in Finland. In Norway, the incidence of RRT is currently similar to in Finland, but is on the rise.

The prevalence of RRT continues to increase because the number of patients entering RRT exceeds the number of deaths. RRT patients' mortality has decreased during the past 10 years. This trend is most evident in the age-standardized analysis, because the RRT patients are getting older. Report 2005 also provides analyses of mortality according to type of treatment and diagnosis of kidney disease.

Report 2005 provides a special analysis on dialysis patients' probability of proceeding to the waitlist for kidney transplantation. The most important variable affecting this probability is age at start of dialysis. Diagnosis of kidney disease and type of dialysis also correlate with proceeding to the waitlist. Patients are proceeding increasingly slowly to the waitlist.

The Finnish Registry for Kidney Diseases is a national healthcare registry, financed by Finland's Slot Machine Association (RAY). Statistics in this report were updated using data obtained from the Registry for Follow-up of Kidney Transplantation Patients, maintained by the Kidney Transplantation Unit of Helsinki University Central Hospital. The Board of the Finnish Registry for Kidney Diseases thanks all supporters and participating hospitals for excellent cooperation.

Helsinki, 25 November 2006

Patrik Finne
Administrative Director

Carola Grönhagen-Riska
Chairman of the Board

Board of the Finnish Registry for Kidney Diseases

Sirpa Aalto, MSc

Ipo Ala-Houhala, Docent

Carola Grönhagen-Riska, Professor

Eero Honkanen, Docent

Risto Ikäheimo, Docent

Pauli Karhapää, MD

Kaj Metsärinne, Docent

Maija Piitulainen

Kai Rönholm, Docent

Kaija Salmela, Docent

Patrik Finne, Docent, Administrative Director

Rauni Jukkara, Secretary

Table 1. The Finnish population and its distribution in healthcare districts.
Finnish Registry for Kidney Diseases 1995–2005

Healthcare district (1000 inhabitants)		Year					Change (%) 1995–2005
		1995	2000	2003	2004	2005	
1	Helsinki-Uusimaa	1306	1389	1423	1432	1445	10.7
3	Varsinais-Suomi	441	453	458	459	461	4.5
4	Satakunta	237	231	228	228	227	-4.4
5	Kanta-Häme	165	165	167	168	168	2.1
6	Pirkanmaa	435	448	459	463	467	7.2
7	Päijät-Häme	208	207	210	210	210	1.2
8	Kymenlaakso	188	183	181	181	181	-3.7
9	Etelä-Karjala	131	130	129	129	129	-2.2
10	Etelä-Savo	110	107	105	104	104	-5.6
11	Itä-Savo	70	67	63	63	62	-11.7
12	Pohjois-Karjala	179	173	171	170	170	-5.2
13	Pohjois-Savo	258	252	251	251	250	-3.2
14	Keski-Suomi	261	264	266	267	268	2.6
15	Etelä-Pohjanmaa	201	196	194	195	194	-3.3
16	Vaasa	167	166	166	166	166	-0.4
17	Keski-Pohjanmaa	80	78	77	77	77	-3.1
18	Pohjois-Pohjanmaa	361	369	376	379	382	5.7
19	Kainuu	91	86	83	82	82	-10.1
20	Länsi-Pohja	72	69	67	67	67	-7.0
21	Lappi	130	123	120	120	119	-8.2
22	Åland	25	26	26	27	27	6.2
Region							
	South	1625	1702	1733	1742	1755	8.0
	Southwest	704	709	712	713	714	1.6
	West	1176	1183	1195	1201	1206	2.5
	East	879	862	856	855	854	-2.9
	North	733	725	723	725	727	-0.9
Entire country		5117	5181	5220	5237	5256	2.7

On 31 December 2005, there were 5.256 million inhabitants in Finland (Table 1, Source: Statistics Finland). During the past ten years the population has increased considerably in the southern region. In the eastern and northern regions, the populations have decreased. Since 1995, the populations have increased in eight healthcare districts and decreased in 13.

The numbers in Figure 1 refer to the healthcare districts listed in Table 1. In this report, “region” refers to a university hospital region.

Figure 1. Healthcare districts and regions in Finland.
Finnish Registry for Kidney Diseases 2005

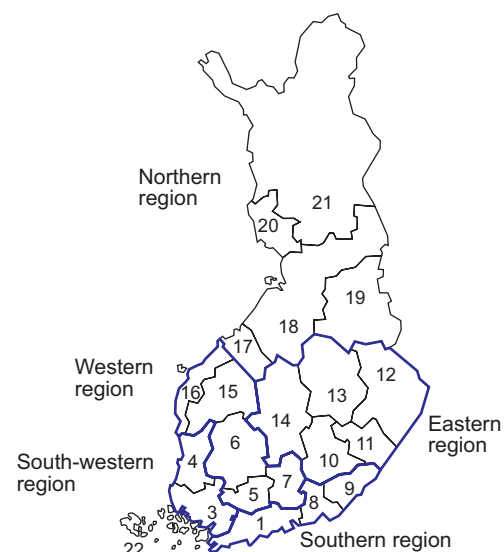


Table 2. The Finnish population according to region, age group, and gender.
Finnish Registry for Kidney Diseases 1995–2005

Region	1995					2005				
	0– 19 y (%)	20– 64 y (%)	65– 74 y (%)	≥ 75 y (%)	Entire country	0– 19 y (%)	20– 64 y (%)	65– 74 y (%)	≥ 75 y (%)	Entire country
South										
Men	203 (26)	505 (65)	48 (6)	24 (3)	780 (100)	208 (24)	548 (65)	58 (7)	35 (4)	849 (100)
Women	195 (23)	520 (62)	69 (8)	61 (7)	844 (100)	200 (22)	561 (62)	72 (8)	72 (8)	906 (100)
Total	398 (25)	1025 (63)	117 (7)	85 (5)	1625 (100)	408 (23)	1109 (63)	131 (7)	107 (6)	1755 (100)
Southwest										
Men	87 (25)	212 (62)	27 (8)	14 (4)	341 (100)	82 (23)	215 (62)	30 (9)	21 (6)	348 (100)
Women	83 (23)	209 (58)	38 (10)	33 (9)	363 (100)	77 (21)	214 (58)	36 (10)	40 (11)	367 (100)
Total	170 (24)	421 (60)	65 (9)	47 (7)	704 (100)	159 (22)	429 (60)	66 (9)	61 (9)	714 (100)
West										
Men	151 (26)	352 (62)	45 (8)	24 (4)	572 (100)	143 (24)	365 (62)	49 (8)	34 (6)	591 (100)
Women	144 (24)	343 (57)	64 (11)	54 (9)	605 (100)	137 (22)	353 (57)	59 (10)	67 (11)	615 (100)
Total	295 (25)	695 (59)	109 (9)	78 (7)	1176 (100)	280 (23)	717 (59)	108 (9)	101 (8)	1206 (100)
East										
Men	114 (26)	267 (62)	35 (8)	17 (4)	432 (100)	99 (23)	259 (62)	38 (9)	25 (6)	421 (100)
Women	109 (24)	252 (56)	48 (11)	38 (8)	447 (100)	95 (22)	245 (57)	44 (10)	49 (11)	433 (100)
Total	223 (25)	518 (59)	83 (9)	55 (6)	879 (100)	193 (23)	504 (59)	82 (10)	74 (9)	854 (100)
North										
Men	109 (30)	221 (60)	26 (7)	11 (3)	367 (100)	96 (26)	221 (61)	29 (8)	18 (5)	364 (100)
Women	105 (29)	205 (56)	33 (9)	24 (7)	366 (100)	92 (25)	205 (57)	33 (9)	32 (9)	362 (100)
Total	213 (29)	426 (58)	58 (8)	35 (5)	733 (100)	188 (26)	426 (59)	61 (8)	51 (7)	727 (100)
Entire country										
Men	663 (27)	1557 (62)	181 (7)	91 (4)	2492 (100)	627 (24)	1609 (63)	204 (8)	133 (5)	2572 (100)
Women	636 (24)	1528 (58)	252 (10)	210 (8)	2625 (100)	601 (22)	1578 (59)	244 (9)	260 (10)	2683 (100)
Total	1299 (25)	3086 (60)	432 (8)	300 (6)	5117 (100)	1228 (23)	3187 (61)	448 (9)	393 (7)	5256 (100)

Table 2 shows the distribution of the Finnish population according to region, age, and gender at the end of 1995 and 2005. The proportion of inhabitants older than 65 years in the entire country has increased from 14% to 16% percent. In the southern region, the proportion of inhabitants older than 65 years is the smallest (13%) and the proportion of 20–64-year-olds is the largest (63%). In the northern region, the proportion of 0–19-year-olds is the largest (26%).

The age of the Finnish population has increased considerably during the past ten years. The number of inhabitants younger than 20 years has decreased by 5%, whereas the number of inhabitants older than 75 years has increased by 31%.

Table 3. Number of new RRT patients and incidence of RRT by healthcare district and region.
Finnish Registry for Kidney Diseases 1995–2005

Healthcare district	Number of new RRT patients						Incidence of RRT/million inhabitants						
	1995	2000	2003	2004	2005	2001–2005 on average	1995	2000	2003	2004	2005	2001–2005 on average	
1	Helsinki-Uusimaa	92	109	130	108	104	111	70	78	91	75	72	78
3	Varsinais-Suomi	31	44	51	47	38	44	70	97	111	102	82	96
4	Satakunta	18	26	19	26	20	24	76	113	83	114	88	107
5	Kanta-Häme	7	16	16	21	20	18	42	97	96	125	119	107
6	Pirkanmaa	37	53	37	43	39	42	85	118	81	93	84	91
7	Päijät-Häme	19	13	30	27	34	28	91	63	143	129	162	135
8	Kymenlaakso	11	16	20	15	27	19	59	87	110	83	149	105
9	Etelä-Karjala	12	20	20	19	23	16	91	154	155	148	179	127
10	Etelä-Savo	11	6	5	4	8	7	100	56	48	38	77	67
11	Itä-Savo	8	8	8	5	7	6	113	120	127	80	112	94
12	Pohjois-Karjala	14	16	11	23	17	18	78	92	64	135	100	108
13	Pohjois-Savo	24	36	24	23	21	27	93	143	95	92	84	108
14	Keski-Suomi	16	24	18	28	20	24	61	91	68	105	75	89
15	Etelä-Pohjanmaa	16	16	18	12	18	18	80	82	93	62	93	94
16	Vaasa	7	5	18	21	13	14	42	30	109	126	78	86
17	Keski-Pohjanmaa	4	7	8	11	7	7	50	90	103	142	90	90
18	Pohjois-Pohjanmaa	20	38	30	39	43	38	55	103	80	103	113	100
19	Kainuu	5	12	9	18	15	12	55	140	109	219	184	150
20	Länsi-Pohja	8	9	8	4	10	7	112	131	120	60	150	102
21	Lappi	8	16	13	11	9	9	62	130	108	92	75	78
22	Åland	2	4	2	0	2	2	79	155	76	0	75	53
Region	South	115	145	170	142	154	146	71	85	98	82	88	84
	Southwest	51	74	72	73	60	70	72	104	101	102	84	98
	West	86	103	119	124	124	120	73	87	100	103	103	100
	East	73	90	66	83	73	82	83	104	77	97	85	96
	North	45	82	68	83	84	73	61	113	94	115	116	101
Entire country		370	494	495	505	495	491	72	95	95	96	94	94
	Children < 15 y	10	8	9	7	8	9	10	9	10	8	9	9

The number of new RRT patients and the incidence of RRT are presented according to healthcare district and region in Table 3. In the entire country, the incidence has remained virtually unchanged during the past five years. During the past decade it has increased by 30%. In 2001–2005, the average incidence was largest in the northern region and

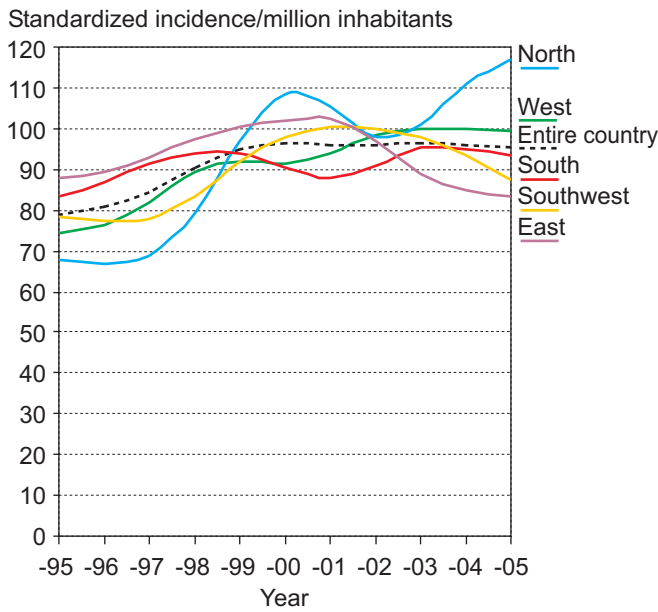
smallest in the southern region. In the southern, western, and northern regions, the incidence was 2–18% greater in 2005 than in 2000. During the same time period the incidence had decreased by 18–20% in the southwestern and eastern regions. In the healthcare districts, the five-year average incidence was 53–150 new RRT patients/million inhabitants.

Table 4. Incidence of RRT by age group and gender.
Finnish Registry for Kidney Diseases 1995–2005

Year		Number of new RRT patients					Incidence/million inhabitants						
		0– 19 y	20– 44 y	45– 64 y	65– 74 y	≥ 75 y	Total	0– 19 y	20– 44 y	45– 64 y	65– 74 y	≥ 75 y	Total
1995	Men	8	49	88	59	18	222	12	53	140	327	199	89
	Women	4	31	57	47	9	148	6	35	90	187	43	56
	Total	12	80	145	106	27	370	9	44	115	245	90	72
2000	Men	6	51	121	91	26	295	9	57	174	472	244	117
	Women	5	36	73	59	26	199	8	42	104	242	111	75
	Total	11	87	194	150	52	494	9	50	139	343	153	95
2003	Men	9	53	118	90	62	332	14	61	163	450	512	130
	Women	4	18	55	50	36	163	7	21	76	204	146	61
	Total	13	71	173	140	98	495	10	41	119	315	266	95
2004	Men	9	64	113	64	57	307	14	73	155	314	450	120
	Women	6	25	82	51	34	198	10	30	112	207	134	74
	Total	15	89	195	115	91	505	12	52	133	255	239	96
2005	Men	7	41	146	61	65	320	11	47	197	299	490	124
	Women	4	32	52	49	38	175	7	38	70	201	146	65
	Total	11	73	198	110	103	495	9	43	133	245	262	94

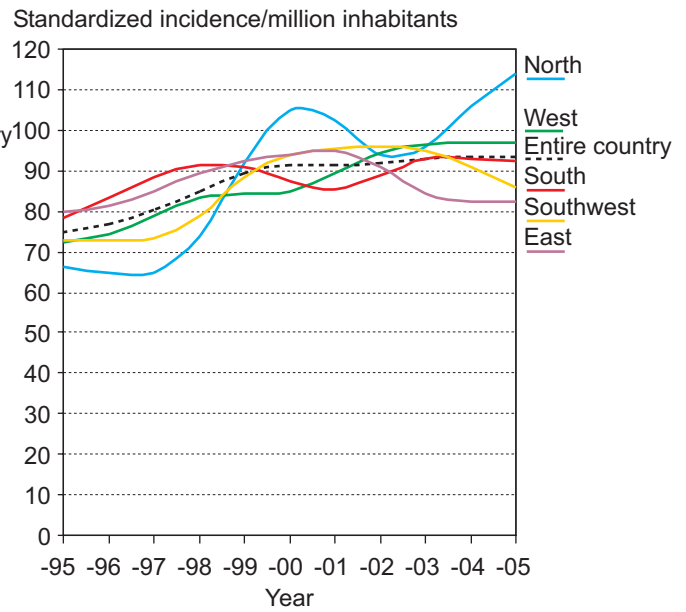
Table 4 shows the number of new RRT patients and the incidence of RRT according to age group and gender in 1995–2005. In inhabitants older than 75 years, the incidence in 2005 was almost threefold that in 1995, and in 45–64-year-olds, the incidence had increased by 16%. In the other age groups, the incidence had not changed markedly from 1995 to 2005.

Figure 2. Standardized incidence of RRT in regions. Finnish Registry for Kidney Diseases 1995–2005



In Figure 2, the incidence of RRT (i.e. dialysis and kidney transplantation) in 1995–2005 is shown regionally as smoothed averages. The incidence rates are age- and gender-standardized using the Finnish population on 31 December 2005 as the reference population. Population changes in 1995–2005 have been considered. Standardization removes the effect of age and gender on the regional differences in incidence rates. In the entire country, the

Figure 3. Standardized incidence of RRT in regions 90 days after the start of RRT. Finnish Registry for Kidney Diseases 1995–2005



incidence has remained virtually unchanged since 1998. In Figure 3, the age- and gender-standardized incidence of RRT 90 days after the start of RRT is shown regionally as smoothed averages. The Finnish Registry for Kidney Diseases does not store data on patients who have regained renal function before 90 days after the start of RRT. In the figure, data on patients who have died or moved abroad within 90 days of the start of RRT have also been excluded.

Figure 4. Incidence of RRT according to diagnosis.
Finnish Registry for Kidney Diseases 1965–2005

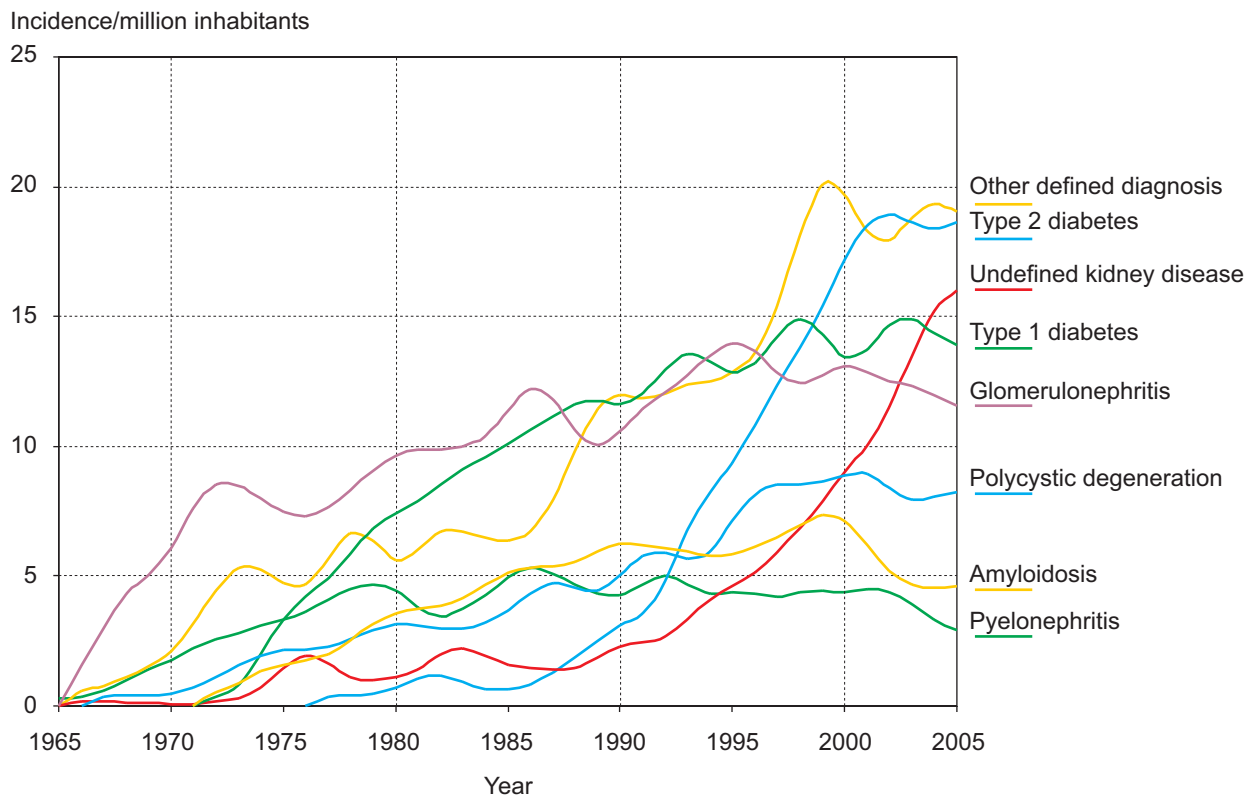
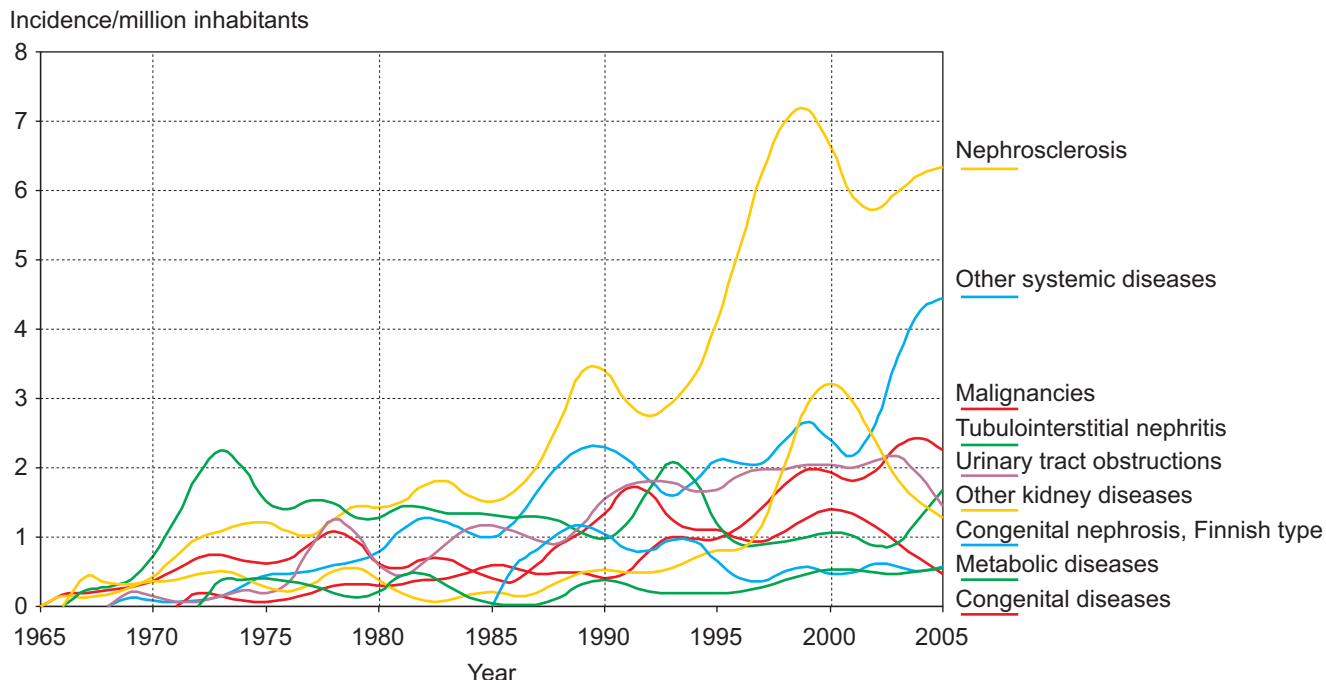


Figure 5. Incidence of RRT according to diagnosis, other defined diagnoses.
Finnish Registry for Kidney Diseases 1965–2005



The incidence of RRT according to diagnosis is shown as smoothed averages in Figure 4. Type 1 and type 2 diabetes are the most common diseases causing chronic uremia. Glomerulonephritis is the third most common diagnosis among new RRT patients, and its incidence has decreased

slightly during the past ten years. The diagnosis “undefined kidney disease” has gained ground in recent years, partly because increasingly older patients are entering RRT.

Figure 5 divides the category “other defined diagnosis” presented in Figure 4 into specific diagnostic groups.

Figure 6. Proportion of new RRT patients with the diagnosis “undefined kidney disease”.
Finnish Registry for Kidney Diseases 1995–2005

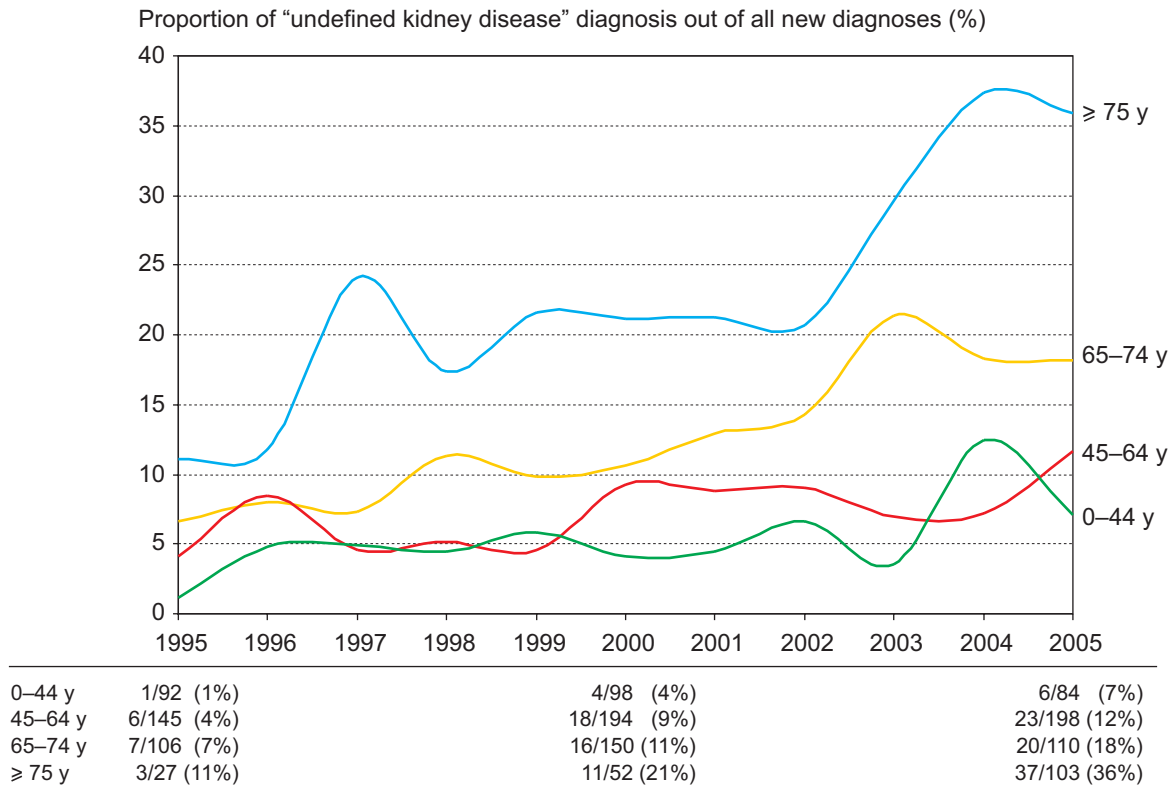


Figure 6 shows that the proportion of “undefined kidney disease” of all new diagnoses is larger in the older age groups. The proportion has increased in all age groups, but especially in patients older than 75 years.

In 2000–2005, the diagnosis of glomerulonephritis was based on biopsy in 86% of 0–44-year-olds, 89% of 45–64-

year-olds, 81% of 65–74-year-olds, and 79% of those older than 75 years. In 1995–1999, the corresponding proportions were 89%, 72%, 59%, and 64%. Thus, biopsy frequency has increased among glomerulonephritis patients. In all RRT patients, the biopsy frequency has remained unchanged.

Figure 7. International comparison of incidence of RRT in 2004.
Finnish Registry for Kidney Diseases 2004

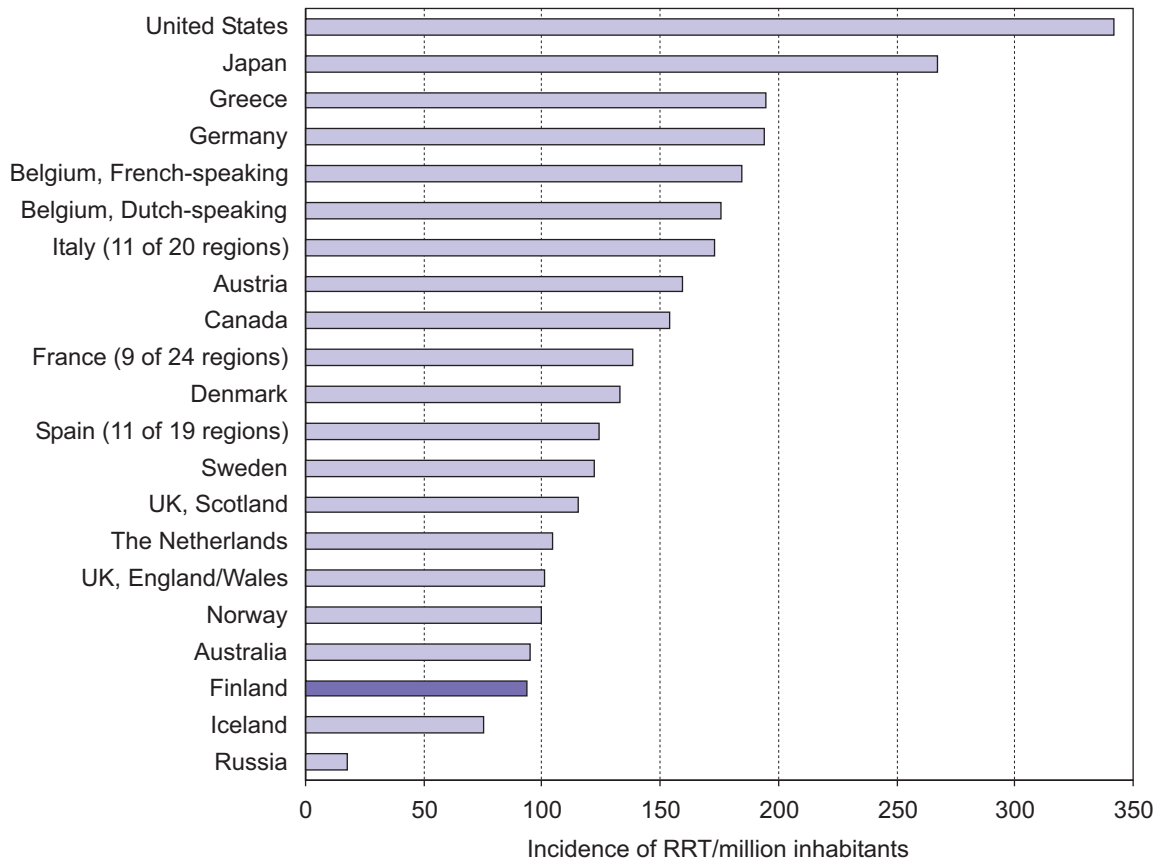


Figure 7 shows the incidence of RRT in 2004 in countries reporting to the ERA-EDTA Registry (<http://www.era-edta-reg.org>) and in Japan, the United States, Canada, and Australia (The 2006 USRDS Annual Data Report Atlas, <http://www.usrds.org>). The incidence of RRT in Finland was the third lowest. In Sweden, the incidence was 30% greater,

in Norway 7% greater, and in Denmark 42% greater than in Finland. Since 2000, the incidence had remained virtually unchanged in Finland and Denmark. In Sweden, the incidence had decreased by 6%, and in Norway increased by 11%.

Table 5. Patients in RRT at the end of the year according to healthcare district and region.
Finnish Registry for Kidney Diseases 1995–2005

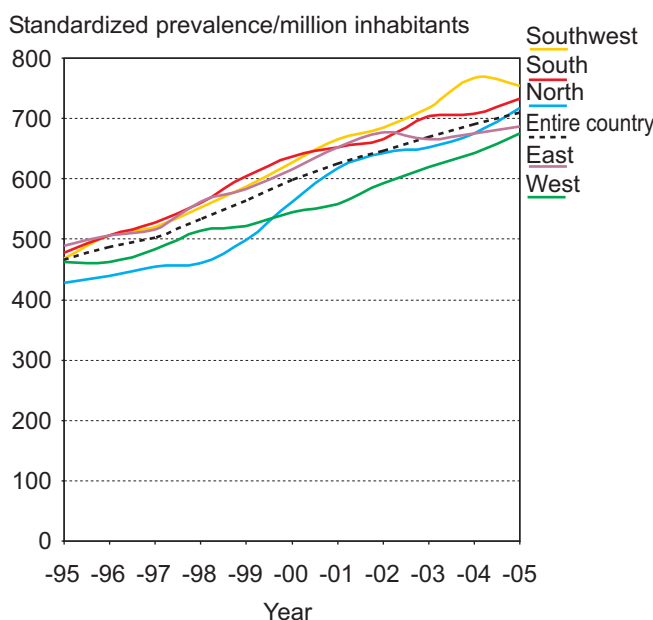
Healthcare district	Number of RRT patients					Prevalence of RRT/million inhabitants					
	1995	2000	2003	2004	2005	1995	2000	2003	2004	2005	
1	Helsinki-Uusimaa	610	834	939	957	989	467	600	660	668	684
3	Varsinais-Suomi	197	282	316	345	343	447	623	690	752	744
4	Satakunta	108	148	188	201	197	455	641	824	883	868
5	Kanta-Häme	60	74	96	110	119	364	448	576	656	707
6	Pirkanmaa	217	295	323	333	339	498	658	704	720	726
7	Päijät-Häme	104	103	130	139	156	500	498	620	662	742
8	Kymenlaakso	68	96	116	106	117	362	525	640	585	647
9	Etelä-Karjala	53	83	98	112	120	403	640	759	870	933
10	Etelä-Savo	43	52	63	63	69	391	488	602	605	666
11	Itä-Savo	37	45	45	46	51	525	676	712	733	819
12	Pohjois-Karjala	82	101	112	119	126	457	583	656	699	741
13	Pohjois-Savo	155	208	224	221	221	600	825	891	880	884
14	Keski-Suomi	103	128	143	151	148	394	485	537	565	552
15	Etelä-Pohjanmaa	79	91	102	98	107	393	464	525	504	550
16	Vaasa	64	75	93	101	107	383	452	561	608	644
17	Keski-Pohjanmaa	22	34	36	43	48	275	435	465	556	619
18	Pohjois-Pohjanmaa	137	197	238	246	265	379	533	633	650	694
19	Kainuu	35	54	58	61	69	386	630	701	742	846
20	Länsi-Pohja	34	38	47	46	49	475	554	703	691	736
21	Lappi	60	65	77	81	79	462	528	642	676	662
22	Åland	13	16	17	15	14	516	621	645	565	523
Region South		731	1013	1153	1175	1226	450	595	665	674	699
Southwest		318	446	521	561	554	452	629	731	787	775
West		524	638	744	781	828	445	540	622	650	686
East		420	534	587	600	615	478	619	686	701	720
North		288	388	456	477	510	393	535	631	658	702
Entire country		2281	3019	3461	3594	3733	446	583	663	686	710

The number of RRT patients and the prevalence of RRT on 31 December 1995–2005 are presented in Table 5. In the entire country, the prevalence has increased by 59% since 1995, and by 22% since 2000. In the healthcare districts, the prevalence has increased by 1–131% during the past ten years. On 31 December 2005, the prevalence was higher in the southwestern region than in the other regions. Since 1995, the prevalence has increased the most in the northern region (79%) and the least in the eastern region (51%).

Table 6. Patients in RRT according to age group and gender.
Finnish Registry for Kidney Diseases 1995–2005

Year		Number of RRT patients						Prevalence of RRT/million inhabitants					
		0– 19 y	20– 44 y	45– 64 y	65– 74 y	≥ 75 y	Total	0– 19 y	20– 44 y	45– 64 y	65– 74 y	≥ 75 y	Total
1995	Men	60	395	599	200	40	1294	90	425	953	1107	441	519
	Women	27	331	407	185	37	987	42	371	640	735	177	376
	Total	87	726	1006	385	77	2281	67	399	796	891	257	446
2000	Men	77	414	849	341	107	1788	119	466	1222	1770	1004	707
	Women	38	321	519	260	93	1231	61	376	742	1065	398	464
	Total	115	735	1368	601	200	3019	91	422	981	1376	588	583
2003	Men	81	436	989	402	182	2090	128	499	1366	2008	1504	819
	Women	46	304	591	300	130	1371	76	362	812	1225	526	514
	Total	127	740	1580	702	312	3461	102	432	1088	1578	847	663
2004	Men	84	455	1012	399	221	2171	133	522	1384	1956	1745	847
	Women	51	293	627	290	162	1423	85	350	854	1176	638	532
	Total	135	748	1639	689	383	3594	110	438	1118	1529	1007	686
2005	Men	82	440	1094	395	262	2273	131	507	1476	1934	1976	884
	Women	52	304	634	285	185	1460	87	365	850	1168	710	544
	Total	134	744	1728	680	447	3733	109	438	1162	1517	1138	710

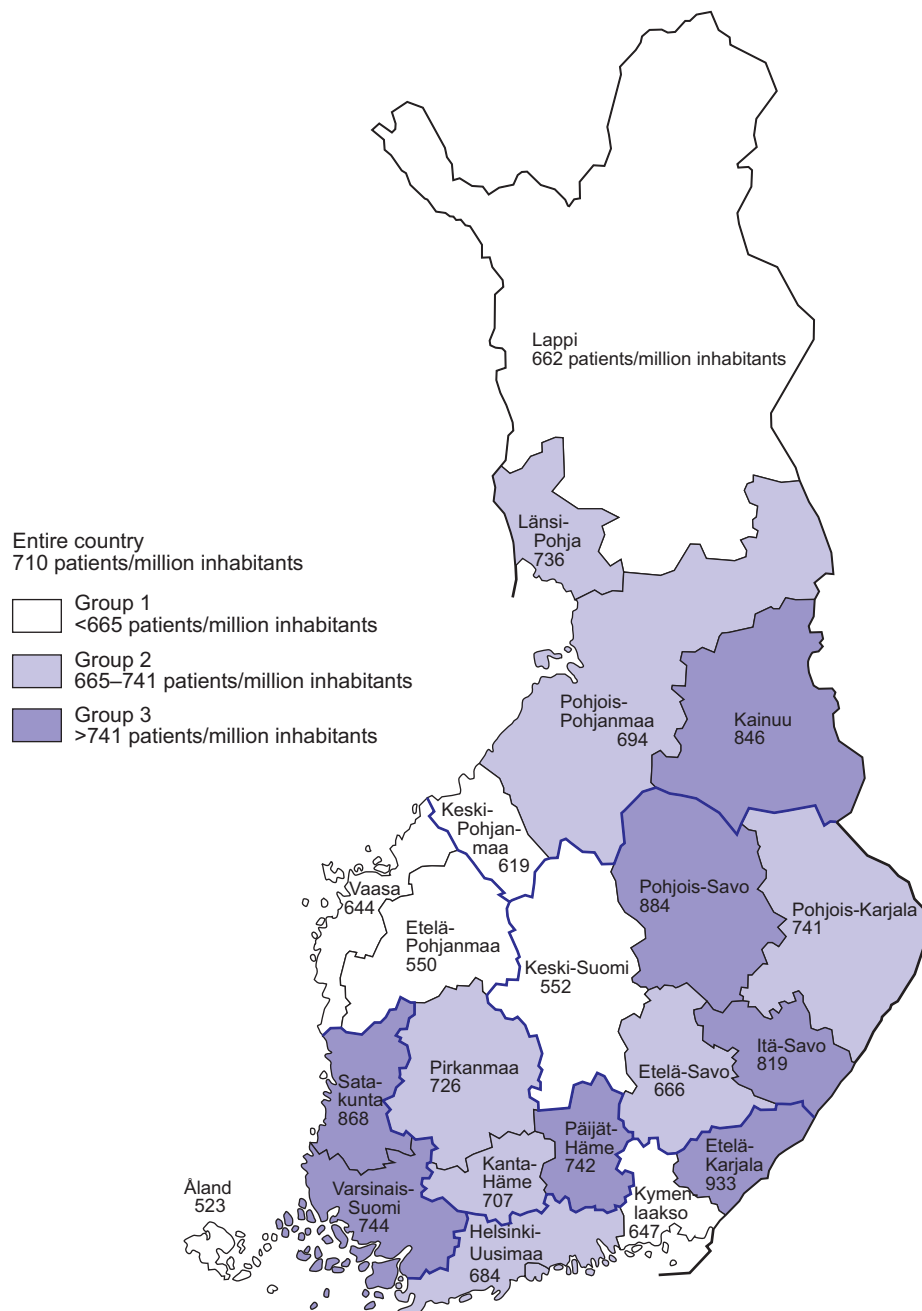
Figure 8. Standardized prevalence of RRT in regions.
Finnish Registry for Kidney Diseases 1995–2005



In Table 6, the number of RRT patients on 31 December 1995–2005 is shown according to age group and gender. In the age group 75 years and older, the prevalence of RRT has increased more than fourfold during the past ten years, and in 65–74-year-olds it has increased by 70%. The prevalence has also increased in younger age groups, but more slowly. The incidence of RRT has increased faster among men (70%) than among women (45%).

In Figure 8, the prevalence rates for 1995–2005 are age- and gender-standardized using the Finnish population on 31 December 2005 as the reference population. Population changes during this period have been considered. Standardization removes the effect of age and gender on regional differences in prevalence rates.

Figure 9. Prevalence of RRT in healthcare districts on 31 December 2005.
Finnish Registry for Kidney Diseases 2005



The healthcare districts shown on the map are grouped according to the prevalence of RRT at the end of 2005 (Figure 9). The prevalence was <665 in seven districts, 665–741 in seven districts, and >741 patients/million inhabitants in seven districts. The borders of the regions are indicated with thick lines.

Figure 10. Prevalence of RRT at the end of the year according to type of treatment.
Finnish Registry for Kidney Diseases 1965–2005

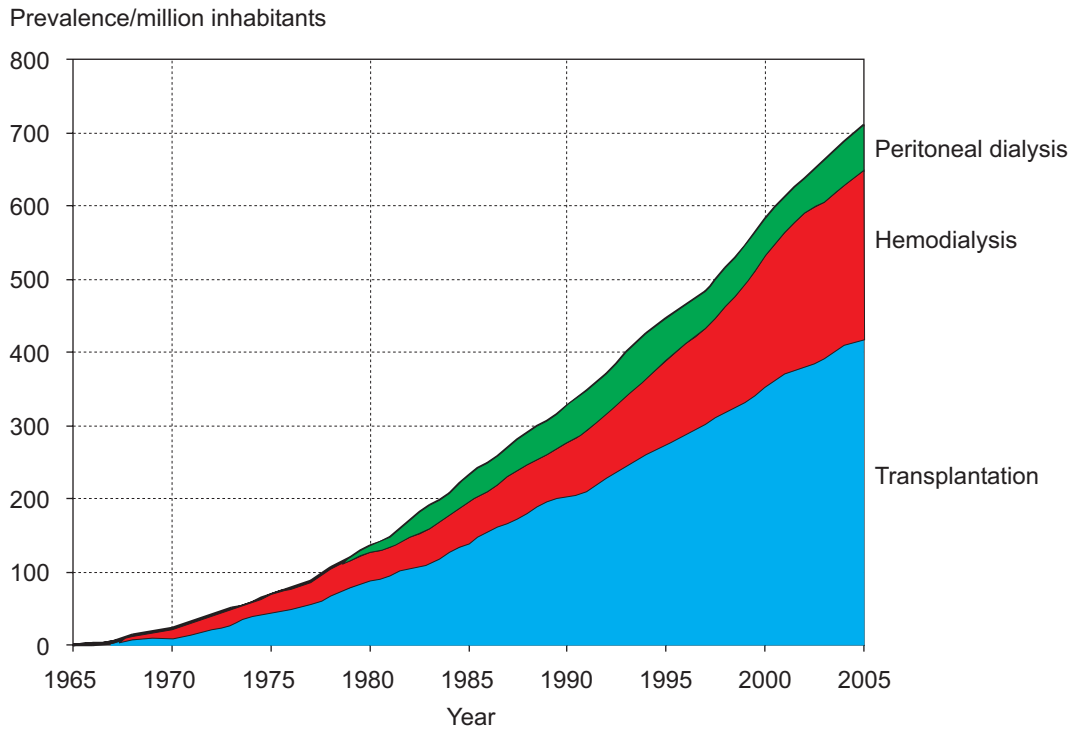
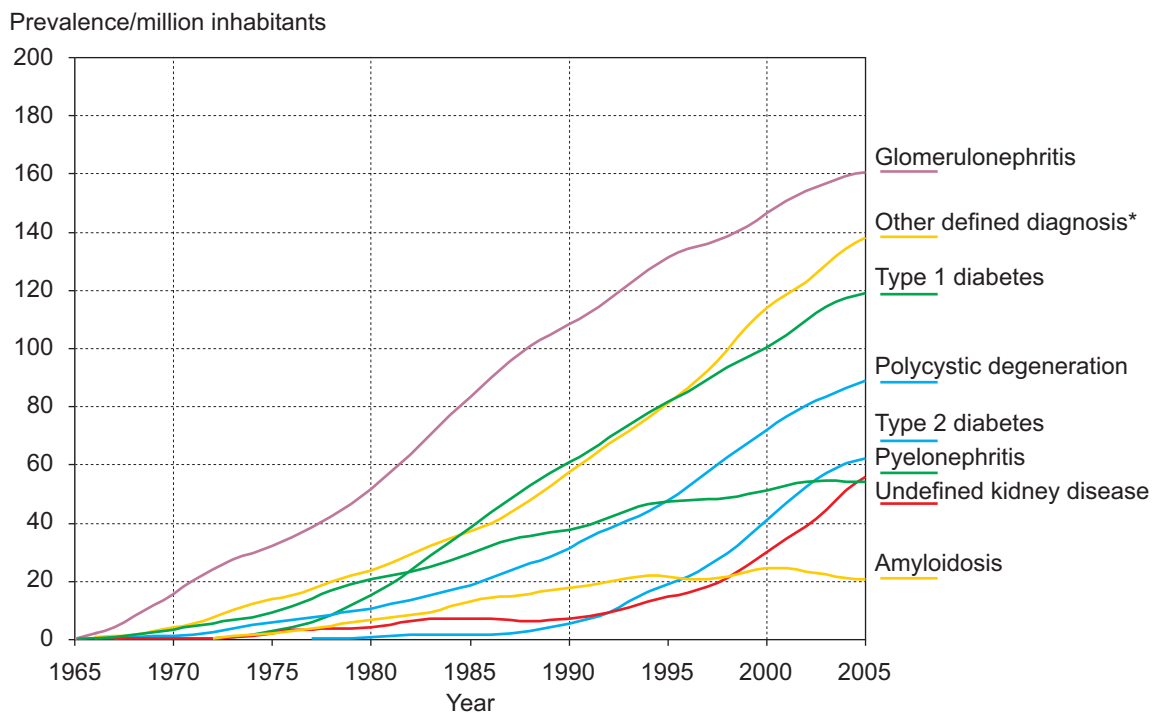


Figure 11. Prevalence of RRT at the end of the year according to diagnosis
Finnish Registry for Kidney Diseases 1965–2005



*nephrosclerosis, other systemic diseases, urinary tract obstruction, congenital diseases, and tubulointerstitial nephritis, among others

Figure 10 displays the prevalence of RRT according to type of treatment. During the past ten years the prevalence of peritoneal dialysis has increased by 10% and that of hemodialysis by 99%. The prevalence of kidney transplantations has increased by 53%.

The prevalence of RRT according to diagnosis is shown as smoothed averages in Figure 11. At the end of 2005, the

most common kidney diagnosis of RRT patients was glomerulonephritis (prevalence rate 162/million inhabitants), with 23% of all RRT patients having glomerulonephritis. Type 1 diabetes was the second most common diagnosis (prevalence rate 120/million inhabitants) and polycystic degeneration was the third most common diagnosis (prevalence rate 90/million inhabitants).

Figure 12. International comparison of prevalence of RRT on 31 December 2004.
Finnish Registry for Kidney Diseases 2004

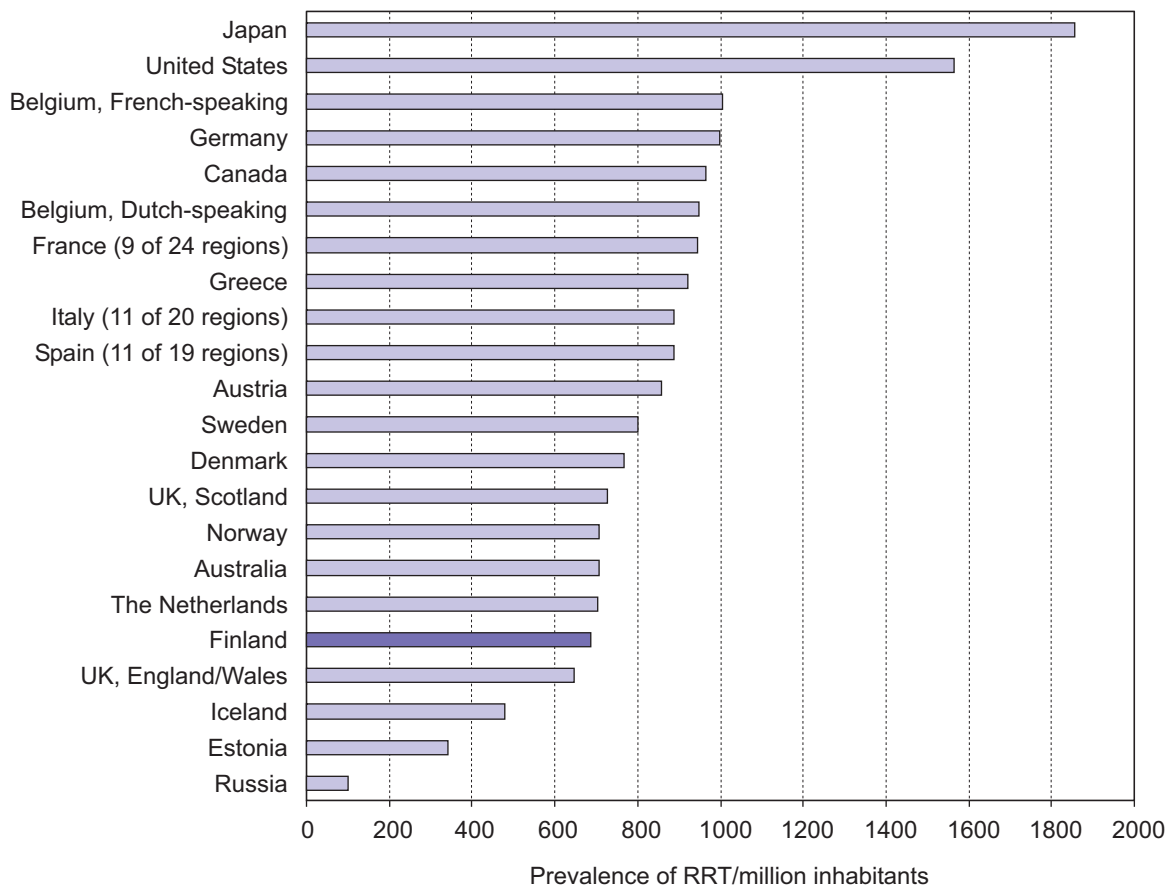


Figure 12 displays the prevalence of RRT on 31 December 2004 in countries reporting to the ERA-EDTA Registry (<http://www.era-edta-reg.org>), and in Japan (only dialysis patients), the United States, Canada, and Australia (The 2006 USRDS Annual Data Report Atlas, <http://www.usrds.org>). The prevalence rate in Finland was the fifth lowest. In Sweden, the prevalence was 17% higher, in Norway 3% higher, and in Denmark 12% higher than in Finland. The prevalence rates differed less between the Scandinavian countries than the incidence rates. International incidence rates are shown in Figure 7.

Table 7. Number of patient-years of all RRT patients according to diagnosis.
Finnish Registry for Kidney Diseases 1985–2005

Diagnosis	Patient-years (%)					Change (%) 1995–2005
	1985	1990	1995	2000	2005	
Glomerulonephritis	394 (36.8)	528 (33.6)	668 (29.9)	753 (25.7)	843 (22.9)	26
Type 1 diabetes	173 (16.2)	294 (18.7)	413 (18.5)	509 (17.4)	633 (17.2)	53
Polycystic degeneration	84 (7.9)	147 (9.4)	235 (10.6)	360 (12.3)	470 (12.8)	100
Type 2 diabetes	6 (0.6)	24 (1.5)	95 (4.3)	197 (6.7)	321 (8.7)	237
Undefined kidney disease	36 (3.3)	36 (2.3)	74 (3.3)	140 (4.8)	289 (7.8)	287
Pyelonephritis	138 (12.9)	183 (11.6)	242 (10.9)	259 (8.8)	287 (7.8)	18
Nephrosclerosis	33 (3.1)	54 (3.5)	68 (3.0)	125 (4.3)	150 (4.1)	123
Other systemic diseases	23 (2.2)	46 (2.9)	68 (3.1)	96 (3.3)	127 (3.5)	86
Urinary tract obstruction	26 (2.4)	42 (2.7)	71 (3.2)	100 (3.4)	122 (3.3)	72
Amyloidosis	62 (5.8)	89 (5.7)	108 (4.8)	127 (4.3)	112 (3.0)	3
Congenital diseases	30 (2.8)	40 (2.5)	72 (3.2)	91 (3.1)	105 (2.9)	46
Congenital nephrosis, Finnish type 0	0 (0.0)	20 (1.3)	41 (1.9)	52 (1.8)	61 (1.7)	48
Tubulointerstitial nephritis	45 (4.2)	50 (3.2)	47 (2.1)	51 (1.7)	58 (1.6)	23
Other kidney diseases	4 (0.4)	4 (0.3)	10 (0.4)	41 (1.4)	55 (1.5)	451
Malignancies	5 (0.5)	7 (0.5)	8 (0.4)	21 (0.7)	33 (0.9)	287
Metabolic diseases	9 (0.8)	9 (0.6)	9 (0.4)	10 (0.4)	16 (0.4)	77
All	1069 (100)	1572 (100)	2231 (100)	2932 (100)	3681 (100)	65

Table 8. Number of patient-years of all RRT patients according to diagnosis and type of treatment.
Finnish Registry for Kidney Diseases 1995–2005

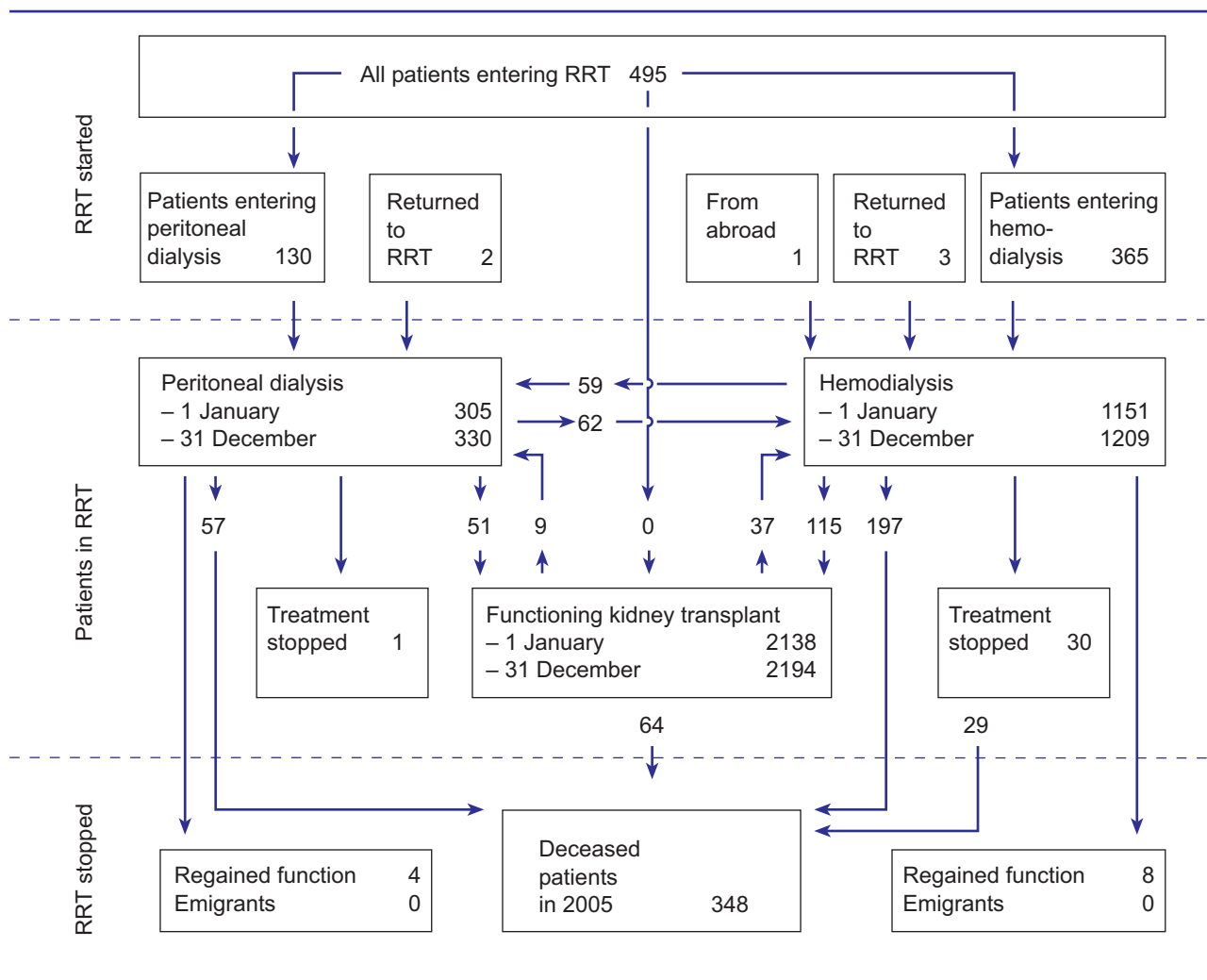
Diagnosis	Patient-years in 1995 (%)				Patient-years in 2005 (%)			
	Peritoneal dialysis	Hemo-dialysis	Trans-plantation	Total	Peritoneal dialysis	Hemo-dialysis	Trans-plantation	Total
Glomerulonephritis	65 (21.5)	132 (23.5)	471 (34.4)	668 (29.9)	52 (16.2)	180 (15.2)	611 (28.1)	843 (22.9)
Type 1 diabetes	82 (27.3)	69 (12.3)	262 (19.2)	413 (18.5)	96 (29.8)	113 (9.5)	424 (19.5)	633 (17.2)
Polycystic degeneration	20 (6.5)	66 (11.8)	149 (10.9)	235 (10.6)	17 (5.3)	115 (9.7)	338 (15.5)	470 (12.8)
Type 2 diabetes	29 (9.5)	59 (10.5)	8 (0.6)	95 (4.3)	42 (12.9)	233 (19.7)	46 (2.1)	321 (8.7)
Undefined kidney disease	22 (7.3)	32 (5.8)	20 (1.5)	74 (3.3)	29 (9.0)	177 (15)	82 (3.8)	289 (7.8)
Pyelonephritis	24 (7.8)	46 (8.2)	173 (12.6)	242 (10.9)	19 (5.8)	67 (5.7)	201 (9.2)	287 (7.8)
Nephrosclerosis	12 (3.9)	30 (5.4)	26 (1.9)	68 (3.0)	24 (7.3)	72 (6.1)	55 (2.5)	150 (4.1)
Other systemic diseases	7 (2.4)	23 (4.2)	38 (2.8)	68 (3.1)	12 (3.8)	50 (4.2)	65 (3.0)	127 (3.5)
Urinary tract obstruction	6 (2.1)	11 (2.0)	53 (3.9)	71 (3.2)	8 (2.5)	32 (2.7)	81 (3.7)	122 (3.3)
Amyloidosis	10 (3.5)	60 (10.7)	37 (2.7)	108 (4.8)	5 (1.5)	62 (5.3)	44 (2.0)	112 (3.0)
Congenital diseases	10 (3.5)	6 (1.1)	55 (4.0)	72 (3.2)	2 (0.7)	12 (1.0)	91 (4.2)	105 (2.9)
Congenital nephrosis, Finnish type 0	6 (1.9)	0 (0.0)	36 (2.6)	41 (1.9)	4 (1.2)	3 (0.3)	54 (2.5)	61 (1.7)
Tubulointerstitial nephritis	6 (2.0)	12 (2.1)	30 (2.2)	47 (2.1)	3 (0.9)	20 (1.7)	35 (1.6)	58 (1.6)
Other kidney diseases	2 (0.7)	4 (0.7)	4 (0.3)	10 (0.4)	4 (1.1)	18 (1.5)	33 (1.5)	55 (1.5)
Malignancies	0 (0.1)	7 (1.2)	1 (0.1)	8 (0.4)	4 (1.1)	24 (2.0)	5 (0.2)	33 (0.9)
Metabolic diseases	0 (0.0)	2 (0.4)	7 (0.5)	9 (0.4)	2 (0.7)	4 (0.4)	10 (0.4)	16 (0.4)
All	301 (100)	561 (100)	1369 (100)	2231 (100)	323 (100)	1182 (100)	2176 (100)	3681 (100)

The number of patient-years of all RRT patients in 1985–2005 according to diagnosis of different kidney diseases is shown in Table 7. The number of patient-years indicates patients' time in RRT during the year. Overall, the number of patient-years has increased by 65% since 1995 and by 245% since 1985. Glomerulonephritis is the most common diagnosis when type 1 and type 2 diabetes are considered separately. The proportion of glomerulonephritis has consistently decreased, being 23% in 2005. Type 1 diabetes is the second most common diagnosis, and its proportion of patient-years has remained virtually unchanged since 1985. The

proportions of patient-years due to type 2 diabetes and "undefined kidney disease" have increased considerably.

Table 8 shows the number of patient-years according to diagnosis and type of treatment in 1995 and 2005. In both years, the most common diagnosis among peritoneal dialysis patients was type 1 diabetes. Among hemodialysis patients, the most common diagnosis was glomerulonephritis in 1995, but in 2005 it was type 2 diabetes. Glomerulonephritis remained the most common diagnosis among kidney transplantation patients.

Figure 13. Net changes in type of treatment.
Finnish Registry for Kidney Diseases 2005



During 2005, 495 new patients entered RRT (Figure 13). In addition, five patients returned to RRT. In all, 3594 patients were receiving RRT at the beginning of the year. Altogether 348 patients died and dialysis for 12 patients was discontinued because patients' own kidney function resumed. Of those who died, 64 had a functioning transplant, 57 were

receiving peritoneal dialysis, and 197 were on hemodialysis. The RRT of 31 uremic patients was discontinued, and of these patients one was alive at the end of 2005. A kidney transplant was received by 166 patients; two received combined liver and kidney transplantations (source: Kidney Transplantation Unit of Helsinki University Central Hospital).

Table 9. Mortality of RRT patients by region.
Finnish Registry for Kidney Diseases 1995–2005

Region	Deaths/1000 patient-years						Deaths/1000 patient-years*					
	1995	2000	2003	2004	2005	2001–2005	1995	2000	2003	2004	2005	2001–2005
South	119	86	89	104	84	91	108	79	86	100	81	88
Southwest	91	97	89	69	111	95	75	92	85	65	109	89
West	105	111	106	113	91	111	97	101	99	105	89	104
East	133	113	114	110	100	109	121	105	109	107	98	102
North	120	89	129	120	101	107	116	87	117	111	99	101
Entire country	115	98	102	103	95	101	104	91	97	98	92	96

*patients who died before 90 days after start of RRT were excluded

Figure 14. Standardized mortality of RRT patients in regions.
Finnish Registry for Kidney Diseases 1995–2005

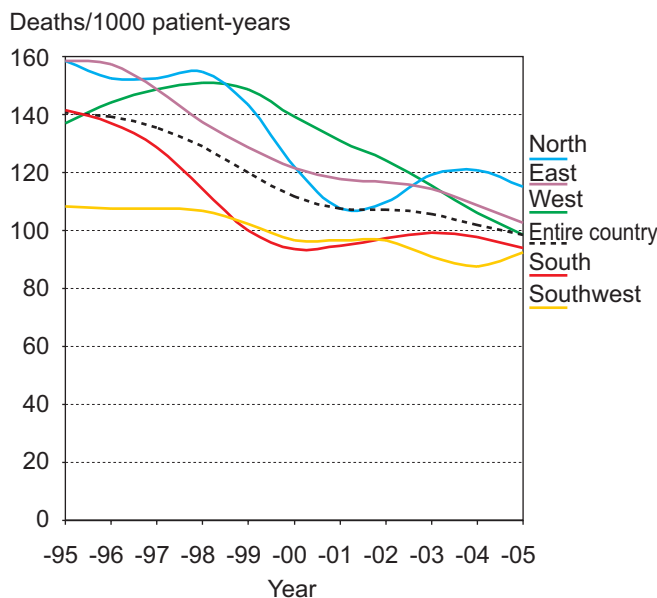
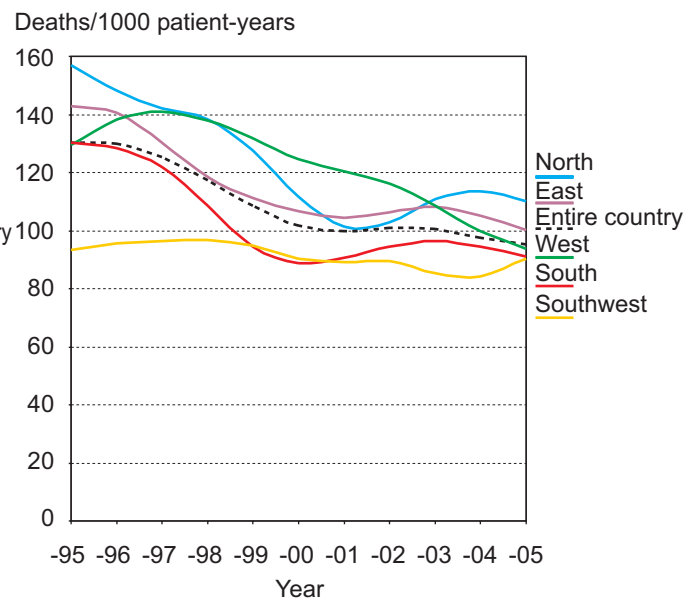


Figure 15. Standardized mortality of RRT patients in regions (patients who died before 90 days after start of RRT were excluded).
Finnish Registry for Kidney Diseases 1995–2005



RRT patients' mortality according to region in 1995–2005 is presented in Table 9. The mortality of patients who have been in RRT for at least 90 days is shown separately. The average mortality in 2001–2005 was highest in the western region and lowest in the southern region.

In Figures 14 and 15, mortality in the regions is shown as smoothed averages. The regional mortality rates for

1995–2005 have been age- and gender-standardized using all patient-years in 2005 as the reference. Changes in age and gender distribution during this ten-year period have been considered. Patients who died within 90 days of the start of RRT were excluded from Figure 15. In the entire country, the standardized mortality rate has remained virtually unchanged during the past five years.

Figure 16. Mortality of RRT patients according to type of treatment.
Finnish Registry for Kidney Diseases 1995–2005

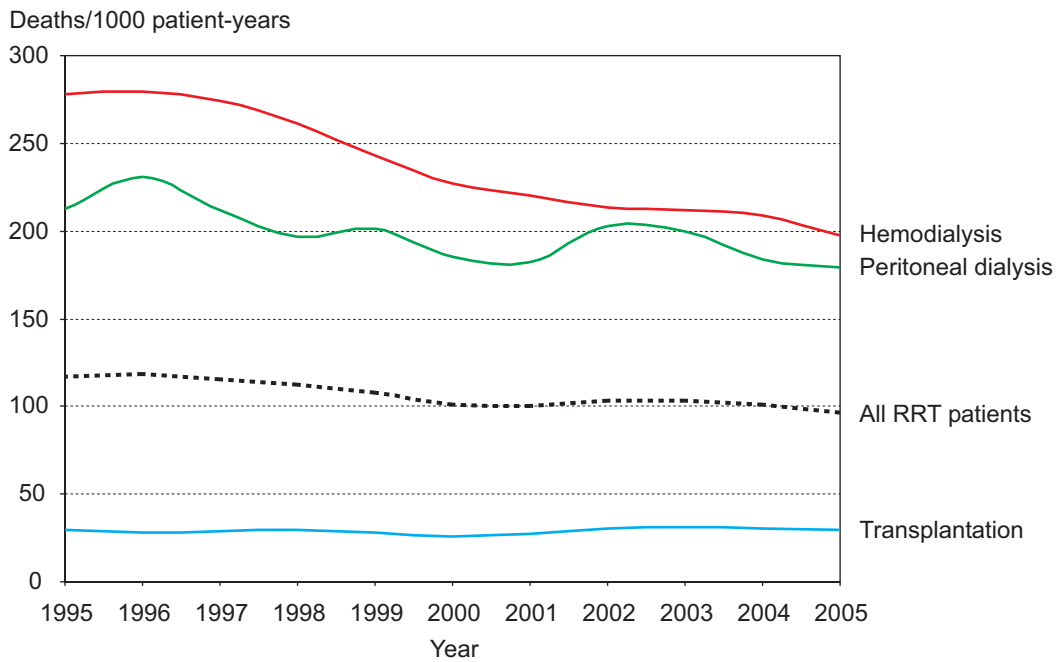
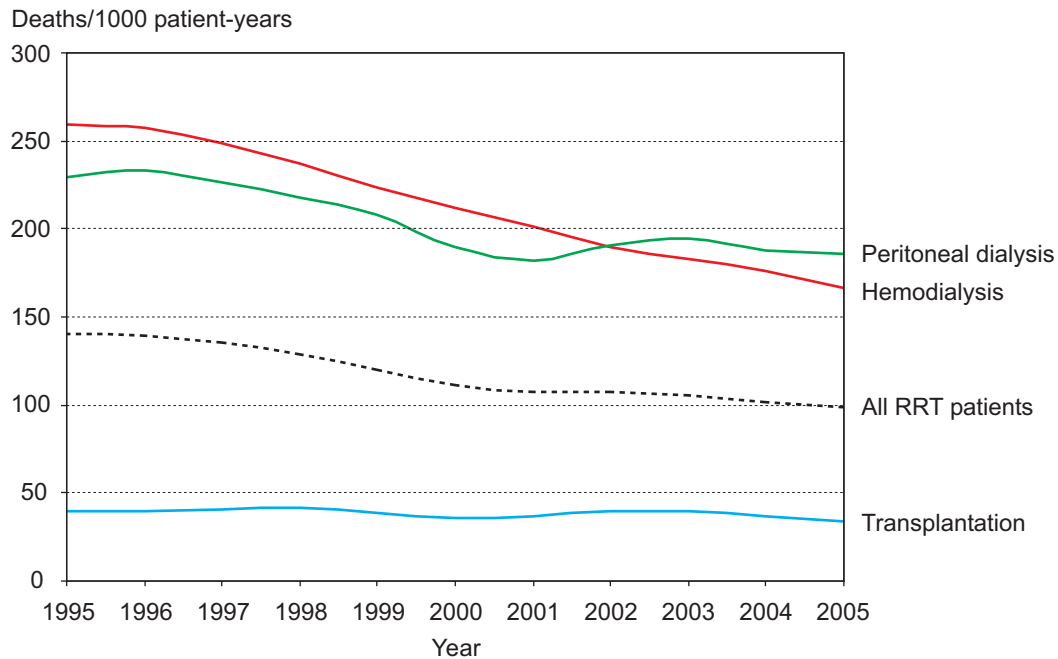


Figure 17. Standardized mortality of RRT patients according to type of treatment.
Finnish Registry for Kidney Diseases 1995–2005



In Figure 16, RRT patients' mortality is shown according to type of treatment. During the past ten years the kidney transplantation patients' unstandardized mortality rate has remained unchanged, ca. 30 deaths/1000 patient-years. The mortality of peritoneal dialysis and hemodialysis patients has decreased.

In Figure 17, the mortality rates for the various treatment

groups have been age- and gender-standardized using all patient-years in 2005 as the reference population. Changes in age and gender distribution during 1995–2005 have been considered. As the hemodialysis patients are the oldest, standardization reduces their mortality rate. Correspondingly, standardization increases mortality rates of transplantation patients and the rates in earlier years.

Figure 18. Mortality of RRT patients according to diagnosis.
Finnish Registry for Kidney Diseases 1995–2005

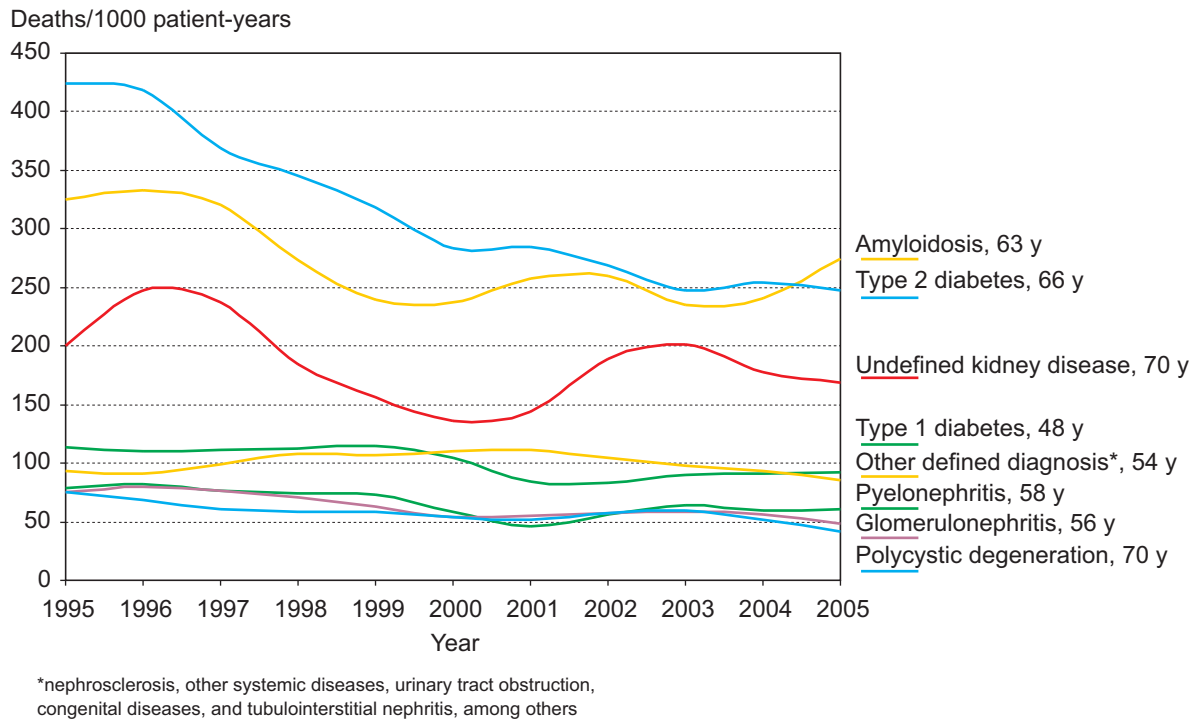


Figure 19. Standardized mortality of RRT patients according to type of treatment.
Finnish Registry for Kidney Diseases 1995–2005

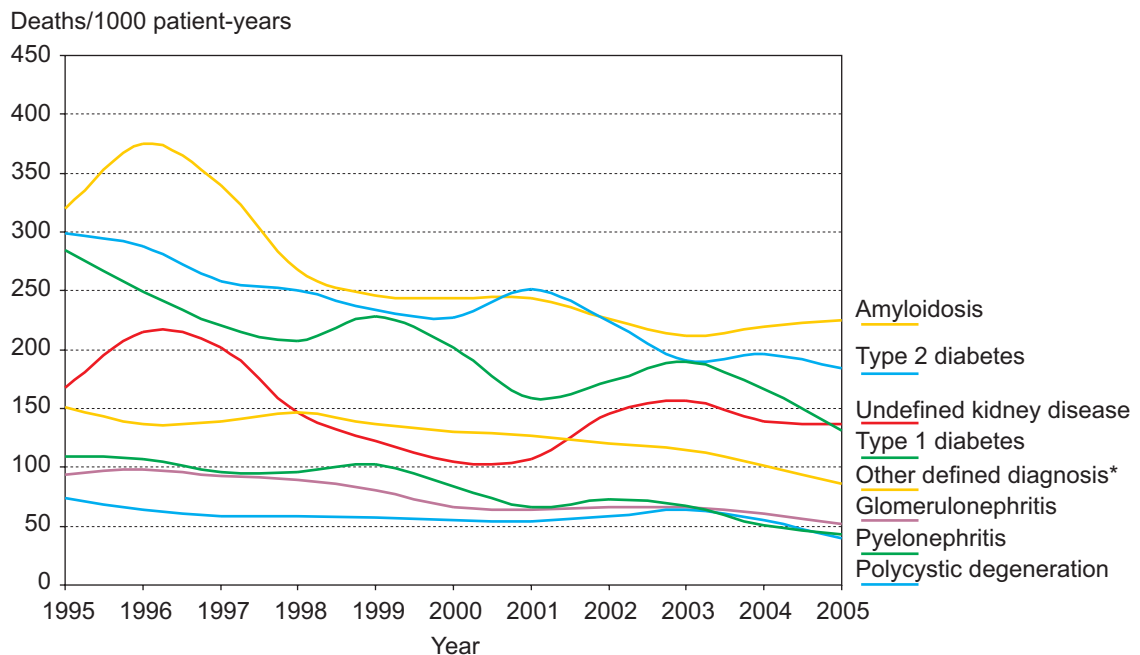


Figure 18 shows RRT patients' mortality according to diagnosis of kidney disease. The median age of living patients at the end of 2005 is noted next to the diagnosis. The mortality of patients with type 2 diabetes or amyloidosis is greater than that of other patients. The mortality of type

2 diabetics has decreased during the past ten years. When differences in age and gender distributions are taken into account by standardization (Figure 19), the mortality of type 1 diabetics is similar to that of type 2 diabetics. In most diagnostic groups, mortality has decreased.

Figure 20. Dialysis patients' probability of proceeding to the transplantation waitlist according to time period of start of dialysis.
Finnish Registry for Kidney Diseases 1992–2005

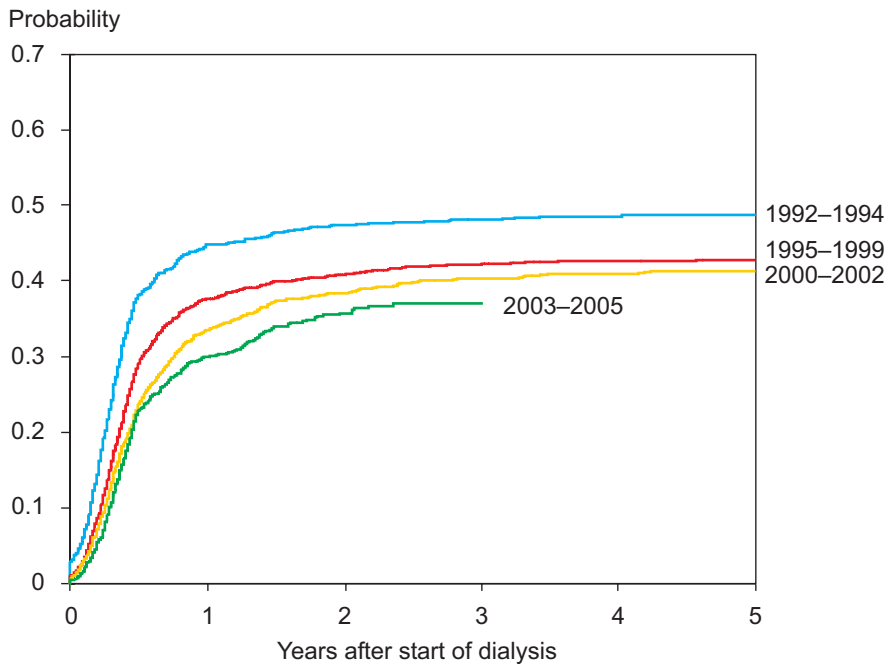
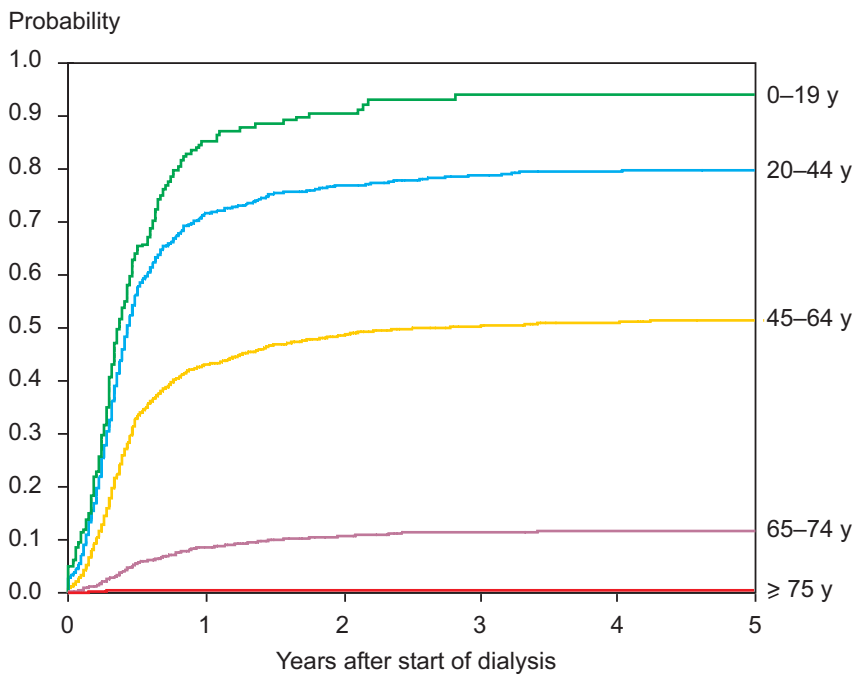


Figure 21. Dialysis patients' probability of proceeding to the transplantation waitlist according to age group.
Finnish Registry for Kidney Diseases 1992–2005



The Finnish Registry for Kidney Diseases has collected data since 1992 on whether or not dialysis patients are on the waitlist for kidney transplantation. Figures 20–23 show dialysis patients' cumulative probability of proceeding to the transplantation waitlist. The study population included 6002 patients entering RRT in 1992–2005. The methodology of the analyses for pages 19–21 is described in the appendix on page 24.

Figure 20 shows dialysis patients' probability of proceeding to the waitlist according to time from start of RRT. This probability has decreased during 1992–2005 ($p < 0.001$). The cumulative probability increases rapidly immediately after the start of dialysis. The increase continues more slowly after half a year, indicating that part of the patients proceed slowly to the waitlist.

Figure 22. Dialysis patients' probability of proceeding to the transplantation waitlist according to diagnosis.
Finnish Registry for Kidney Diseases 1992–2005

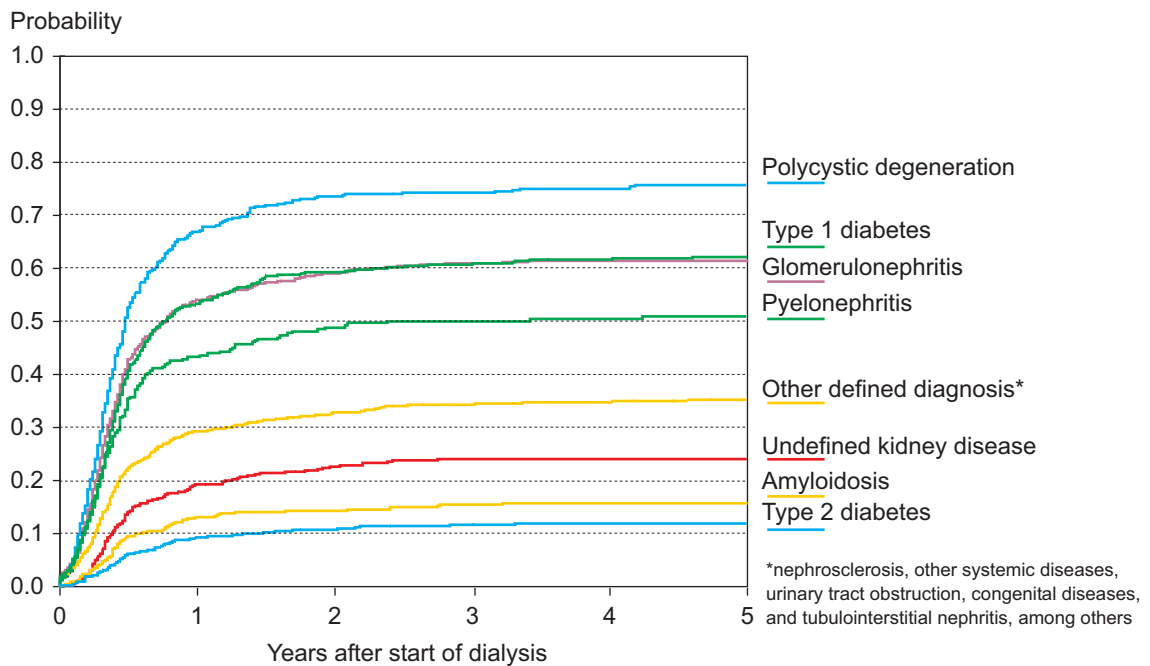


Figure 23. Dialysis patients' probability of proceeding to the transplantation waitlist according to type of treatment.
Finnish Registry for Kidney Diseases 1992–2005

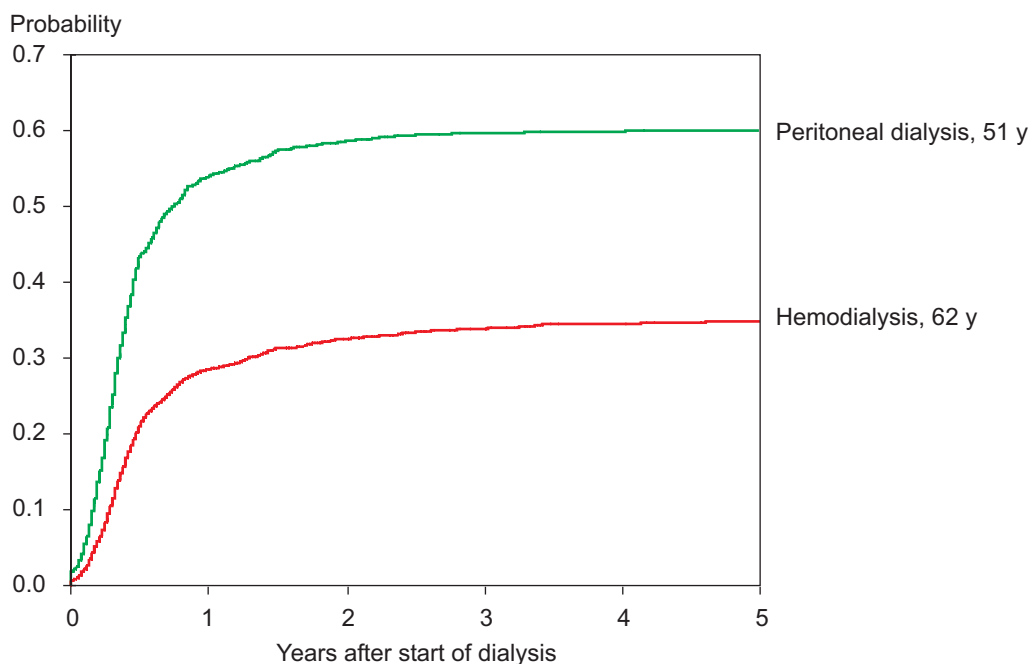


Figure 22 shows dialysis patients' cumulative probability of proceeding to the waitlist for transplantation according to diagnosis of kidney disease. One year after start of dialysis, the probability was 0.77 for patients with polycystic degeneration and 0.09 for patients with type 2 diabetes. Dialysis patients' probability of proceeding to the trans-

plantation waitlist is shown in Figure 23 according to type of dialysis. The probability is larger for peritoneal dialysis patients than for hemodialysis patients. Peritoneal dialysis patients were notably younger at the start of dialysis in 1992–2005. The median age at start of dialysis has been noted next to the treatment type.

Table 10. Relative probability of dialysis patients proceeding to transplantation waitlist, statistically significant variables. Finnish Registry for Kidney Diseases 1992–2005

Variable	Relative probability (95% confidence interval)	Age-adjusted relative probability (95% confidence interval)
Age at start of RRT		
0–19 y	1 (reference group)	
20–44 y	0.71 (0.60–0.85)	
45–64 y	0.33 (0.28–0.39)	
65–74 y	0.05 (0.04–0.07)	
≥ 75 y	0.002 (0.001–0.007)	
Diagnosis		
Glomerulonephritis	1 (reference group)	1 (reference group)
Polycystic degeneration	1.42 (1.25–1.62)	1.48 (1.30–1.68)
Type 1 diabetes	0.99 (0.88–1.11)	0.64 (0.57–0.72)
Type 2 diabetes	0.13 (0.11–0.16)	0.20 (0.16–0.24)
Pyelonephritis	0.76 (0.63–0.91)	0.95 (0.80–1.14)
Amyloidosis	0.18 (0.14–0.23)	0.22 (0.17–0.29)
Other defined diagnosis	0.28 (0.23–0.34)	0.37 (0.33–0.43)
Undefined kidney disease	0.45 (0.40–0.51)	0.38 (0.32–0.46)
Type of treatment		
HD vs. PD	0.45 (0.42–0.49)	0.74 (0.68–0.81)
Time period of start of RRT		
1992–1994	1 (reference group)	1 (reference group)
1995–1999	0.79 (0.71–0.88)	0.94 (0.84–1.05)
2000–2002	0.73 (0.65–0.82)	0.89 (0.79–1.00)
2003–2005	0.63 (0.55–0.72)	0.82 (0.72–0.94)
Gender		
Male vs. female	1.11 (1.02–1.21)	1.09 (1.00–1.18)

Table 10 displays in order of importance variables affecting dialysis patients' probability of proceeding to the kidney transplantation waitlist. Age-adjusted relative probabilities have been estimated using Cox regression analysis. Age at start of RRT is the most important variable. Patients with polycystic degeneration have 48% greater, and patients with

type 1 diabetes 36% smaller probability of proceeding to the waitlist than glomerulonephritis patients. Hemodialysis patients' probability is 26% smaller than the peritoneal dialysis patients' probability. Men have 9% larger probability than women ($p=0.047$).

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Appendix: Methodology of analyses for pages 19–21

Dialysis patients' probability of proceeding to the transplantation waitlist

The study population comprised 6002 patients who had entered RRT in 1992–2005. Data on whether dialysis patients are on the waitlist for transplantation has been collected in the Finnish Registry for Kidney Diseases on 31 December each year. Cox proportional hazards regression and Kaplan-Meier curves were used to examine the probability of proceeding to the transplantation waitlist. The event was registration the waitlist. Patients were censored at death or on 31 December 2005.

Characteristics of study population

Of the 6002 patients, 1635 proceeded to the waitlist according to the files of the Finnish Registry for Kidney Diseases. Of these, 496 did not receive a kidney transplant before the end of the follow-up. However, 1919 patients received at least one transplant, and of these 1082 had been registered on the waitlist before the transplantation. Thus, 837 (44%) of the transplanted patients lacked preceding waitlist data. One reason was quickly received transplants, before the end of the patient's first year in RRT.

Estimated date of being added to the waitlist

As waitlist status only became known at the end of the year, the actual waitlist date was generally earlier, and it was

estimated as follows:

- If time (T) from start of dialysis to positive waitlist status at end of year was < 1 year, then estimated waitlist date = start date of dialysis + T/2.
- If T >= 1 year, then estimated waitlist date = start date of dialysis + T – 0.5 years.

Dealing with missing values

For transplanted patients who lacked a waitlist date, this date was estimated as follows:

- If time between start date of dialysis and transplantation was < 2 years, then estimated waitlist date = start date of dialysis + 0.5(transplantation date – start date of dialysis).
- If time between start date of dialysis and transplantation was >= 2 years, then estimated waitlist date = transplantation date – 1.281 years (average time between waitlist date and transplantation date for the 1082 patients with available information).

Finnish Registry for Kidney Diseases

Report 2005



Finnish Registry for Kidney Diseases
Pohjoinen Hesperiankatu 5 A 1
FIN-00260 Helsinki
Finland
Phone: +358-9-43422760
Fax: +358-9-45410075
Email: Rauni.Jukkara@musili.fi
Patrik.Finne@helsinki.fi
www.musili.fi/smtr/english

Suomen munuaistautirekisteri
Pohjoinen Hesperiankatu 5 A 1
FIN-00260 Helsinki
Suomi
Puh: +358-9-43422760
Faksi: +358-9-45410075
Sähköposti: Rauni.Jukkara@musili.fi
Patrik.Finne@helsinki.fi
www.musili.fi/smtr