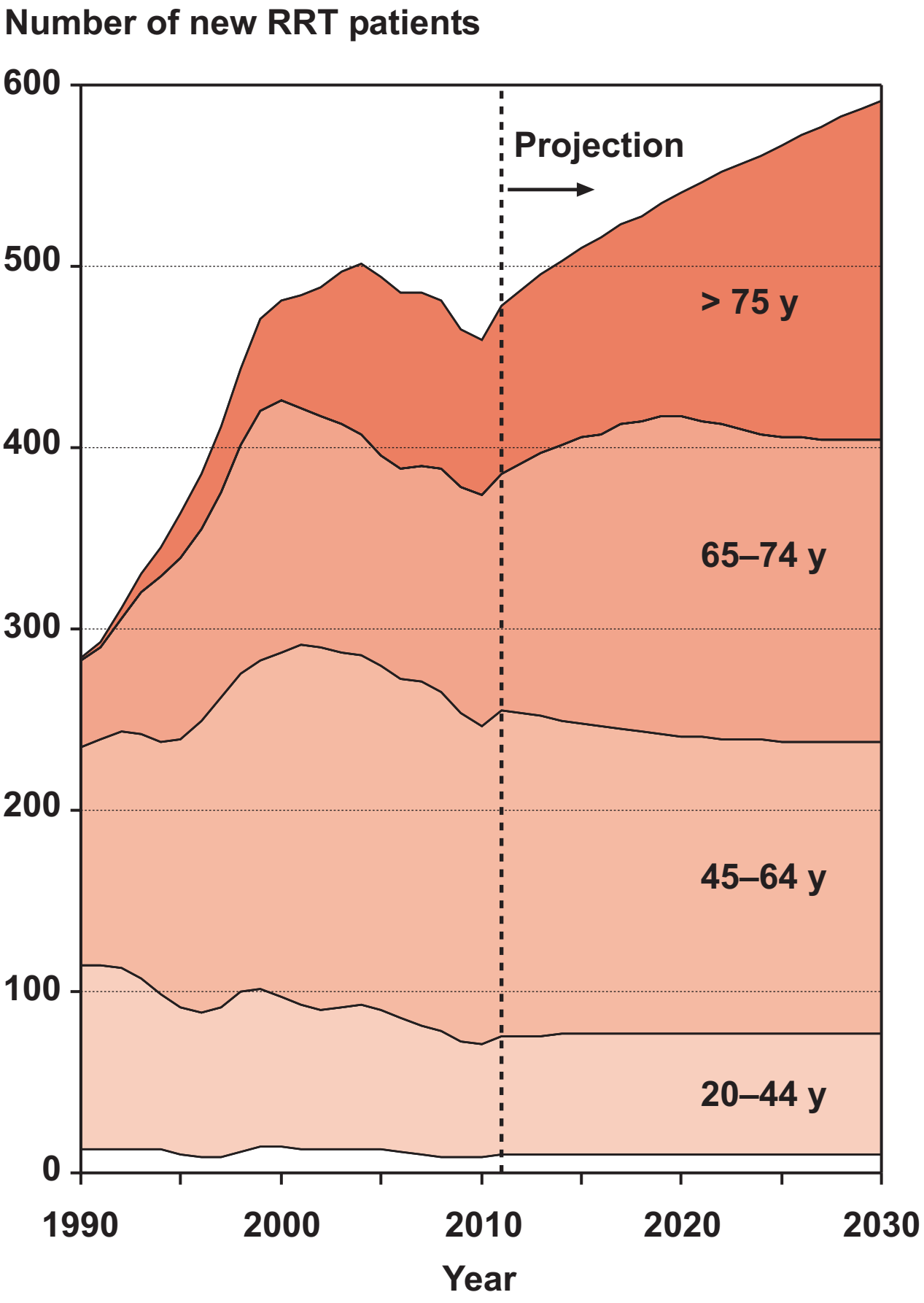
Report 2010

Finnish Registry for Kidney Diseases



Finnish Registry for Kidney Diseases – Report 2010

Contents

The Finnish Registry for Kidney Diseases is a national healthcare registry that contains information on dialysis and kidney transplantation patients. The estimated coverage of the registry is high, 97–99%. When a new patient enters renal replacement therapy (RRT), the treating hospital, upon written agreement of the patient, reports data regarding the kidney disease and its treatment. Changes in type of treatment, e.g. kidney transplantation or transfer to another type of dialysis, are also reported. At the end of each year, the hospitals report basic information, such as laboratory results, on all patients.

Report 2010 provides an overview on the incidence and prevalence of RRT (dialysis or kidney transplantation) in the Finnish population and on mortality of patients receiving RRT. The incidence increased rapidly in the 1990s, but in the 2000s the increase stopped and recently it has even reversed. A similar trend has been seen in many other countries. Age-standardized mortality among RRT patients has diminished, but as the patients are older, the absolute number of deaths has remained virtually unchanged. The prevalence of RRT depends on incidence and mortality. The prevalence has grown continuously, but the growth has slowed down in recent years.

The biggest challenge of Finnish healthcare during the coming years will be the aging of the population. According to the forecast of Statistics Finland, the proportion of inhabitants older than 65 years is anticipated to grow from the current 17.6% to 26% in 2030. The proportion of 20–64-year-olds will fall from 60% to 52%. Based on population projections, this report presents the anticipated numbers of incident and prevalent RRT patients until 2030. Basic assumptions of the projections are that incidence and mortality will remain unchanged in the different age groups and that the number of kidney transplantations and the risk of graft loss will not change. The population change alone will increase the number of patients entering RRT by 54% and the number of prevalent patients by 25%. Notably, the number of kidney transplantations per million inhabitants is smaller in Finland than in, for instance, Sweden, Norway, or Denmark. If the number of kidney transplantations could be increased, the projections would change significantly. In recent years, mortality among RRT patients has decreased, and if this favorable trend continues the prevalence of RRT will grow faster. The incidence of RRT also affects the projected prevalence.

The Finnish Registry for Kidney Diseases is a national healthcare registry financed by the Finnish government. Funds were earlier channeled through Finland's Slot Machine Association, but since the beginning of 2011 the funding has been provided by the National Institute for Health and Welfare. The Finnish Kidney and Liver Association continues to be in charge of the technical maintenance of the registry. Statistics in this report were updated using data obtained from the Registry for the 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.

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Table 1. The Finnish population and its distribution in healthcare districts.
Finnish Registry for Kidney Diseases 2000–2010

Healthcare district		Year					Change (%) 2000–2010
		2000	2005	2008	2009	2010	
1	Helsinki-Uusimaa	1390	1448	1497	1514	1528	9.9
3	Varsinais-Suomi	451	459	465	466	468	3.9
4	Satakunta	233	229	226	226	226	–2.9
5	Kanta-Häme	165	168	173	174	175	5.6
6	Pirkanmaa	447	465	479	482	486	8.8
7	Päijät-Häme	209	210	212	212	213	1.9
8	Kymenlaakso	180	178	176	176	175	–2.5
9	Etelä-Karjala	136	135	134	133	133	–2.5
10	Etelä-Savo	113	109	107	107	106	–5.8
11	Itä-Savo	49	48	46	46	46	–7.8
12	Pohjois-Karjala	176	173	170	170	170	–3.6
13	Pohjois-Savo	254	250	248	248	248	–2.3
14	Keski-Suomi	266	270	272	273	274	3.0
15	Etelä-Pohjanmaa	201	199	199	198	198	–1.1
16	Vaasa	161	162	164	165	166	3.1
17	Keski-Pohjanmaa	75	74	75	75	75	0.2
18	Pohjois-Pohjanmaa	373	385	393	396	398	6.9
19	Kainuu	86	82	80	79	79	–8.2
20	Länsi-Pohja	69	67	66	65	65	–4.8
21	Lappi	123	119	118	118	118	–4.1
22	Åland	26	27	27	28	28	8.7
Region	South	1707	1761	1807	1822	1837	7.6
	Southwest	709	714	718	720	722	1.8
	West	1183	1204	1226	1232	1238	4.7
	East	858	849	844	843	843	–1.7
	North	725	727	731	733	736	1.5
Entire country		5181	5256	5326	5351	5375	3.7

On 31 December 2010, the population of Finland was 5.375 million (Table 1, Source: Statistics Finland). During the past ten years the population of the country overall has increased by 3.7%, with the fastest increase occurring in the southern region. In the eastern region, the population has decreased. Of the healthcare districts, the population has increased most in Helsinki-Uusimaa, Pirkanmaa, and Ahvenanmaa. In the healthcare districts of Kainuu and Itä-Savo, the population has decreased especially rapidly.

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 2010

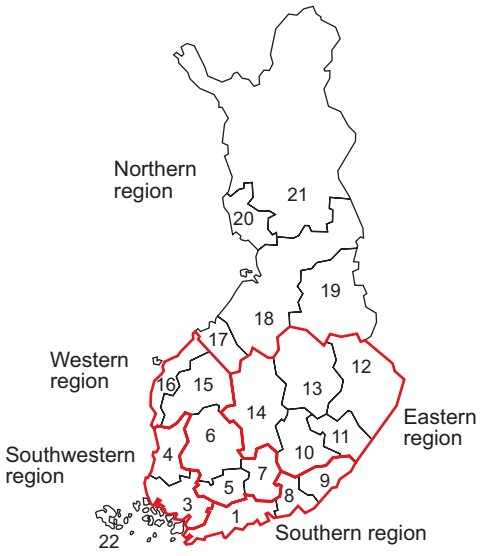


Table 2. The Finnish population according to region, age group, and gender.
Finnish Registry for Kidney Diseases 2000–2010

Region	2000					2010				
	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	208 (25)	534 (65)	53 (6)	28 (3)	823 (100)	212 (24)	566 (64)	71 (8)	42 (5)	891 (100)
Women	201 (23)	547 (62)	70 (8)	66 (8)	884 (100)	204 (22)	576 (61)	86 (9)	79 (8)	945 (100)
Total	408 (24)	1081 (63)	123 (7)	95 (6)	1707 (100)	416 (23)	1142 (62)	158 (9)	121 (7)	1837 (100)
Southwest										
Men	85 (25)	214 (62)	28 (8)	17 (5)	344 (100)	80 (23)	214 (61)	35 (10)	24 (7)	353 (100)
Women	81 (22)	211 (58)	36 (10)	37 (10)	365 (100)	76 (21)	212 (57)	39 (11)	42 (11)	370 (100)
Total	165 (23)	426 (60)	65 (9)	53 (8)	709 (100)	156 (22)	426 (59)	74 (10)	66 (9)	722 (100)
West										
Men	147 (25)	356 (62)	47 (8)	28 (5)	577 (100)	143 (24)	370 (61)	56 (9)	39 (6)	609 (100)
Women	140 (23)	345 (57)	60 (10)	61 (10)	605 (100)	137 (22)	357 (57)	64 (10)	70 (11)	629 (100)
Total	286 (24)	701 (59)	107 (9)	88 (7)	1183 (100)	281 (23)	727 (59)	121 (10)	110 (9)	1238 (100)
East										
Men	106 (25)	259 (61)	37 (9)	20 (5)	422 (100)	93 (22)	253 (61)	41 (10)	29 (7)	416 (100)
Women	102 (23)	246 (56)	46 (11)	42 (10)	436 (100)	89 (21)	240 (56)	46 (11)	51 (12)	427 (100)
Total	208 (24)	505 (59)	83 (10)	62 (7)	858 (100)	182 (22)	493 (58)	88 (10)	80 (10)	843 (100)
North										
Men	102 (28)	219 (60)	28 (8)	14 (4)	363 (100)	95 (26)	221 (60)	32 (9)	22 (6)	369 (100)
Women	98 (27)	203 (56)	32 (9)	28 (8)	362 (100)	90 (25)	206 (56)	34 (9)	36 (10)	366 (100)
Total	200 (28)	423 (58)	60 (8)	42 (6)	725 (100)	185 (25)	427 (58)	66 (9)	58 (8)	736 (100)
Entire country										
Men	648 (26)	1583 (63)	193 (8)	107 (4)	2529 (100)	623 (24)	1624 (62)	235 (9)	156 (6)	2638 (100)
Women	620 (23)	1553 (59)	244 (9)	234 (9)	2652 (100)	597 (22)	1591 (58)	270 (10)	279 (10)	2737 (100)
Total	1268 (24)	3136 (61)	437 (8)	340 (7)	5181 (100)	1220 (23)	3214 (60)	505 (9)	436 (8)	5375 (100)

Table 2 shows the distribution of the Finnish population according to region, age, and gender at the end of 2000 and 2010. On 31 December 2010, 18% of the Finnish population was aged over 65 years. This proportion was the smallest, 15%, in the southern region, ranging from 17% to 20% in the other regions. The proportion of 20–64-year-olds was the largest (62%) in the southern region. In the northern region, the proportion of 0–19-year-olds was the largest (25%).

The age of the Finnish population has increased considerably during the past decade. The number of inhabitants under 20 years has decreased by 3.8%. The number of inhabitants aged 65–74 years has increased by 16%, and the number of inhabitants over 75 by 28%. Altogether, at the end of 2010, the number of inhabitants aged 65 years or older was 941 041, increasing by 21% or 163 843 persons in ten years.

According to the projections of Statistics Finland, the number of inhabitants aged 65 years or older will be more than one and a half million in 2030, their proportion of the entire population being 26%.

Table 3. Number of new RRT patients and incidence of RRT by healthcare district and region. Finnish Registry for Kidney Diseases 2000–2010

Healthcare district		Number of new RRT patients						Incidence of RRT/million inhabitants					
		2000	2005	2008	2009	2010	2006–2010 on average	2000	2005	2008	2009	2010	2006–2010 on average
1	Helsinki-Uusimaa	109	111	120	108	107	105	78	77	80	71	70	70
3	Varsinais-Suomi	44	39	57	32	33	43	98	85	123	69	70	92
4	Satakunta	26	20	25	25	19	24	112	87	110	111	84	107
5	Kanta-Häme	16	20	16	17	20	15	97	119	92	98	115	88
6	Pirkanmaa	53	40	39	52	37	50	119	86	81	108	76	104
7	Päijät-Häme	13	35	27	14	22	21	62	166	127	66	103	98
8	Kymenlaakso	16	27	23	13	17	21	89	152	131	74	97	117
9	Etelä-Karjala	23	23	23	13	19	17	169	171	172	98	143	127
10	Etelä-Savo	6	8	5	14	8	9	53	73	47	131	76	88
11	Itä-Savo	5	7	4	9	5	6	101	147	87	196	110	125
12	Pohjois-Karjala	16	18	14	15	14	15	91	104	82	88	82	87
13	Pohjois-Savo	36	21	26	25	20	25	142	84	105	101	81	99
14	Keski-Suomi	24	23	28	19	24	23	90	85	103	70	88	85
15	Etelä-Pohjanmaa	16	17	12	16	17	16	80	85	60	81	86	82
16	Vaasa	5	13	15	15	16	14	31	80	91	91	96	85
17	Keski-Pohjanmaa	7	7	6	13	6	8	93	94	80	174	80	104
18	Pohjois-Pohjanmaa	37	43	38	28	35	32	99	112	97	71	88	82
19	Kainuu	12	15	4	5	6	8	140	184	50	63	76	98
20	Länsi-Pohja	9	10	14	6	5	9	131	150	213	92	77	131
21	Lappi	17	9	6	7	5	7	138	75	51	59	42	57
22	Åland	4	2	5	3	2	3	155	75	182	108	71	94
Region	South	148	161	166	134	143	142	87	91	92	74	78	79
	Southwest	74	61	87	60	54	69	104	85	121	83	75	97
	West	103	125	109	114	112	116	87	104	89	93	90	95
	East	87	77	77	82	71	78	101	91	91	97	84	92
	North	82	84	68	59	57	63	113	116	93	80	77	87
Entire country		494	508	507	449	437	469	95	97	95	84	81	88
	Children <15 y	8	10	4	6	7	7	9	11	4	7	8	8

Table 3 shows the number of new RRT patients and the incidence of RRT according to healthcare district and region. In the entire country, the incidence in 2010 was similar to that in 2009, but 16% lower than in 2005 and 15% lower than in 2000.

In 2006–2010, the average incidence was highest in the southwestern region and lowest in the southern region. In the healthcare districts, the average incidence in 2006–2010 was 57–131 new RRT patients/million inhabitants.

Figure 2. Standardized incidence of RRT in regions. Finnish Registry for Kidney Diseases 2000–2010

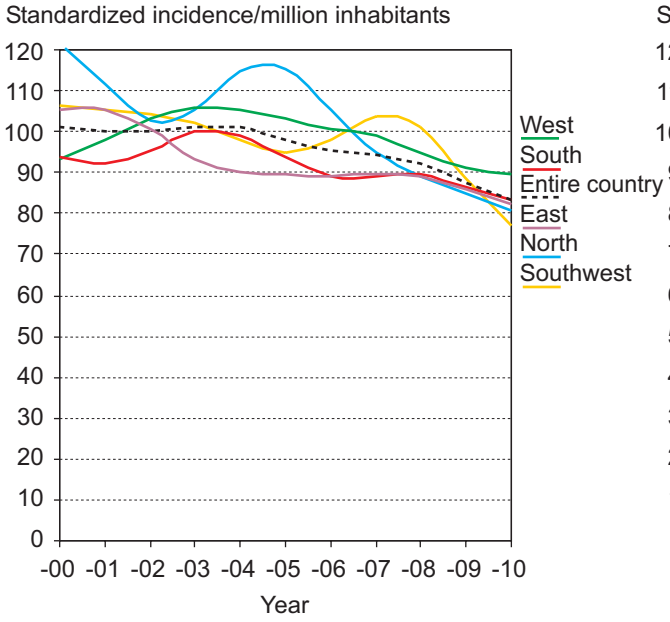


Figure 3. Standardized incidence of RRT in regions 90 days after the start of RRT. Finnish Registry for Kidney Diseases 2000–2010

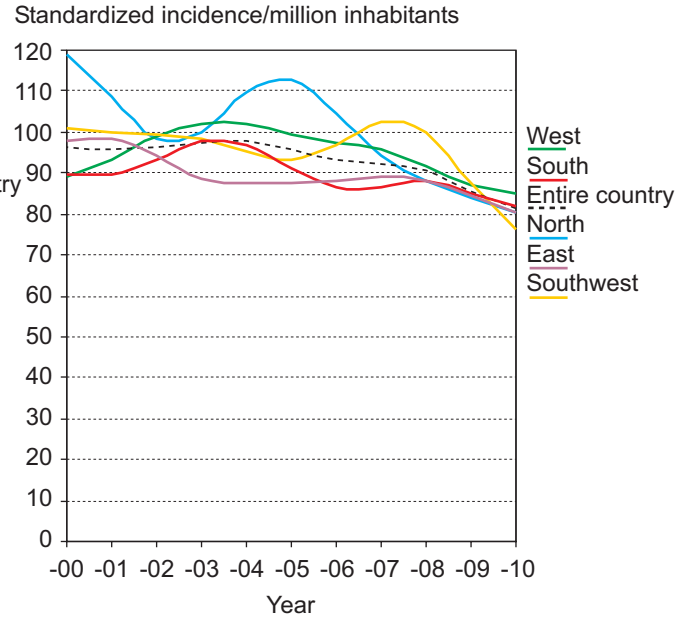


Figure 2 shows the regional incidence of RRT (i.e. dialysis and kidney transplantation) in 2000–2010 as smoothed averages. The incidence rates are age- and gender-standardized using the Finnish general population on 31 December 2010 as the reference population. Population changes in 2000–2010 have been taken into consideration. Standardization removes the effect of age and gender on regional differences in incidence rates. Nationwide, the standardized incidence remained virtually unchanged during 1999–2005, but has been falling since. Regional differences in standardized incidence are very small.

Figure 3 shows the age- and gender-standardized regional incidence of RRT 90 days after the start of RRT as smoothed averages. The Finnish Registry for Kidney Diseases does not store data on patients who have regained renal function within 90 days after the start of RRT. Figure 3 excludes data on patients who died or moved abroad within 90 days of the start of RRT.

Table 4. Incidence of RRT by age group and gender.
Finnish Registry for Kidney Diseases 2000–2010

Age group		Number of new RRT patients					Incidence/million inhabitants				
		2000	2005	2008	2009	2010	2000	2005	2008	2009	2010
0–19 y	Men	6	8	5	6	4	9	13	8	10	6
	Women	5	5	1	2	7	8	8	2	3	12
	Total	11	13	6	8	11	9	11	5	7	9
20–44 y	Men	51	41	51	41	34	57	47	59	48	40
	Women	36	32	22	24	15	42	38	27	29	18
	Total	87	73	73	65	49	50	43	43	39	29
45–64 y	Men	121	151	119	122	116	174	204	156	159	152
	Women	73	54	70	62	47	104	72	91	80	61
	Total	194	205	189	184	163	139	138	124	119	106
65–74 y	Men	91	62	96	78	90	472	304	440	348	382
	Women	59	49	38	40	41	242	201	149	154	152
	Total	150	111	134	118	131	343	248	283	244	259
⩾ 75 y	Men	26	68	57	49	56	244	513	387	323	358
	Women	26	38	48	25	27	111	146	176	91	97
	Total	52	106	105	74	83	153	270	250	173	191
Total	Men	295	330	328	296	300	117	128	126	113	114
	Women	199	178	179	153	137	75	66	66	56	50
	Total	494	508	507	449	437	95	97	95	84	81

Table 4 shows the number of new RRT patients and the incidence of RRT according to age group and gender in 2000–2010. In 2009 and 2010, the incidence was clearly lower than in previous years. In 2010, the incidence was lower than in 2000 among 20–74-year-olds, but somewhat higher among those older than 75 years. Compared with 2005, the incidence has remained unchanged only among 65–74-year-olds, decreasing in all other age groups.

In 2010, the incidence of RRT in women was 56% lower than the incidence in men. The largest difference between the sexes was observed in those aged 75 years or older, the incidence being 73% lower in women than in men.

Figure 4. Incidence of RRT 90 days after the start of RRT according to age group. Finnish Registry for Kidney Diseases 1965–2010

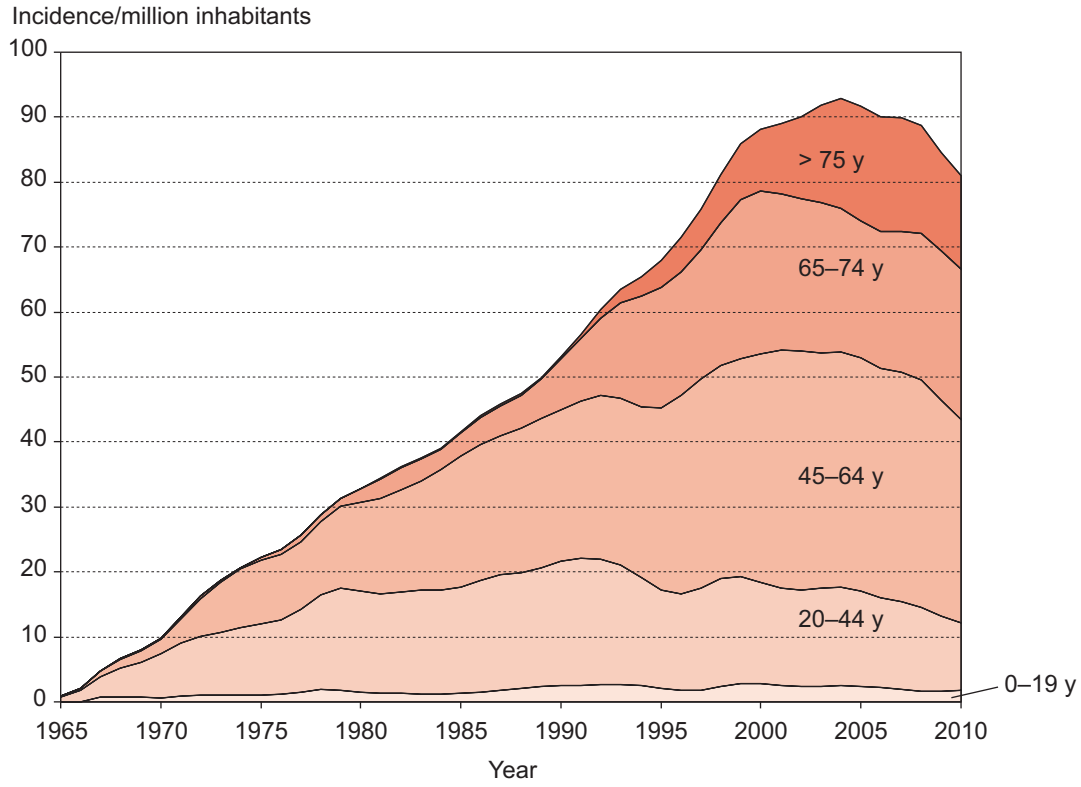
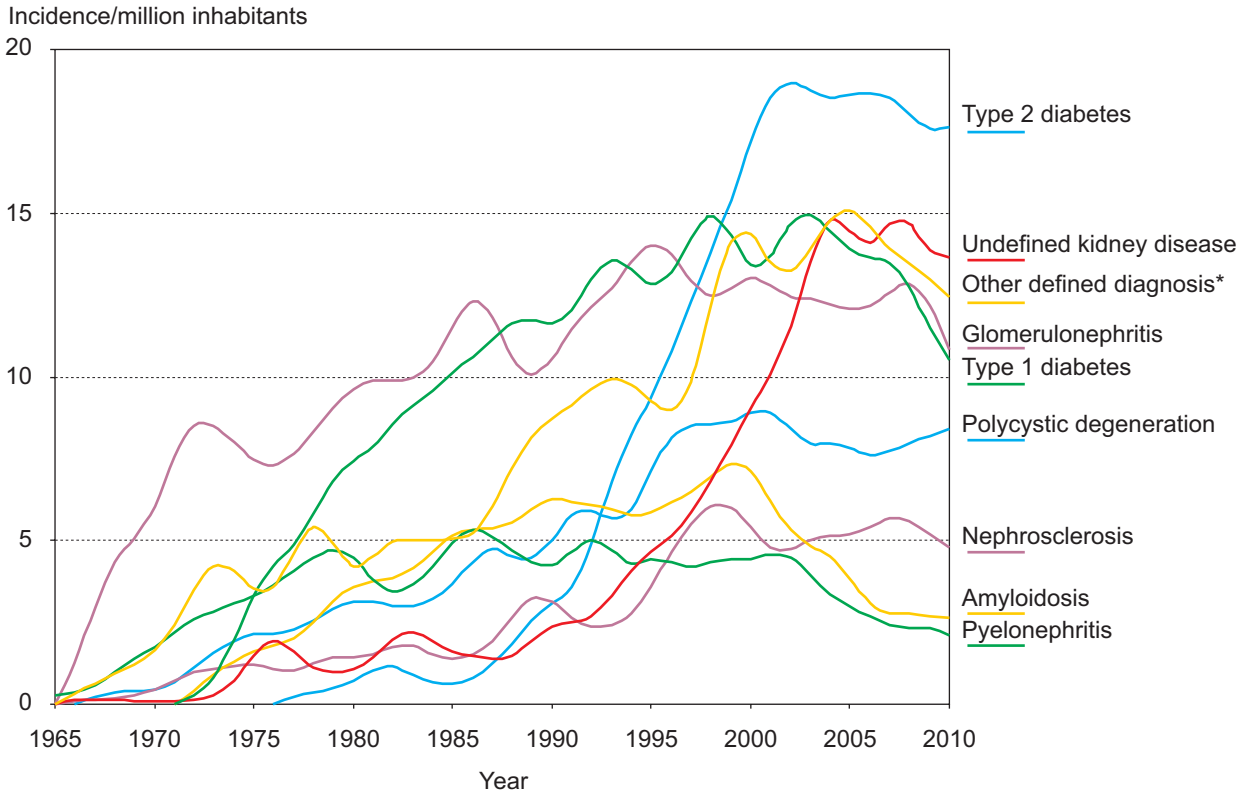


Figure 4 shows the incidence of RRT 90 days after the start of RRT as smoothed averages according to age group. The incidence of RRT in 45–74-year-olds increased sharply in the 1980s and 1990s, but has decreased slightly since 2000. Among inhabitants aged over 75 years, the incidence stopped increasing a few years later. The incidence of RRT in age groups under 45 years has remained virtually unchanged for three decades, except for the slight decrease in incidence in the past few years.

Figure 5. Incidence of RRT according to diagnosis.
Finnish Registry for Kidney Diseases 1965–2010



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

The incidence of RRT according to diagnosis appears as smoothed averages in Figure 5. Type 2 diabetes is the most common cause of chronic uremia. The number of patients entering RRT due to type 2 diabetes increased rapidly during the 1990s, but in the 2000s, this increase has subsided. Type 1 diabetes also commonly leads to initiation of dialysis. The incidence of RRT due to type 1 diabetes has decreased in recent years, despite an increased prevalence of type 1 diabetes in the population. This indicates that treatment of diabetes has improved. The numbers of amyloidosis patients entering RRT increased continuously until 2000, thereafter clearly decreasing. The incidence of chronic uremia caused by pyelonephritis is also declining.

Figure 6. Distribution of RRT patients according to type of treatment at start of RRT. Finnish Registry for Kidney Diseases 2001–2010

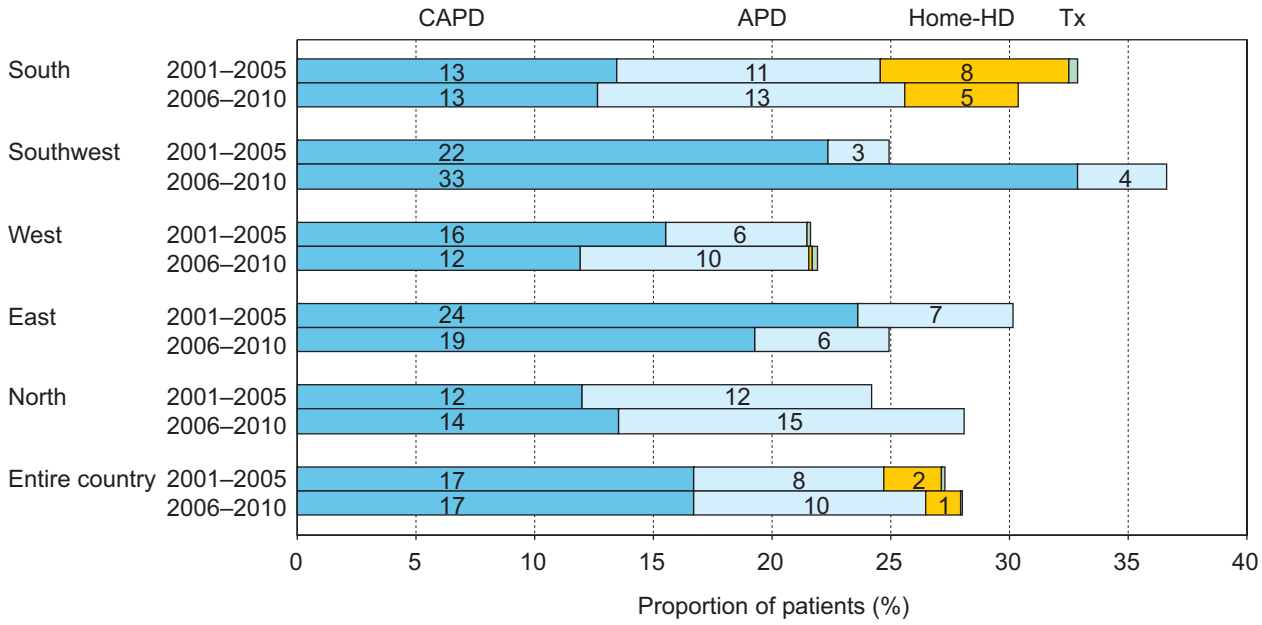
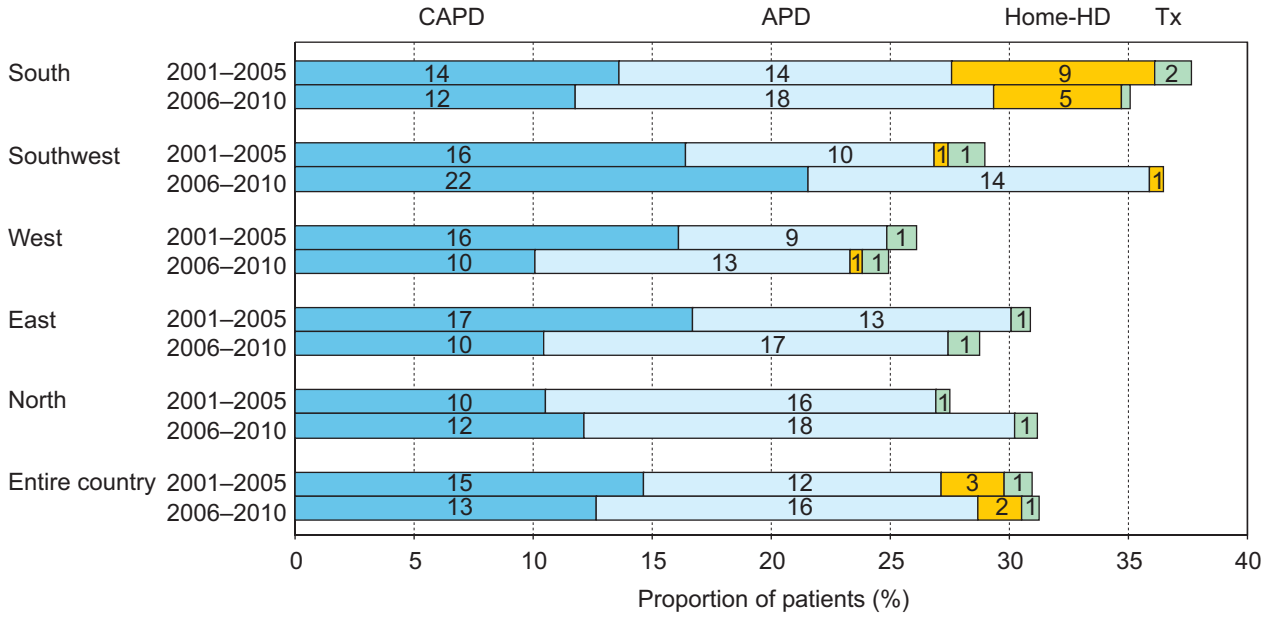


Figure 7. Distribution of RRT patients according to type of treatment at 90 days from start of RRT. Finnish Registry for Kidney Diseases 2001–2010



In 2006–2010, 2344 patients entered RRT. The first type of treatment was continuous ambulatory peritoneal dialysis (CAPD) in 17%, automatic peritoneal dialysis (APD) in 10%, home hemodialysis (home-HD) in 1%, and kidney transplantation (Tx) in 0.04% (Figure 6). The first treatment type was in-center hemodialysis for 72% of patients, but this is not shown in the figure. Home hemodialysis is most common in the southern region, while peritoneal dialysis is most common in the southwestern region.

Figure 7 shows the distribution of treatment types at 90 days from the start of RRT. APD has become more frequent in 2006–2010 as compared with 2001–2005. A portion of the patients who started hemodialysis had transferred to peritoneal dialysis at 90 days.

Figure 8. International comparison of incidence of RRT in 2009.
Finnish Registry for Kidney Diseases 2009

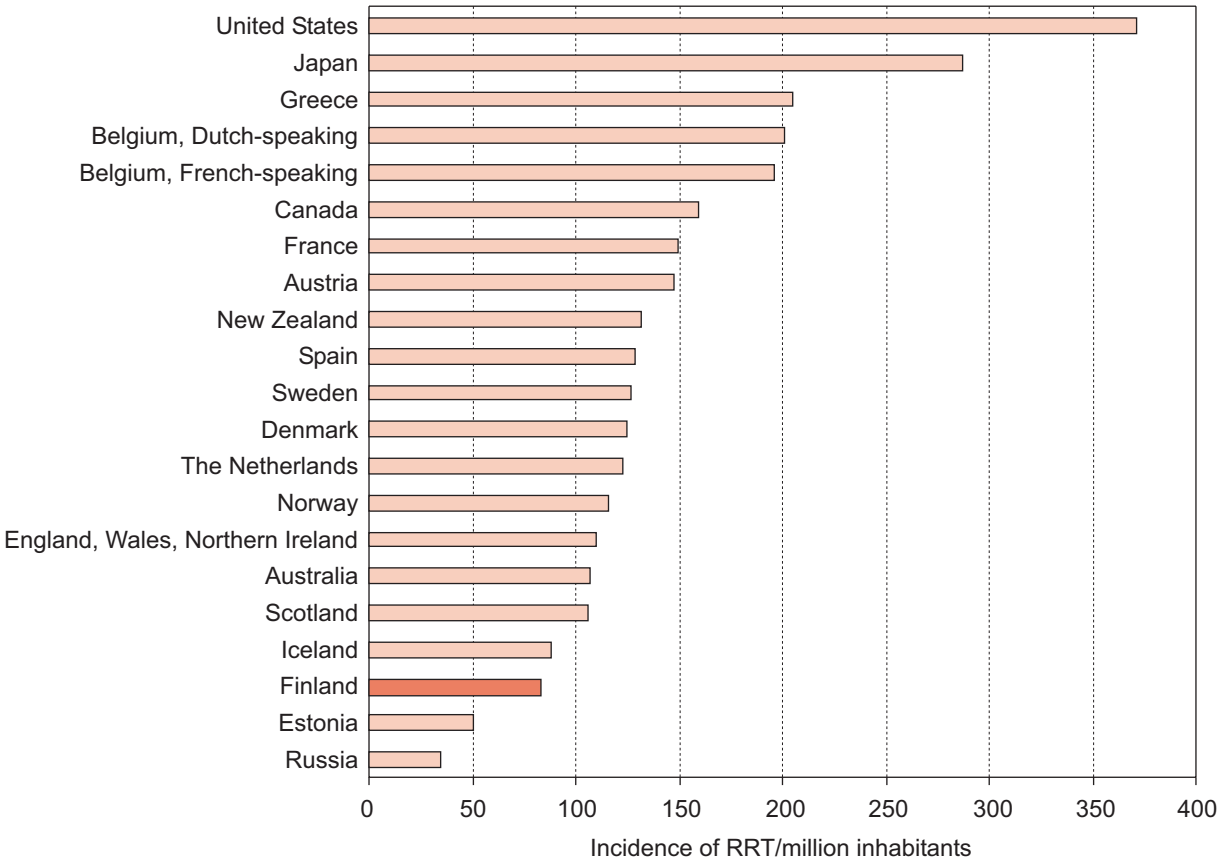


Figure 8 shows the incidence of RRT in 2009 in countries reporting to the ERA-EDTA Registry (Annual Report 2009, http://www.era-edta-reg.org) and in the United States, Canada, Australia, New Zealand, and Japan (The 2011 USRDS Annual Data Report Atlas, http://www.usrds.org). In 2009, the incidence of RRT in Finland was the lowest among the Nordic countries. Relative to Finland, the incidence in Sweden was 52% higher, in Denmark 51% higher, in Norway 40% higher, and in Iceland 6% higher.

Table 5. Patients in RRT at end of year according to healthcare district and region.
Finnish Registry for Kidney Diseases 2000–2010

Healthcare district		Number of RRT patients					Prevalence of RRT/million inhabitants				
		2000	2005	2008	2009	2010	2000	2005	2008	2009	2010
1	Helsinki-Uusimaa	832	1000	1068	1084	1122	598	691	713	716	734
3	Varsinais-Suomi	282	344	389	394	398	625	749	837	845	850
4	Satakunta	148	198	232	234	236	636	866	1025	1035	1045
5	Kanta-Häme	74	119	121	129	134	448	707	699	742	768
6	Pirkanmaa	295	342	391	407	401	661	735	817	844	825
7	Päijät-Häme	104	160	173	172	178	498	761	816	810	836
8	Kymenlaakso	95	115	142	145	143	528	646	808	826	815
9	Etelä-Karjala	91	125	144	140	146	668	927	1077	1051	1099
10	Etelä-Savo	54	72	81	90	88	480	659	756	845	831
11	Itä-Savo	33	41	41	46	49	667	859	887	1003	1074
12	Pohjois-Karjala	103	128	132	139	135	585	741	776	818	795
13	Pohjois-Savo	211	221	221	229	221	831	884	890	923	891
14	Keski-Suomi	129	152	173	173	182	486	564	637	634	665
15	Etelä-Pohjanmaa	91	105	114	113	120	453	528	574	569	605
16	Vaasa	75	107	107	108	117	465	661	651	653	704
17	Keski-Pohjanmaa	34	48	50	56	58	454	645	669	748	773
18	Pohjois-Pohjanmaa	197	266	276	281	289	529	691	703	710	726
19	Kainuu	54	69	67	63	62	630	846	841	795	788
20	Länsi-Pohja	38	49	65	67	62	554	736	991	1025	950
21	Lappi	65	78	76	74	74	528	654	642	625	626
22	Åland	16	14	21	23	24	621	523	765	829	857
Region	South	1018	1240	1354	1369	1411	597	704	749	751	768
	Southwest	446	556	642	651	658	629	778	894	904	911
	West	639	833	906	929	950	540	692	739	754	767
	East	530	614	648	677	675	618	723	768	803	801
	North	388	510	534	541	545	535	702	730	738	741
Entire country		3021	3753	4084	4167	4239	583	714	767	779	789

Table 5 shows the number of RRT patients and the prevalence of RRT on 31 December 2000–2010. In the entire country, the prevalence increased by 22% from 2000 to 2005 and by 10% from 2005 to 2010, indicating that the increase in prevalence has slowed down. On 31 December 2010, the prevalence was the highest in the southwestern region. In the healthcare districts, the prevalence varied between 605 and 1099 patients per million inhabitants.

Table 6. Patients in RRT according to age group and gender.
Finnish Registry for Kidney Diseases 2000–2010

Age group		Number of RRT patients					Prevalence of RRT/million inhabitants				
		2000	2005	2008	2009	2010	2000	2005	2008	2009	2010
0–19 y	Men	76	82	69	68	69	117	131	110	109	111
	Women	38	53	52	51	54	61	88	87	85	90
	Total	114	135	121	119	123	90	110	99	97	101
20–44 y	Men	415	444	458	456	421	468	512	533	532	490
	Women	321	304	271	273	263	376	365	330	333	321
	Total	736	748	729	729	684	423	440	434	435	408
45–64 y	Men	850	1100	1198	1221	1240	1223	1484	1572	1591	1620
	Women	519	638	720	724	707	742	856	938	936	915
	Total	1369	1738	1918	1945	1947	982	1169	1254	1262	1266
65–74 y	Men	341	396	494	539	603	1770	1939	2264	2408	2562
	Women	260	285	316	325	355	1065	1168	1241	1252	1314
	Total	601	681	810	864	958	1376	1519	1713	1787	1895
≥75 y	Men	107	265	310	309	329	1004	1999	2107	2039	2104
	Women	94	186	196	201	198	402	714	720	729	709
	Total	201	451	506	510	527	590	1148	1207	1194	1210
Total	Men	1789	2287	2529	2593	2662	707	889	968	988	1009
	Women	1232	1466	1555	1574	1577	465	546	573	577	576
	Total	3021	3753	4084	4167	4239	583	714	767	779	789

Figure 9. Standardized prevalence of RRT in regions.
Finnish Registry for Kidney Diseases 2000–2010

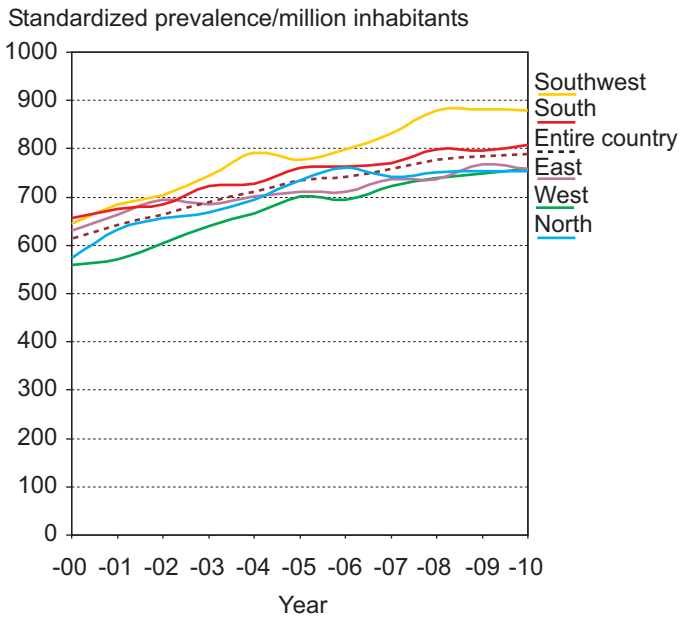
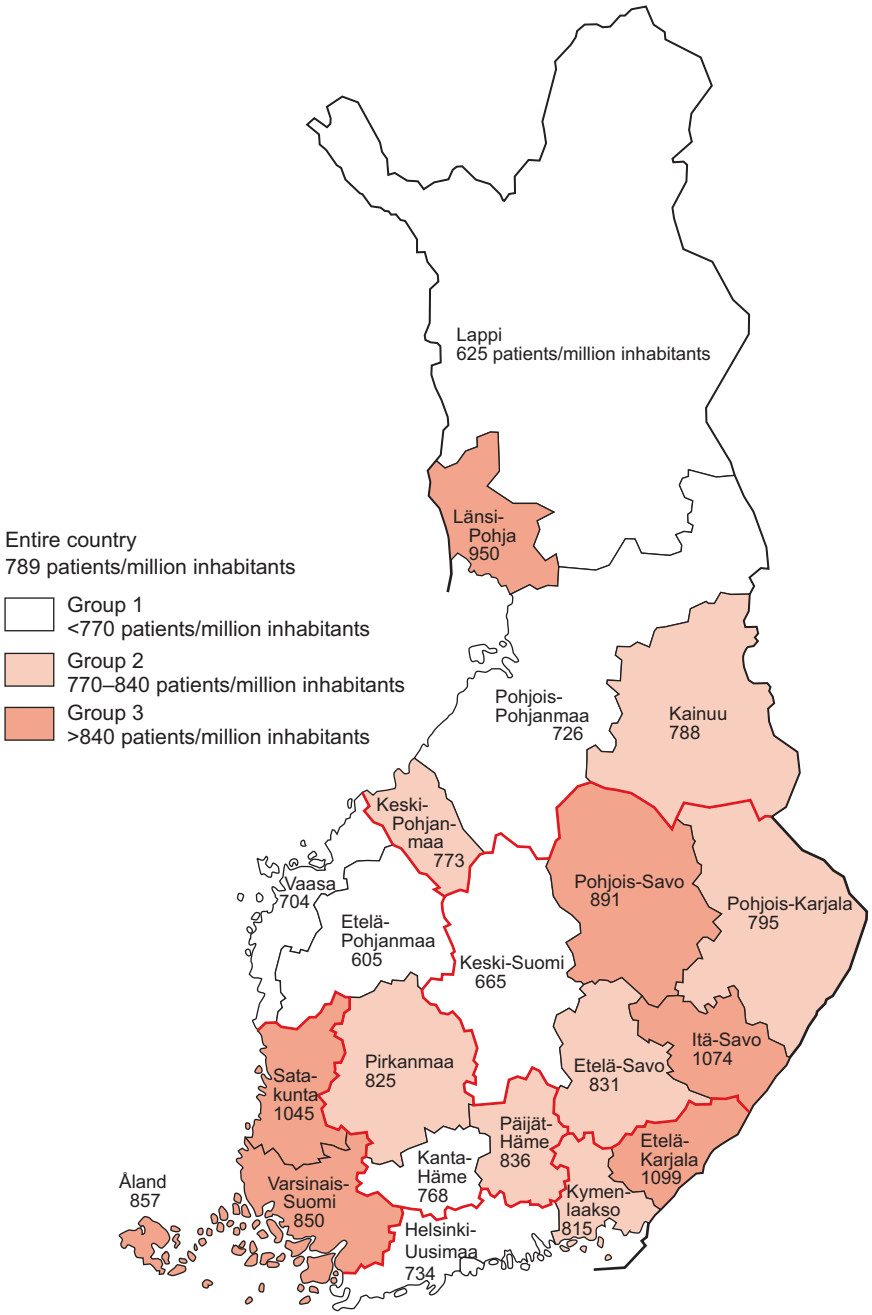


Table 6 shows the number of RRT patients and the prevalence of RRT on 31 December 2000–2010 according to age group and gender. The prevalence has increased by 35% since 2000. In the age group 75 years and older, the prevalence of RRT has doubled. In the other age groups, the prevalence has increased by 12–38%, except in the age group 20–44 years, in which it has remained virtually unchanged. The highest prevalence, observed among men aged 65–74 years at the end of 2010, was 2562 cases per million inhabitants, which means that approximately every 390th man in this age group is on RRT. At the end of 2010, the prevalence was 75% greater among men than women, and the gender difference was even more pronounced in the older age groups.

Figure 9 shows the age- and gender-standardized prevalence rates for 2000–2010 using the Finnish general population on 31 December 2010 as the reference population. Population changes during this period have been taken into consideration. Standardization removes the effect of age and gender on regional differences in prevalence rates. The standardized prevalence is also greatest in the southwestern region.

Figure 10. Prevalence of RRT in healthcare districts on 31 December 2010.
Finnish Registry for Kidney Diseases 2010



The healthcare districts shown on the map are grouped according to the prevalence of RRT at the end of 2010 (Figure 10). The prevalence per million inhabitants was <770 in seven districts, 770–840 in seven districts, and >840 in seven districts. The borders of the regions are indicated with thick lines.

Figure 11. Prevalence of RRT at end of year according to type of treatment.
Finnish Registry for Kidney Diseases 1965–2010

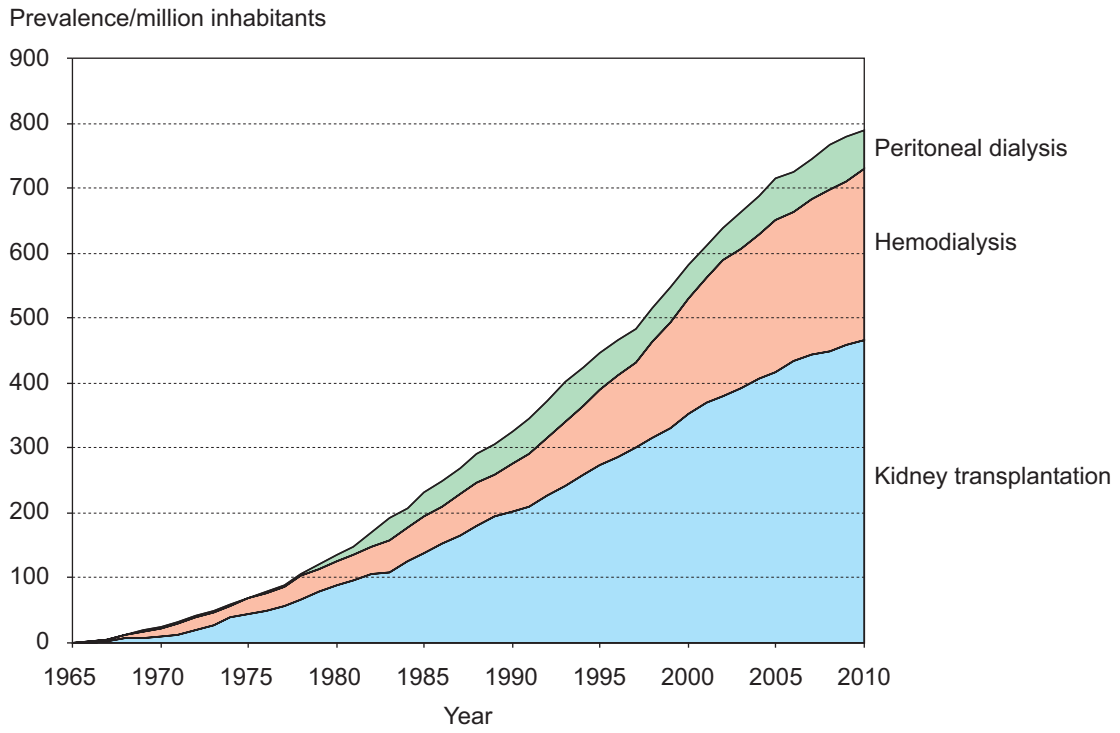


Figure 11 displays the prevalence of RRT according to treatment type. The prevalence of hemodialysis and kidney transplantation has increased continuously, at the end of 2010 being 252% and 132% greater, respectively, than in 1990. The prevalence of peritoneal dialysis has remained virtually unchanged. At the end of 2010, the proportion of hemodialysis patients of all RRT patients was 33%, that of peritoneal dialysis patients 8%, and that of kidney transplantation patients 59%. These proportions remained virtually unchanged during the 2000s.

Figure 12. Distribution of RRT patients according to type of treatment at end of year.
Finnish Registry for Kidney Diseases 2005 ja 2010

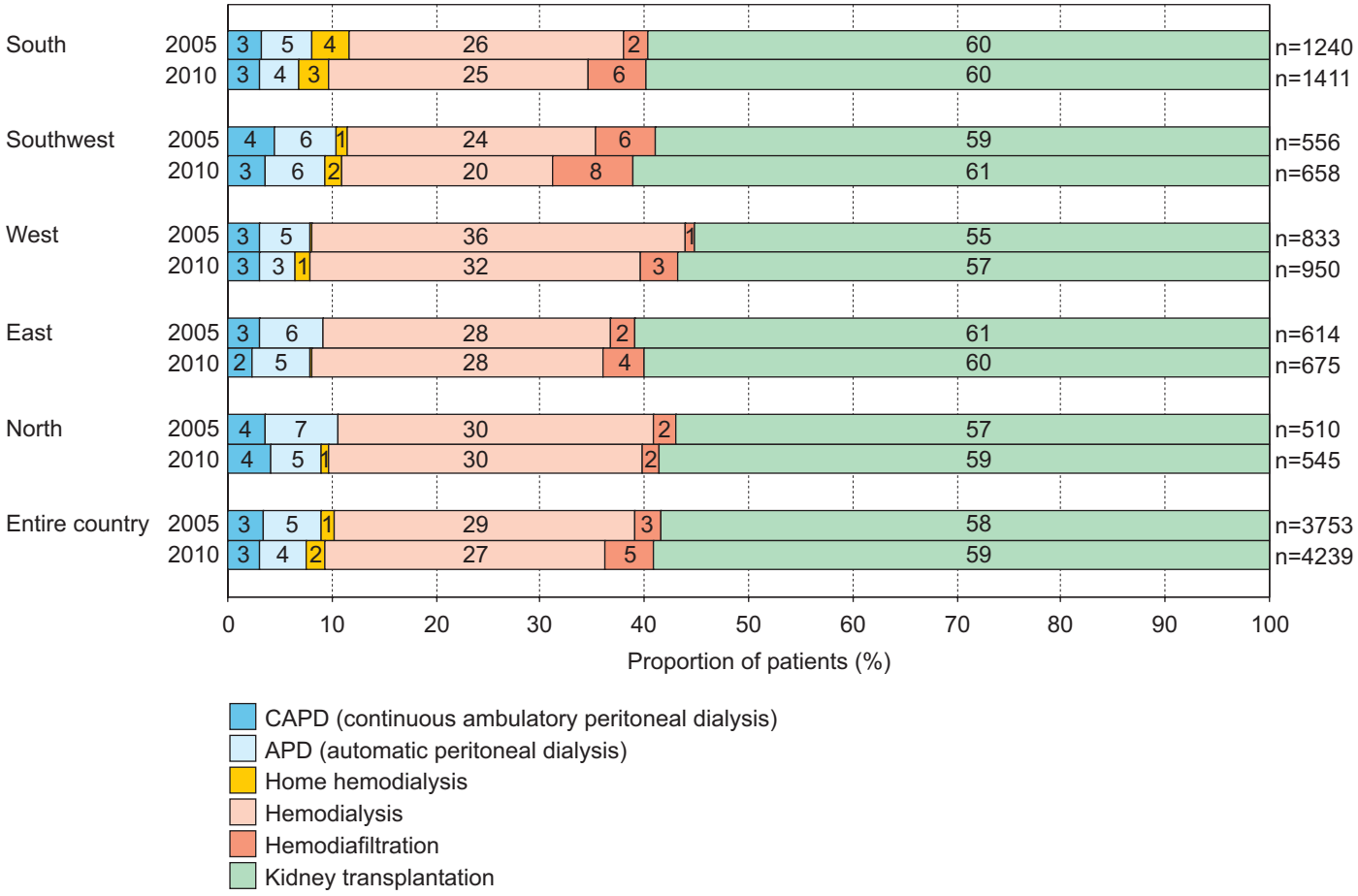


Figure 12 shows the distribution of RRT patients according to type of treatment at the end of 2005 and 2010. In 2010, the proportion of kidney transplantation patients of all RRT patients was 57–61% in various regions. Country-wide, the proportion of home dialysis patients (CAPD, APD, home hemodialysis) of all dialysis patients was 24.7% at the end of 2005 and 22.7% at the end of 2010. In the reports of the Finnish Registry for Kidney Diseases, hemodialysis and hemodiafiltration patients have usually been reported as one group, but here they are shown separately. The proportion of hemodiafiltration patients has increased in all regions, except the northern region.

Figure 13. International comparison of prevalence of RRT on 31 December 2009.
Finnish Registry for Kidney Diseases 2009

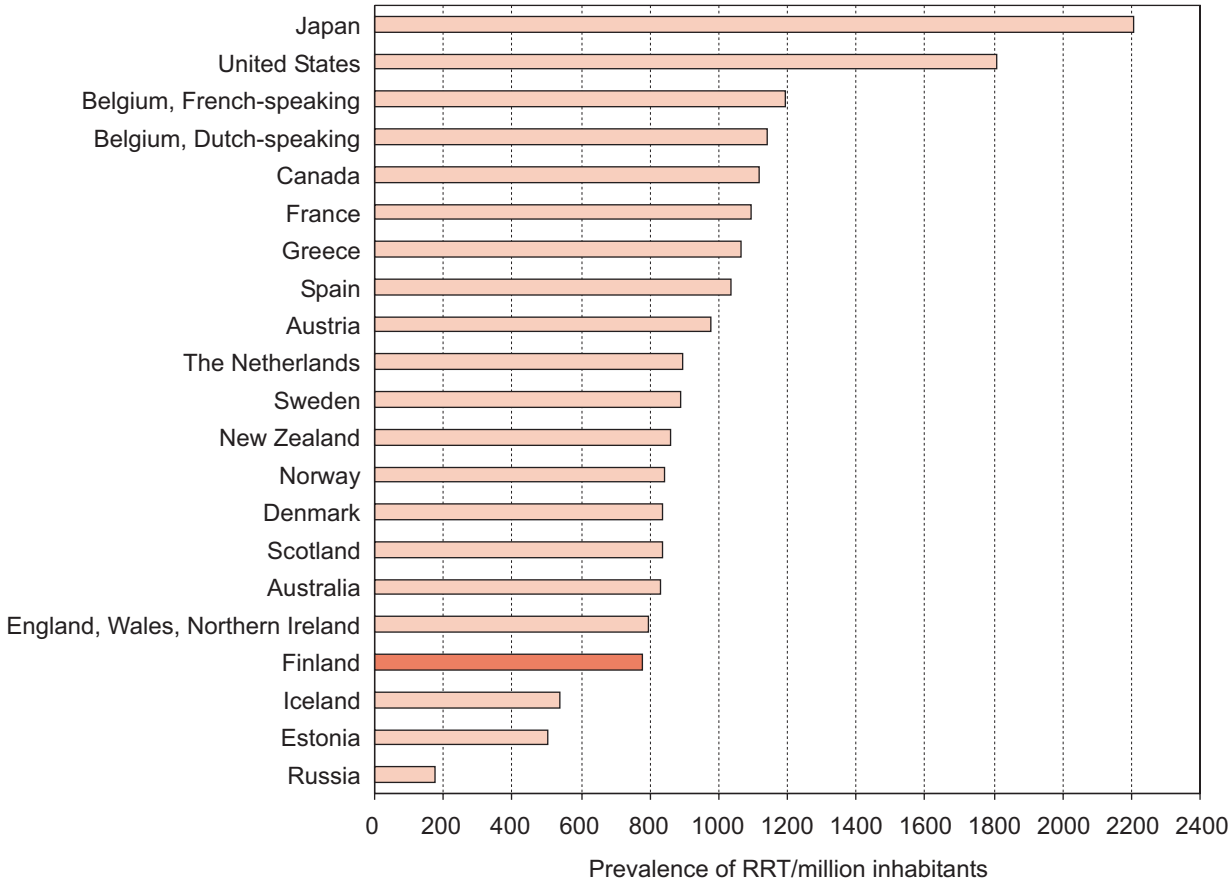


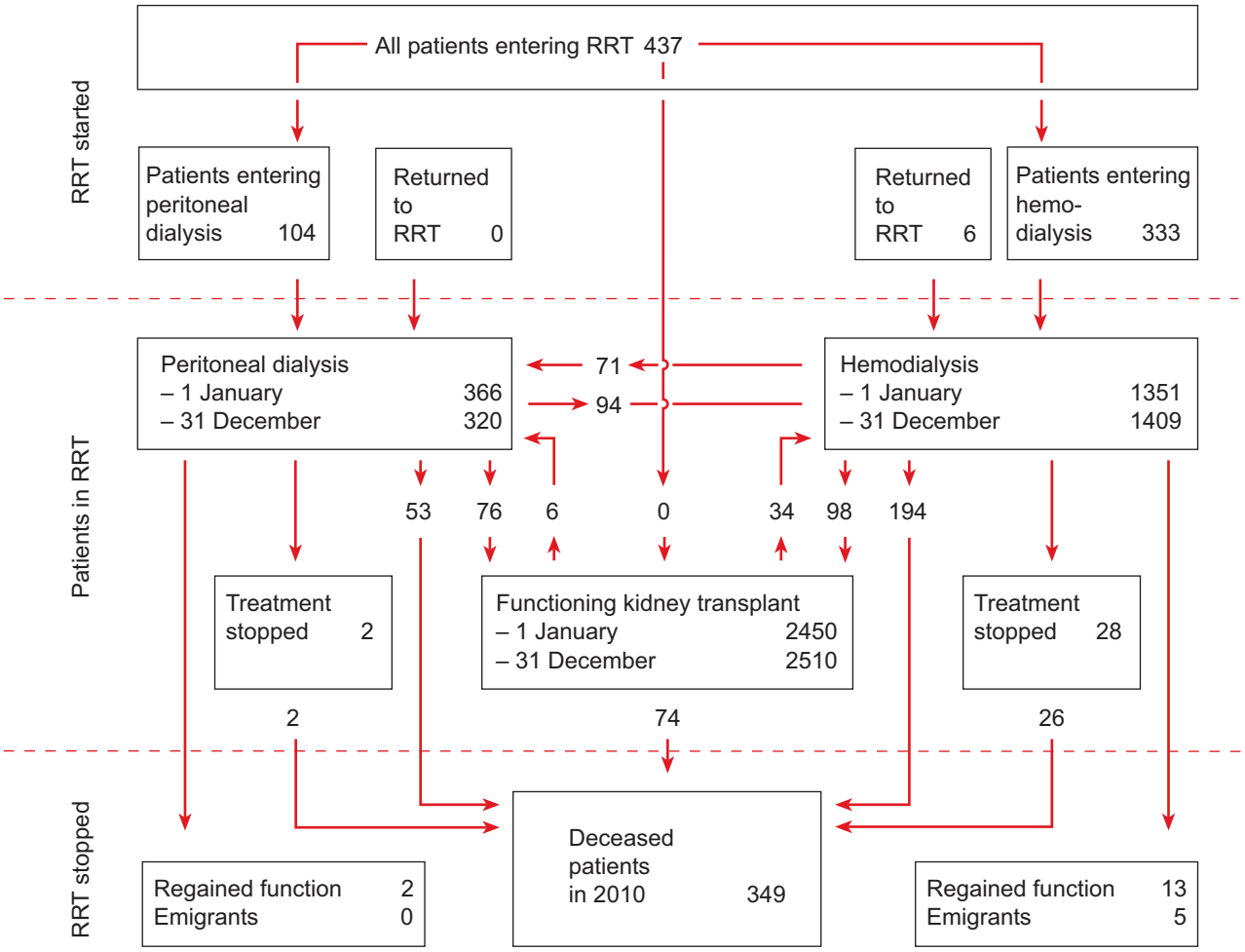
Figure 13 displays the prevalence of RRT on 31 December 2009 in countries reporting to the ERA-EDTA Registry (Annual Report 2009, http://www.era-edta-reg.org) and in the United States, Canada, Australia, New Zealand, and Japan (The 2011 USRDS Annual Data Report Atlas, http://www.usrds.org). The prevalence rate in Finland was the fourth lowest internationally and the second lowest in the Nordic countries. Relative to Finland, the prevalence in Sweden was 14% higher, in Norway 8% higher, and in Denmark 7% higher. Figure 8 shows the international incidence rates.

Table 7. Number of patient-years of all RRT patients according to diagnosis and type of treatment. Finnish Registry for Kidney Diseases 2000–2010

Diagnosis	Number of patient-years in 2000 (%)				Number of patient-years in 2010 (%)			
	Peritoneal dialysis	Hemo-dialysis	Trans-plantation	Total	Peritoneal dialysis	Hemo-dialysis	Trans-plantation	Total
Glomerulonephritis	51 (18.2)	159 (18.1)	544 (30.6)	753 (25.7)	66 (19.1)	210 (15.2)	656 (26.5)	933 (22.2)
Type 1 diabetes	68 (24.3)	91 (10.4)	350 (19.7)	509 (17.3)	87 (25.1)	145 (10.5)	466 (18.8)	698 (16.6)
Polycystic degeneration	21 (7.4)	92 (10.5)	247 (13.9)	360 (12.3)	20 (5.8)	124 (9.0)	417 (16.8)	561 (13.3)
Undefined kidney disease	20 (7.2)	77 (8.8)	43 (2.4)	141 (4.8)	46 (13.1)	234 (16.9)	116 (4.7)	395 (9.4)
Type 2 diabetes	28 (10.1)	150 (17.1)	19 (1.1)	197 (6.7)	54 (15.5)	277 (20.0)	63 (2.5)	394 (9.4)
Pyelonephritis	17 (5.9)	47 (5.4)	194 (10.9)	258 (8.8)	7 (2.1)	57 (4.1)	199 (8.1)	263 (6.3)
Other systemic diseases	9 (3.4)	35 (4.0)	53 (3.0)	97 (3.3)	13 (3.9)	60 (4.3)	89 (3.6)	162 (3.8)
Nephrosclerosis	17 (6.0)	55 (6.3)	35 (2.0)	107 (3.6)	20 (5.9)	79 (5.7)	56 (2.3)	155 (3.7)
Urinary tract obstruction	7 (2.7)	23 (2.6)	70 (3.9)	100 (3.4)	8 (2.3)	48 (3.5)	93 (3.8)	149 (3.5)
Congenital diseases	6 (2.2)	9 (1.0)	77 (4.3)	92 (3.2)	5 (1.4)	18 (1.3)	99 (4.0)	123 (2.9)
Other kidney diseases	14 (4.9)	27 (3.1)	16 (0.9)	57 (1.9)	6 (1.9)	32 (2.3)	54 (2.2)	93 (2.2)
Amyloidosis	9 (3.3)	76 (8.6)	42 (2.4)	127 (4.3)	6 (1.9)	42 (3.0)	37 (1.5)	85 (2.0)
Congenital nephrosis, Finnish type	5 (1.9)	0 (0.1)	46 (2.6)	52 (1.8)	2 (0.6)	6 (0.4)	70 (2.8)	78 (1.9)
Tubulointerstitial nephritis	4 (1.6)	15 (1.7)	33 (1.8)	52 (1.8)	0.5 (0.1)	13 (0.9)	39 (1.6)	53 (1.3)
Malignancies	2 (0.8)	18 (2.0)	1 (0.1)	21 (0.7)	2 (0.6)	33 (2.4)	8 (0.3)	43 (1.0)
Metabolic diseases	0.4 (0.2)	4 (0.4)	6 (0.4)	10 (0.4)	3 (0.9)	6 (0.5)	12 (0.5)	22 (0.5)
All	279 (100)	877 (100)	1776 (100)	2933 (100)	347 (100)	1384 (100)	2475 (100)	4206 (100)

Table 7 presents the number of patient-years according to diagnosis of kidney disease and type of treatment in 2000 and 2010. The number of patient-years indicates time spent by patients in RRT during the year. Overall, the number of patient-years has increased by 43% since 2000. The number of patient-years has increased the most (58%) in hemodialysis. Glomerulonephritis is the most common diagnosis among all RRT patients and kidney transplantation patients, and the proportion of patient-years due to glomerulonephritis was 22% in 2010. Type 1 diabetes is the second most common diagnosis among all RRT patients and the most common diagnosis among peritoneal dialysis patients. The number of patient-years due to type 2 diabetes has doubled during the past decade, and in 2010, type 2 diabetes was the most common kidney disease diagnosis among hemodialysis patients. Among kidney transplantation patients, type 2 diabetes is a rare cause of end-stage renal disease. The proportion of patient-years due to "undefined kidney disease" has increased. Amyloidosis is the only diagnosis for which the number of patient-years has decreased since 2000.

Figure 14. Net changes in type of treatment.
Finnish Registry for Kidney Diseases 2010



During 2010, 437 new patients entered RRT (Figure 14), and six patients returned to RRT. In all, 4167 patients were receiving RRT at the beginning of the year. Altogether 349 patients died and dialysis was discontinued for 15 patients because the patients' own kidney function resumed. Of those who died, 74 had a functioning transplant, 53 were receiving peritoneal dialysis, and 194 were on hemodialysis. RRT was discontinued for 30 uremic patients, and the treatment of two patients who died in 2010 had been discontinued in 2009. Four patients whose treatment was discontinued in 2010 died at the beginning of 2011. A total of 175 patients received a kidney transplant. Two of these patients received a combined liver and kidney transplantation and two received a combined pancreas and kidney transplantation (source: Kidney Transplantation Unit, Helsinki University Central Hospital).

Table 8. Mortality of RRT patients by region.
Finnish Registry for Kidney Diseases 2000–2010

Region	Deaths/1000 patient-years						Deaths/1000 patient-years[1)]					
	2000	2005	2008	2009	2010	2006–2010	2000	2005	2008	2009	2010	2006–2010
South	87	81	76	80	69	78	80	79	76	77	68	75
Southwest	94	113	81	72	73	78	90	111	77	72	72	77
West	111	91	93	98	96	103	101	89	92	93	91	98
East	114	101	111	82	98	98	106	99	110	81	95	96
North	90	101	110	86	88	98	87	99	106	86	88	97
Entire country	98	94	91	84	83	89	91	92	89	82	81	87

[1)]patients who died within 90 days of start of RRT excluded

Figure 15. Standardized mortality of RRT patients by region.
Finnish Registry for Kidney Diseases 2000–2010

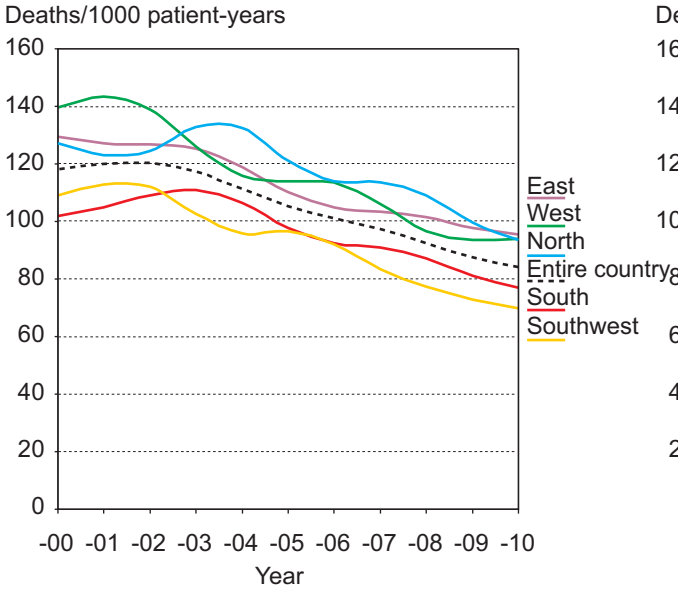


Figure 16. Standardized mortality of RRT patients by region (patients who died within 90 days of start of RRT excluded).
Finnish Registry for Kidney Diseases 2000–2010

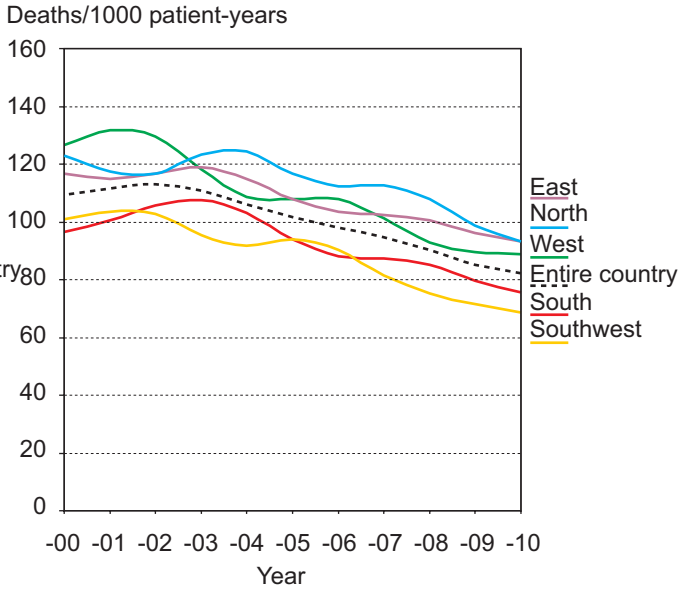


Table 8 shows RRT patient mortality in 2000–2010 according to region. The mortality of patients who have been on RRT for at least 90 days is presented separately. The average mortality in 2006–2010 was lower in the southwestern and southern regions than elsewhere.

Figures 15 and 16 show regional mortality as smoothed averages. The regional mortality rates for 2000–2010 have been age- and gender-standardized using all patient-years in 2010 as the reference. Changes in age and gender distribution during this ten-year period have been taken into consideration. Patients who died within 90 days of the start of RRT were excluded from Figure 16. The standardized mortality rate has decreased in all regions over the past ten years.

Figure 17. Projected annual number of new RRT patients.
Finnish Registry for Kidney Diseases 1990–2010

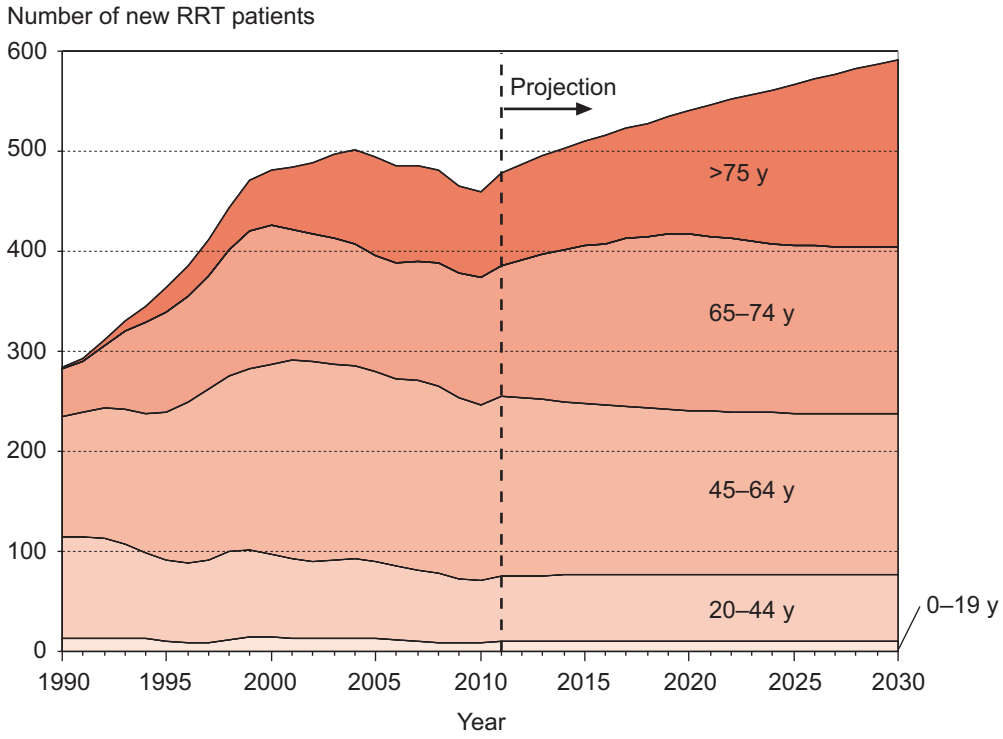


Figure 17 shows the projected yearly number of patients entering RRT until the year 2030. The projection is based on the assumption that the average incidence of RRT in 2006–2010 will remain unchanged in age and gender groups. The population projection of Statistics Finland was taken into account.

The incidence of RRT increased rapidly in the 1990s, approximately 5% per year. The increase occurred especially among those aged 65 years or older. After 2000, the increase in incidence slowed down, and in recent years the incidence has decreased. In 2006–2010, an average of 469 new patients entered RRT annually. According to the projection, the number of patients entering RRT in 2030 will be 592. The proportion of new patients older than 75 years is forecasted to increase from 19% in 2010 to 32% in 2030.

If age- and gender-specific incidence of RRT does not remain unchanged, but increases by, for instance, 1% annually, the number of new RRT patients in 2030 will be 722. On the other hand, if the incidence decreases by 1% annually, the number of new RRT patients in 2030 will be 484, i.e. similar to the current situation.

According to the projection of Statistics Finland, there will be 5.85 million inhabitants in Finland in 2030. The number of inhabitants older than 75 years will increase by 94% and that of 65–74-year-olds by 34%, whereas the number of 45–64-year-olds will decrease by 11%. The number of inhabitants younger than 45 years will remain almost unchanged.

Figure 18. Projected number of dialysis patients according to age group. Finnish Registry for Kidney Diseases 1990–2010

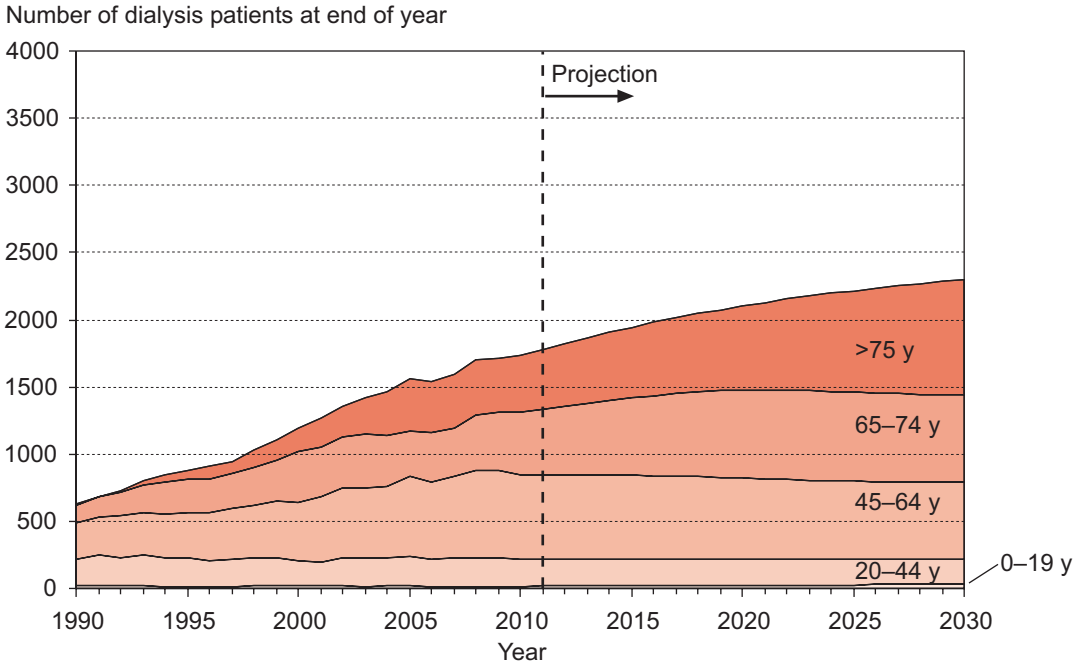
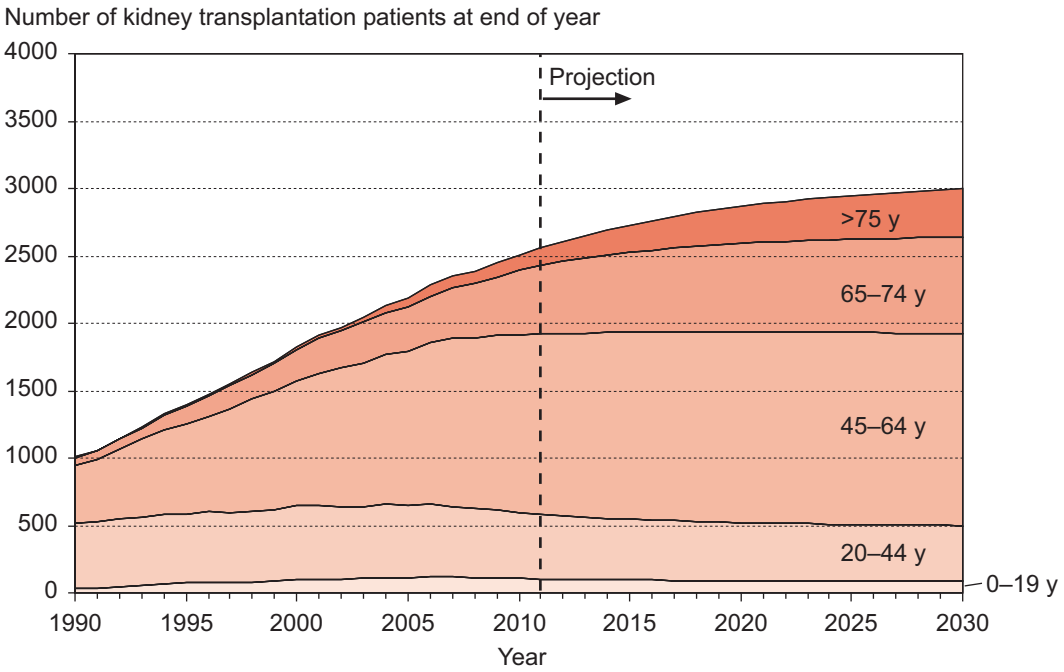


Figure 19. Projected number of kidney transplantation patients according to age group. Finnish Registry for Kidney Diseases 1990–2010



Figures 18 and 19 present the projected numbers of prevalent dialysis and kidney transplantation patients until the year 2030. The population projection of Statistics Finland was taken into account. The following assumptions were made: 1) the average incidence in 2010 will remain unchanged in age and gender groups, 2) dialysis and kidney transplantation patients' average mortality in 2006–2010 will remain unchanged in age and gender groups, 3) the average annual number of kidney transplantations in 2006–2010 (n=176) will remain unchanged and the risk of graft loss will remain unchanged in age and gender groups.

According to the projection, in 2030 there will be 5301 patients on RRT in Finland, 57% of whom will have a functioning kidney graft. The number of dialysis patients will be 33% larger and the number of kidney transplantation patients 19% larger than in 2010.

Figure 20. Projected number of dialysis patients if the number of kidney transplantations rises. Finnish Registry for Kidney Diseases 1990–2010

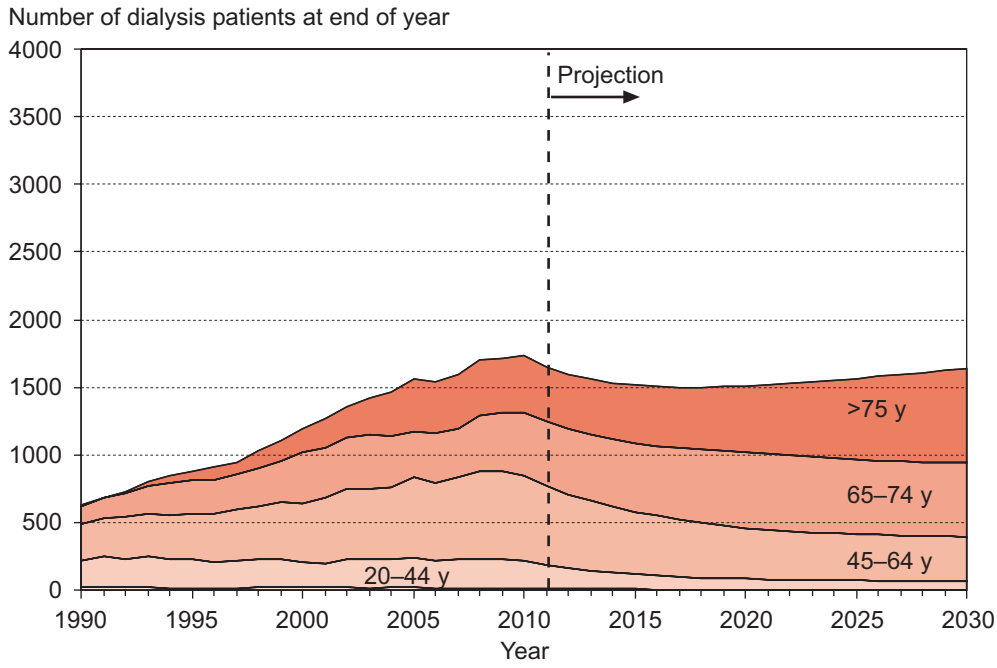
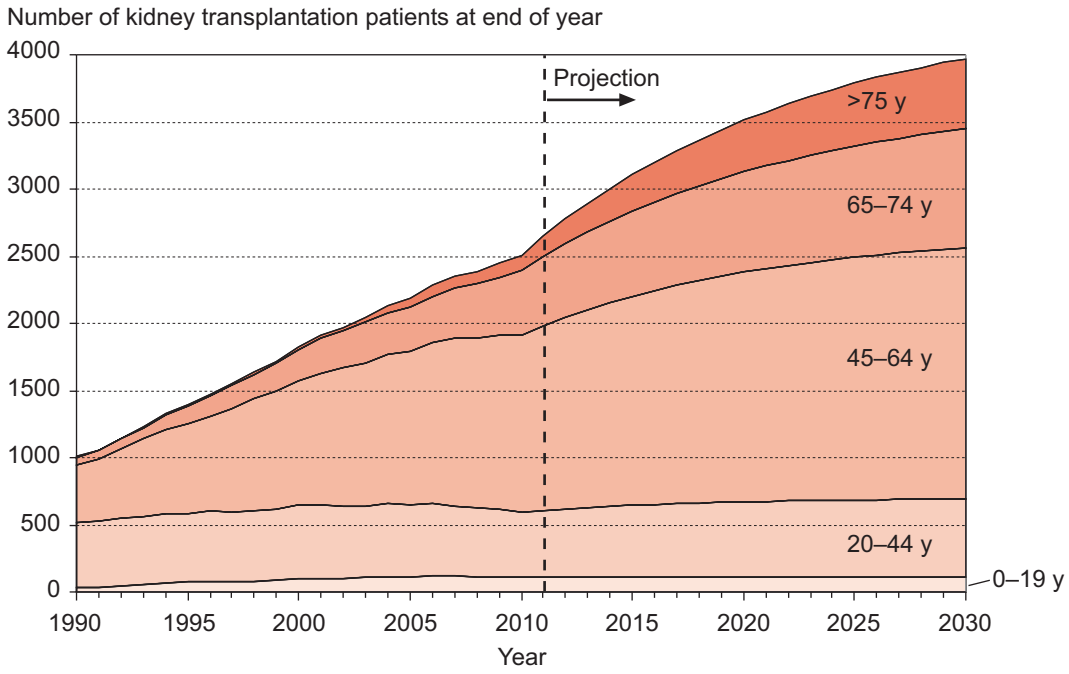


Figure 21. Projected number of kidney transplantation patients if the number of kidney transplantations rises. Finnish Registry for Kidney Diseases 1990–2010



In 2009, a total of 175 kidney transplantations were performed in Finland, which equals 33 kidney transplantations per million inhabitants. The corresponding number in Sweden was 42, in Denmark 40, in Norway 60, and in the Netherlands 50. In various regions of Spain, the number ranged from 35 to 78 transplantations per million inhabitants.

Figures 20 and 21 show the projected numbers of prevalent dialysis and kidney transplantation patients assuming that the number of kidney transplantations in Finland is 50 per million inhabitants, i.e. 269 kidney transplantations annually. If the number of kidney transplantations is greater, patients with a worse prognosis would be selected to this treatment, and the mortality among kidney transplantation patients would probably increase. Due to selection, the mortality of dialysis patients would also increase. Because of this, in the projection model the mortality among both dialysis and kidney transplantation patients was assumed to be 10% greater than in 2006–2010. A further assumption was that dialysis patients would have a nine times higher probability than currently of receiving a kidney transplant, meaning 20 kidney transplantations annually in this age group. All other assumptions are the same as on page 24.

According to this model, in 2030 there will be 5607 patients on RRT, 71% of whom will have a functioning kidney graft. The number of dialysis patients will be 5% smaller and the number of kidney transplantation patients 58% larger than in 2010.

Figure 22. Projected number of dialysis patients if mortality continues to decrease. Finnish Registry for Kidney Diseases 1990–2010

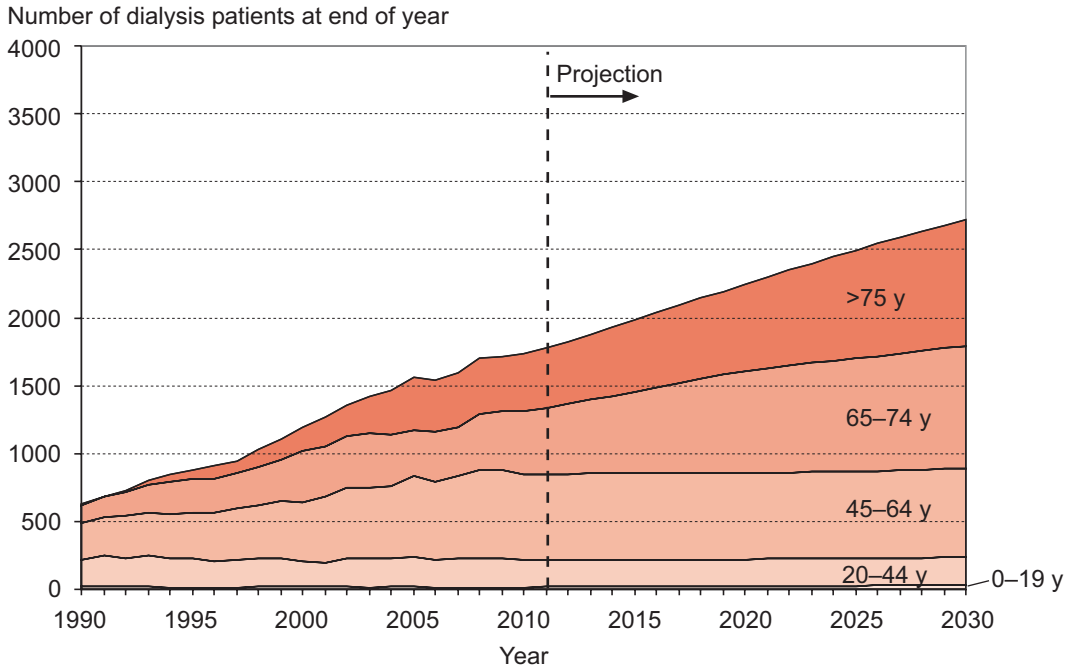
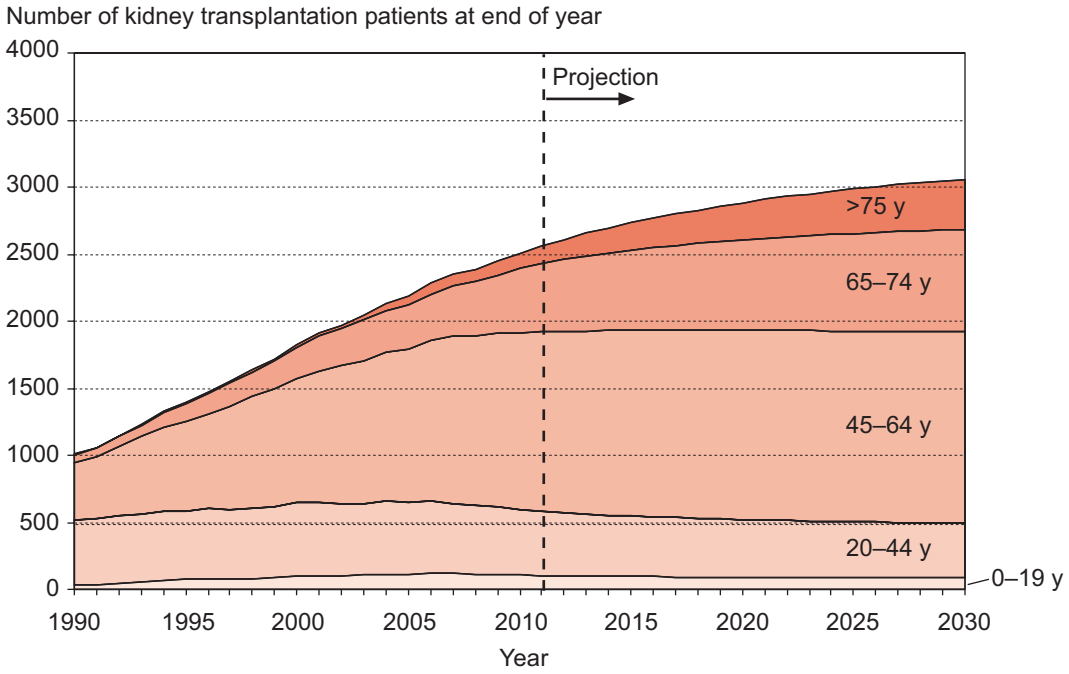


Figure 23. Projected number of kidney transplantation patients if mortality continues to decrease. Finnish Registry for Kidney Diseases 1990–2010



In 2001–2010, the mortality of RRT patients, especially the age-adjusted mortality of dialysis patients, decreased markedly (see page 22).

Figures 22 and 23 show the projected number of dialysis and kidney transplantation patients up to the year 2030. The age- and gender-adjusted mortality of dialysis and kidney transplantation patients aged under 75 years was assumed to decrease, but 50% slower than in 2001–2010. The mortality of patients older than 75 years was assumed to remain unchanged. Other assumptions are the same as on page 24.

According to this model, in 2030 there will be 5783 patients on RRT, 53% of whom will have a functioning kidney graft. The number of dialysis patients will be 58% larger and the number of kidney transplantation patients 22% larger than in 2010.

Table 9. Survey of healthcare districts on dialysis capacity.
Finnish Registry for Kidney Diseases 2010

Healthcare district		Results of survey			Number of patients on 31 December 2010			
		Number of dialysis centers	Number of dialysis stations	HD capacity	HD	Peritoneal dialysis, home-HD	Trans-plan-tation	Proportion of home dialysis (%)
1	Helsinki-Uusimaa	9	118	380 ~	311	111	700	26
3	Varsinais-Suomi	4	50	144 ~	108	40	250	27
4	Satakunta	2	25	82 ~	63	32	141	34
5	Kanta-Häme	2	34	96 ~	57	16	61	22
6	Pirkanmaa	11	59	174 +	147	23	231	14
7	Päijät-Häme	1	29	87 ~	59	13	106	18
8	Kymenlaakso	1	16	58 +	55	21	67	28
9	Etelä-Karjala	2	23	70 ~	64	5	77	7
10	Etelä-Savo	1	9	36 ~	32	3	53	9
11	Itä-Savo	1	8	32 +	21	1	27	5
12	Pohjois-Karjala	2	12	42 +	39	15	81	28
13	Pohjois-Savo	3	36	108 +	70	16	135	19
14	Keski-Suomi	4	27	78 +	53	20	109	27
15	Etelä-Pohjanmaa	1	14	56 +	40	10	70	20
16	Vaasa	3	16	42 ~	32	13	72	29
17	Keski-Pohjanmaa	1	12	32 ~	23	6	29	21
18	Pohjois-Pohjanmaa	5	42	130 ~	90	25	174	22
19	Kainuu	2	11	25 ~	19	6	37	24
20	Länsi-Pohja	1	10	40 ~	27	5	30	16
21	Lappi	1	6	18 +	14	11	49	44
22	Åland	1	5	20 ~	13	0	11	0
Region	South	12	157	508	430	137	844	24
	Southwest	7	80	246	184	72	402	28
	West	18	152	455	335	75	540	18
	East	11	92	296	215	55	405	20
	North	10	81	245	173	53	319	23
Entire country		58	562	1750	1337	392	2510	23

~ = No changes in hemodialysis (HD) capacity are planned.
+ = More HD capacity is needed or planned

A survey was distributed to healthcare districts' leading nephrologists in November 2011. The aim was to get an estimate of the dialysis capacity in the healthcare districts. All healthcare districts responded to the survey. The results are presented in Table 9. A total of 58 centers provide hemodialysis therapy in Finland. Altogether, these centers have 562 dialysis stations, used in 1–4 shifts. Dialysis capacity is estimated by multiplying the number of dialysis stations by the number of shifts. The nation-wide in-center hemodialysis capacity is 1750 patients.

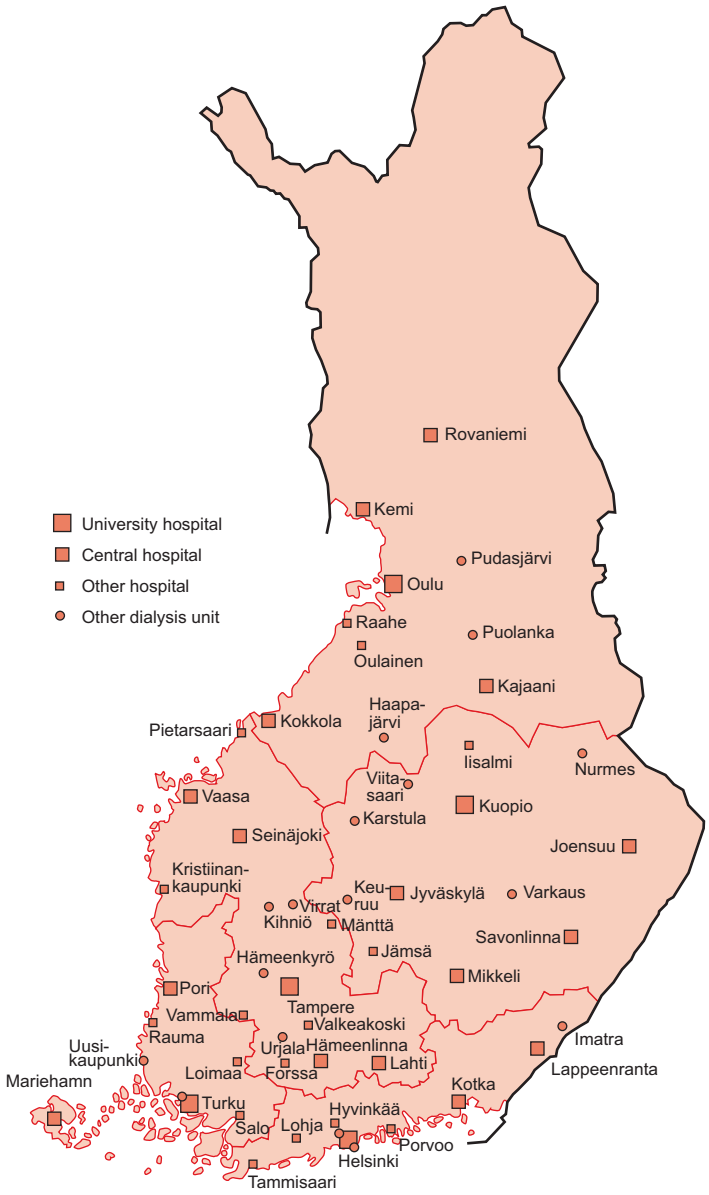
Nocturnal chronic in-center hemodialysis is not performed at any center. Eight healthcare districts have planned to increase the number of dialysis stations; in the other healthcare districts, no change is planned.

At the end of 2010, the proportion of home dialysis patients of all dialysis patients was 23%, the proportion varying significantly between healthcare districts. The majority of the healthcare districts noted that peritoneal dialysis or home hemodialysis are the primary dialysis therapy choices. Five healthcare districts indicated that they attempted to increase the proportion of patients in home dialysis. Two healthcare districts identified lack of resources as an obstacle to increasing the proportion of home dialysis patients.

1. How many centers in your healthcare district perform hemodialysis?
2. How many dialysis stations are there in each center?
3. How many shifts (e.g. 4 shifts if the dialysis stations are in use in morning and evening shifts six days a week) of dialysis are performed at each center?
4. Is nocturnal in-center hemodialysis used for chronic dialysis patients in your healthcare district?
5. Do you plan to increase/decrease the number of dialysis stations or is the need for dialysis stable?
6. In Finland, peritoneal dialysis is the first type of treatment in 26% of RRT patients, but the proportion varies between 0% and 61% between healthcare districts. In 2006–2010, this proportion was X in your healthcare district. Please comment on this proportion and your policy in selecting the type of treatment.

Finnish Registry for Kidney Diseases

Report 2010



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