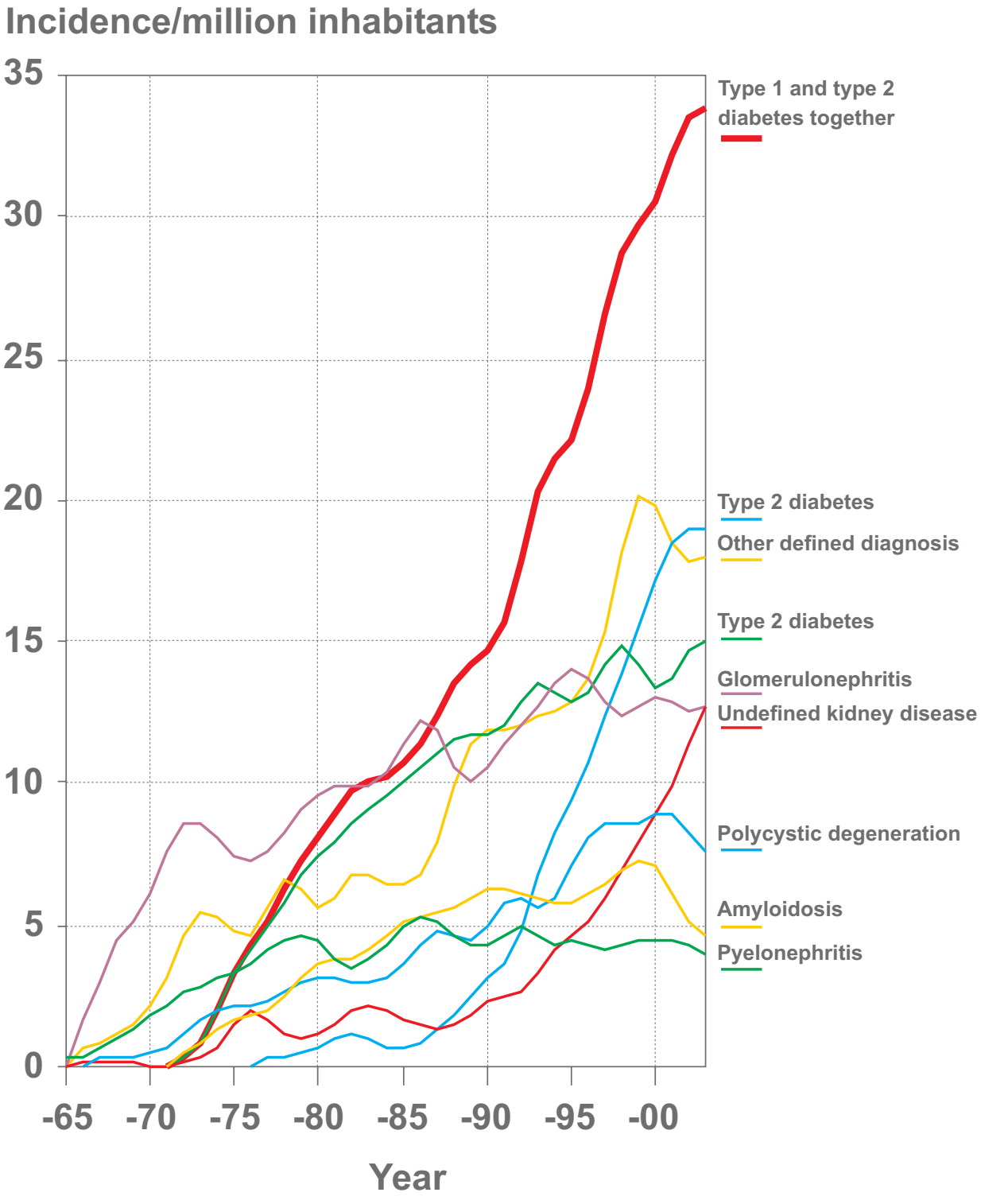
Finnish Registry for Kidney Diseases

Report 2003



Finnish Registry for Kidney Diseases – Report 2003

Contents

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The Finnish Registry for Kidney Diseases Report 2003 gives up-to-date information on the incidence and prevalence of renal replacement therapy (RRT), including dialysis and kidney transplantation in the Finnish population. Mortality of RRT patients is also reported each year. The Finnish Registry for Kidney Diseases is estimated to cover at least 97–99% of all RRT patients in Finland. At the end of the year 2003, the registry contained information on 8875 patients who had been on RRT since 1964.

The prevalence of RRT has increased continuously at a rate of about 5% annually during the past ten years. The increase in incidence has, however, slowed down. During 1993 to 1998 the incidence had increased 5% a year, but thereafter, the incidence has remained virtually unchanged. If this trend continues, the increase in prevalence will probably also slow down (page 15). The incidence of RRT does not affect the number of kidney transplantation patients; this number is most strongly influenced by kidney transplantation activity. Compared internationally, the incidence and prevalence of RRT in Finland are still relatively low (pages 5 and 10).

RRT patients' most common diagnosis is glomerulonephritis (24% of all patient-years in RRT) if type 1 and type 2 diabetes are considered as separate diagnoses (page 13). Type 2 diabetes is rare among kidney transplantation patients, among whom glomerulonephritis comprises 30% of patient-years (page 14). Among dialysis patients, type 2 diabetes is the predominant diagnosis, comprising 19% of patient-years (page 14). This Report also provides special analyses on kidney graft survival (pages 16 and 17), immunosuppressive treatment of new kidney transplantation patients (page 18), peritonitis among peritoneal dialysis patients (page 19), and the use of biopsy for confirming the kidney disease diagnosis (page 20).

The Finnish Registry for Kidney Diseases is a national healthcare registry, which is 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, which is 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 fruitful cooperation.

Helsinki, 18 October 2004

Patrik Finne
Administrative Director

Carola Grönhagen-Riska
Chairman of the Board

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Table 1. The Finnish population and its distribution in healthcare districts
Finnish Registry for Kidney Diseases 1993–2003

Healthcare district (1000 inhabitants)		Year					Change (%) 1993–2003
		1993	1998	2001	2002	2003	
1	Helsinki-Uusimaa	1272	1358	1404	1415	1425	12.0
3	Varsinais-Suomi	436	449	455	456	458	4.9
4	Satakunta	239	234	230	229	228	–4.4
5	Kanta-Häme	165	165	166	166	167	1.1
6	Pirkanmaa	430	443	452	455	459	6.6
7	Päijät-Häme	208	207	207	207	208	–0.2
8	Kymenlaakso	189	185	182	182	181	–4.3
9	Etelä-Karjala	132	130	130	129	129	–2.2
10	Etelä-Savo	111	108	106	105	105	–5.4
11	Itä-Savo	71	68	66	65	65	–9.3
12	Pohjois-Karjala	180	176	172	171	171	–5.2
13	Pohjois-Savo	259	255	251	250	250	–3.5
14	Keski-Suomi	260	263	265	265	266	2.4
15	Etelä-Pohjanmaa	203	198	195	195	194	–4.0
16	Vaasa	167	167	166	166	166	–0.6
17	Keski-Pohjanmaa	80	79	78	77	77	–3.1
18	Pohjois-Pohjanmaa	356	365	372	374	376	5.5
19	Kainuu	92	88	84	83	83	–9.9
20	Länsi-Pohja	72	70	68	67	67	–7.7
21	Lappi	130	127	121	121	120	–8.0
22	Åland	25	26	26	26	26	5.0
Region	South	1594	1673	1715	1726	1735	8.9
	South-West	700	708	710	711	712	1.7
	West	1173	1180	1185	1189	1193	1.8
	East	881	870	860	857	856	–2.8
	North	731	728	723	723	723	–1.1
Entire country		5078	5160	5195	5206	5220	2.8

On 31 December 2003, there were 5.22 million inhabitants in Finland (Table 1, Source: Statistics Finland). During the past ten years the population has increased in the southern, south-western, and western regions. In the eastern and northern regions, the populations have decreased. Since 1993, the populations have increased in seven healthcare districts and decreased in 14. In the entire country, the population has increased 2.8%.

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 2003

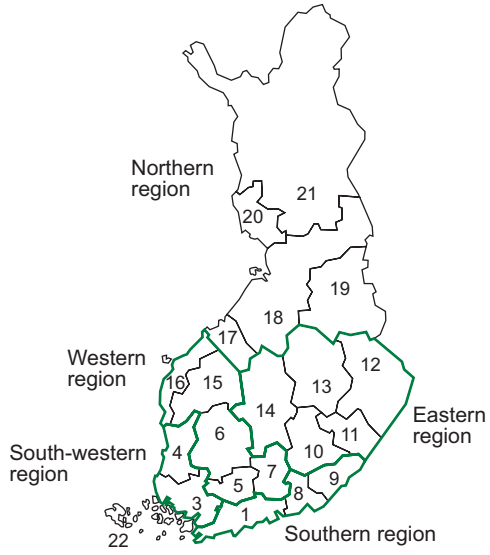


Table 2. The Finnish population according to region, age group, and gender
Finnish Registry for Kidney Diseases 2003

Region		Age group (years)					Entire country
		0–19 (%)	20–44 (%)	45–64 (%)	65–74 (%)	≥ 75 (%)	
South	Men	208 (25)	313 (37)	230 (27)	56 (7)	31 (4)	838 (100)
	Women	200 (22)	312 (35)	245 (27)	71 (8)	69 (8)	897 (100)
	Total	408 (24)	625 (36)	475 (27)	127 (7)	100 (6)	1735 (100)
South-West	Men	83 (24)	115 (33)	100 (29)	29 (9)	19 (5)	346 (100)
	Women	78 (21)	112 (31)	101 (28)	36 (10)	39 (11)	366 (100)
	Total	161 (23)	227 (32)	201 (28)	65 (9)	57 (8)	712 (100)
West	Men	143 (25)	194 (33)	167 (29)	48 (8)	31 (5)	584 (100)
	Women	137 (22)	183 (30)	166 (27)	60 (10)	64 (10)	609 (100)
	Total	281 (24)	377 (32)	333 (28)	108 (9)	95 (8)	1193 (100)
East	Men	102 (24)	133 (31)	127 (30)	38 (9)	23 (5)	422 (100)
	Women	97 (22)	125 (29)	120 (28)	45 (10)	46 (11)	434 (100)
	Total	199 (23)	258 (30)	247 (29)	83 (10)	69 (8)	856 (100)
North	Men	98 (27)	120 (33)	100 (28)	29 (8)	16 (5)	363 (100)
	Women	94 (26)	108 (30)	95 (26)	33 (9)	30 (8)	360 (100)
	Total	191 (26)	228 (32)	195 (27)	61 (8)	47 (6)	723 (100)
Entire country	Men	633 (25)	874 (34)	724 (28)	200 (8)	121 (5)	2553 (100)
	Women	607 (23)	840 (32)	728 (27)	245 (9)	247 (9)	2667 (100)
	Total	1240 (24)	1715 (33)	1452 (28)	445 (9)	368 (7)	5220 (100)

Table 2 shows the distribution of the Finnish population according to region, age, and gender. In the southern region, the proportion of 20- to 64-year-olds was the largest (63%) and that of inhabitants older than 65 years was the smallest (13%). In the other regions, the corresponding proportions were 59–60% and 15–18%.

In Figure 2, the incidence of renal replacement therapy (RRT, i.e. dialysis and kidney transplantation) in 1993–2003 is shown regionally as smoothed averages. The incidence rates are age- and gender-standardized using the Finnish population on 31 December 2003 as a reference population. The population changes in 1993–2003 have been considered. Standardization removes the effect of age and gender on the regional differences in incidence rates. In the entire country, the incidence has remained virtually unchanged since 1998.

Figure 2. Standardized incidence of RRT in regions
Finnish Registry for Kidney Diseases 1993–2003

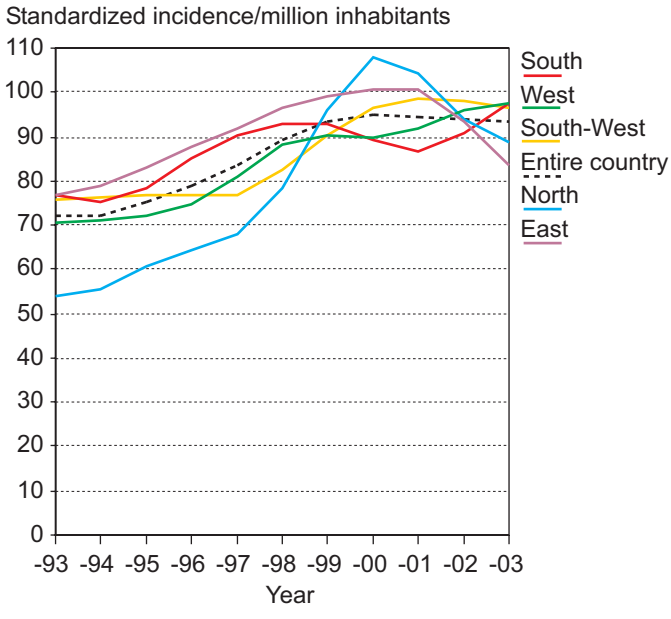
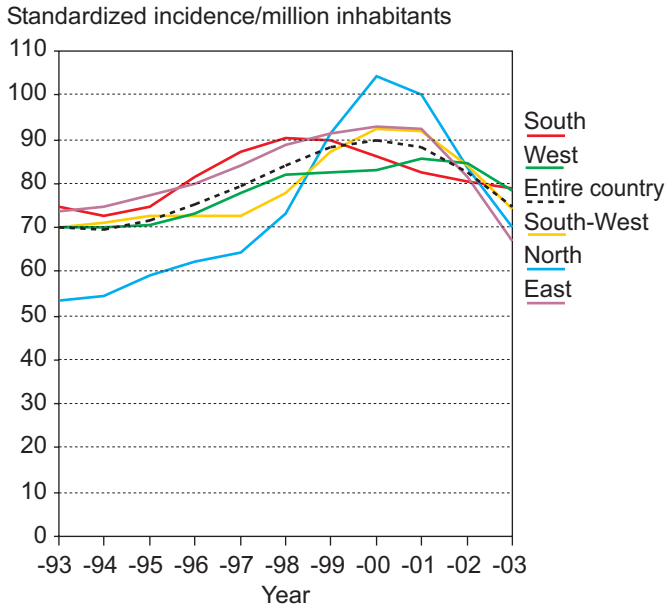


Table 3. Number of new RRT patients and incidence of RRT by healthcare district and region
Finnish Registry for Kidney Diseases 1993–2003

Healthcare district		Number of new RRT patients						Incidence of RRT/million inhabitants					
		1993	1998	2001	2002	2003	1999–2003 on average	1993	1998	2001	2002	2003	1999–2003 on average
1	Helsinki-Uusimaa	105	125	101	109	129	113	83	92	72	77	91	81
3	Varsinais-Suomi	31	42	45	39	51	45	71	94	99	85	111	98
4	Satakunta	17	20	24	33	18	24	71	86	105	144	79	104
5	Kanta-Häme	10	16	18	14	16	16	61	97	109	84	96	95
6	Pirkanmaa	34	49	45	42	37	45	79	111	100	92	81	100
7	Päijät-Häme	13	14	19	31	30	22	62	68	92	149	144	108
8	Kymenlaakso	8	12	14	19	19	17	42	65	77	105	105	92
9	Etelä-Karjala	9	11	9	12	20	15	68	84	69	93	155	114
10	Etelä-Savo	4	10	11	7	5	7	36	93	104	67	48	64
11	Itä-Savo	9	16	4	6	8	7	126	234	61	92	123	109
12	Pohjois-Karjala	8	14	16	24	11	16	44	80	93	140	64	95
13	Pohjois-Savo	30	34	38	29	24	31	116	133	151	116	96	122
14	Keski-Suomi	16	21	25	27	18	24	62	80	94	102	68	91
15	Etelä-Pohjanmaa	14	15	17	27	18	19	69	76	87	139	93	97
16	Vaasa	9	17	7	12	17	10	54	102	42	72	102	60
17	Keski-Pohjanmaa	4	7	6	3	7	6	50	89	77	39	90	80
18	Pohjois-Pohjanmaa	17	22	49	28	28	36	48	60	132	75	75	96
19	Kainuu	3	6	8	12	9	11	33	68	95	144	109	125
20	Länsi-Pohja	5	4	7	6	6	7	69	57	103	89	90	103
21	Lappi	9	8	7	7	13	10	69	63	58	58	108	82
22	Åland	4	1	2	1	2	2	159	39	77	38	76	77
Region	South	122	148	124	140	168	145	77	88	72	81	97	84
	South-West	52	63	71	73	71	70	74	89	100	103	100	99
	West	80	111	106	126	118	112	68	94	89	106	99	95
	East	67	95	94	93	66	85	76	109	109	108	77	99
	North	38	47	77	56	63	70	52	65	106	77	87	96
Entire country		359	464	472	488	486	482	71	90	91	94	93	93
	Children < 15 y	13	9	11	8	9	11	13	9	12	9	10	11

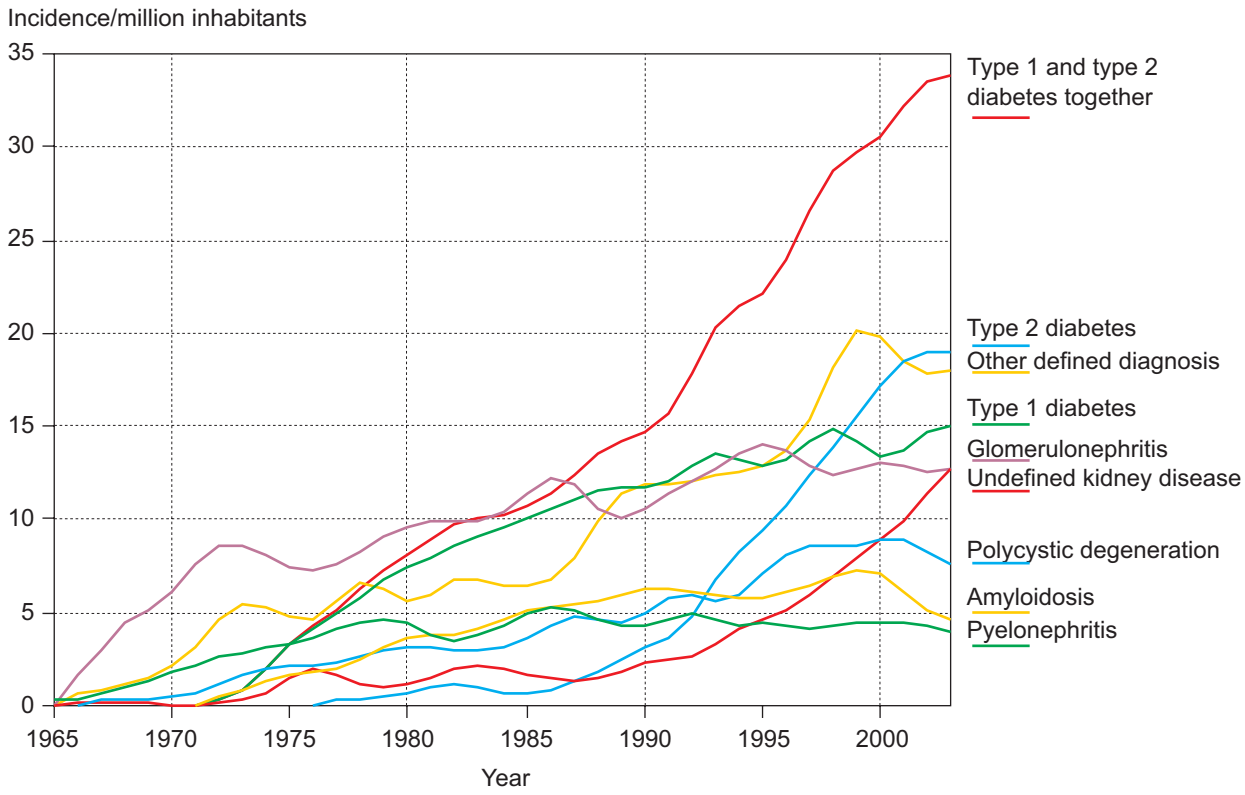
Figure 3. Standardized incidence of RRT in regions 90 days after start of RRT
Finnish Registry for Kidney Diseases 1993–2003



The number of new RRT patients and the incidence of RRT are shown according to healthcare district and region in Table 3. In the entire country, the incidence has increased 4% during the past five years and 32% during the past ten years. In the southern, south-western, and western regions, the incidence was 6–12% greater in 2003 than in 1998. In the northern region, the incidence has increased by 35% during the past five years, although it has decreased during the past two years. In the eastern region, the incidence was considerably smaller in 2003 than in 2002, and 30% smaller than in 1998. In 1999–2003, the average incidence was largest in the south-western and eastern regions and smallest in the southern region. In the healthcare districts, the five-year average incidence was 60–125 new RRT patients/million inhabitants.

In Figure 3, the age- and gender-standardized incidence of RRT 90 days after 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 start of RRT. In Figure 3, data on patients who have died or moved abroad within 90 days after start of RRT have also been excluded.

Figure 4. Incidence of RRT according to diagnosis
Finnish Registry for Kidney Diseases 1965–2003



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. The proportion of diabetic patients has increased; in 1980–1989 it was 25%, in 1990–1999 it was 31%, and in 2000–2003 it was 35%. The rate of new glomerulonephritis patients has decreased as compared to other patients. Glomerulonephritis comprised 24% of all new diagnoses in 1980–1989, 18% in 1990–1999, and 14% in 2000–2003. The group “other defined diagnoses” includes nephrosclerosis, other systemic diseases, urinary tract obstruction, congenital diseases, and tubulointerstitial nephritis.

Figure 5. International comparison of incidence of RRT in 2002
Finnish Registry for Kidney Diseases 2002

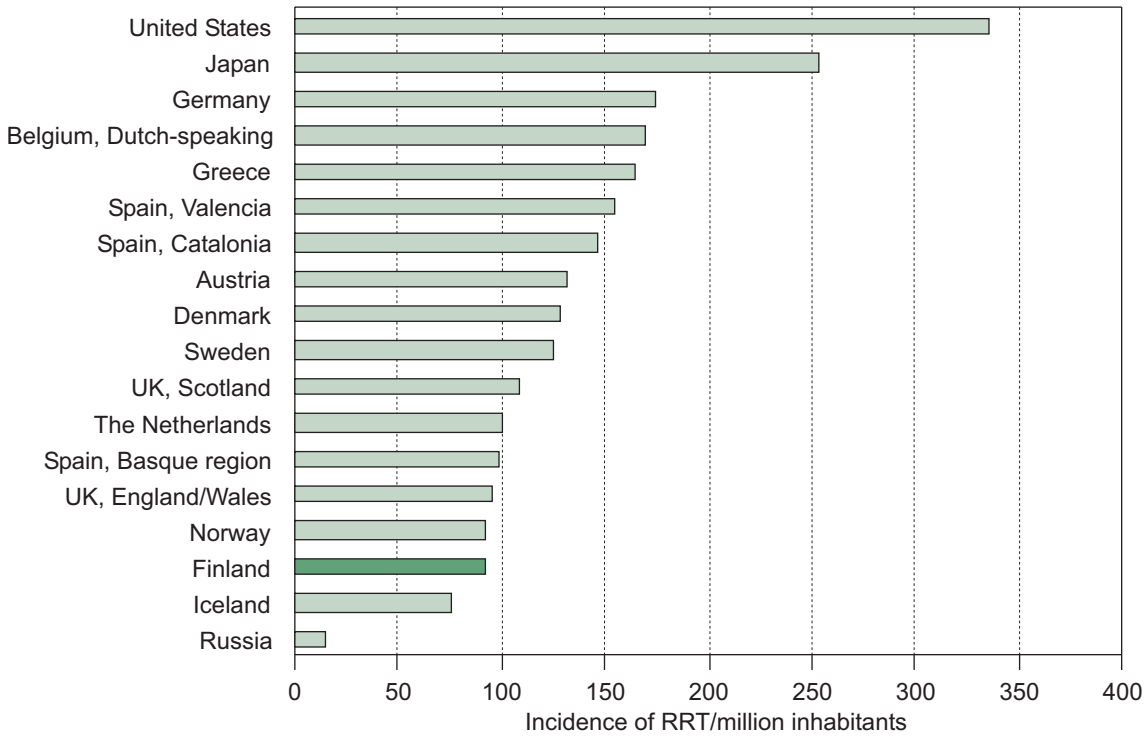


Figure 5 shows the incidence of RRT in 2002 in countries reporting to the ERA-EDTA Registry (http://www.era-edta-reg.org) and in Japan, and the United States (USRDS, Report 2004, www.usrds.org). The incidence of RRT in Finland was the third lowest. In the United States, the incidence was 267% larger, in Sweden 37% larger, and in Denmark 41% larger than in Finland. In Norway the incidence was similar to that in Finland. International prevalence rates are shown in Figure 10.

Table 4. Patients in RRT at end of year according to healthcare district and region
Finnish Registry for Kidney Diseases 1993–2003

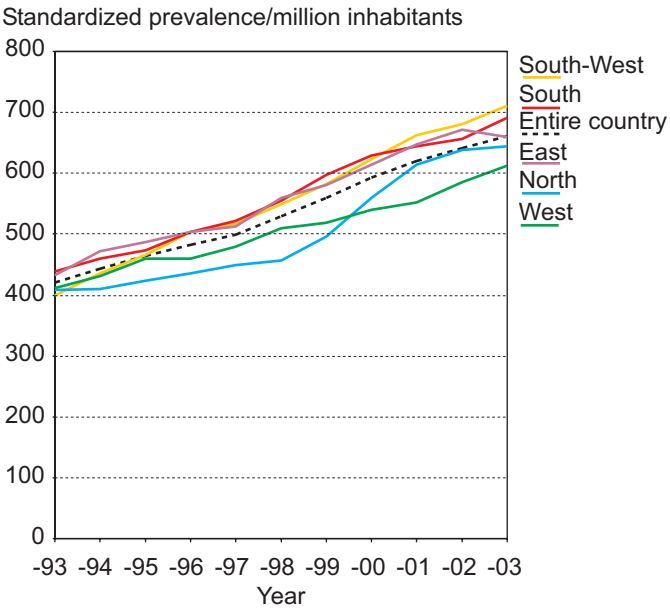
Healthcare district		Number of RRT patients					Prevalence of RRT/million inhabitants				
		1993	1998	2001	2002	2003	1993	1998	2001	2002	2003
1	Helsinki-Uusimaa	554	726	860	888	938	435	535	613	628	658
3	Varsinais-Suomi	159	240	295	295	316	364	535	649	646	690
4	Satakunta	97	130	164	181	187	407	556	715	791	820
5	Kanta-Häme	58	64	83	87	95	352	388	501	524	570
6	Pirkanmaa	186	261	308	311	321	432	589	681	683	700
7	Päijät-Häme	90	102	102	120	131	432	493	493	579	631
8	Kymenlaakso	62	92	102	106	114	327	497	560	583	629
9	Etelä-Karjala	48	60	87	89	97	364	460	671	688	751
10	Etelä-Savo	37	47	60	62	63	335	435	566	590	602
11	Itä-Savo	33	41	45	44	46	462	600	683	673	710
12	Pohjois-Karjala	69	92	108	118	112	383	524	626	688	656
13	Pohjois-Savo	133	186	223	229	225	514	729	888	915	901
14	Keski-Suomi	97	119	133	139	141	373	452	502	524	530
15	Etelä-Pohjanmaa	73	82	91	103	103	360	414	467	529	530
16	Vaasa	57	85	72	81	91	342	509	434	489	549
17	Keski-Pohjanmaa	22	28	36	32	36	276	355	464	413	465
18	Pohjois-Pohjanmaa	134	154	226	237	236	376	422	608	634	628
19	Kainuu	28	41	55	62	59	305	467	651	743	713
20	Länsi-Pohja	31	30	43	47	46	428	429	634	700	688
21	Lappi	55	61	67	69	77	422	482	551	572	642
22	Åland	12	17	19	18	18	478	663	731	686	683
Region	South	664	878	1049	1083	1149	417	525	611	627	662
	South-West	268	387	478	494	521	383	546	673	694	731
	West	464	594	656	702	741	396	503	553	590	621
	East	369	485	569	592	587	419	557	661	690	686
	North	270	314	427	447	454	370	431	590	619	628
Entire country		2035	2658	3179	3318	3452	401	515	612	637	661

The number of RRT patients and the prevalence of RRT on 31 December 1993–2003 are shown in Table 4. In the entire country, the prevalence has increased by 65% since 1993, and by 29% since 1998. In the healthcare districts, the prevalence has increased by 43–132% during the past ten years, and by 3–63% during the past five years. On 31 December 2003, the prevalence was highest in the south-western region and lowest in the western region. During the past ten years the prevalence has increased the most in the south-western region (91%) and the least in the western region (58%).

Table 5. Patients in RRT at end of 2003 according to region, age group, and gender
Finnish Registry for Kidney Diseases 2003

Region		Number of RRT patients						Prevalence of RRT/million inhabitants					
		0–19 y	20–44 y	45–64 y	65–74 y	≥ 75 y	All	0–19 y	20–44 y	45–64 y	65–74 y	≥ 75 y	All
South	Men	17	151	326	133	48	675	82	482	1417	2373	1526	805
	Women	13	114	208	95	44	474	65	366	848	1336	640	528
	Total	30	265	534	228	92	1149	74	424	1124	1793	918	662
South-West	Men	5	62	131	68	26	292	61	539	1305	2311	1377	844
	Women	4	44	97	62	22	229	51	392	961	1725	570	625
	Total	9	106	228	130	48	521	56	467	1133	1989	835	731
West	Men	12	102	225	89	43	471	84	525	1350	1841	1371	807
	Women	7	72	109	50	32	270	51	394	656	838	502	443
	Total	19	174	334	139	75	741	68	462	1003	1287	789	621
East	Men	10	88	174	70	40	382	98	664	1372	1854	1746	906
	Women	7	38	95	51	14	205	72	303	789	1122	306	472
	Total	17	126	269	121	54	587	85	489	1088	1454	786	686
North	Men	2	70	131	41	20	264	20	586	1306	1434	1216	728
	Women	4	46	80	42	18	190	43	424	840	1285	595	528
	Total	6	116	211	83	38	454	31	509	1079	1355	813	628
Entire country	Men	46	473	987	401	177	2084	73	541	1363	2003	1462	816
	Women	35	314	589	300	130	1368	58	374	809	1225	526	513
	Total	81	787	1576	701	307	3452	65	459	1085	1575	834	661

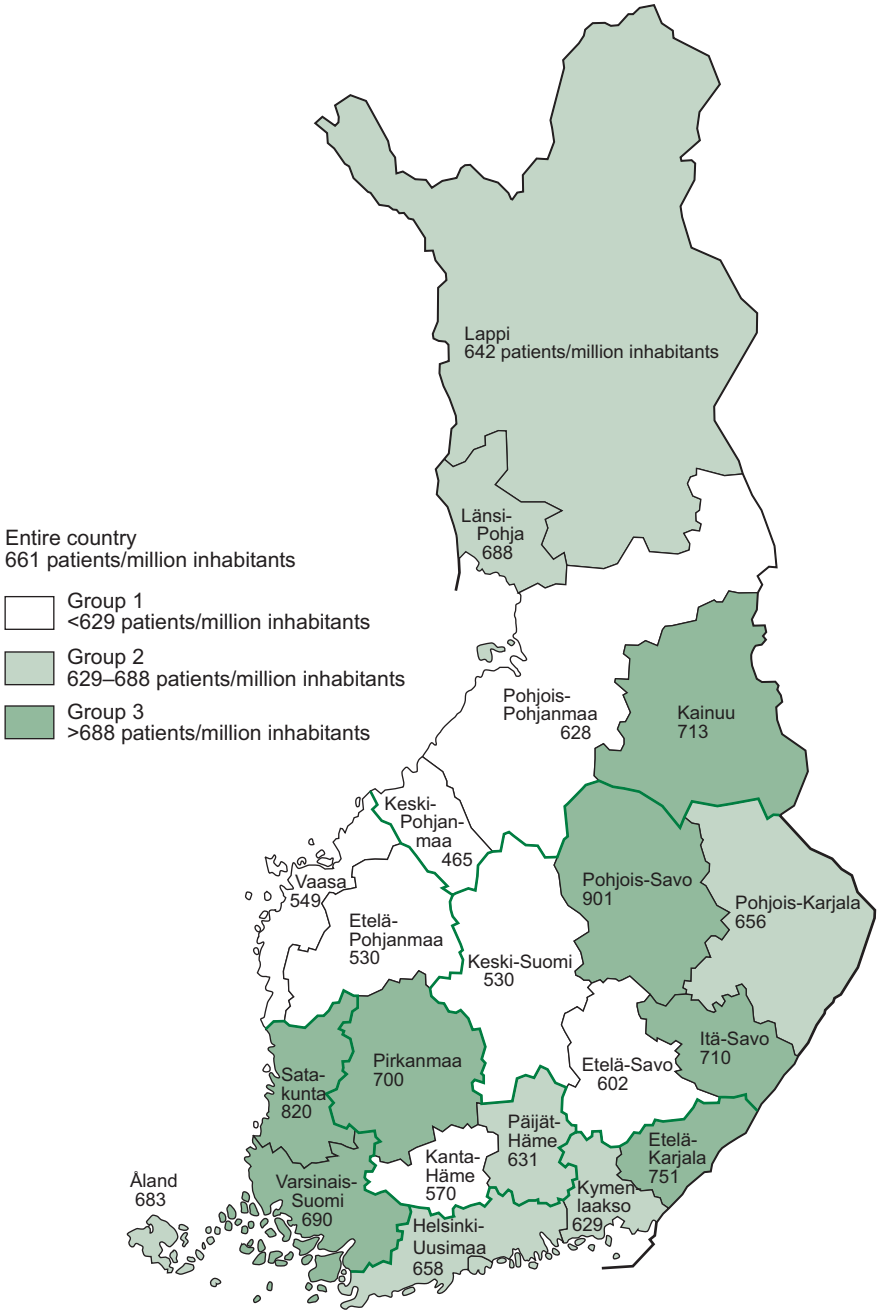
Figure 6. Standardized prevalence of RRT in regions
Finnish Registry for Kidney Diseases 1993–2003



The number of RRT patients in the regions on 31 December 2003 is shown according to age group and gender in Table 5. In the entire country, prevalence was 59% higher among men than women. Prevalence was highest in 65- to 74-year-olds (1575 patients/million age-matched inhabitants) and lowest in those younger than 20 years (65 patients/million age-matched inhabitants).

In Figure 6, the prevalence rates for 1993–2003 are age- and gender-standardized using the Finnish population on 31 December 2003 as a reference population. The population changes during this period have been considered. Standardization removes the effect of age and gender on the regional differences in prevalence rates.

Figure 7. Prevalence of RRT in healthcare districts on 31 December 2003
Finnish Registry for Kidney Diseases 2003



The healthcare districts shown on the map are grouped according to the prevalence of RRT at the end of 2003 (Figure 7). The prevalence was <629 in seven districts, 629–688 in seven districts, and >688 patients/million inhabitants in seven districts. The borders of the regions are indicated with thick lines.

Figure 8. Prevalence of RRT at end of year according to type of treatment
Finnish Registry for Kidney Diseases 1965–2003

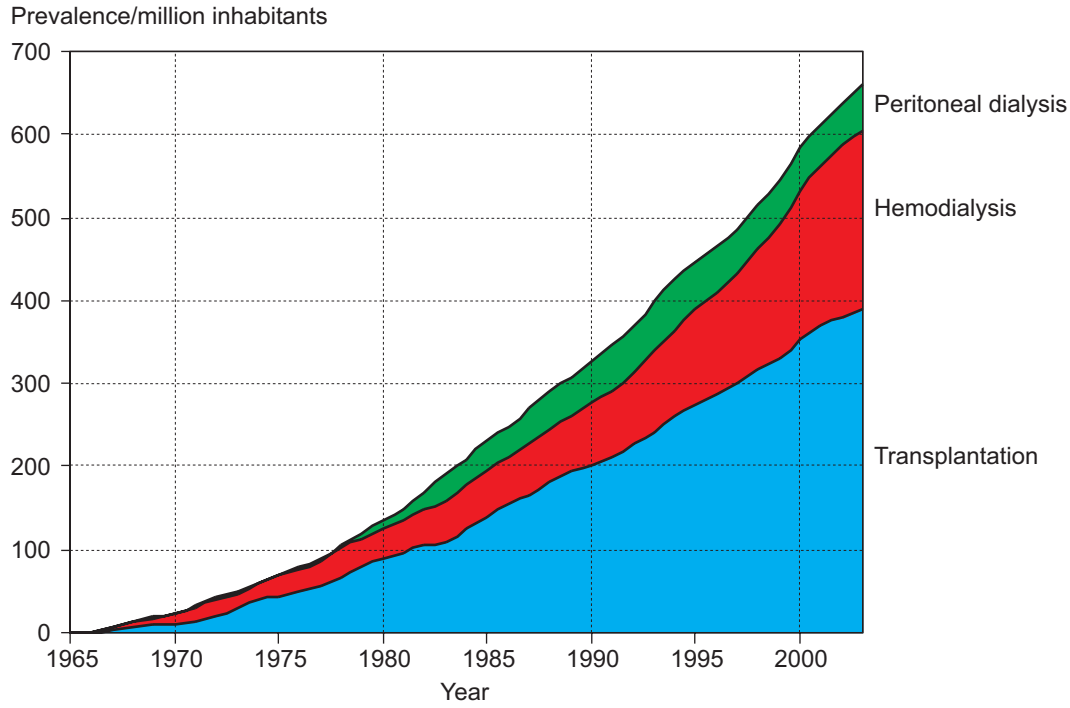


Figure 9. Prevalence of RRT at end of year according to diagnosis
Finnish Registry for Kidney Diseases 1965–2003

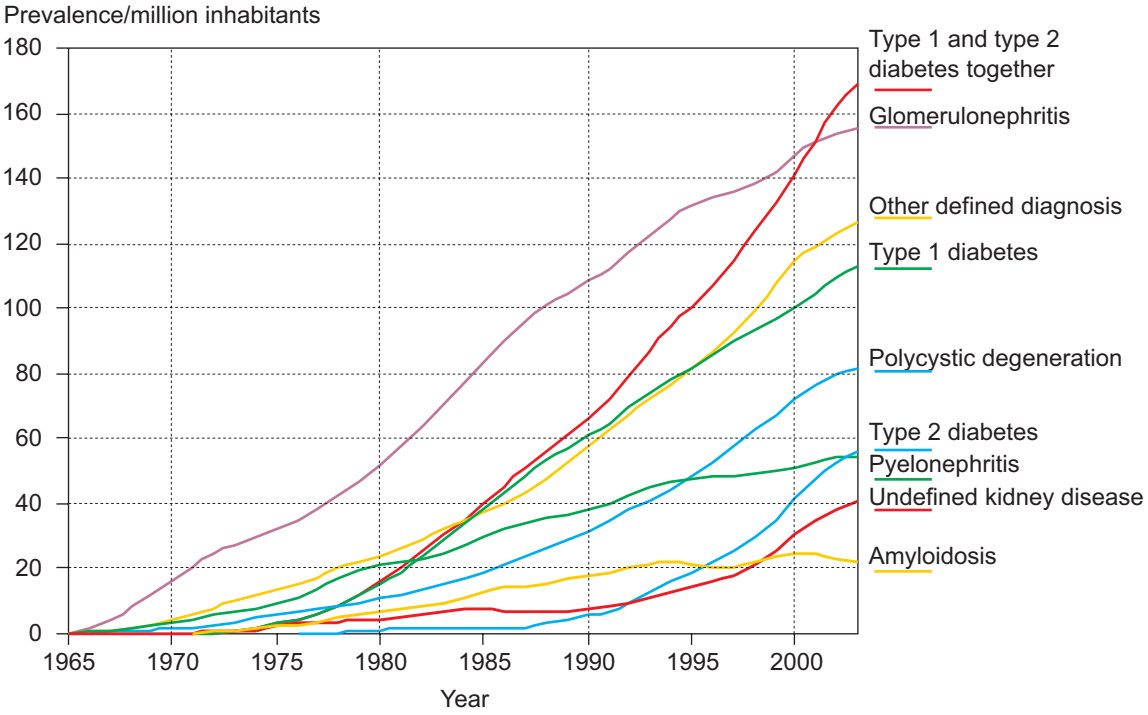


Figure 8 shows prevalence of RRT according to type of treatment. During recent years the numbers of hemodialysis patients and patients with a kidney transplant have increased more rapidly than the number of peritoneal dialysis patients.

Prevalence of RRT according to diagnosis is shown as smoothed averages in Figure 9. At the end of 2003 the most common kidney diagnosis of RRT patients was diabetes (prevalence rate 174/million inhabitants) and 26% of all RRT patients had diabetes. Glomerulonephritis was the second most common diagnosis (prevalence rate 157/million inhabitants). The group “other defined diagnoses” includes nephrosclerosis, other systemic diseases, urinary tract obstruction, congenital diseases, and tubulointerstitial nephritis.

Figure 10. International comparison of prevalence of RRT on 31 December 2002
Finnish Registry for Kidney Diseases 2002

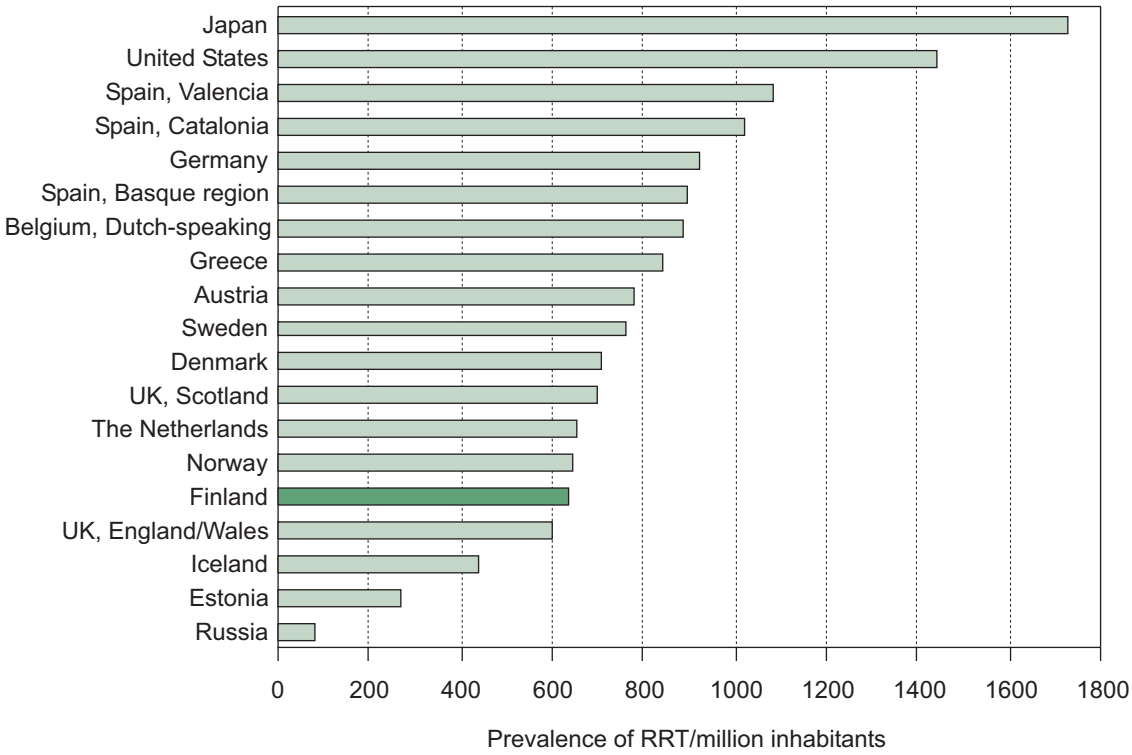
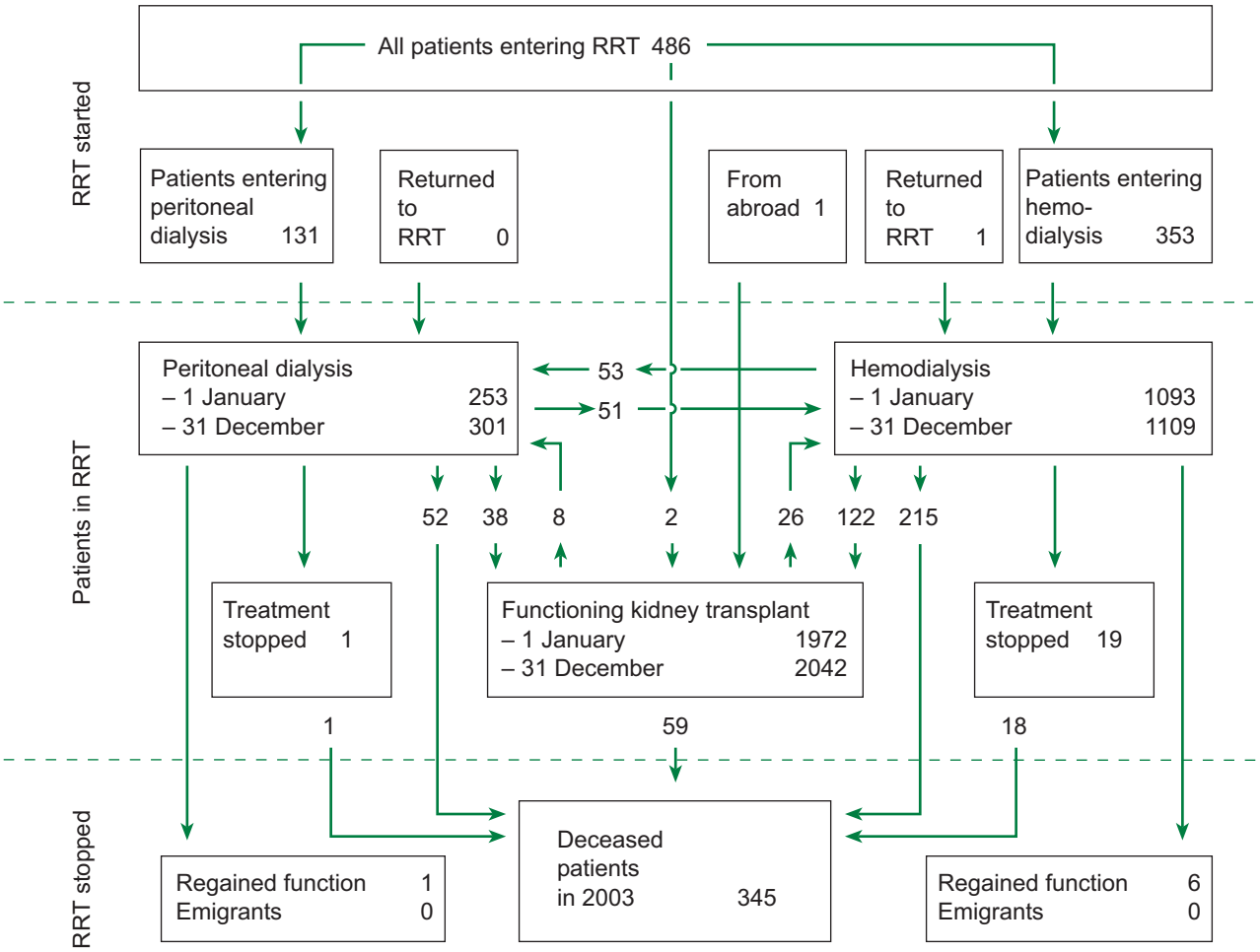


Figure 10 displays the prevalence of RRT on 31 December 2002 in countries reporting to the ERA-EDTA Registry (http://www.era-edta-reg.org) and Japan and the United States (USRDS, Report 2004, www.usrds.org). The prevalence rate in Finland was the fifth lowest. In Norway, the prevalence rate was similar as in Finland. In Japan, Sweden, and Denmark the prevalence rates were 172%, 19% and 11% higher than the Finnish rate, respectively. International incidence rates are shown in Figure 5.

Figure 11. Net changes in type of treatment
Finnish Registry for Kidney Diseases 2003



During 2003, 486 new patients entered RRT (Figure 11). In addition, one patient returned to RRT and one patient came from abroad. In all, 3318 patients were receiving RRT at the beginning of the year. Altogether 345 patients died and dialysis for seven patients was discontinued because the patients' own kidney function resumed. Of those who died, 59 had a functioning transplant, 52 were receiving peritoneal dialysis, and 215 were on hemodialysis. The RRT of 20 uremic patients was discontinued. Of these, 19 died during 2003 and one died during 2004. A kidney transplant was received by 162 patients.

Table 6. Mortality of RRT patients by region
Finnish Registry for Kidney Diseases 1993–2003

Region	Deaths/1000 patient-years						Deaths/1000 patient-years[1)]					
	1993	1998	2001	2002	2003	1999–2003	1993	1998	2001	2002	2003	1999–2003
South	91	98	84	95	89	87	88	94	81	93	86	83
South-West	111	101	86	121	89	97	92	93	77	110	85	91
West	119	136	131	120	106	125	119	125	120	116	99	114
East	109	122	109	117	118	116	103	103	89	108	111	104
North	93	126	93	89	127	104	93	113	88	85	116	96
Entire country	104	114	99	107	103	104	99	105	91	102	97	96

[1)]Patients who died before 90 days after start of RRT were excluded from analysis

Figure 12. Standardized mortality of RRT patients in regions
Finnish Registry for Kidney Diseases 1993–2003

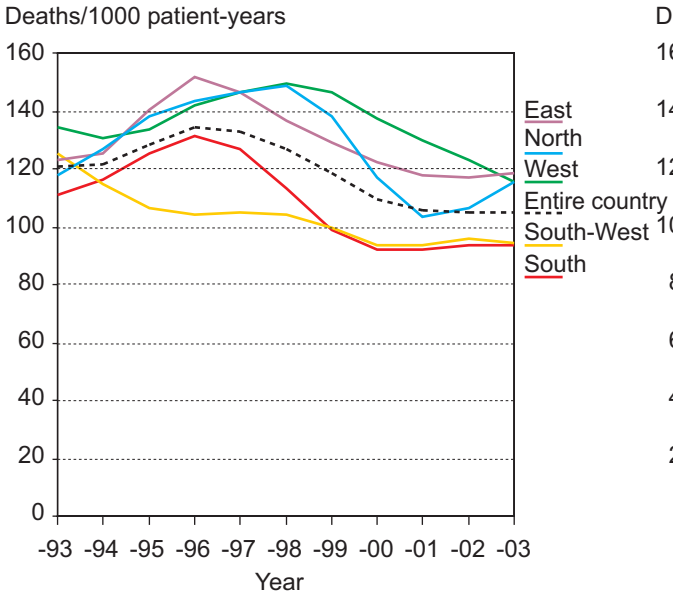
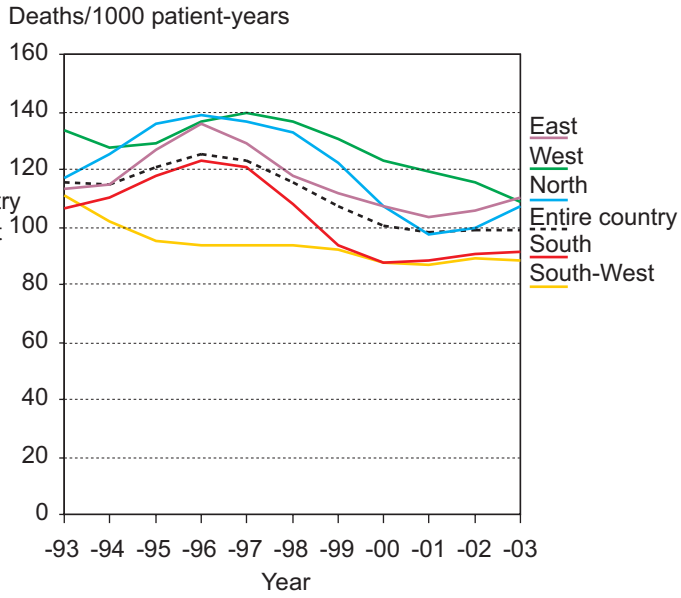


Figure 13. Standardized mortality of RRT patients in regions (patients who died before 90 days after start of RRT were excluded from analysis
Finnish Registry for Kidney Diseases 1993–2003



RRT patients' mortality according to region in 1993–2003 is presented in Table 6. Table 6 shows the mortality of patients who have been in RRT at least 90 days separately. The average mortality in 1999–2003 was highest in the western region and lowest in the southern region.

In Figures 12 and 13, mortality in the regions is shown as smoothed averages. The regional mortality rates for 1993–2003 have been age- and gender-standardized using all patient-years in 2003 as a reference population. The changes in age and gender distribution in this ten-year period have been considered. In the entire country, the standardized mortality rate was 20% lower in 2003 than in 1993. When patients who died within 90 days from start of RRT were excluded (Figure 13), the standardized mortality rate was also 20% lower in 2003 than in 1993.

Table 7. Number of patient-years of all RRT patients according to diagnosis
Finnish Registry for Kidney Diseases 1993–2003

Diagnosis	Patient-years (%)					Change (%) 1993–2003
	1993	1998	2001	2002	2003	
Glomerulonephritis	606 (31.2)	703 (27.5)	774 (24.9)	800 (24.5)	809 (24.0)	34
Type 1 diabetes	356 (18.3)	472 (18.4)	529 (17.0)	561 (17.2)	589 (17.4)	65
Polycystic degeneration	202 (10.4)	311 (12.2)	389 (12.5)	417 (12.8)	428 (12.7)	112
Type 2 diabetes	54 (2.8)	139 (5.4)	228 (7.3)	260 (7.9)	293 (8.7)	445
Pyelonephritis	219 (11.3)	248 (9.7)	269 (8.7)	284 (8.7)	286 (8.5)	31
Undefined kidney disease	49 (2.5)	100 (3.9)	168 (5.4)	191 (5.8)	202 (6.0)	313
Nephrosclerosis	55 (2.8)	99 (3.8)	130 (4.2)	128 (3.9)	127 (3.7)	131
Amyloidosis	105 (5.4)	104 (4.1)	135 (4.3)	125 (3.8)	121 (3.6)	15
Urinary tract obstruction	60 (3.1)	88 (3.4)	105 (3.4)	111 (3.4)	115 (3.4)	92
Other systemic diseases	61 (3.1)	81 (3.1)	99 (3.2)	99 (3.0)	108 (3.2)	77
Congenital diseases	62 (3.2)	80 (3.1)	96 (3.1)	102 (3.1)	105 (3.1)	69
Congenital nephrosis, Finnish type	31 (1.6)	46 (1.8)	51 (1.7)	55 (1.7)	58 (1.7)	85
Other kidney diseases	6 (0.3)	17 (0.6)	49 (1.6)	54 (1.7)	54 (1.6)	881
Tubulointerstitial nephritis	54 (2.8)	52 (2.0)	51 (1.6)	47 (1.4)	49 (1.4)	–11
Malignancies	12 (0.6)	14 (0.5)	22 (0.7)	20 (0.6)	23 (0.7)	87
Metabolic diseases	10 (0.5)	9 (0.3)	12 (0.4)	13 (0.4)	14 (0.4)	40
All	1940 (100)	2562 (100)	3108 (100)	3266 (100)	3379 (100)	74

The number of patient-years of all RRT patients from 1993 to 2003 according to the 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 74% since 1993 and by 32% since 1998. Glomerulonephritis is the most common diagnosis when type 1 and type 2 diabetes are considered as separate diagnoses. The proportion of glomerulonephritis has decreased constantly, being 24% in 2003. Type 1 diabetes is the second most common diagnosis, and its proportion of patient-years has remained unchanged since 1993. The proportion of patient-years due to type 2 diabetes has increased considerably, in 2003 ranking as the fourth most common diagnosis. The proportion of polycystic degeneration has increased, while that of pyelonephritis has decreased.

Table 8. Number of patient-years of dialysis patients according to diagnosis Finnish Registry for Kidney Diseases 1993–2003

Diagnosis	Patient-years (%)					Change (%) 1993–2003
	1993	1998	2001	2002	2003	
Glomerulonephritis	175 (23.4)	202 (20.6)	208 (16.9)	224 (16.9)	228 (16.6)	30
Type 1 diabetes	130 (17.4)	164 (16.7)	158 (12.9)	178 (13.4)	195 (14.2)	50
Polycystic degeneration	83 (11.1)	105 (10.7)	124 (10.0)	133 (10.0)	123 (8.9)	47
Type 2 diabetes	50 (6.7)	124 (12.7)	205 (16.6)	232 (17.6)	262 (19.1)	423
Pyelonephritis	66 (8.8)	68 (7.0)	66 (5.4)	82 (6.2)	83 (6.1)	26
Undefined kidney disease	32 (4.2)	65 (6.6)	117 (9.5)	133 (10.0)	136 (9.9)	330
Nephrosclerosis	31 (4.2)	64 (6.5)	86 (7.0)	85 (6.4)	80 (5.8)	157
Amyloidosis	69 (9.2)	66 (6.7)	92 (7.5)	81 (6.1)	76 (5.5)	10
Urinary tract obstruction	20 (2.6)	27 (2.7)	32 (2.6)	33 (2.5)	35 (2.5)	78
Other systemic diseases	33 (4.4)	34 (3.5)	44 (3.6)	45 (3.4)	52 (3.8)	59
Congenital diseases	17 (2.3)	10 (1.1)	15 (1.2)	18 (1.4)	20 (1.4)	16
Congenital nephrosis, Finnish type	3 (0.4)	6 (0.6)	6 (0.5)	6 (0.5)	6 (0.4)	87
Other kidney diseases	3 (0.3)	10 (1.0)	35 (2.8)	35 (2.7)	31 (2.3)	1141
Tubulointerstitial nephritis	25 (3.3)	20 (2.0)	17 (1.4)	15 (1.2)	19 (1.4)	-25
Malignancies	10 (1.4)	13 (1.4)	20 (1.6)	18 (1.3)	19 (1.4)	83
Metabolic diseases	2 (0.3)	3 (0.3)	5 (0.4)	6 (0.5)	7 (0.5)	229
All	748 (100)	981 (100)	1231 (100)	1323 (100)	1371 (100)	83

Table 9. Number of patient-years of kidney transplantation patients according to diagnosis Finnish Registry for Kidney Diseases 1993–2003

Diagnosis	Patient-years (%)					Change (%) 1993–2003
	1993	1998	2001	2002	2003	
Glomerulonephritis	431 (36.1)	501 (31.7)	566 (30.2)	576 (29.7)	582 (29.0)	35
Type 1 diabetes	226 (18.9)	308 (19.5)	371 (19.7)	383 (19.7)	394 (19.6)	74
Polycystic degeneration	118 (9.9)	206 (13.1)	266 (14.2)	284 (14.6)	306 (15.2)	159
Type 2 diabetes	4 (0.3)	14 (0.9)	23 (1.2)	27 (1.4)	31 (1.5)	763
Pyelonephritis	153 (12.8)	180 (11.4)	203 (10.8)	203 (10.4)	202 (10.1)	33
Undefined kidney disease	17 (1.5)	35 (2.2)	50 (2.7)	58 (3.0)	66 (3.3)	279
Nephrosclerosis	24 (2.0)	35 (2.2)	44 (2.3)	43 (2.2)	46 (2.3)	96
Amyloidosis	36 (3.0)	38 (2.4)	43 (2.3)	45 (2.3)	45 (2.2)	25
Urinary tract obstruction	40 (3.4)	61 (3.9)	73 (3.9)	78 (4.0)	80 (4.0)	99
Other systemic diseases	28 (2.4)	47 (2.9)	55 (2.9)	54 (2.8)	56 (2.8)	98
Congenital diseases	45 (3.8)	70 (4.4)	81 (4.3)	84 (4.3)	85 (4.2)	89
Congenital nephrosis, Finnish type	28 (2.3)	40 (2.5)	46 (2.4)	49 (2.5)	51 (2.6)	85
Other kidney diseases	3 (0.3)	7 (0.4)	14 (0.8)	19 (1.0)	23 (1.2)	680
Tubulointerstitial nephritis	30 (2.5)	32 (2.0)	34 (1.8)	32 (1.6)	30 (1.5)	1
Malignancies	2 (0.2)	0 (0.0)	2 (0.1)	2 (0.1)	4 (0.2)	107
Metabolic diseases	8 (0.7)	6 (0.4)	7 (0.4)	7 (0.3)	7 (0.4)	-11
All	1192 (100)	1581 (100)	1876 (100)	1942 (100)	2008 (100)	68

Tables 8 and 9 show the numbers of patient-years of dialysis patients and kidney transplantation patients from 1993 to 2003. In 2003, the most common diagnosis of dialysis patients was type 2 diabetes (19% of the patient-years). This diagnosis was rare in transplantation patients, among whom glomerulonephritis predominated (29% of patient-years).

Figure 14. Projected prevalence of RRT to the year 2015
Finnish Registry for Kidney Diseases 1993–2003

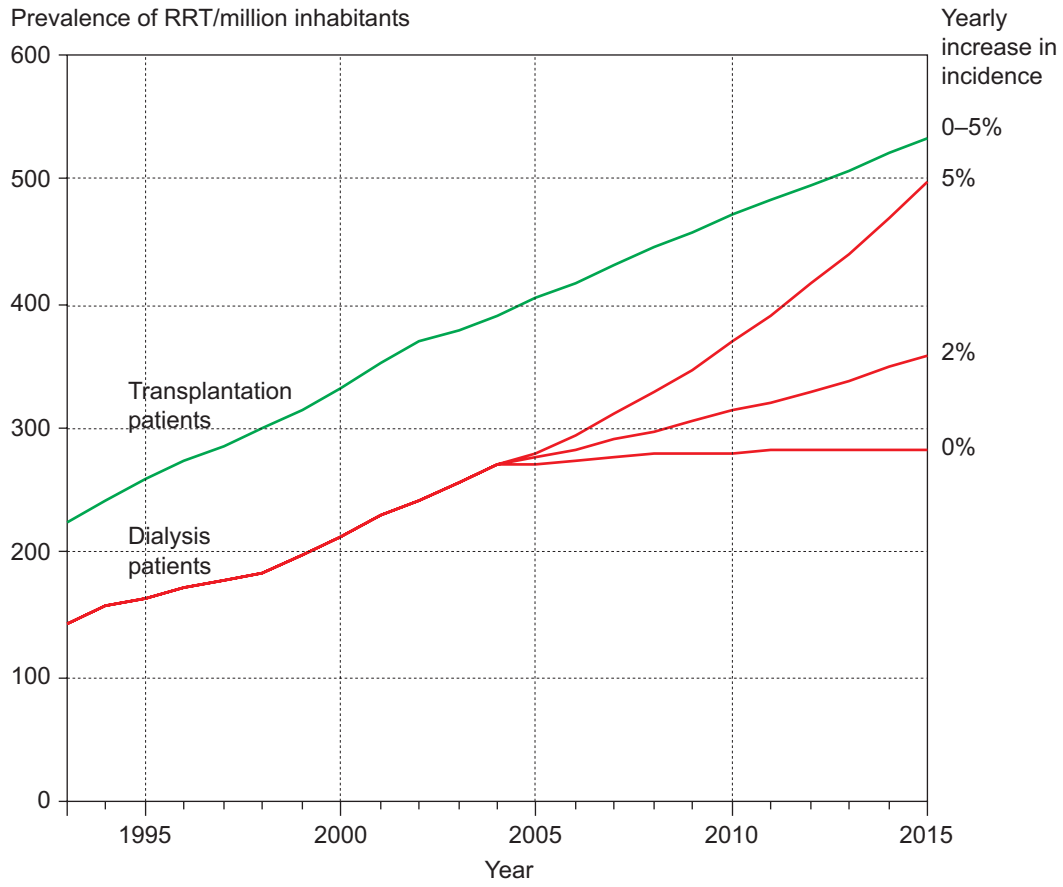


Figure 14 shows the projected prevalence of dialysis and kidney transplantation patients to the year 2015. The prevalence is based on three factors: the incidence of RRT, the mortality of dialysis and kidney transplantation patients, and the net flow of patients from dialysis to kidney transplantation. The effect of incidence on prevalence is studied using three different scenarios: the incidence remains unchanged (93 new patients/million inhabitants in 2015), the incidence increases by 2% each year (118/million inhabitants in 2015), or the incidence increases by 5% each year (167/million inhabitants in 2015). The incidence of RRT has remained virtually unchanged since 1998, but from 1993 to 1998 it had increased about 5% a year. The mortality and the net flow of patients from dialysis to kidney transplantation were predicted using a linear regression equation based on data from 1993 to 2003. The mortality of dialysis patients is expected to decline slightly from 2004 to 2015 (from 219 to 210 deaths/1000 patient-years). Correspondingly, the mortality of kidney transplantation patients is predicted to increase from 29 to 31 deaths/1000 patient-years. The net flow of patients from dialysis to kidney transplantation is expected to increase from 139 to 160 patients annually.

The model shows that the relative number of dialysis patients of all RRT patients will decrease if the incidence of RRT does not increase. However, if the incidence increases by 5% yearly, the number of dialysis patients will approach that of kidney transplantation patients in 2015. In the model, the number of kidney transplantation patients is independent of incidence of RRT because almost all patients enter dialysis first. The number of kidney transplantation patients is affected by the net flow of patients from dialysis to kidney transplantation (the number of kidney transplantations minus the number of transplantation patients returning to dialysis) and the mortality of kidney transplantation patients. The model does not consider that the age structure of the RRT patients will change during the coming years. The effect of the population's aging on mortality was assumed to be the same for 2004–2015 as for 1993–2003.

Figure 15. Survival of kidney graft after first transplantation according to time period of transplantation
Finnish Registry for Kidney Diseases 1965–2003

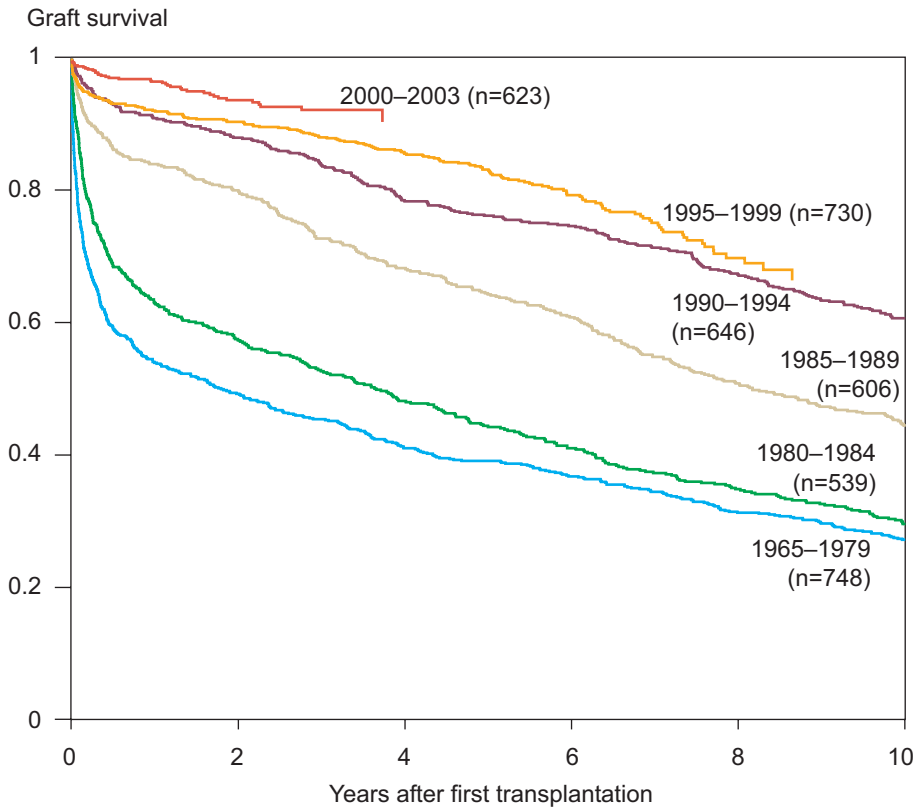


Figure 15 displays the survival probability of kidney grafts after patients' first kidney transplantation according to time period of transplantation. Graft rejection (start of dialysis) and death were defined as risk events in the analysis. Graft survival was adjusted for age and gender. The six-month survival has improved considerably. Beyond six months, the graft survival curves are fairly parallel.

Figure 16. Survival of kidney graft after first transplantation according to diagnosis
Finnish Registry for Kidney Diseases 1990–2003

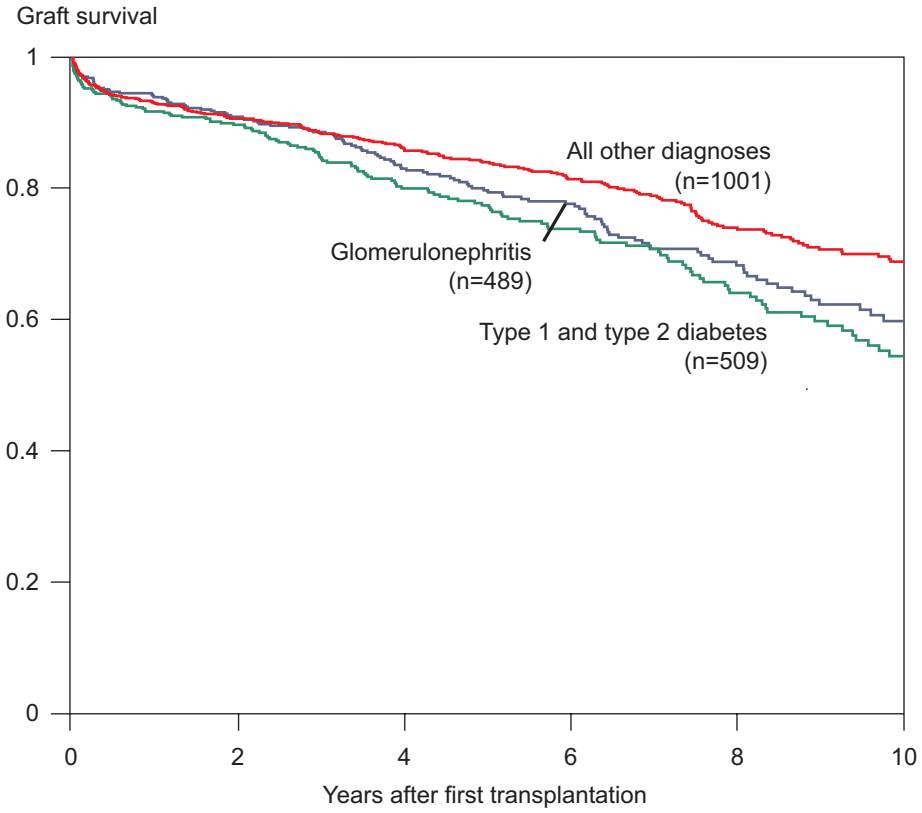


Figure 16 shows the survival probability of kidney grafts after patients' first kidney transplantation in 1990–2003 according to diagnosis. No difference was seen between glomerulonephritis and diabetes patients (p=0.198). In the group of patients with other diagnoses, the probability of graft survival was larger than in glomerulonephritis patients (P=0.027). Of diabetes patients, 9% had type 2 diabetes.

Figure 17. Immunosuppressive treatment at the end of the year in patients who had received their first kidney transplant
Finnish Registry for Kidney Diseases 1998–2003

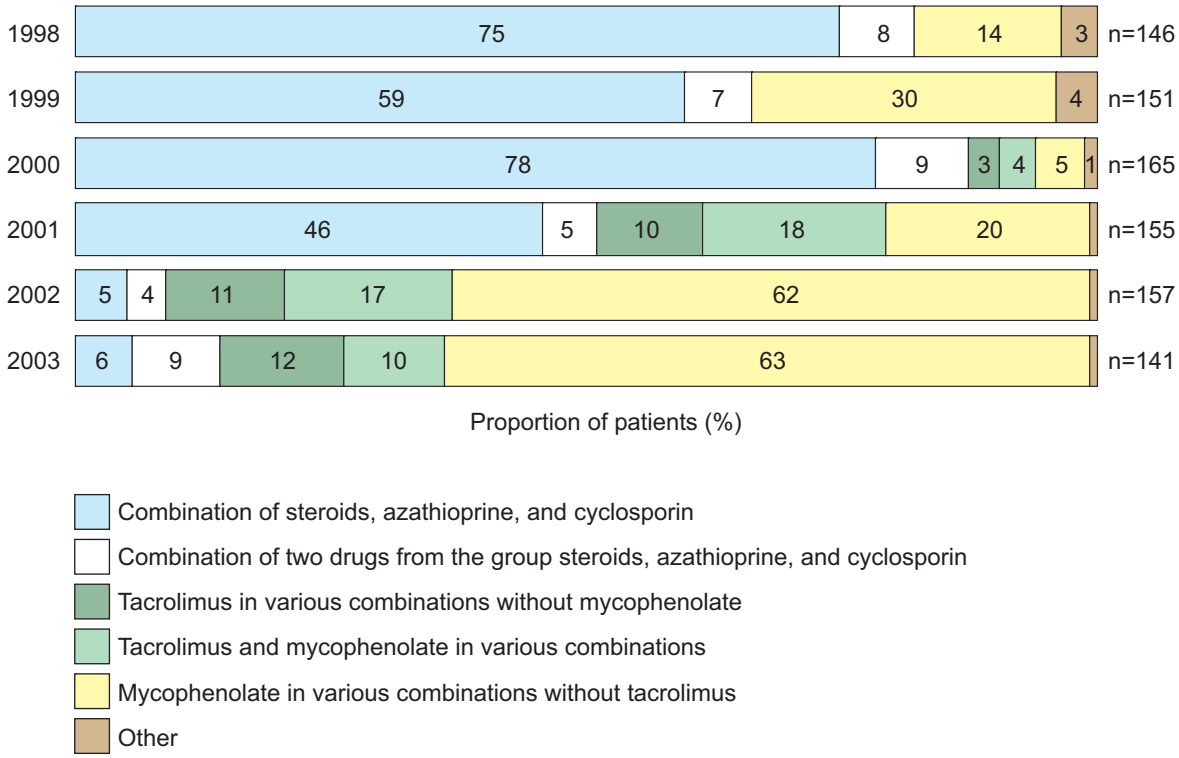


Table 10. Peritonitis in peritoneal dialysis patients according to age group
Finnish Registry for Kidney Diseases 1998–2003

Year	Number of peritonites				Number of patient-years				Number of peritonites/ 1000 patient-years			
	0–44 y	45–64 y	≥65 y	All	0–44 y	45–64 y	≥65 y	All	0–44 y	45–64 y	≥65 y	All
1998	65	37	33	135	91	95	73	258	715	391	453	522
1999	37	53	57	147	96	101	87	284	385	527	656	518
2000	28	42	51	121	76	104	99	279	369	403	513	433
2001	24	49	49	122	65	105	96	266	369	466	513	459
2002	20	57	52	129	59	116	93	269	337	489	558	480
2003	25	51	58	134	72	101	97	270	348	505	598	497
1998–2003	199	289	300	790	459	622	545	1626	433	465	551	486

At the end of the year in 1998–2001, the most common immunosuppressive treatment of patients who had received their first kidney transplant was a combination of steroids, azathioprine, and cyclosporin (Figure 17). Since 2002, mycophenolate has almost completely replaced azathioprine, and the majority of new kidney transplantation patients have received mycophenolate in various combinations without tacrolimus. In this group, mycophenolate was most commonly combined with steroids and cyclosporin (95% of cases). In 2003, the most common single immunosuppressive drug was steroids, used by 96% of patients. Mycophenolate was used by 76%, cyclosporin by 73%, tacrolimus by 25% and azathioprine by 8% of the new kidney transplantation patients.

The incidence of peritonitis among peritoneal dialysis patients has remained virtually unchanged since 1998 (Table 10). In 1998–2003, patients older than 65 years had a somewhat increased risk of peritonitis. Women's risk of peritonitis (532 peritonites/1000 patient-years) was larger than men's (451 peritonites/1000 patient-years).

Figure 18. Hemodialysis patients' vascular access types according to age group
Finnish Registry for Kidney Diseases 2003

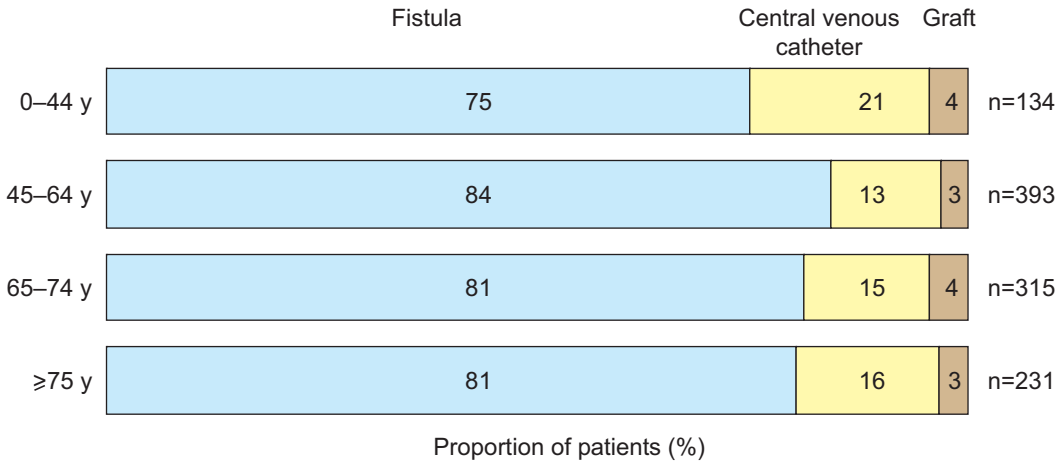


Figure 19. Number of nephrological consultations of hemodialysis patients treated in satellite dialysis units
Finnish Registry for Kidney Diseases 2002–2003

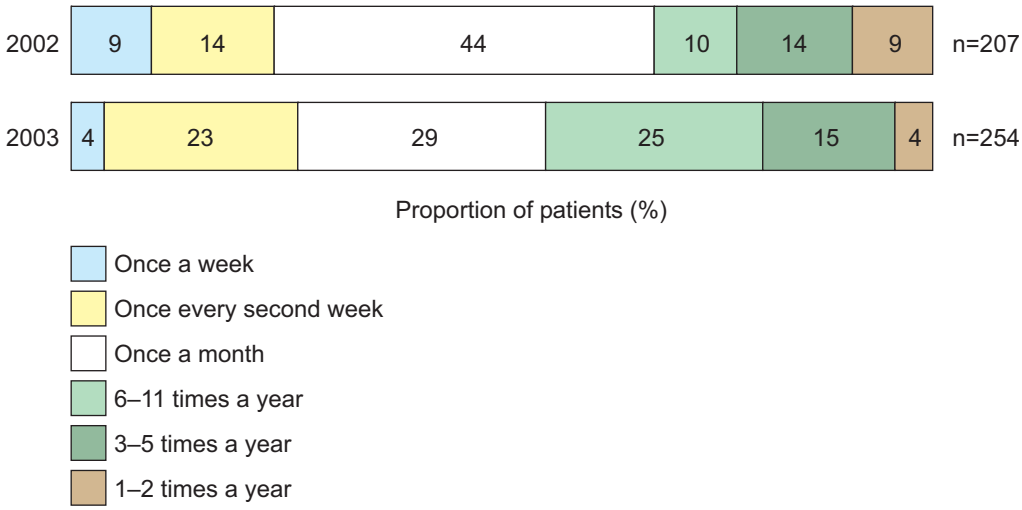


Figure 18 shows hemodialysis patients' vascular access types at the end of the year in 2003. Information on vascular access type was available for 97% of hemodialysis patients. The distribution of vascular access types was similar in all age groups. In 21% of patients, the fistula or graft needed some surgical or radiological intervention during 2003.

Figure 19 shows the frequency of nephrological consultations of patients receiving hemodialysis in satellite dialysis units or healthcare centers in 2002–2003. Such consultations were reported for 19% (207/1093) of all hemodialysis patients in 2002 and for 23% (254/1109) in 2003. In 2002, 67% of patients dialysed in satellite units had received a nephrological consultation at least once a month. In 2003, the corresponding proportion was 56%.

Figure 20. Use of biopsy to confirm kidney disease diagnoses in various diagnostic groups
Finnish Registry for Kidney Diseases 1990–2003

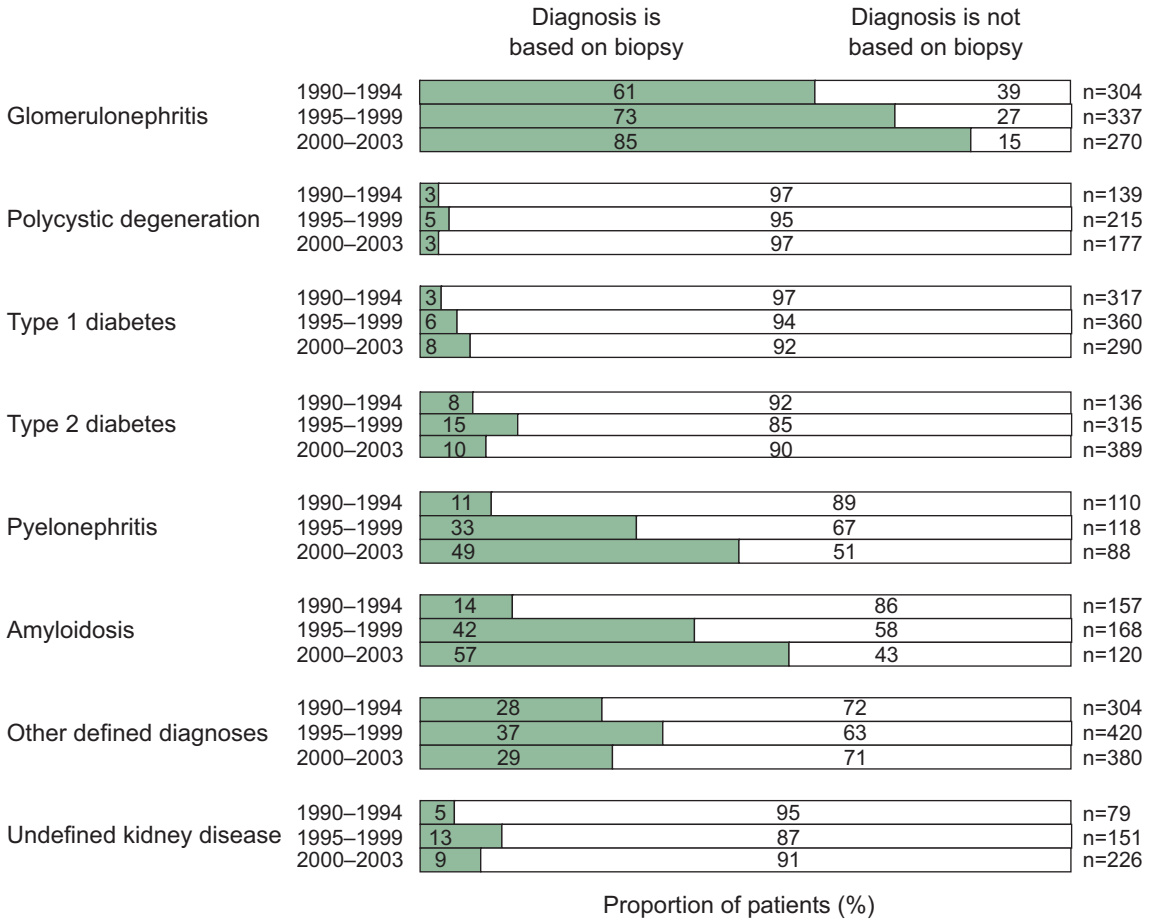


Figure 20 shows how often biopsies are used to confirm RRT patients' kidney disease diagnoses in the various diagnostic groups. Since the early 1990s, biopsy has been increasingly used to corroborate the diagnoses of glomerulonephritis, pyelonephritis, and amyloidosis. The Finnish Registry for Kidney Diseases questionnaire seeks to determine whether diagnoses are based on information obtained in biopsy. The biopsy rate in amyloidosis patients might also include skin biopsies; this would explain the high frequency of biopsies in recent years.

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Finnish Registry for Kidney Diseases

Report 2003

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