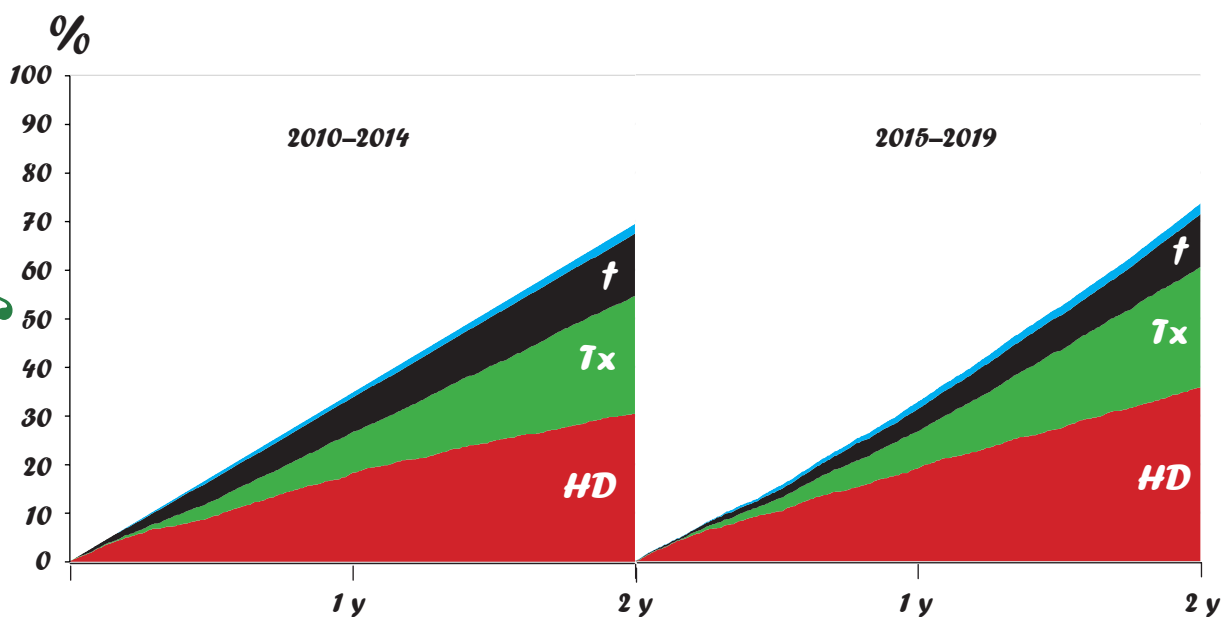


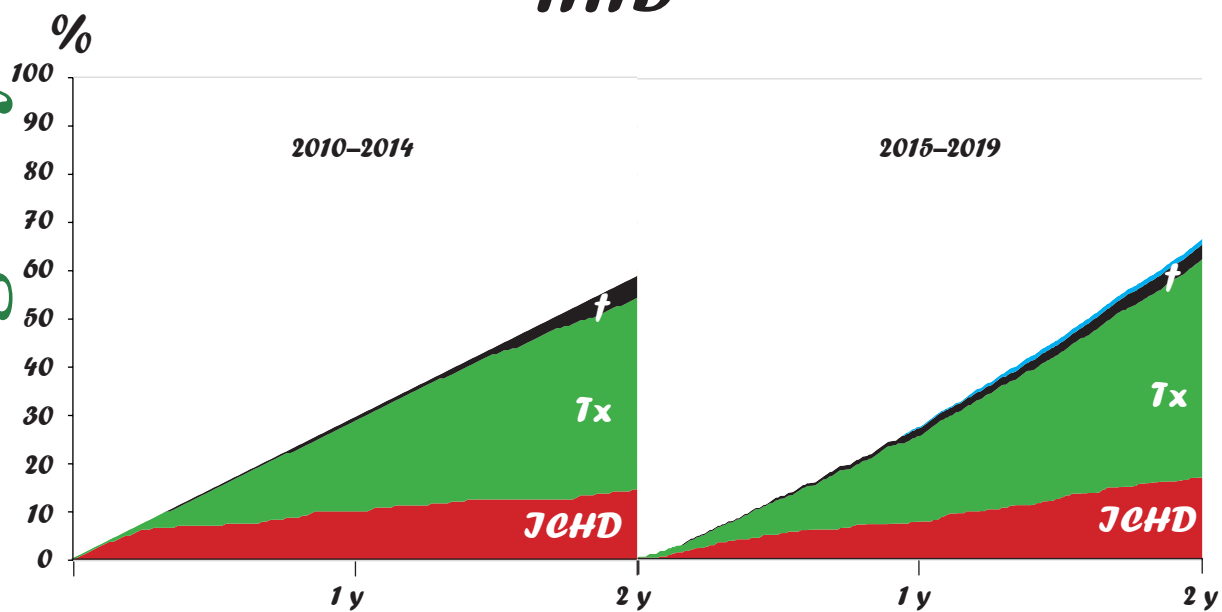
# Report 2019

## Finnish Registry for Kidney Diseases

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# Finnish Registry for Kidney Diseases – Report 2019

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## *Finnish Registry for Kidney Diseases 2019*

The Finnish Registry for Kidney Diseases is one of the oldest national health registers in Finland. It has collected data on virtually all chronic kidney failure patients who have been on dialysis or who have received a kidney transplant in Finland since 1964. Since the early 1990s, the registry has published an annual report that summarizes key data on patients who have started or are currently on renal replacement therapy (RRT). Since 2012, the annual report has published information on quality of care indicators by healthcare region and district. Monitoring the quality of care is becoming increasingly important and new quality registers are constantly being developed. Nationally comprehensive quality registries are the only way to ensure equal treatment of patients and enable the quality of care to be further developed as problem areas are identified and addressed.

Report 2019 shows that the number of patients on RRT continues to increase steadily. At the end of 2019, there were 1987 patients on dialysis and 3203 patients had a functioning kidney transplant, an increase of 20% in ten years, translating to a total of 939 patients per million inhabitants. In 2019, altogether 530 patients started RRT, which is the same level as in previous years. There were 293 kidney transplantations, a record number, and 24 of these were operated without preceding dialysis treatment. On 1 September 2018, it became possible to waitlist patients for kidney transplantation before start of dialysis. In 2019, 7% of those who started RRT had been waitlisted before start of dialysis. However, within 180 days after initiating RRT, the proportion of waitlisted patients remained unchanged at 18%. During 2019 the number of peritoneal dialysis patients decreased by 17% and the number of home hemodialysis patients by 10%. This was due to an increase in the number of kidney transplantations and a decrease in the number of patients starting home dialysis.

The previous year has been exceptional for the Finnish Registry for Kidney Diseases. Jaakko Helve was elected as the Administrative Director of the register in the spring, and Professor Patrik Finne, who has run the register for more than 20 years, will continue on the board of the registry and as a consultant. Information on the possible legal status of the register has been pending for a long time. The funding of future statutory registries remains unclear. The Finnish Registry for Kidney Diseases received a further funding from the Funding Centre for Social Welfare and Health Organizations (STEA), which will enable it to continue its operations unchanged for the coming year. The Covid-19 pandemic has put a significant strain on all healthcare in 2020. The Finnish Registry for Kidney Diseases began collecting data on Covid-19-infected RRT patients as soon as the epidemic spread to Finland in March, and information on the development of the situation has since been distributed regularly. Despite the difficult year, the nephrology units reported information on RRT patients to the register as before. We thank all partners for fruitful cooperation!

Jaakko Helve  
Administrative Director

Patrik Finne  
Consultant

Per-Henrik Groop  
Chairman of the Board

## Summary of Report

### Finnish population (pages 9–10)

The Finnish population increased by 3.2% in 2009–2019. The population has grown in seven healthcare districts, most in Helsinki-Uusimaa, Åland, and Pirkanmaa, and the population has decreased in 14 healthcare districts, most in Itä-Savo, Kainuu, and Länsi-Pohja. The proportion of inhabitants older than 65 years has increased in all healthcare districts in 2009–2019. In 2019, the proportion of inhabitants under the age of 20 years was highest in the northern region (24%), inhabitants aged 20–64 years in the southern region (60%), and inhabitants over 75 years in the eastern and southwestern regions (11%).

### Incidence of RRT, number of patients entering RRT (pages 11–17)

In 2019, the incidence of RRT was 96 patients per million inhabitants. Age- and sex-standardized incidence increased in 2013–2016 and decreased thereafter. Variation between regions has been small, although in 2019 the incidence increased in the northern region and decreased in the eastern region more than in the other regions. Significant variation has emerged in the incidence of RRT between healthcare districts in 2015–2019, ranging from 73 patients per year per million inhabitants in Lappi to 141 in Keski-Pohjanmaa. The difference is explained at least partly by differences in the age structure of the population. The number of new RRT patients has been higher than previously during the last years, with the increase being greatest in the age group over 65 years. Of new RRT patients, the incidence of RRT is the highest in the age group 65–74 years. In contrast to other regions, the incidence of RRT in the southern region was the highest in the age group over 75 years. The incidence of RRT in Finland is still low in an international comparison.

In 2019, the most common kidney disease diagnosis of patients entering RRT was type 2 diabetes, as in the last 20 years. Glomerulonephritis was the second most common kidney disease diagnosis. The incidence of type 1 diabetes has decreased, being

the third most common diagnosis. The incidence of polycystic degeneration and nephrosclerosis has increased in this millennium, while the incidence of amyloidosis and tubulointerstitial nephritis has decreased. In 2019, three months after the start of RRT, one-fourth of the patients were on home dialysis (peritoneal dialysis or home hemodialysis); this proportion has diminished. The proportion of patients receiving pre-emptive kidney transplantation has increased to 5%. The proportion of home dialysis varied between 0% and 45% in healthcare districts, but the variation was smaller between regions.

### Prevalence of RRT, number of patients at end of year (pages 18–25)

At the end of 2019, there were 1987 dialysis patients and 3203 kidney transplantation patients in Finland. The number of dialysis patients decreased by 1% and the number of kidney transplantation patients increased by 4% relative to the end of 2018. The prevalence of RRT was 939 per million inhabitants. The prevalence has increased by 20% in ten years, and the rise has taken place in all regions. The prevalence has increased the most in the age group 75 years and over (31%) and the least in the age group 20–44 years (4%). The prevalence ranged from 787 to 1245 patients per million inhabitants in healthcare districts. Of all dialysis patients, 15% were on peritoneal dialysis (PD) and 7% on home hemodialysis (HHD) at the end of 2019. Compared with the end of 2018, the proportion of home dialysis (PD and HHD) has decreased from 26% to 22%. In the healthcare districts, the proportion of home dialysis varied from 0% to 46%. The most frequent kidney disease diagnosis of kidney transplantation patients was glomerulonephritis, and the number of patient-years of patients with type 2 diabetes and kidney transplantation has increased by 79% during the last ten years. The most frequent kidney disease diagnosis of hemodialysis patients was type 2 diabetes and of peritoneal dialysis patients type 1 diabetes.

### Changes in type of treatment (page 26)

In 2019, altogether 530 new patients started RRT, 423 patients died, and dialysis was discontinued in 12 patients after recovery of kidney function. Treatment was terminated in 89 patients, most of whom had been on hemodialysis (83 patients). During the year 293 patients received a kidney transplant, which is more than ever before. The number of in-center hemodialysis and kidney transplantation patients increased by 4%. The number of peritoneal dialysis patients decreased by 17%, and the number of home hemodialysis patients decreased by 10%.

### RRT patients' mortality (page 27)

In 2019, the mortality of RRT patients was 81 deaths per 1000 patient-years. During the past ten years age- and sex-standardized mortality has decreased.

### Quality of care (pages 28–38)

Since Report 2012, analyses of quality of care have been presented openly according to healthcare district and region. The most central analyses are repeated in each annual report.

At the end of 2019, 81% of dialysis patients reached a hemoglobin concentration  $\geq 100$  g/l, but the proportion of patients with a hemoglobin concentration  $< 100$  g/l has increased in ten years from 11% to 19%. No temporal changes have occurred in serum phosphorus concentrations, nor have significant differences emerged between healthcare districts and regions in the treatment of hyperphosphatemia. In 2019, the proportion of fistula or graft for vascular access in new hemodialysis patients was 47%, and the proportion varied significantly between healthcare districts and regions. In all patients on hemodialysis, the proportion of catheters has increased steadily over the past decade, reaching 17% at the end of 2019, but the proportion varied between healthcare districts and regions. Of patients on hemodialysis, the proportion reaching therapeutic goals in blood pressure management of  $< 140/90$  mmHg has decreased during the last years. The proportion of kidney transplant patients reaching the blood pressure target level of  $< 130/80$  mmHg has increased gradually, but was still only 21%. In 2019, 68% of the kidney transplant pa-

tients reached a target serum LDL cholesterol level of  $< 2.6$  mmol/l, but the proportion varied significantly between healthcare districts and regions. In 2019, 7% of the patients were waitlisted for kidney transplantation at the beginning of RRT. The proportion has increased significantly from previous years, and there were no regional differences. However, the proportion of those who were waitlisted within 180 days after start of RRT was unchanged compared with previous years. Younger patients were waitlisted faster than older patients. Within 90 days of start of RRT, 10% of patients had been waitlisted, and the proportion varied significantly by region (8–13%). The proportion of patients on dialysis for less than six months before the first kidney transplantation increased between 2011 and 2016, but has since decreased, being 14% in 2019.

### Changes in home dialysis patients (pages 39–42)

The proportion of dialysis patients on peritoneal dialysis decreased markedly in those under 65 years between 2009 and 2019, while in the elderly the proportion remained stable. The proportion of home hemodialysis patients increased in all age groups. In recent years, the number of APD patients has declined. This is due to a decrease in the number of new patients starting peritoneal dialysis, an increase in the number of kidney transplantations, and a change to hemodialysis. The number of home hemodialysis patients increased 2.5-fold in 2009–2018, but decreased by 10% in 2018–2019. The number of patients starting home hemodialysis has remained stable in recent years. Kidney transplantation is the most common reason for discontinuing home hemodialysis. The increase in both the number of kidney transplants and the transition to in-center hemodialysis and the decrease in the number of patients starting home hemodialysis were behind the decrease in the proportion of dialysis patients on home hemodialysis in 2019. Two years after starting home dialysis, the proportion of patients still on this treatment modality declined when patients who started home dialysis in 2010–2014 and 2015–2019 were compared. This was due to an increased proportion of patients changing to another dialysis modality or receiving a kidney transplant.



Table 1. The Finnish population (as thousands of inhabitants) and its distribution in healthcare districts  
Finnish Registry for Kidney Diseases 2009–2019

Healthcare district		Year					Change (%) 2009–2019
		2009	2014	2017	2018	2019	
1	Helsinki-Uusimaa	1514	1599	1652	1667	1686	11,4
3	Varsinais-Suomi	466	476	481	481	482	3,4
4	Satakunta	226	224	220	219	217	-4,1
5	Kanta-Häme	174	175	173	171	171	-1,7
6	Pirkanmaa	508	524	532	535	537	5,8
7	Päijät-Häme	212	213	212	211	210	-1,1
8	Kymenlaakso	176	173	169	167	164	-6,3
9	Etelä-Karjala	133	132	130	129	128	-4,1
10	Etelä-Savo	107	104	102	100	99	-7,2
11	Itä-Savo	46	44	42	41	40	-12,2
12	Pohjois-Karjala	170	169	166	166	164	-3,2
13	Pohjois-Savo	248	248	247	246	244	-1,6
14	Keski-Suomi	247	251	253	253	253	2,2
15	Etelä-Pohjanmaa	198	198	196	194	193	-2,7
16	Vaasa	165	170	170	170	169	2,5
17	Keski-Pohjanmaa	78	78	78	78	77	-0,7
18	Pohjois-Pohjanmaa	392	406	409	409	410	4,5
19	Kainuu	79	76	74	73	72	-8,7
20	Länsi-Pohja	65	64	62	61	60	-7,8
21	Lappi	118	118	117	117	117	-1,3
22	Åland	28	29	29	30	30	7,8
Region South		1822	1904	1950	1963	1978	8,6
Southwest		885	898	900	900	898	1,4
West		1093	1111	1113	1112	1111	1,7
East		818	816	810	805	800	-2,1
North		733	742	740	739	737	0,5
Entire country		5351	5472	5513	5518	5525	3,2

Figure 1. Healthcare districts and regions in Finland  
Finnish Registry for Kidney Diseases 2019

On 31 December 2019, the population of Finland was 5.525 million (Table 1, Source: Statistics Finland). During the past ten years the population of the country has increased by 3.2%, with the fastest increase occurring in the southern region. The population in the eastern region has decreased. Of the healthcare districts, the population has increased most (more than 5%) in Helsinki-Uusimaa, Åland, and Pirkanmaa. In the healthcare districts of Itä-Savo, Kainuu, Länsi-Pohja, Etelä-Savo, and Kymenlaakso, 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.

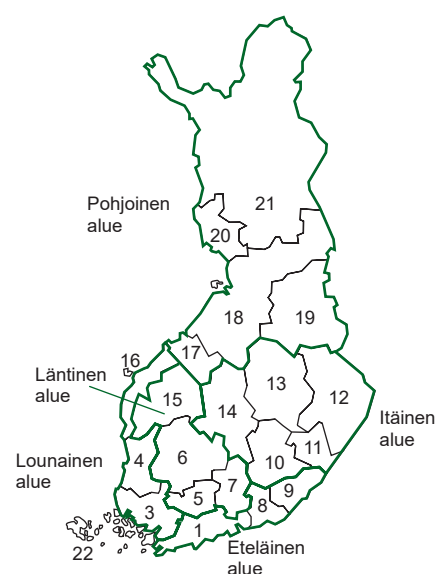


Table 2. The Finnish population (as thousands of inhabitants) according to region, age group, and sex  
Finnish Registry for Kidney Diseases 2009–2019

Region	2009					2019				
	0– 19 y (%)	20– 64 y (%)	65– 74 y (%)	≥75 y (%)	Total	0– 19 y (%)	20– 64 y (%)	65– 74 y (%)	≥75 y (%)	Total
South										
Men	211 (24)	565 (64)	67 (8)	41 (5)	884 (100)	214 (22)	593 (61)	100 (10)	60 (6)	968 (100)
Women	204 (22)	575 (61)	81 (9)	78 (8)	938 (100)	205 (20)	587 (58)	120 (12)	97 (10)	1010 (100)
Total	415 (23)	1140 (63)	148 (8)	119 (7)	1822 (100)	420 (21)	1181 (60)	220 (11)	158 (8)	1978 (100)
Southwest										
Men	101 (23)	264 (61)	40 (9)	29 (7)	434 (100)	94 (21)	253 (57)	58 (13)	38 (9)	444 (100)
Women	95 (21)	259 (57)	45 (10)	52 (11)	451 (100)	90 (20)	244 (54)	64 (14)	57 (13)	454 (100)
Total	196 (22)	523 (59)	86 (10)	81 (9)	885 (100)	184 (20)	497 (55)	122 (14)	95 (11)	898 (100)
West										
Men	126 (24)	328 (61)	48 (9)	33 (6)	536 (100)	119 (22)	312 (57)	72 (13)	45 (8)	548 (100)
Women	121 (22)	318 (57)	56 (10)	62 (11)	557 (100)	113 (20)	300 (53)	80 (14)	70 (12)	563 (100)
Total	247 (23)	646 (59)	104 (9)	96 (9)	1093 (100)	232 (21)	612 (55)	152 (14)	115 (10)	1111 (100)
East										
Men	91 (23)	247 (61)	38 (9)	27 (7)	404 (100)	81 (20)	224 (56)	58 (15)	35 (9)	397 (100)
Women	88 (21)	234 (57)	43 (10)	49 (12)	414 (100)	78 (19)	213 (53)	60 (15)	53 (13)	403 (100)
Total	179 (22)	481 (59)	82 (10)	76 (9)	818 (100)	158 (20)	437 (55)	117 (15)	88 (11)	800 (100)
North										
Men	95 (26)	221 (60)	31 (8)	21 (6)	368 (100)	89 (24)	207 (56)	47 (13)	28 (8)	371 (100)
Women	91 (25)	206 (56)	34 (9)	35 (10)	365 (100)	85 (23)	193 (53)	48 (13)	41 (11)	366 (100)
Total	186 (25)	427 (58)	64 (9)	56 (8)	733 (100)	173 (24)	399 (54)	95 (13)	69 (9)	737 (100)
Entire country										
Men	624 (24)	1625 (62)	224 (9)	152 (6)	2625 (100)	597 (22)	1589 (58)	335 (12)	207 (8)	2728 (100)
Women	599 (22)	1593 (58)	260 (10)	276 (10)	2726 (100)	570 (20)	1537 (55)	372 (13)	318 (11)	2797 (100)
Total	1223 (23)	3218 (60)	483 (9)	427 (8)	5351 (100)	1168 (21)	3126 (57)	707 (13)	525 (9)	5525 (100)

Table 2 shows the age and sex distribution of the Finnish population at the end of 2009 and 2019. The age of the Finnish population has increased during the past ten years. The proportion of inhabitants older than 75 years has increased from 8% to 9%, and the proportion of 65–74-year-olds from 9% to 13%.

At the end of 2019, the proportion of inhabitants older than 65 years was the smallest, 19%, in the southern region, while it was 22–26% in the other regions. During the past ten years the proportion of inhabitants older than 65 years has increased by 35% in the entire country, similarly

in all regions.

The proportion of inhabitants aged 20–64 years was largest in the southern region, 60%, while it was 54–55% in the other regions. The proportion of 20–64-year-olds country-wide has decreased from 60% to 57%.

At the end of 2019, the proportion of inhabitants younger than 20 years was the largest, 24%, in the northern region, and it was 20–21% in the other regions. The number of inhabitants younger than 20 years has decreased by 5% during the past ten years.

Table 3. Number of new RRT patients and incidence of RRT by healthcare district and region  
Finnish Registry for Kidney Diseases 2009–2019

Healthcare district		Number of new RRT patients						Incidence of RRT/million inhabitants					
		2009	2014	2017	2018	2019	2015–2019 on average	2009	2014	2017	2018	2019	2015–2019 on average
1	Helsinki-Uusimaa	108	123	154	144	146	143	71	77	93	86	87	87
3	Varsinais-Suomi	32	49	57	43	44	49	69	103	119	89	91	103
4	Satakunta	25	20	28	23	22	25	111	89	127	105	101	115
5	Kanta-Häme	17	27	22	19	21	21	98	154	127	111	123	123
6	Pirkanmaa	55	51	55	48	62	55	108	97	103	90	115	103
7	Päijät-Häme	14	23	25	11	19	19	66	108	118	52	90	90
8	Kymenlaakso	13	16	9	13	15	14	74	93	53	78	91	83
9	Etelä-Karjala	13	9	14	14	13	16	98	68	108	109	102	122
10	Etelä-Savo	14	8	9	11	6	11	131	77	89	110	61	105
11	Itä-Savo	9	2	6	1	4	4	196	45	142	24	99	105
12	Pohjois-Karjala	15	10	23	26	11	20	88	59	138	157	67	120
13	Pohjois-Savo	25	22	18	29	15	25	101	89	73	118	61	102
14	Keski-Suomi	17	19	25	18	24	23	69	76	99	71	95	91
15	Etelä-Pohjanmaa	16	19	24	17	18	21	81	96	123	87	93	106
16	Vaasa	15	7	23	16	17	19	91	41	136	94	100	110
17	Keski-Pohjanmaa	15	10	8	13	13	11	193	128	102	167	168	141
18	Pohjois-Pohjanmaa	26	30	40	36	43	36	66	74	98	88	105	87
19	Kainuu	5	8	6	8	12	10	63	105	81	109	166	135
20	Länsi-Pohja	6	8	6	10	13	9	92	126	97	163	216	139
21	Lappi	7	6	6	11	10	9	59	51	51	94	86	73
22	Åland	3	0	2	3	2	3	108	0	68	101	67	95
Region South		134	148	177	171	174	173	74	78	91	87	88	89
Southwest		75	76	110	85	85	96	85	85	122	94	95	107
West		102	120	126	95	120	116	93	108	113	85	108	104
East		80	61	81	85	60	83	98	75	100	106	75	103
North		59	62	66	78	91	74	80	84	89	106	123	100
Entire country		450	467	560	514	530	542	84	85	102	93	96	98
Children <15 y		6	11	11	8	5	8	7	12	12	9	6	9

Table 3 shows the number of new RRT (dialysis and kidney transplantation) patients and the incidence of RRT according to healthcare district and region. In 2019, the incidence was 96 new patients per million inhabitants. In 2015–2019, the average incidence was highest in the southwestern region and lowest in the southern region. In the healthcare districts, the average incidence during the same period was lowest in Lapland (73 new RRT patients per million inhabitants) and highest in Keski-Pohjanmaa (141 per million inhabitants).

Table 4. Number of new RRT patients by age group in healthcare districts and regions  
Finnish Registry for Kidney Diseases 2015–2019

Healthcare district		Average annual number of new RRT patients in 2015–2019 by age group (y)						Incidence*/million inhabitants in 2015–2019 by age group (y)					
		0–19	20–44	45–64	65–74	≥75	Total	0–19	20–44	45–64	65–74	≥75	Total
1	Helsinki-Uusimaa	4.0	19.4	50.4	38.6	30.8	143	11	33	121	229	272	87
3	Varsinais-Suomi	1.0	5.2	17.8	16.2	9.2	49	10	35	144	264	196	103
4	Satakunta	0.2	4.2	9.8	7.6	3.6	25	5	71	165	239	142	115
5	Kanta-Häme	0.0	3.4	7.2	5.6	5.0	21	0	72	151	238	282	123
6	Pirkanmaa	1.4	7.0	21.6	16.8	8.2	55	12	40	163	261	166	103
7	Päijät-Häme	0.0	2.2	7.6	6.2	3.0	19	0	38	132	199	133	90
8	Kymenlaakso	0.2	1.2	6.2	3.8	2.6	14	6	27	130	151	133	83
9	Etelä-Karjala	0.0	2.2	5.6	4.6	3.4	16	0	62	155	248	222	122
10	Etelä-Savo	0.0	2.2	4.4	2.2	1.8	11	0	89	151	138	141	105
11	Itä-Savo	0.0	0.6	1.4	1.0	1.4	4	0	64	112	141	242	105
12	Pohjois-Karjala	0.4	2.2	7.8	6.0	3.6	20	12	48	170	252	200	120
13	Pohjois-Savo	0.8	3.2	9.6	7.8	3.8	25	16	46	142	236	147	102
14	Keski-Suomi	0.8	3.4	8.6	6.8	3.4	23	14	43	136	219	145	91
15	Etelä-Pohjanmaa	0.4	2.8	7.4	6.2	4.0	21	9	53	144	238	189	106
16	Vaasa	1.0	1.8	4.4	5.4	6.0	19	26	34	108	264	350	110
17	Keski-Pohjanmaa	0.2	1.6	2.8	3.2	3.2	11	10	73	146	320	422	141
18	Pohjois-Pohjanmaa	0.8	4.6	11.2	11.4	7.6	36	7	36	114	262	236	87
19	Kainuu	0.2	0.8	5.2	2.6	1.2	10	14	44	241	238	137	135
20	Länsi-Pohja	0.0	0.8	3.6	2.8	1.4	9	0	50	209	319	211	139
21	Lappi	0.2	1.6	3.4	2.6	0.8	9	9	48	102	168	66	73
22	Åland	0.0	0.6	1.0	0.8	0.4	3	0	70	124	217	147	95
Region	South	4.2	22.8	62.2	47.0	36.8	173	10	34	124	222	249	89
	Southwest	2.2	11.8	33.0	30.0	19.2	96	12	44	142	256	208	107
	West	1.8	15.4	43.8	34.8	20.2	116	8	47	152	240	183	104
	East	2.0	11.6	31.8	23.8	14.0	83	12	50	146	215	163	103
	North	1.4	9.4	26.2	22.6	14.2	74	8	43	138	255	211	100
Entire country		11.6	71.0	197.0	158.2	104.4	542	10	41	138	235	207	98

\*Average annual incidence of RRT in subgroup

Table 4 presents the average annual number of new RRT patients and the incidence of RRT in 2015–2019 according to healthcare district, region, and age group. The incidence was highest among 65–74-year-olds and varied in this age group from 138 to 320 in the healthcare districts.

In the age group of 75 years and over, the incidence was 207 new RRT patients per million age-related inhabitants, with a range of 66–422 in healthcare districts and a range of 163–249 in regions.

Table 5. Number of new RRT patients by age group and sex  
Finnish Registry for Kidney Diseases 2009–2019

Age group		Number of new RRT patients					Incidence of RRT/million inhabitants				
		2009	2014	2017	2018	2019	2009	2014	2017	2018	2019
0–19 y	Men	6	9	9	8	4	10	15	15	13	7
	Women	3	5	6	4	3	5	8	10	7	5
	Total	9	14	15	12	7	7	12	13	10	6
20–44 y	Men	38	41	44	38	39	44	47	50	43	44
	Women	23	21	29	24	22	28	25	35	29	26
	Total	61	62	73	62	61	36	37	42	36	35
45–64 y	Men	127	142	123	125	112	165	193	173	178	160
	Women	62	53	71	69	71	80	71	99	98	102
	Total	189	195	194	194	183	123	132	136	137	131
65–74 y	Men	78	79	112	103	103	348	271	348	313	307
	Women	40	32	61	49	57	154	99	171	135	153
	Total	118	111	173	152	160	244	180	255	219	226
≥75 y	Men	49	54	66	65	76	323	302	340	325	368
	Women	24	31	40	29	43	87	104	130	93	135
	Total	73	85	106	94	119	171	179	211	184	227
Total	Men	298	325	354	339	334	114	121	130	124	122
	Women	152	142	207	175	196	56	51	74	63	70
	Total	450	467	561	514	530	84	85	102	93	96

Table 5 shows the number of new RRT patients and the incidence of RRT according to age group and sex in 2009–2019. The number of new RRT patients has been bigger during the last years. The increase was mainly observed in the age groups of 65 years and over. Of the new RRT patients in 2019, 63% were men.

The incidence was 96 new patients per million inhabitants in 2019. The highest incidence was in the group of men 75 years and over. The incidence of RRT in men compared to women has remained at the same level for ten years.

Figure 2. Standardized incidence of RRT in regions Finnish Registry for Kidney Diseases 2009–2019

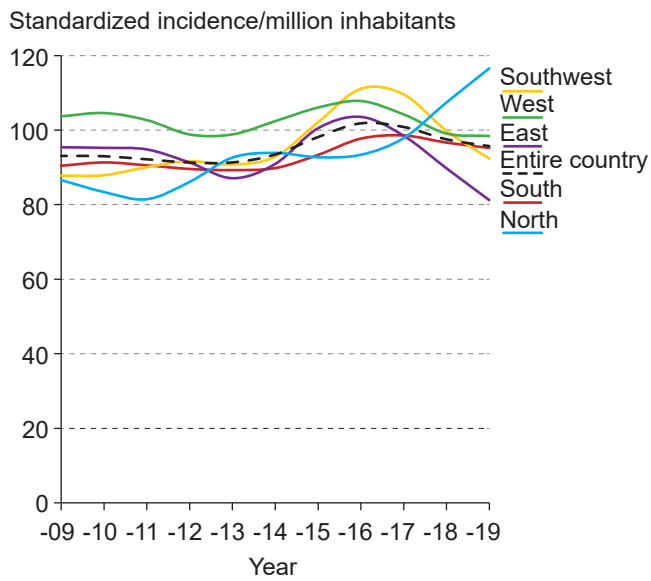


Figure 2 shows the regional incidence of RRT in 2009–2019 as smoothed averages. The incidence rates are age- and sex-standardized using the Finnish general population on 31 December 2019 as the reference. Population changes in 2009–2019 have been taken into consideration. Standardization removes the effect of age and sex on regional differences in incidence rates. Nationwide, the standardized incidence increased since 2014, but has decreased again after 2017. Regional differences in standardized incidence are small.

Figure 3. Standardized incidence of RRT in regions 90 days after start of RRT Finnish Registry for Kidney Diseases 2009–2019

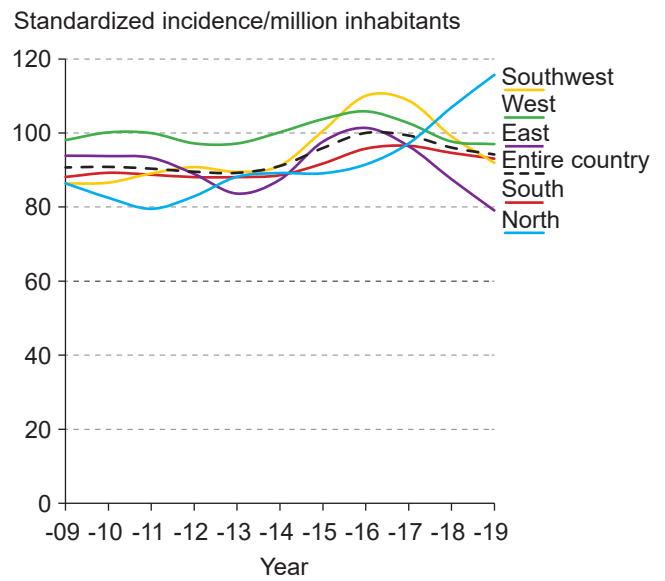
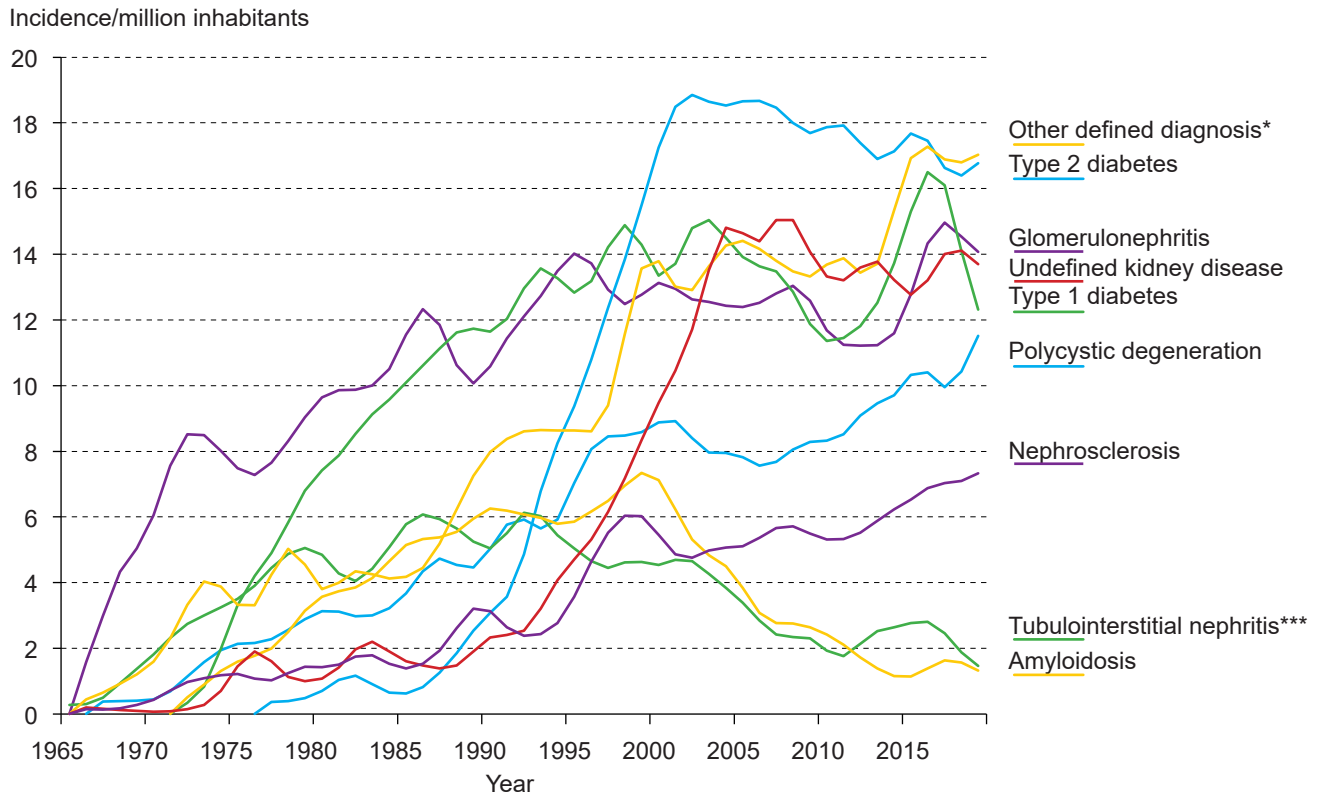


Figure 3 shows the age- and sex-standardized regional incidence of RRT 90 days after the start of RRT. The Finnish Registry for Kidney Diseases does not store data on patients who have regained renal function within 90 days of start of RRT because in that case RRT is not considered chronic. However, the registry does store information on patients who died or moved abroad within 90 days of start of RRT, but these patients were excluded from Figure 3.

Figure 4. Incidence of RRT according to diagnosis  
Finnish Registry for Kidney Diseases 1965–2019



\*For example, other systemic diseases, urinary tract obstruction, congenital diseases, and malignancies  
\*\*ICD-10 codes I12, I13, I70.1, and N28.0  
\*\*\*ICD-10 codes N10, N11, and N12

The incidence of RRT according to diagnosis appears as smoothed averages in Figure 4. Until the end of the 1990s, the incidence increased in almost all diagnostic groups, but thereafter the increase stopped. During the past few years the incidence was larger than before, and the proportions arised from especially type 1 diabetes, glomerulonephritis, and other defined kidney disease, but now the incidence of these diagnoses have decreased. The incidence of nephrosclerosis and polycystic degeneration has steadily increased.

Type 2 diabetes has been the leading cause of end-stage renal disease since 1999, and glomerulonephritis and type 1 diabetes have been the next most common causes. The number of amyloidosis and tubulointerstitial nephritis patients entering RRT has decreased since the year 2000,

but the decrease has now levelled off.

The group of other defined diagnoses has grown considerably, being larger than type 2 diabetes in 2019. In 2019, altogether 96 new RRT patients had been assigned the “other defined diagnosis”. The most common diagnoses were urinary tract obstruction (n=16), myeloma (n=11), vasculitis (n=10), medullary cystic kidney disease (n=4), Goodpasture syndrome (n=3), kidney cancer (n=2), and congenital nephrosis of Finnish type (n=2).

Of the 96 patients, 31 had an ICD-10 code of N18.8, indicating other defined kidney disease, but no further specification was given. Of these patients, 30 had an ERA-EDTA diagnosis code, specifying the diagnosis for 10 patients, whereas for 20 patients the kidney disease remained unknown.

Figure 5. Type of treatment at 90 days from start of RRT  
Finnish Registry for Kidney Diseases 2009–2019

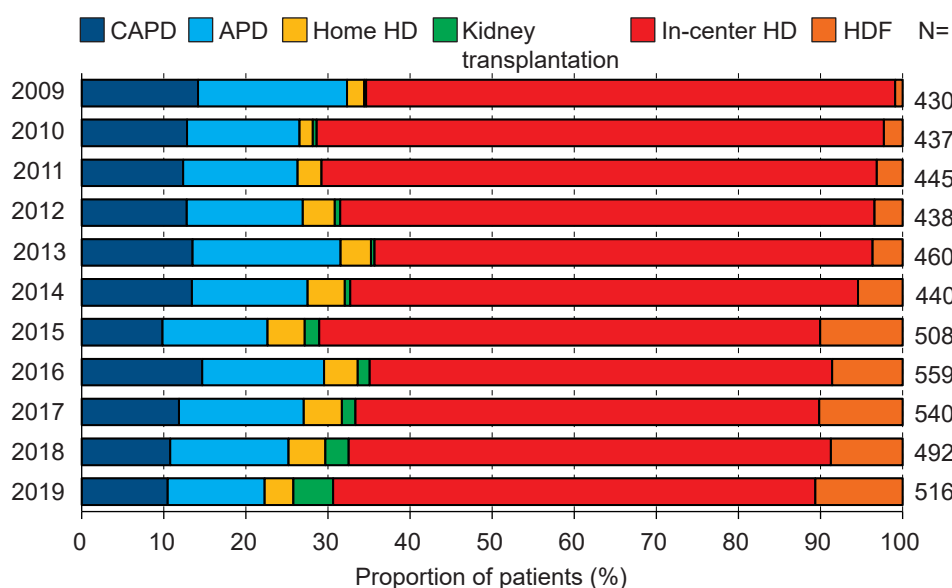


Figure 6. Type of treatment at 90 days from start of RRT in healthcare districts and regions  
Finnish Registry for Kidney Diseases 2015–2019

Proportion of patients (%)

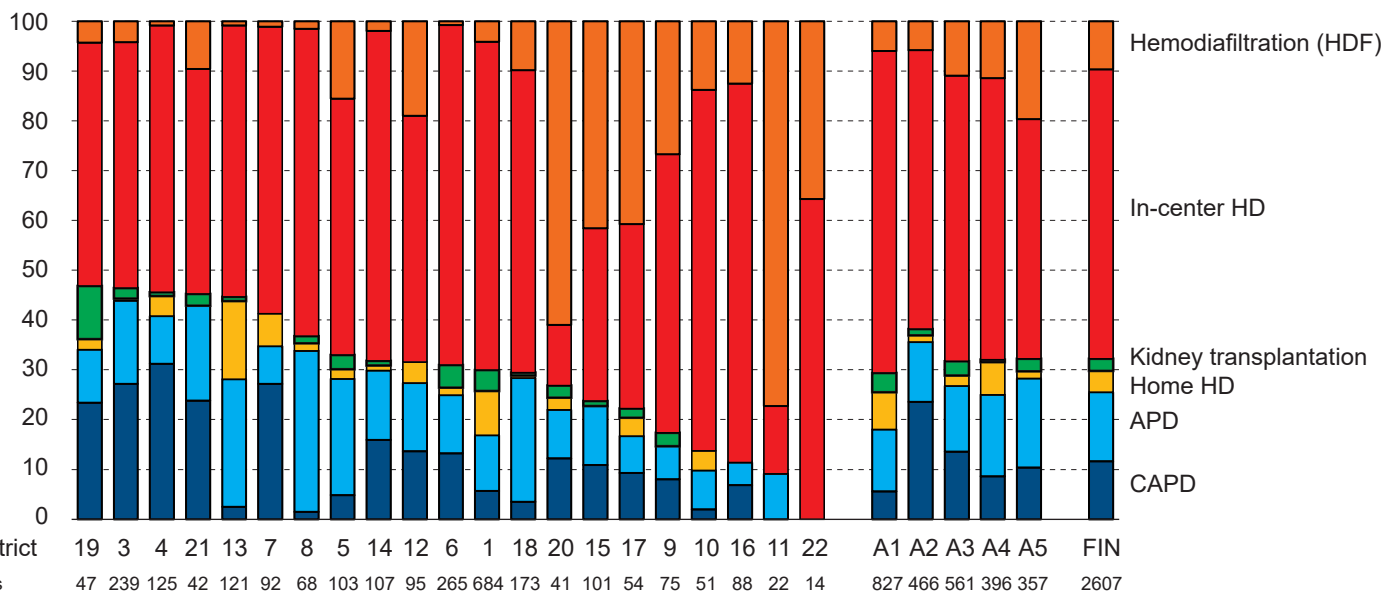


Figure 5 presents the number of RRT patients aged 20 years and over at 90 days from start of RRT in 2009–2019 according to type of treatment. The proportion of patients on in-center hemodialysis and hemodiafiltration has remained stable at an average of 68%. However, the proportion of patients on hemodiafiltration has increased. During the past five years the proportion of patients on home hemodialysis (home HD) has been 4–5%. The proportion of patients receiving a kidney transplant at 90 days from start of RRT has increased from less than 1% to 5%. The proportion of patients on continuous ambulatory peritoneal dialysis (CAPD) or automated peritoneal dialysis (APD) has varied between 22% and 32%.

Figure 6 shows according to healthcare district and region the distribution of RRT modalities at 90 days from start of RRT in 2015–2019 of patients older than 20 years. The proportion of patients on home dialysis (CAPD, APD, or home HD) varied in healthcare districts from 0% to 45%. The proportion of APD patients in patients on peritoneal dialysis varied between 22% and 96% in healthcare districts. There was less variation in distribution of RRT modalities between regions than between healthcare districts.



Figure 7. International comparison of incidence of RRT in 2018  
Finnish Registry for Kidney Diseases 2019

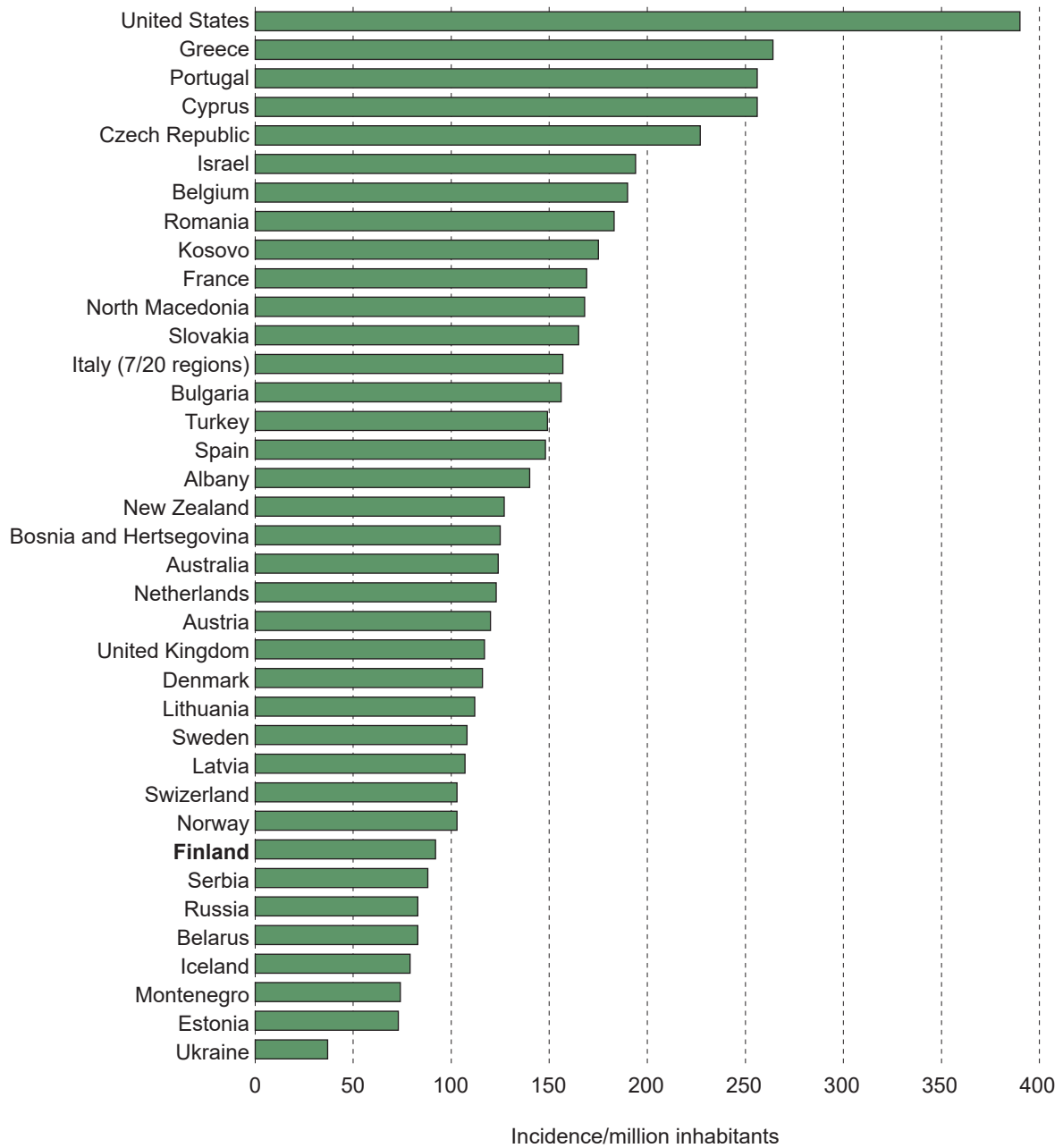


Figure 7 shows the incidence of RRT in 2018 in countries reporting to the ERA-EDTA Registry (Annual Report 2018, <http://www.era-edta-reg.org>) and in the United States, Australia, and New Zealand (The 2020 USRDS Annual Data Report, <http://www.usrds.org>; ANZDATA 42nd Annual Report 2019, [www.anzdata.org.au](http://www.anzdata.org.au)). In 2018, the incidence of RRT in Finland was one of the lowest in Europe. In the Nordic countries, relative to Finland, the incidence in Norway was 12% higher, in Sweden 17% higher, in Denmark 26% higher, and in Iceland 14% lower. In Greece and Portugal, the incidence was 2.5-fold and in the United States 4-fold that in Finland.

Table 6. Patients on RRT at end of year according to healthcare district and region  
Finnish Registry for Kidney Diseases 2009–2019

Healthcare district		Number of RRT patients					Prevalence of RRT/million inhabitants				
		2009	2014	2017	2018	2019	2009	2014	2017	2018	2019
1	Helsinki-Uusimaa	1093	1276	1378	1415	1462	722	798	834	849	867
3	Varsinais-Suomi	392	427	458	456	467	841	897	953	947	969
4	Satakunta	236	214	247	253	246	1044	955	1121	1157	1135
5	Kanta-Häme	129	160	176	173	178	742	912	1019	1010	1041
6	Pirkanmaa	432	472	515	520	544	851	900	968	972	1013
7	Päijät-Häme	172	183	204	200	207	810	859	962	947	985
8	Kymenlaakso	144	135	133	133	131	820	781	788	798	797
9	Etelä-Karjala	138	149	167	161	159	1036	1131	1286	1250	1245
10	Etelä-Savo	90	88	97	100	99	845	847	955	998	1002
11	Itä-Savo	46	49	54	50	48	1003	1112	1279	1218	1192
12	Pohjois-Karjala	139	133	159	163	158	818	787	955	984	961
13	Pohjois-Savo	229	256	268	277	269	923	1031	1087	1128	1101
14	Keski-Suomi	150	173	206	205	206	607	689	815	811	815
15	Etelä-Pohjanmaa	115	131	158	161	164	579	661	808	829	849
16	Vaasa	105	133	157	158	163	635	784	925	931	962
17	Keski-Pohjanmaa	61	60	74	80	81	783	765	947	1030	1048
18	Pohjois-Pohjanmaa	276	312	334	337	344	703	769	817	823	839
19	Kainuu	63	65	70	72	77	795	854	946	985	1065
20	Länsi-Pohja	67	58	55	59	65	1025	912	890	964	1078
21	Lappi	75	78	78	88	92	634	660	664	750	787
22	Åland	23	25	28	30	30	829	865	950	1007	1004
Region	South	1375	1560	1678	1709	1752	755	819	860	871	886
	Southwest	756	799	890	897	906	854	889	989	997	1009
	West	848	946	1053	1054	1093	776	851	946	948	983
	East	654	699	784	795	780	800	856	968	987	974
	North	542	573	611	636	659	739	772	825	861	894
Entire country		4175	4577	5016	5091	5190	780	836	910	923	939

Table 6 presents the number of RRT patients and the prevalence of RRT on 31 December 2009–2019. In the entire country, the prevalence at the end of 2019 was 939 RRT patients per million inhabitants. On 31 December 2019, the prevalence was the highest in the southwestern region and the lowest in the southern region. In the healthcare districts, the prevalence varied between 787 and 1245 patients per million inhabitants.

In the entire country, the prevalence has increased by 20% since 2009 and by 12% since 2014. Since 2014, the prevalence has increased in all regions, the least in the southern region (8%) and the most in the eastern region (16%). In the healthcare districts, the prevalence has increased over 25% during the past five years in Etelä-Pohjanmaa, Keski-Pohjanmaa, and Kainuu. In Kymenlaakso, Itä-Savo, and Pohjois-Savo the prevalence has increased the least.

Table 7. Patients on RRT according to age group and sex  
Finnish Registry for Kidney Diseases 2009–2019

Age group		Number of RRT patients					Prevalence of RRT/million inhabitants				
		2009	2014	2017	2018	2019	2009	2014	2017	2018	2019
0–19 y	Men	68	70	71	74	70	109	114	117	123	117
	Women	50	50	53	50	51	84	85	92	87	89
	Total	118	120	124	124	121	96	100	105	105	104
20–44 y	Men	458	432	485	483	493	534	497	549	544	554
	Women	273	238	276	289	288	333	288	331	345	344
	Total	731	670	761	772	781	436	395	443	448	452
45–64 y	Men	1224	1228	1245	1252	1235	1594	1665	1747	1778	1766
	Women	725	722	769	781	795	937	971	1072	1105	1137
	Total	1949	1950	2014	2033	2030	1264	1317	1409	1441	1451
65–74 y	Men	540	749	878	908	941	2413	2573	2730	2762	2809
	Women	324	413	482	477	491	1248	1273	1354	1310	1321
	Total	864	1162	1360	1385	1432	1787	1888	2007	1999	2026
≥75 y	Men	312	441	482	484	515	2059	2465	2483	2420	2491
	Women	201	234	275	293	311	729	788	894	939	978
	Total	513	675	757	777	826	1201	1418	1509	1518	1575
Total	Men	2602	2920	3161	3201	3254	991	1085	1163	1175	1193
	Women	1573	1657	1855	1890	1936	577	596	664	676	692
	Total	4175	4577	5016	5091	5190	780	836	910	923	939

Figure 8. Standardized prevalence of RRT in regions  
Finnish Registry for Kidney Diseases 2009–2019

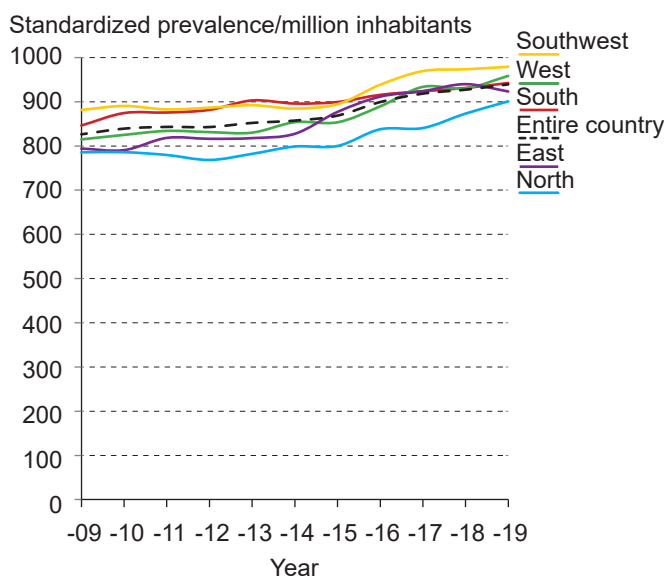


Table 7 shows the number of RRT patients and the prevalence of RRT on 31 December 2009–2019 according to age group and sex. The prevalence has increased by 31% in the age group 75 years and over, by 13% in 65–74-year-olds, by 15% in 45–64-year-olds, by 4% in 20–44-year-olds, and by 7% in 0–19-year-olds. The highest prevalence, observed among men aged 65–74 years at the end of 2019, was 2809 cases per million age-related inhabitants. At the end of 2019, the prevalence was 72% greater among men than among women, and the sex difference was even more pronounced in the oldest age group, in which the prevalence was 2.5-fold higher in men than in women.

Figure 8 shows the age- and sex-standardized prevalence rates for 2009–2019 using the Finnish general population on 31 December 2019 as the reference. The changes in the distribution of age and sex in 2009–2019 have been taken into account. The standardized prevalence rates have increased slowly in recent years, and the differences between regions are small.

Figure 9. Prevalence of RRT on 31 December 2019  
Finnish Registry for Kidney Diseases 2019



The healthcare districts shown on the map are grouped according to the prevalence of RRT at the end of 2019 (Figure 9). The prevalence per million inhabitants was <900 in six districts, 900–1000 in four districts, and >1000 in eleven districts. The borders of the regions are indicated with thick lines.

Figure 10. Prevalence of RRT at end of year according to type of treatment  
Finnish Registry for Kidney Diseases 1965–2019

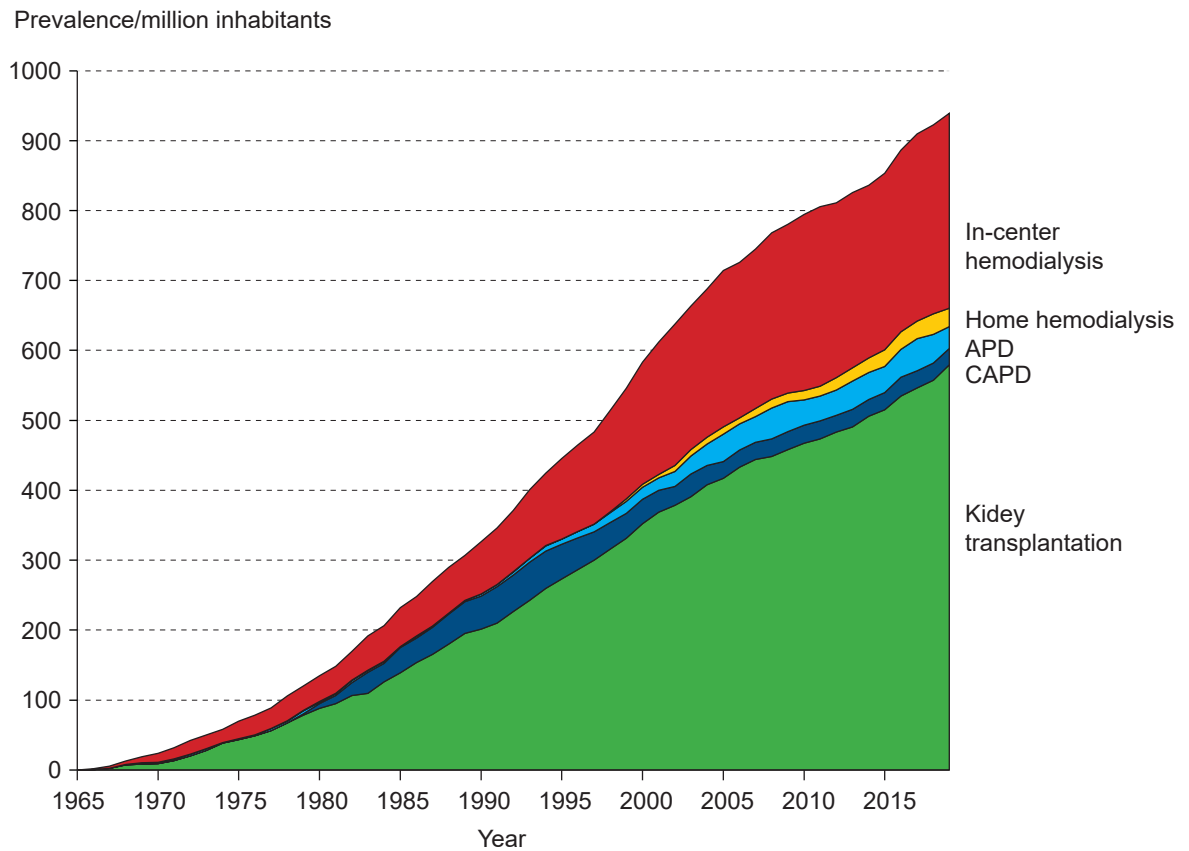


Figure 10 displays the prevalence of RRT according to treatment type. The prevalence of kidney transplantation has grown steadily, increasing by 26% during 2009–2019. At the same time the prevalence of in-center hemodialysis patients increased by 16%, the prevalence of peritoneal dialysis patients decreased by 21%, and the prevalence of home hemodialysis patients increased twofold. In 2009–

2019, the proportion of patients on in-center hemodialysis decreased from 31% to 30%, the proportion of patients with kidney transplantation increased from 59% to 62%, the proportion of patients on home hemodialysis increased from 2% to 3%, and the proportion of patients on peritoneal dialysis decreased from 9% to 6%. Since 2005, the proportion of APD patients of all PD patients has been about 61%.

Table 8. Prevalence of dialysis and kidney transplantation in healthcare districts and regions  
Finnish Registry for Kidney Diseases 2009–2019

Healthcare district		Number of dialysis patients/ million inhabitants					Number of kidney transplant patients/ million inhabitants				
		2009	2014	2017	2018	2019	2009	2014	2017	2018	2019
1	Helsinki-Uusimaa	278	290	327	327	329	444	508	507	522	539
3	Varsinais-Suomi	326	376	408	399	386	515	521	545	548	583
4	Satakunta	425	362	436	476	420	619	594	685	682	715
5	Kanta-Häme	426	416	457	414	439	316	496	562	595	603
6	Pirkanmaa	376	381	370	361	363	474	519	597	611	650
7	Päijät-Häme	330	347	396	360	405	480	512	566	587	581
8	Kymenlaakso	399	416	344	342	359	422	364	445	456	438
9	Etelä-Karjala	518	448	539	505	438	518	683	747	746	806
10	Etelä-Savo	310	289	345	419	385	535	558	611	579	617
11	Itä-Savo	480	409	521	463	422	523	704	758	755	770
12	Pohjois-Karjala	306	302	409	423	359	512	486	547	562	602
13	Pohjois-Savo	363	370	324	366	356	560	660	762	761	745
14	Keski-Suomi	226	263	332	297	285	380	426	482	514	530
15	Etelä-Pohjanmaa	232	318	435	458	419	348	343	373	371	430
16	Vaasa	230	295	412	401	425	405	489	513	530	537
17	Keski-Pohjanmaa	385	306	371	438	466	398	459	576	592	582
18	Pohjois-Pohjanmaa	278	301	340	337	341	425	468	477	486	497
19	Kainuu	341	250	257	287	263	454	604	690	698	802
20	Länsi-Pohja	581	535	437	490	514	444	377	453	474	564
21	Lappi	228	254	153	205	205	406	406	511	545	582
22	Åland	397	242	271	369	335	433	622	678	638	669
Region	South	307	312	343	340	338	447	507	518	531	547
	Southwest	335	353	411	417	400	518	537	578	580	609
	West	349	369	400	386	392	427	482	547	562	591
	East	309	315	357	368	341	490	541	611	620	633
	North	315	309	313	334	339	424	464	512	527	555
Entire country		322	330	363	365	360	458	506	546	558	580

Table 8 presents the prevalence of dialysis and kidney transplantation per million inhabitants in healthcare districts and regions in 2009–2019. The prevalence of dialysis has increased by 12% and that of kidney transplantation by 26% during the past ten years. Over the past five years, the prevalence of dialysis has increased by 9% and the prevalence of kidney transplantation by 15%. At the end of 2019, the prevalence of dialysis varied in healthcare districts between 205 and 514 per million inhabitants and that of kidney transplantation between 430 and 806 per million inhabitants. In regions, the prevalence of dialysis varied between 338 and 400 per million inhabitants and that of kidney transplantation between 547 and 633 per million inhabitants.

Table 9. Number of RRT patients at end of year according to type of treatment in healthcare districts and regions  
Finnish Registry for Kidney Diseases 2019

Healthcare district		Number of patients on 31 December 2019 (%)						
		CAPD	APD	Home HD	In-center HD	HDF	Tx	Total
1	Helsinki-Uusimaa	28 (2)	36 (2)	58 (4)	296 (20)	136 (9)	908 (62)	1462 (100)
3	Varsinais-Suomi	14 (3)	33 (7)	11 (2)	68 (15)	60 (13)	281 (60)	467 (100)
4	Satakunta	17 (7)	5 (2)	9 (4)	45 (18)	15 (6)	155 (63)	246 (100)
5	Kanta-Häme	5 (3)	9 (5)	4 (2)	26 (15)	31 (17)	103 (58)	178 (100)
6	Pirkanmaa	13 (2)	13 (2)	6 (1)	122 (22)	41 (8)	349 (64)	544 (100)
7	Päijät-Häme	11 (5)	6 (3)	9 (4)	51 (25)	8 (4)	122 (59)	207 (100)
8	Kymenlaakso	2 (2)	9 (7)	5 (4)	29 (22)	14 (11)	72 (55)	131 (100)
9	Etelä-Karjala	4 (3)	1 (1)	6 (4)	8 (5)	37 (23)	103 (65)	159 (100)
10	Etelä-Savo	1 (1)	1 (1)	1 (1)	17 (17)	18 (18)	61 (62)	99 (100)
11	Itä-Savo	0 (0)	1 (2)	0 (0)	1 (2)	15 (31)	31 (65)	48 (100)
12	Pohjois-Karjala	4 (3)	2 (1)	10 (6)	13 (8)	30 (19)	99 (63)	158 (100)
13	Pohjois-Savo	3 (1)	10 (4)	14 (5)	41 (15)	19 (7)	182 (68)	269 (100)
14	Keski-Suomi	6 (3)	7 (3)	3 (1)	36 (17)	20 (10)	134 (65)	206 (100)
15	Etelä-Pohjanmaa	3 (2)	4 (2)	1 (1)	11 (7)	62 (38)	83 (51)	164 (100)
16	Vaasa	3 (2)	4 (2)	2 (1)	19 (12)	44 (27)	91 (56)	163 (100)
17	Keski-Pohjanmaa	5 (6)	4 (5)	3 (4)	3 (4)	21 (26)	45 (56)	81 (100)
18	Pohjois-Pohjanmaa	2 (1)	16 (5)	2 (1)	45 (13)	75 (22)	204 (59)	344 (100)
19	Kainuu	2 (3)	1 (1)	0 (0)	8 (10)	8 (10)	58 (75)	77 (100)
20	Länsi-Pohja	1 (2)	3 (5)	0 (0)	4 (6)	23 (35)	34 (52)	65 (100)
21	Lappi	5 (5)	5 (5)	1 (1)	6 (7)	7 (8)	68 (74)	92 (100)
22	Åland	0 (0)	0 (0)	0 (0)	2 (7)	8 (27)	20 (67)	30 (100)
Region South		34 (2)	46 (3)	69 (4)	333 (19)	187 (11)	1083 (62)	1752 (100)
Southwest		34 (4)	42 (5)	22 (2)	134 (15)	127 (14)	547 (60)	906 (100)
West		32 (3)	32 (3)	20 (2)	210 (19)	142 (13)	657 (60)	1093 (100)
East		14 (2)	21 (3)	28 (4)	108 (14)	102 (13)	507 (65)	780 (100)
North		15 (2)	29 (4)	6 (1)	66 (10)	134 (20)	409 (62)	659 (100)
Entire country		129 (2)	170 (3)	145 (3)	851 (16)	692 (13)	3203 (62)	5190 (100)

Table 9 presents the number of RRT patients according to type of treatment in healthcare districts and regions at the end of 2019. The proportion of peritoneal dialysis patients was the greatest in the healthcare district of Lappi, where 42% of all dialysis patients were receiving either continuous ambulatory peritoneal dialysis (CAPD) or automated peritoneal dialysis (APD). The proportion of dialysis patients on home hemodialysis (home HD) was largest, 17%, in the healthcare district of Pohjois-Karjala. Four healthcare districts had no home HD patients.

Of all dialysis patients, 22% were on home dialysis (CAPD, APD, or home HD) at the end of 2019. The proportion of home dialysis was highest (46%) in the healthcare district of Lappi and higher than 33% also in Keski-Pohjanmaa and Satakunta and lower than 10% in four healthcare districts.

The proportion of kidney transplantation patients varied between 51% and 75% in healthcare districts and between 60% and 65% in regions.

Figure 11. International comparison of prevalence of RRT on 31 December 2018  
Finnish Registry for Kidney Diseases 2019

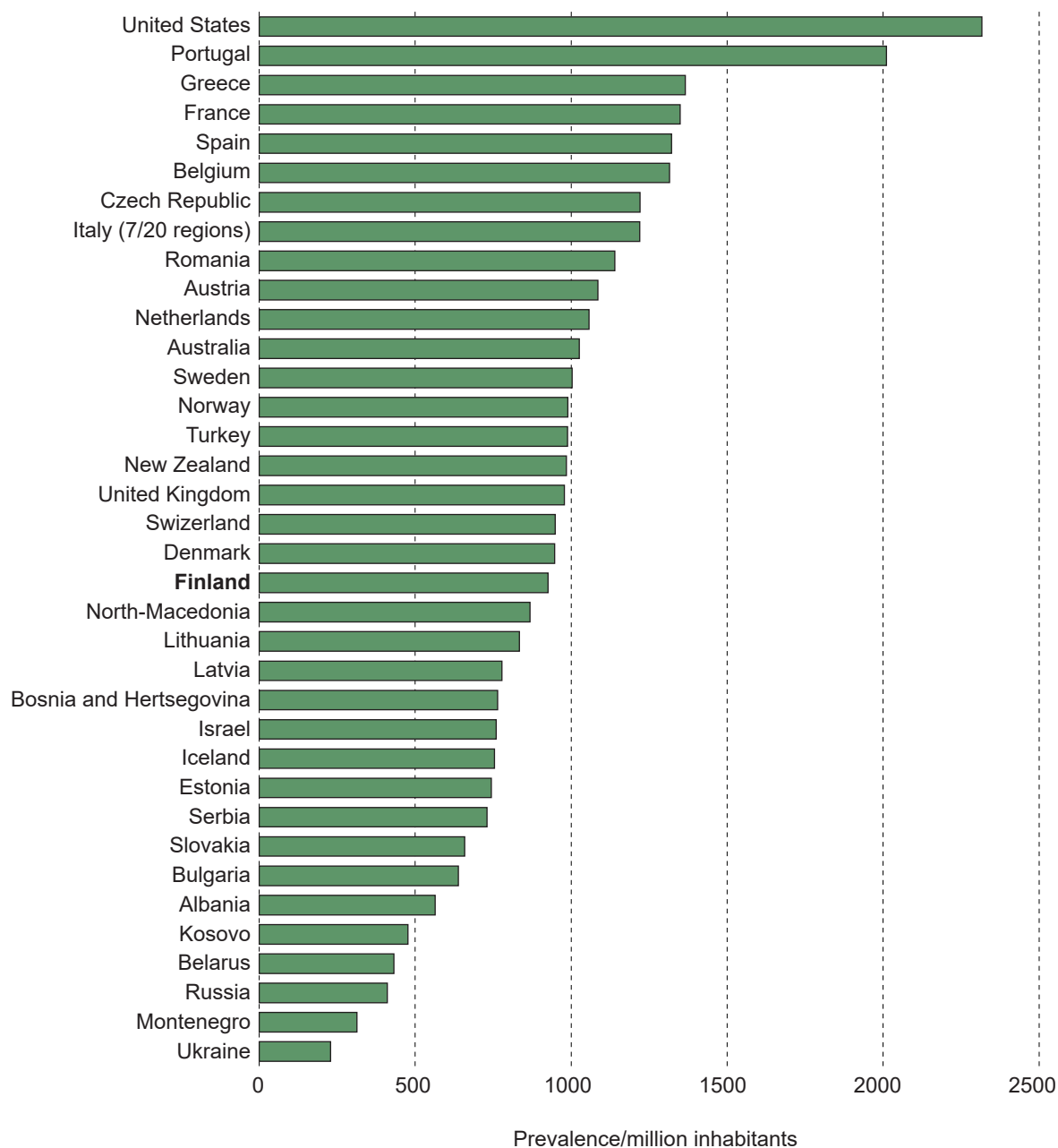


Figure 11 displays the prevalence of RRT on 31 December 2018 in countries reporting to the ERA-EDTA Registry (Annual Report 2018, <http://www.era-edta-reg.org>) and in the United States, Australia, and New Zealand (The 2020 US-RDS Annual Data Report, <http://www.usrds.org>; ANZDATA 42nd Annual Report 2019, [www.anzdata.org.au](http://www.anzdata.org.au)). The prevalence rates in the Nordic countries were similar. Relative to Finland, the prevalence in Denmark was 2% higher, in Norway 7% higher, in Sweden 8% higher, and in Iceland 19% lower. In Portugal and in the United States the prevalence was more than twofold.



Table 10. Number of patient-years of all RRT patients according to diagnosis and type of treatment  
Finnish Registry for Kidney Diseases 2009–2019

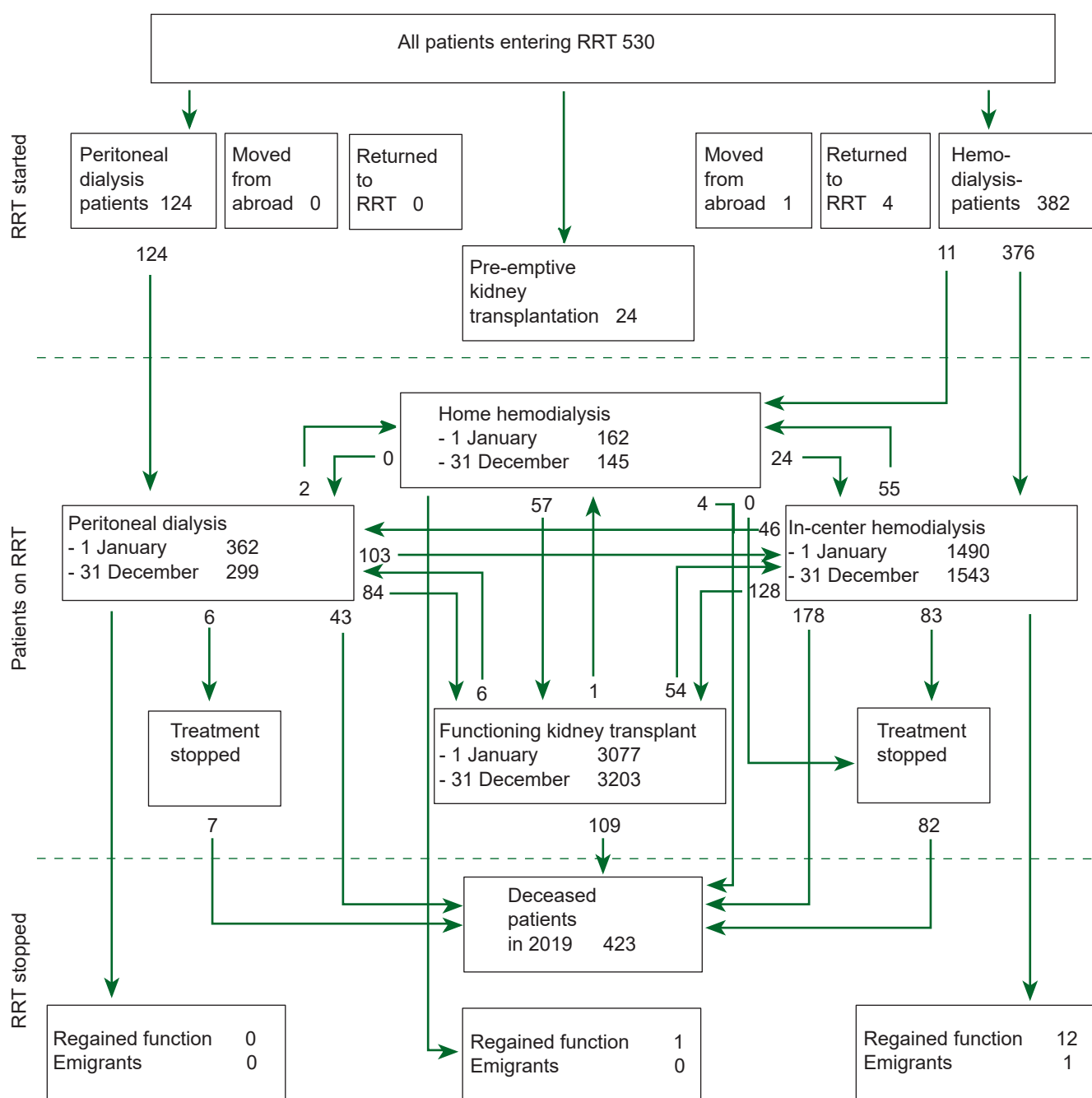
Diagnosis	Number of patient-years in 2009(%)				Number of patient-years in 2019 (%)			
	Peritoneal dialysis	Hemo-dialysis	Trans-plantation	Total	Peritoneal dialysis	Hemo-dialysis	Trans-plantation	Total
Glomerulonephritis	69 (18.3)	206 (15.5)	652 (26.9)	931 (22.5)	67 (19.9)	244 (14.7)	807 (25.7)	1122 (21.8)
Type 1 diabetes	92 (24.1)	149 (11.2)	463 (19.1)	703 (17.0)	72 (21.4)	220 (13.2)	535 (17.0)	828 (16.1)
Polycystic degeneration	22 (5.9)	114 (8.5)	404 (16.6)	540 (13.0)	18 (5.5)	170 (10.2)	567 (18.0)	757 (14.7)
Undefined kidney disease	55 (14.5)	221 (16.6)	99 (4.1)	375 (9.1)	40 (11.9)	239 (14.4)	207 (6.6)	487 (9.5)
Type 2 diabetes	56 (14.7)	264 (19.8)	58 (2.4)	378 (9.1)	48 (14.3)	308 (18.5)	104 (3.3)	460 (8.9)
Tubulointerstitial nephritis	25 (6.7)	79 (6.0)	59 (2.4)	163 (3.9)	29 (8.7)	120 (7.2)	93 (3.0)	242 (4.7)
Nephrosclerosis	6 (1.6)	58 (4.3)	199 (8.2)	263 (6.3)	8 (2.4)	47 (2.8)	175 (5.6)	230 (4.5)
Urinary tract obstruction	7 (1.8)	42 (3.1)	95 (3.9)	145 (3.5)	13 (3.8)	60 (3.6)	139 (4.4)	211 (4.1)
Other systemic diseases	7 (1.9)	30 (2.3)	62 (2.6)	100 (2.4)	16 (4.9)	92 (5.5)	96 (3.0)	204 (4.0)
Other kidney diseases	21 (5.4)	61 (4.6)	82 (3.4)	163 (3.9)	9 (2.8)	66 (4.0)	124 (3.9)	199 (3.9)
Congenital diseases	6 (1.6)	17 (1.3)	105 (4.3)	128 (3.1)	4 (1.2)	21 (1.2)	138 (4.4)	162 (3.1)
Congenital nephrosis. Finnish type	2 (0.5)	4 (0.3)	69 (2.8)	75 (1.8)	3 (0.8)	7 (0.4)	97 (3.1)	106 (2.1)
Amyloidosis	5 (1.3)	40 (3.0)	40 (1.6)	85 (2.0)	2 (0.7)	25 (1.5)	27 (0.9)	54 (1.1)
Malignancies	2 (0.6)	35 (2.6)	9 (0.4)	45 (1.1)	5 (1.4)	33 (2.0)	13 (0.4)	50 (1.0)
Pyelonephritis	2 (0.5)	6 (0.4)	12 (0.5)	20 (0.5)	1 (0.4)	6 (0.4)	12 (0.4)	20 (0.4)
Metabolic diseases	2 (0.6)	6 (0.5)	20 (0.8)	29 (0.7)	0 (0.0)	7 (0.4)	11 (0.3)	18 (0.4)
<b>Total</b>	<b>380 (100)</b>	<b>1332 (100)</b>	<b>2427 (100)</b>	<b>4143 (100)</b>	<b>334 (100)</b>	<b>1664 (100)</b>	<b>3146 (100)</b>	<b>5151 (100)</b>

Table 10 presents the number of patient-years according to diagnosis of kidney disease and type of treatment in 2009 and 2019. The number of patient-years indicates time spent by patients in RRT during the year. Overall, the number of patient-years has increased by 24% since 2009. The number of patient-years has increased by 25% in hemodialysis and by 30% in kidney transplantation, and decreased by 12% in peritoneal dialysis.

Glomerulonephritis is the most common diagnosis among all RRT patients and among kidney transplantation patients; the proportion of patient-years due to glomerulonephritis was 22% in 2019. Type 1 diabetes is the second most common diagnosis among all RRT patients and the

most common diagnosis among peritoneal dialysis patients. Type 2 diabetes is the most common kidney disease diagnosis of hemodialysis patients, and the number of patient-years among kidney transplantation patients with type 2 diabetes has increased by 79% within the last ten years. The number of patient-years of all RRT patients with polycystic degeneration, nephrosclerosis, urinary tract obstruction, other kidney diseases, and congenital nephrosis has increased over 40% during the last ten years. The number of patient-years of all RRT patients with amyloidosis and pyelonephritis has decreased over one-third during the last ten years.

Figure 12. Net changes in type of treatment  
Finnish Registry for Kidney Diseases 2019



During 2019 altogether 530 new patients entered RRT (Figure 12) and four patients returned to RRT. In all, 5091 patients were receiving RRT at the beginning of the year and 5190 patients at the end of the year. Altogether 423 patients died, and dialysis was discontinued for 13 patients because the patient's own kidney function resumed. Of those who died, 109 had a functioning kidney transplant, 43 were receiving peritoneal dialysis, 4 were on home hemodialysis, and 178 were on in-center hemodialysis. During 2019 RRT was discontinued for 89 uremic patients. At the end of 2019, the number of peritoneal dialysis patients was 17% and the number of home hemodialysis patients 10% smaller than

at the beginning of the year. The number of kidney transplantation patients and in-center hemodialysis patients increased 4% during year 2019.

A total of 293 patients received a kidney transplant which is more than ever before. Of these patients, 38 received a combined pancreas and kidney transplantation and two received a combined liver and kidney transplantation (source: Kidney Transplantation Unit, Helsinki University Central Hospital). Twenty-five kidney transplants were received from living donors, of which 14 were from relatives and four were ABO-incompatible.

Table 11. Mortality of RRT patients by region  
Finnish Registry for Kidney Diseases 2009–2019

Region	Deaths/1000 patient-years						Deaths/1000 patient-years <sup>1)</sup>					
	2009	2014	2017	2018	2019	2015–2019	2009	2014	2017	2018	2019	2015–2019
South	80	79	80	81	76	78	78	78	78	78	73	76
Southwest	79	97	93	85	77	84	79	95	92	84	77	83
West	97	91	73	86	74	84	91	87	72	86	71	82
East	78	76	83	86	95	83	76	71	82	81	94	81
North	86	75	82	90	98	89	86	71	82	90	96	87
Entire country	84	84	82	84	81	82	81	81	80	82	79	80

<sup>1)</sup>Patients who died within 90 days of start of RRT excluded

Figure 13. Standardized mortality of RRT patients by region  
Finnish Registry for Kidney Diseases 2009–2019

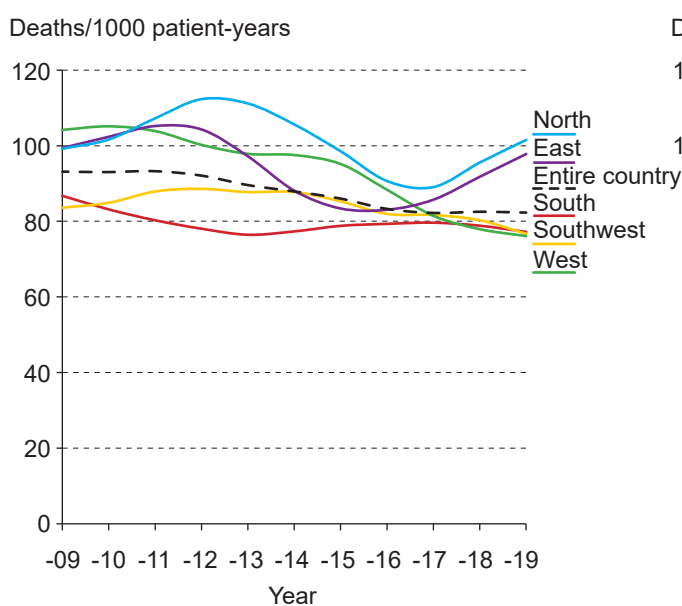


Figure 14. Standardized mortality of RRT patients by region (patients who died within 90 days of start of RRT excluded)  
Finnish Registry for Kidney Diseases 2009–2019

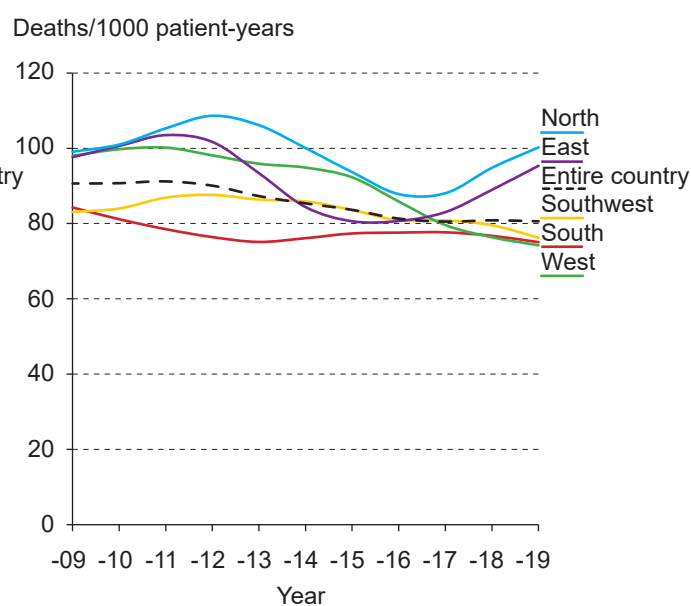


Table 11 shows RRT patients' mortality in 2009–2019 according to region. The mortality of patients who had been on RRT for at least 90 days is presented separately. The average mortality in 2015–2019 was lower in the southern region than elsewhere.

Figures 13 and 14 show regional mortality as smoothed averages. The regional mortality rates for 2009–2019 have

been age- and sex-standardized using all patient-years in 2019 as the reference. Changes in age and sex distribution during this ten-year period have been taken into consideration. Patients who died within 90 days of start of RRT were excluded from Figure 14. During 2009–2019 the standardized mortality rate has declined.

Table 12. Number of RRT patients older than 20 years in hospitals  
Finnish Registry for Kidney Diseases 2019

Region	Healthcare district	Hospital	RRT patients (≥20 y) on 31/12/2019			
			PD	HD	Tx	Total
<b>South (R1)</b>			78	587	1041	1706
	<b>Helsinki-Uusimaa (1)</b>		63	489	874	1426
		Helsinki University Central Hospital	63	361	740	1164
		Nephrology Polyclinic			740	740
		Dialysis unit DHK		84		84
		Dialysis unit DOK	63	97		160
		B. Braun Malmi		90		90
		B. Braun Pitäjänmäki		89		89
		Hyvinkää Hospital		44	38	82
		Lohja Hospital		34	48	82
		Länsi-Uusimaa Hospital		22	21	43
		Porvoo Hospital		29	27	56
	<b>Kymenlaakso (8)</b>		10	48	69	127
		Kymenlaakso Central Hospital	10	48	69	127
	<b>Etelä-Karjala (9)</b>		5	50	98	153
		South Karelia Central Hospital	5	34	98	137
		Honkajarju Hospital		16		16
<b>Southwest (R2)</b>			75	281	523	879
	<b>Varsinais-Suomi (3)</b>		47	139	273	459
		Turku University Central Hospital	47	139	273	459
	<b>Satakunta (4)</b>		21	67	150	238
		Satakunta Central Hospital	21	67	150	238
	<b>Vaasa (16)</b>		7	66	80	153
		Vaasa Central Hospital	7	49	76	132
		Pietarsaari Hospital		17	4	21
	<b>Åland (22)</b>			9	20	29
		Åland Central Hospital		9	20	29
<b>West (R3)</b>			66	376	632	1074
	<b>Kanta-Häme (5)</b>		14	63	104	181
		Central Hospital of Tavastia	14	63	104	181
	<b>Pirkanmaa (6)</b>		28	170	332	530
		Tampere University Hospital	28	170	332	530
	<b>Päijät-Häme (7)</b>		17	69	123	209
		Päijänne Tavastia Central Hospital	17	69	123	209
	<b>Etelä-Pohjanmaa (15)</b>		7	74	73	154
		Southern Ostrobothnia Central Hospital	7	74	73	154
<b>East (R4)</b>			34	239	491	764
	<b>Etelä-Savo (10)</b>		2	32	56	90
		Mikkeli Central Hospital	2	32	56	90
	<b>Itä-Savo (11)</b>		1	17	34	52
		Central Hospital of Savonlinna	1	17	34	52
	<b>Pohjois-Karjala (12)</b>		5	53	93	151
		North Karelia Central Hospital	5	53	93	151
	<b>Pohjois-Savo (13)</b>		13	77	174	264
		Kuopio University Hospital	13	50	154	217
		Regional Hospital of Iisalmi		14	12	26
		Regional Hospital of Varkaus		13	8	21
	<b>Keski-Suomi (14)</b>		13	60	134	207
		Central Finland Central Hospital	13	60	134	207
<b>North (R5)</b>			44	203	395	642
	<b>Keski-Pohjanmaa (17)</b>		9	30	43	82
		Central Hospital of Keski-Pohjanmaa	9	30	43	82
	<b>Pohjois-Pohjanmaa (18)</b>		19	118	196	333
		Oulu University Hospital	19	118	196	333
	<b>Kainuu (19)</b>		3	17	57	77
		Kainuu Central Hospital	3	17	57	77
	<b>Länsi-Pohja (20)</b>		3	23	34	60
		Central Hospital of Länsi-Pohja	3	23	34	60
	<b>Lappi (21)</b>		10	15	65	90
		Lapland Central Hospital	10	15	65	90
<b>Entire country</b>			297	1686	3082	5065

At the end of 2019, dialysis and kidney transplantation patients were treated and followed up in 29 hospitals of 21 healthcare districts in five regions (Table 12). In the first part of this report, the healthcare district of the patient is determined according to place of residence. However, in the

analysis of treatment quality on pages 33–43, healthcare district of the patient is determined according to treating unit. In the entire country, 98% of patients lived in the same healthcare district in which they were treated.

Figure 15. Hemoglobin distribution of dialysis patients older than 20 years at end of year  
Finnish Registry for Kidney Diseases 2009–2019

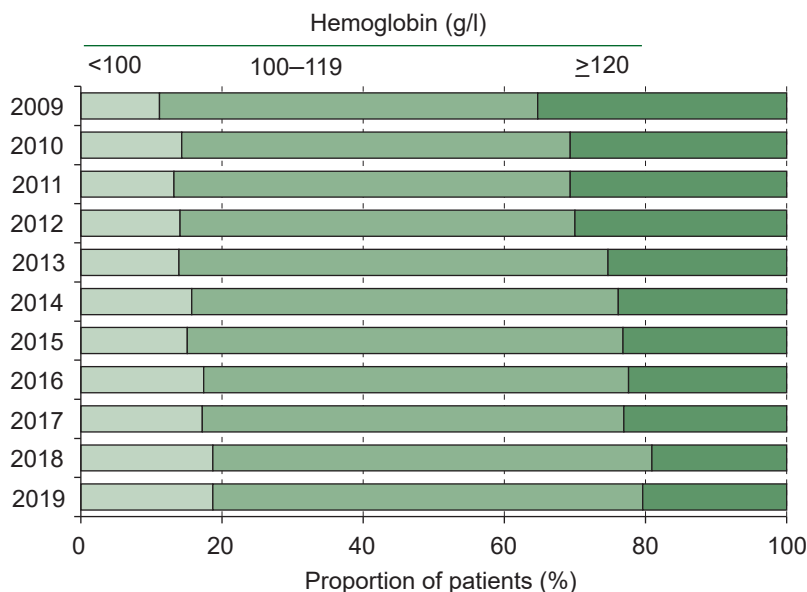
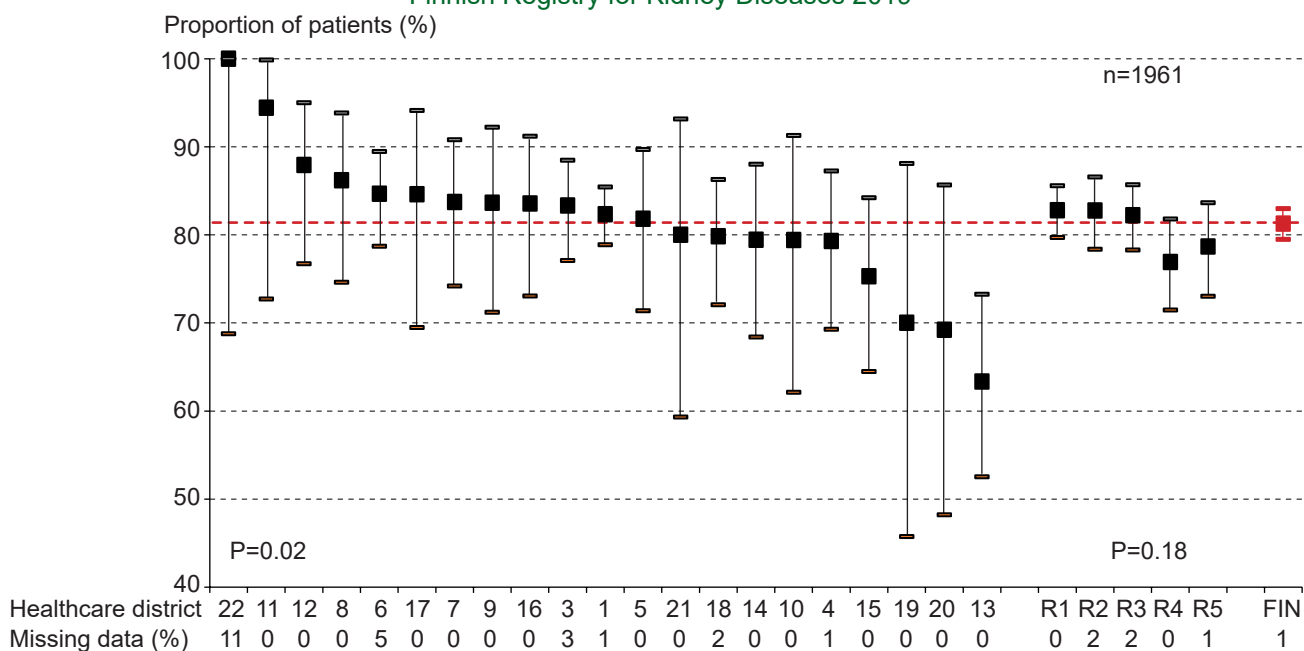


Figure 16. Proportion of dialysis patients older than 20 years with hemoglobin concentration  $\geq 100$  g/l in healthcare districts and regions  
Finnish Registry for Kidney Diseases 2019



Several guidelines exist regarding the target for blood hemoglobin concentration in dialysis patients: European Best Practice Guidelines (EBPG) and the guidelines of the Kidney Disease Outcome Quality Initiative (KDOQI) and the Kidney Disease Global Outcomes (KDIGO). KDIGO published new guidelines on renal anemia in 2012, according to which erythropoiesis-stimulating agents (ESAs) should be used to keep dialysis patients' hemoglobin in the range of 100–115 g/l.

The renal registries in the UK and Sweden have in their reports used target hemoglobin levels of either 100–120 g/l or  $\geq 100$  g/l. For sake of comparison, we have chosen these same cut-offs.

The distribution of dialysis patients' hemoglobin concentration has changed during 2009–2019 (Figure 15). The

proportion of patients with a hemoglobin concentration  $<100$  g/l has increased from 11% to 19%, while the proportion of patients with a hemoglobin concentration  $\geq 120$  g/l has decreased from 35% to 20%. Figures 15 and 216 include all hemodialysis patients, also those who did not use ESAs. In 2019, hemoglobin concentration was  $<100$  g/l in 21% and  $>120$  g/l in 15% of the patients using ESAs.

In Figure 16, the hemoglobin target is  $\geq 100$  g/l. At the end of 2019, the proportion of dialysis patients reaching this target was 81%, varying from 63% to 100% in the healthcare districts ( $P=0.02$ ) and from 77% to 83% in the regions ( $P=0.18$ ). No significant difference was present in the proportions of men and women with a hemoglobin concentration  $\geq 100$  g/l.

Figure 17. Distribution of serum phosphate among dialysis patients older than 20 years at end of year Finnish Registry for Kidney Diseases 2009–2019

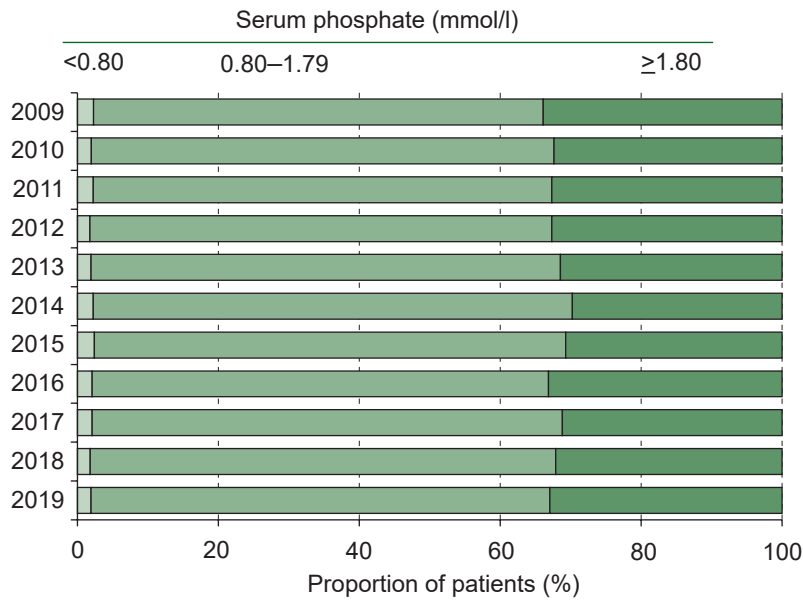
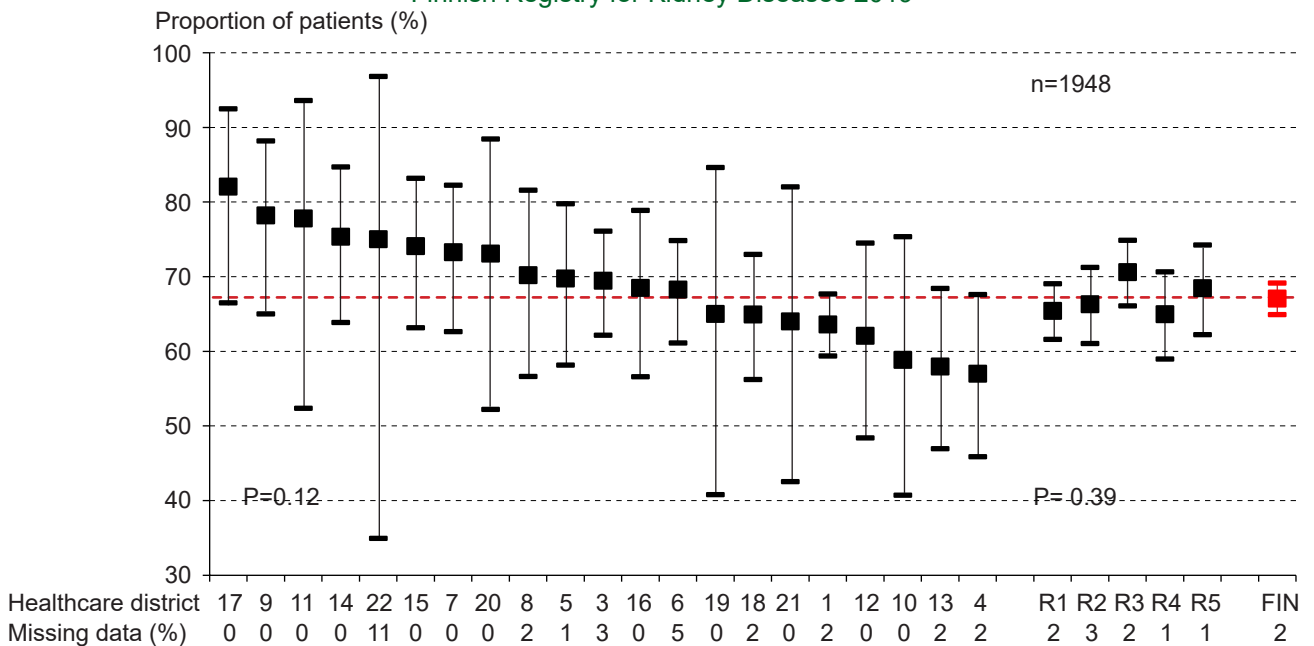


Figure 18. Proportion of dialysis patients older than 20 years with serum phosphate <1.8 mmol/l in healthcare districts and regions Finnish Registry for Kidney Diseases 2019



Hyperphosphatemia among patients with kidney disease is associated with vascular calcification and increased mortality. The guideline of the Kidney Disease Global Outcomes (KDIGO) suggests that elevated serum phosphate of dialysis patients should be lowered towards the normal range with diet, intensified dialysis treatment, and phosphate binders if needed.

At the end of 2019, 67% of hemodialysis and peritoneal dialysis patients had concentrations of serum phosphate <1.8 mmol/l; this proportion has remained virtually un-

changed in the last decade (Figure 17). Only 2% of dialysis patients had an excessively low concentration of serum phosphate (<0.8 mmol/l).

The proportion of patients with serum phosphate <1.8 mmol/l varied between 57% and 82% in the healthcare districts (P=0.12) and between 65% and 71% in the regions (P=0.39) (Figure 18). Serum phosphate was <1.8 mmol/l more often among female than male dialysis patients (P=0.04).

Figure 19. Vascular access of new hemodialysis patients older than 20 years at end of year  
Finnish Registry for Kidney Diseases 2014–2019

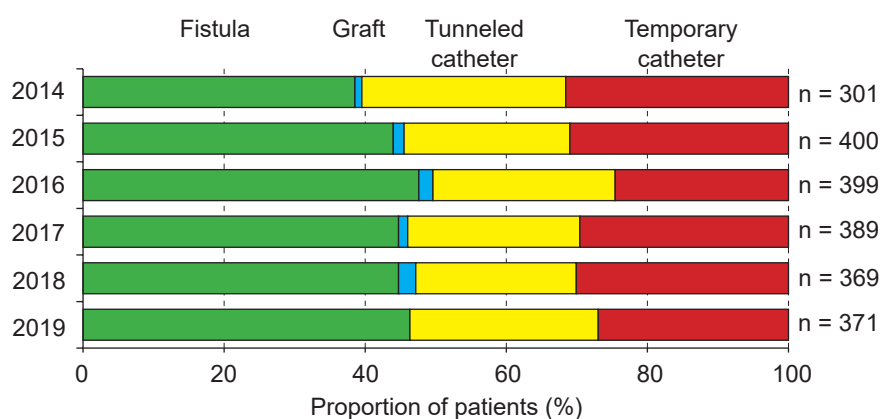
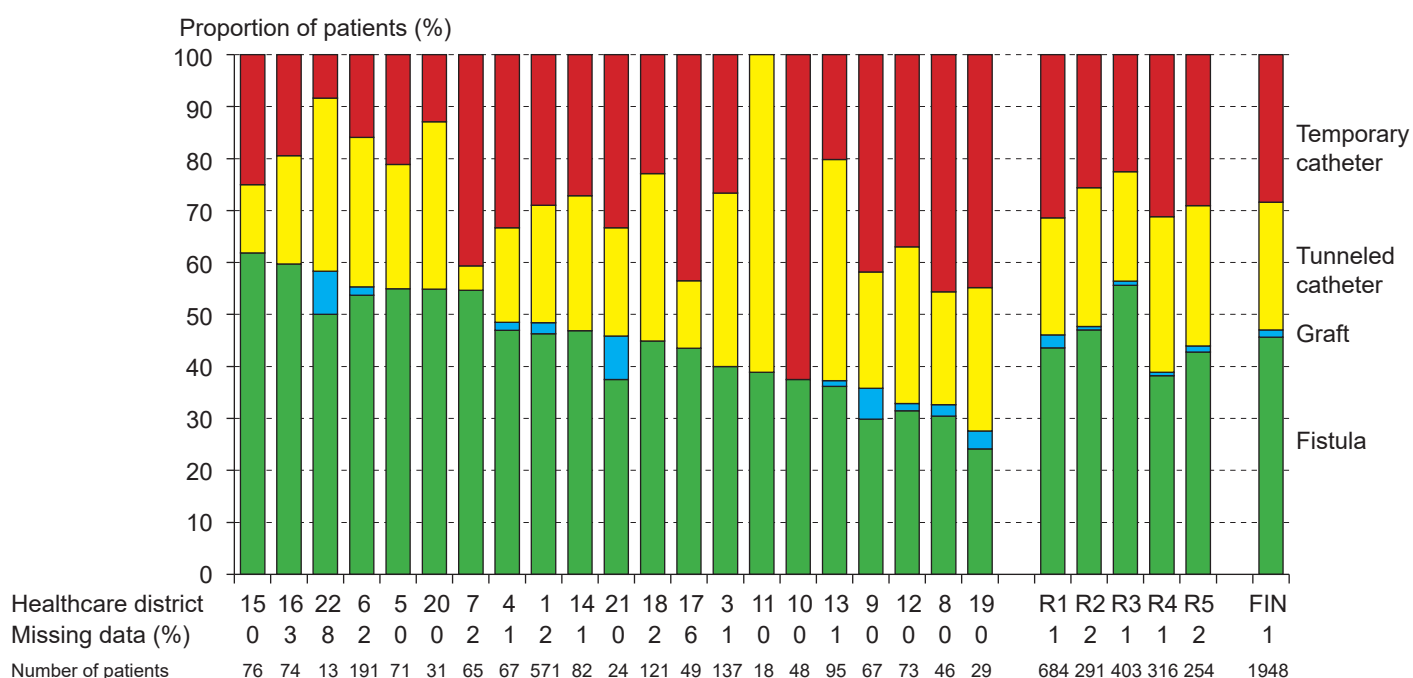


Figure 20. Vascular access of new hemodialysis patients older than 20 years in healthcare districts  
Finnish Registry for Kidney Diseases 2015–2019



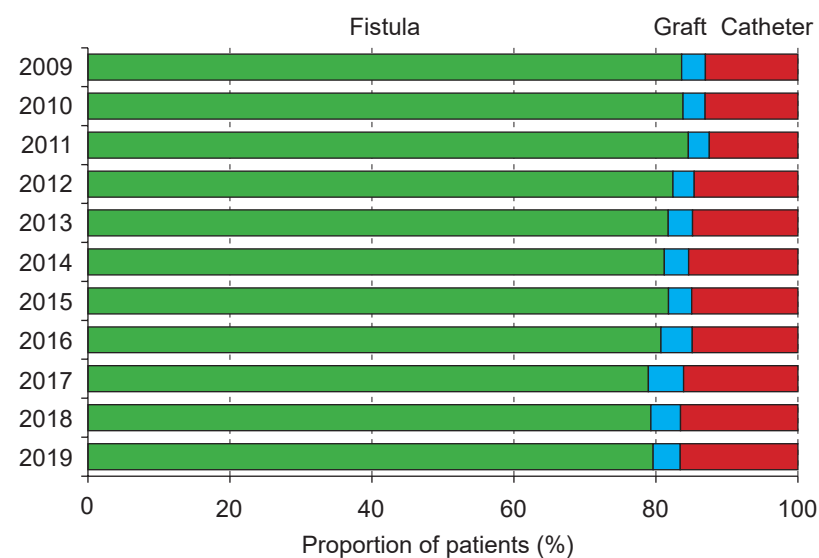
The Finnish Registry for Kidney Diseases has since 2014 collected data on vascular access of patients entering hemodialysis as the first type of RRT. The recommended type of vascular access is an arteriovenous fistula or graft. A tunneled central venous catheter is a better alternative than a temporary (non-cuffed) central venous catheter, which is recommended only when dialysis is started acutely and other types of vascular access are not possible.

In 2019, 46% of patients older than 20 years who entered hemodialysis had an arteriovenous fistula or graft, and the

proportion has been stable during the last years (Figure 19). Of new hemodialysis patients in 2019, 27% started with a temporary catheter.

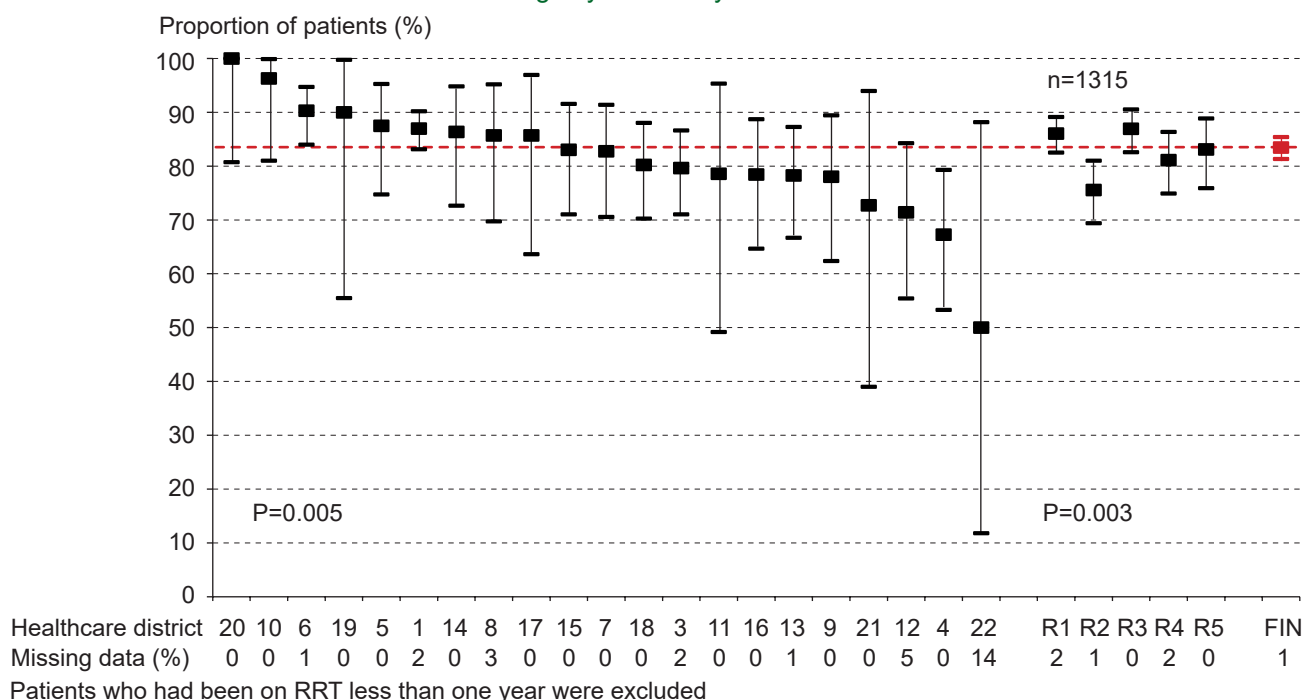
Figure 20 presents the distribution of types of first vascular access among patients who entered hemodialysis in 2015–2019. In the entire country, 47% of patients had a fistula or graft, but the proportion varied between 28% and 62% in healthcare districts ( $P < 0.001$ ) and between 39% and 56% in regions ( $P < 0.001$ ). The proportion of patients with a fistula or graft did not differ between the sexes.

Figure 21. Vascular access of hemodialysis patients older than 20 years at end of year  
Finnish Registry for Kidney Diseases 2009–2019



Patients who had been on RRT less than one year were excluded

Figure 22. Proportion of hemodialysis patients older than 20 years with a fistula or graft  
in healthcare districts and regions  
Finnish Registry for Kidney Diseases 2019

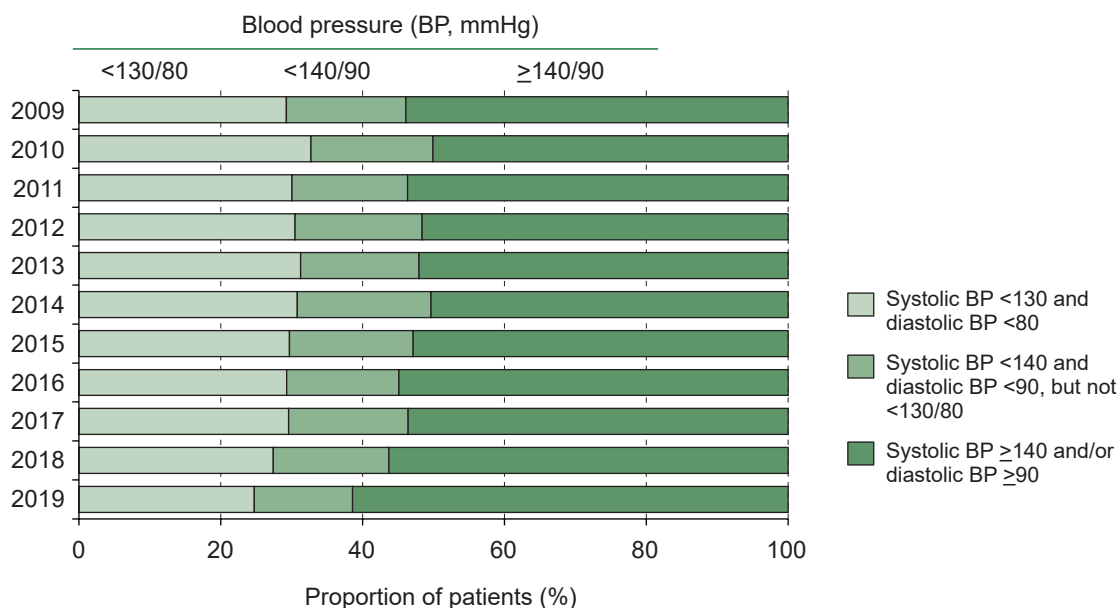


Vascular access is one of the most important quality measures of hemodialysis. Use of a central venous catheter is associated with complications, and the goal is that hemodialysis patients have an arteriovenous fistula or graft. Of hemodialysis patients aged 20 years or older who had been on RRT for at least one year, the proportion with a fistula or graft had decreased from 87% in 2009 to 83% in 2019 (Figure 21).

At the end of 2019, the proportion of patients with a fistula or graft varied between 50% and 100% in healthcare districts ( $P=0.005$ ) and between 76% and 87% in regions ( $P=0.003$ ) (Figure 22). At the end of 2019, female hemodialysis patients less frequently than male patients had a fistula or graft (80% vs. 85%,  $P=0.03$ ). A fistula or graft was as common in patients over 75 years as in younger patients.

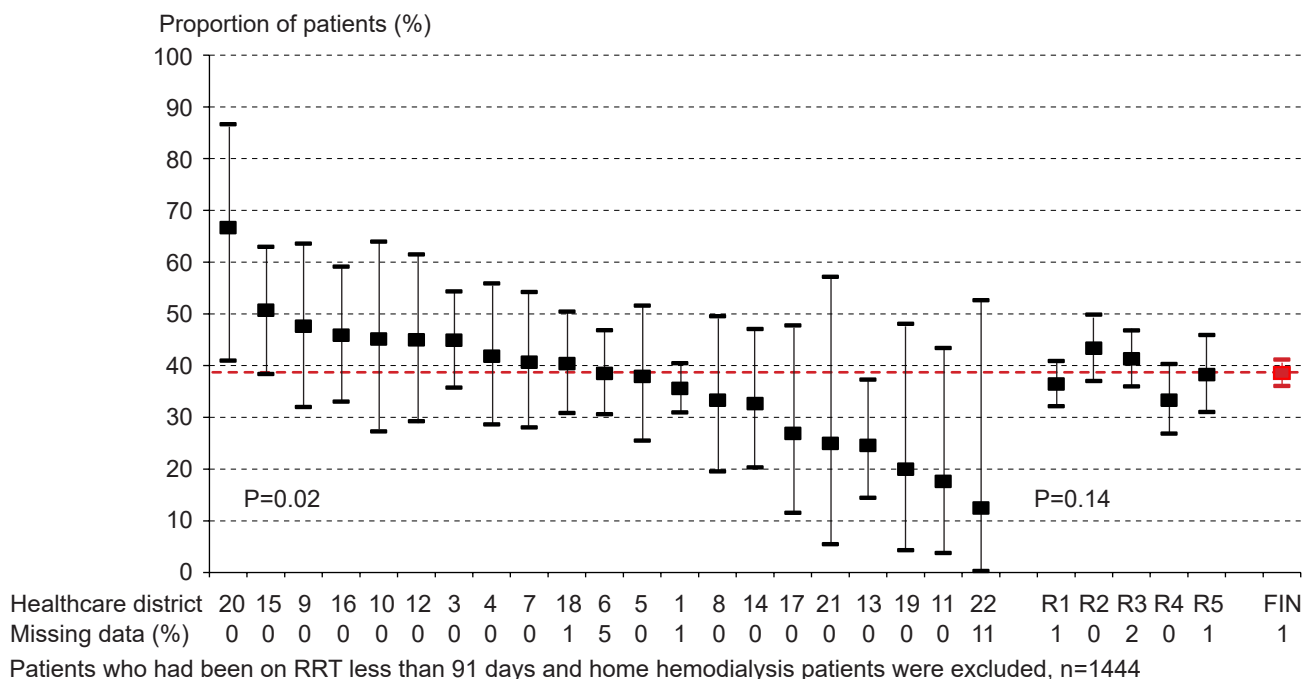


Figure 23. Distribution of predialytic blood pressure among hemodialysis patients older than 20 years Finnish Registry for Kidney Diseases 2009–2019



Patients who had been on RRT less than 91 days and home hemodialysis patients were excluded

Figure 24. Proportion of hemodialysis patients older than 20 years with predialytic blood pressure <140/90 mmHg in healthcare districts and regions Finnish Registry for Kidney Diseases 2019



According to the guidelines of the Kidney Disease Outcome Quality Initiative (KDOQI), hemodialysis patients' target predialytic blood pressure is <140/90 mmHg. At the end of 2019, 39% of hemodialysis patients reached this target and the proportion has decreased during the last years (Figure

23). The proportion of patients attaining the target varied between 13% and 67% in healthcare districts (P=0.02) and between 33% and 43% in regions (P=0.73) (Figure 24). No significant difference was observed between the sexes.

Figure 25. Distribution of blood pressure in kidney transplantation patients older than 20 years  
Finnish Registry for Kidney Diseases 2009–2019

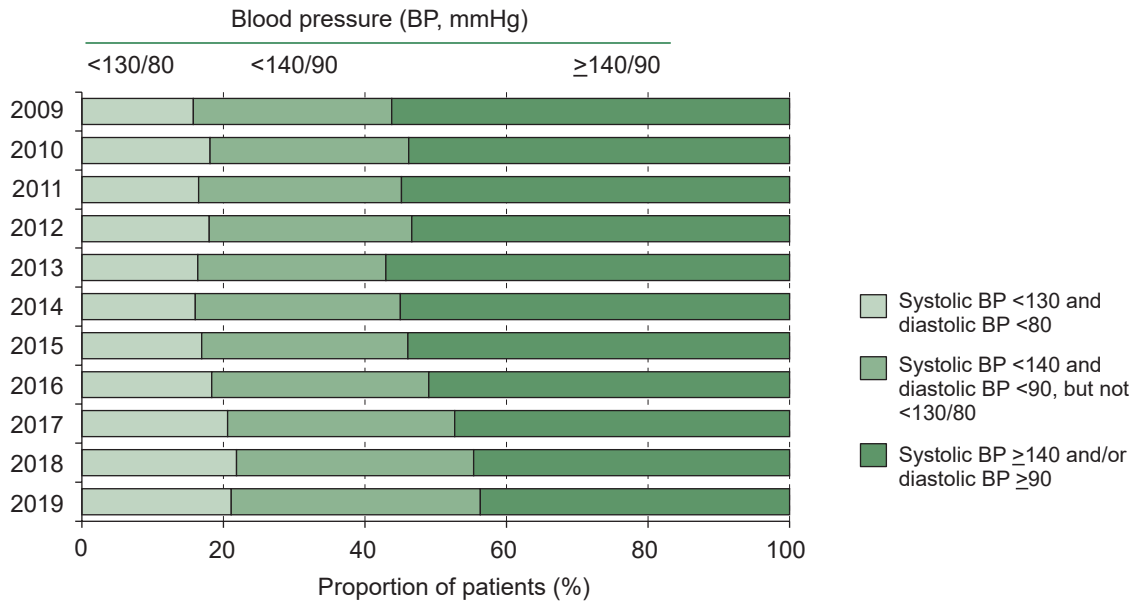
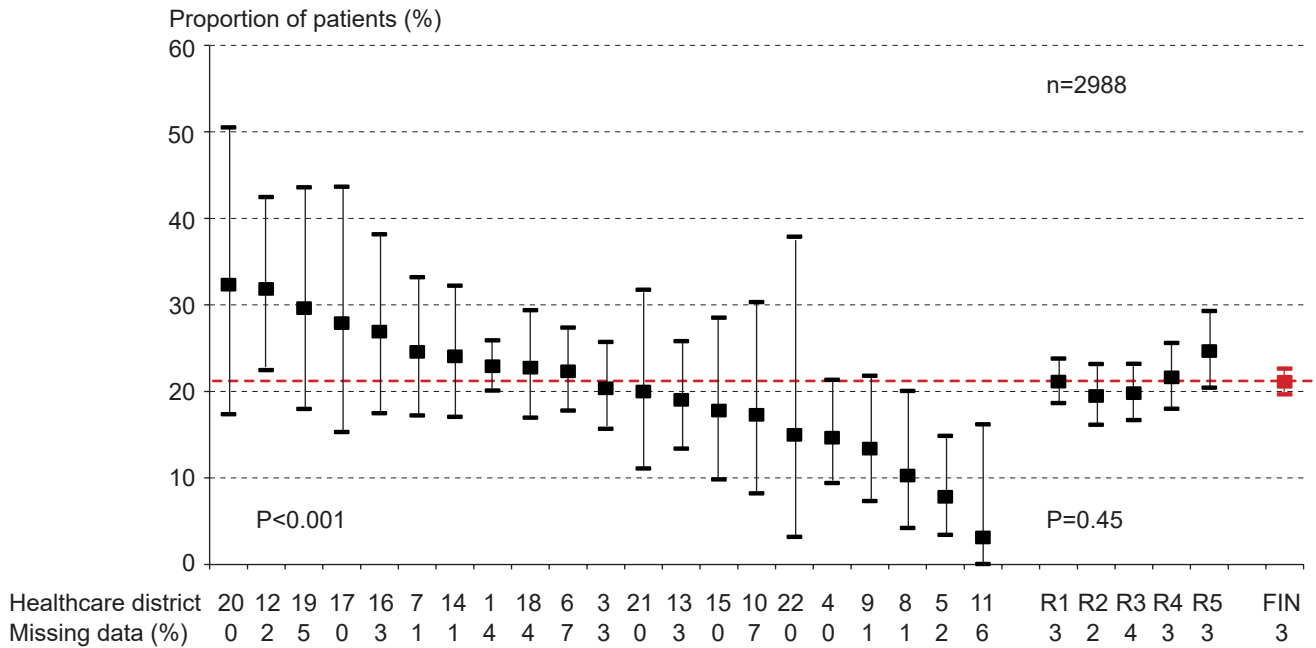


Figure 26. Proportion of kidney transplantation patients older than 20 years with blood pressure <130/80 mmHg in healthcare districts and regions  
Finnish Registry for Kidney Diseases 2019



The KDIGO guidelines suggest that the blood pressure target of kidney transplantation patients be <130 mmHg for systolic blood pressure and <80 mmHg for diastolic blood pressure. Figure 25 shows the blood pressure distribution of kidney transplantation patients at the end of the years 2009–2019. The proportion of patients reaching the target (<130/80 mmHg) was 16% in 2009 and 21% in 2019. The

proportion of patients with blood pressure <140/90 mmHg increased from 44% in 2009 to 56% in 2019.

At the end of 2019, the proportion of kidney transplantation patients attaining the blood pressure target varied between 3% and 32% in healthcare districts ( $P<0.001$ ) and between 19% and 25% in regions ( $P=0.45$ ) (Figure 26). No significant difference was observed between the sexes.

Figure 27. Distribution of serum LDL cholesterol among kidney transplantation patients older than 20 years Finnish Registry for Kidney Diseases 2009–2019

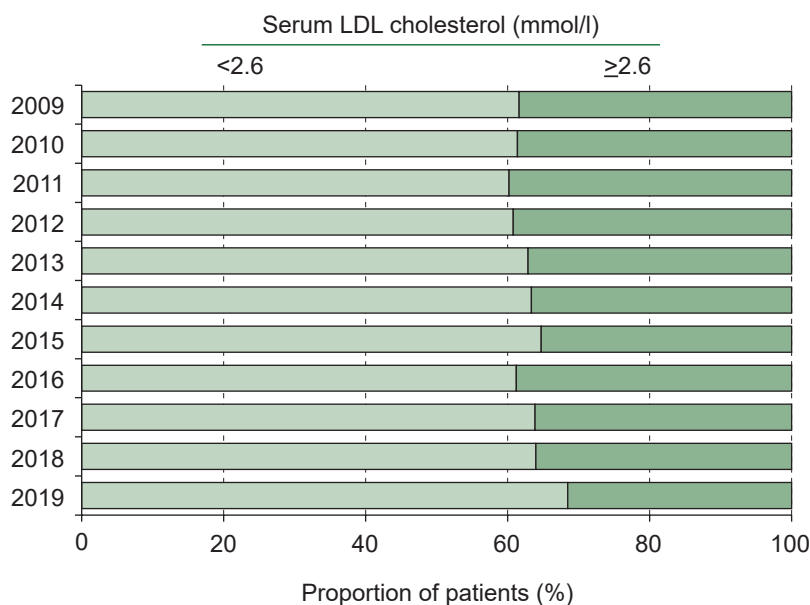
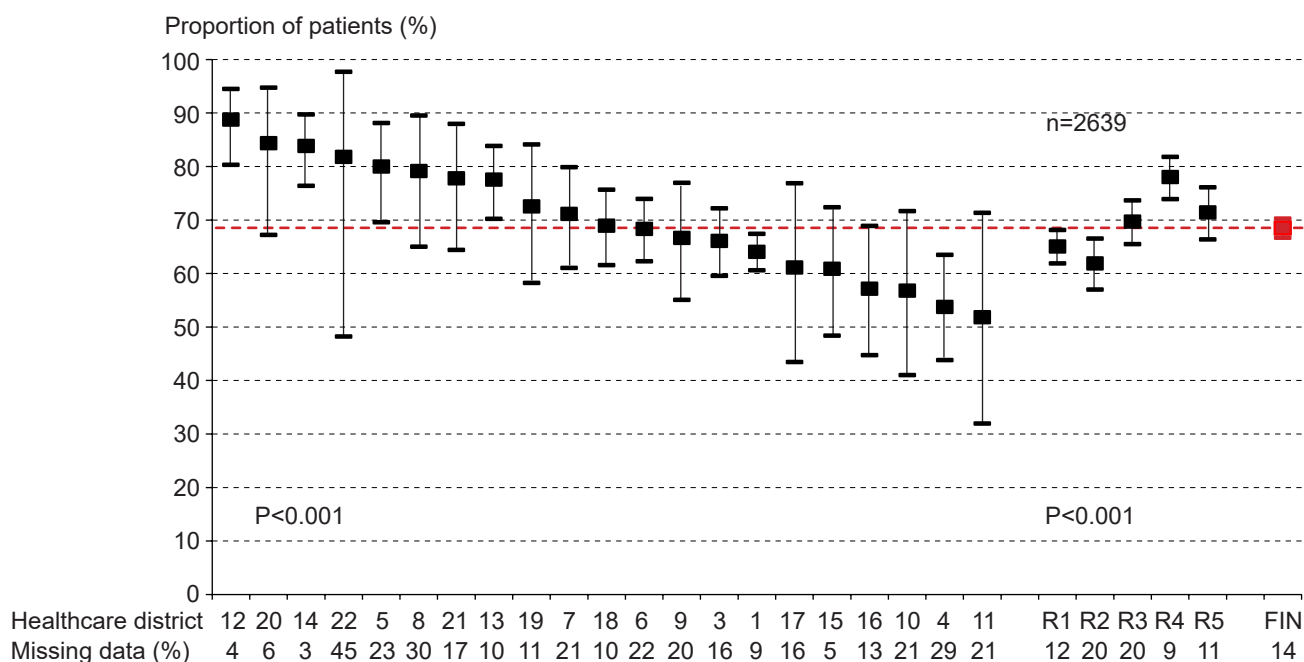


Figure 28. Proportion of kidney transplantation patients older than 20 years with serum LDL cholesterol <2.6 mmol/l in healthcare districts and regions Finnish Registry for Kidney Diseases 2019



According to the KDIGO and KDOQI guidelines, kidney transplantation patients' concentration of serum low-density lipoprotein (LDL) cholesterol should be <2.6 mmol/l. In 2019, 68% of kidney transplantation patients reached this target (Figure 27).

The proportion of kidney transplantation patients reaching the treatment target for LDL cholesterol varied between 52% and 89% in healthcare districts ( $P<0.001$ ) and between 62% and 78% in regions ( $P<0.001$ ) (Figure 28).

Male patients reached the treatment target more often than female patients (71% vs. 64%,  $P<0.001$ ).

The concentration of LDL cholesterol was calculated using the Friedewald formula based on serum concentrations of total cholesterol, high-density lipoprotein (HDL) cholesterol, and triglycerides. Because of restrictions of the Friedewald formula, patients with a triglyceride concentration >4.5 mmol/l were excluded.

Figure 29. Time to waitlisting for kidney transplantation of new RRT patients older than 20 years  
Finnish Registry for Kidney Diseases 2010–2019

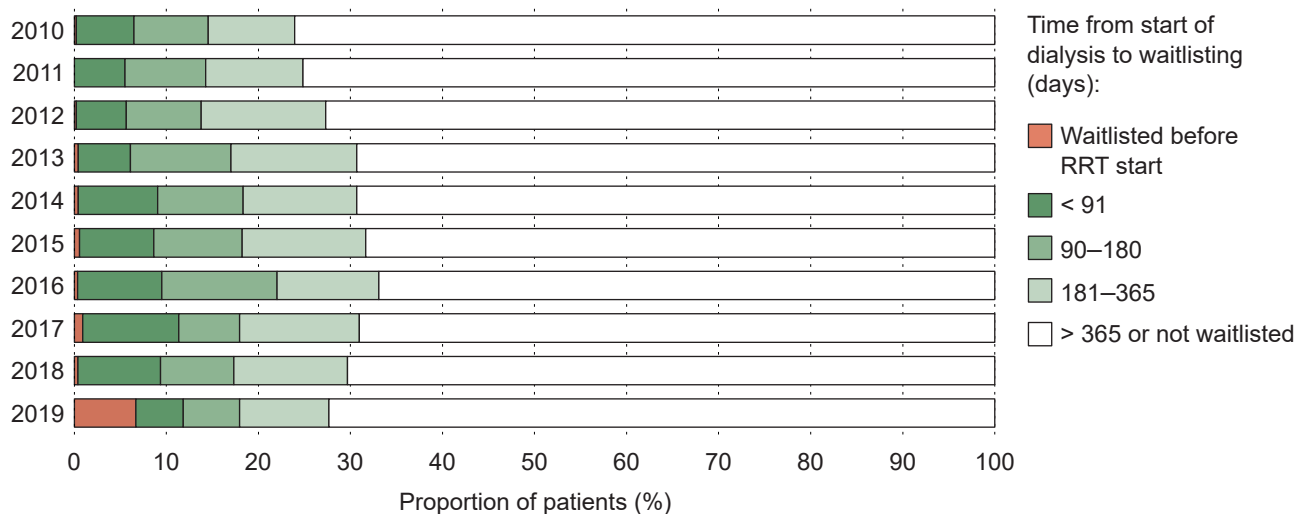
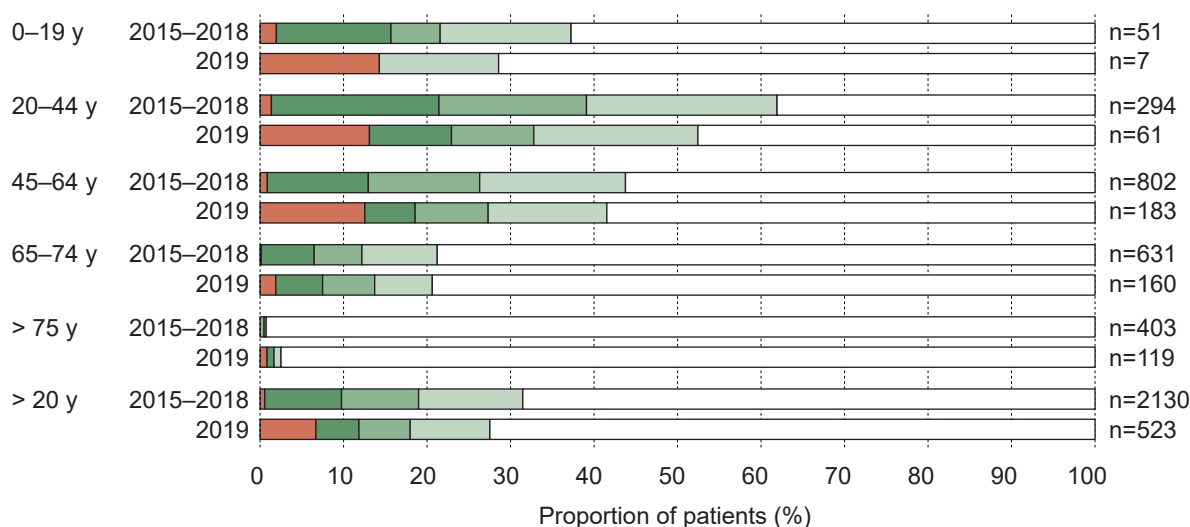


Figure 30. Time to waitlisting for kidney transplantation by age group of new RRT patients  
Finnish Registry for Kidney Diseases 2015–2019



In 2010–2019, altogether 4935 patients older than 20 years entered RRT. Figure 29 shows the time from initiation of RRT to waitlisting for kidney transplantation. Since 1 September 2018, it has been possible to waitlist patients for kidney transplantation from a deceased donor before start of dialysis. Of those who started RRT in 2019, 7% were already waitlisted at the start of RRT, while in 2010–2018 the corresponding proportion was 0.4%. Nevertheless, within 180 days of RRT initiation, the proportion of patients waitlisted, which was 18% in 2019, had not increased relative to previous years.

Information on waitlisting received from the Transplantation Registry at Helsinki University Hospital covered the period up to 16 September 2020. Because of this, a complete follow-up data of 365 days on waitlisting for kidney transplantation were not available for patient starting RRT after 16 September 2019 (n=154) in the analyses of Figures 29–32. If the follow-up period were complete, the proportion of patients who started RRT in 2019 and were waitlisted in

less than a year would increase by about 1% in Figure 29.

Figure 30 shows the time from start of RRT until waitlisting for kidney transplantation by age groups in 2015–2018 and in 2019. Patients aged 20–44 years were waitlisted the most quickly, with the proportion of patients waitlisted decreasing in older age groups. In patients who started RRT in 2019, 13% of those aged 20–64 years, 2% of those aged 65–74 years, and 1% of those aged over 75 years were waitlisted before start of RRT.

Between 1 January 2015 and 31 August 2018, altogether 907 patients (247 patients per year) who had not previously received a kidney transplant were waitlisted for kidney transplantation. Of these patients, 1.6% were not on dialysis. With the introduction of the new waitlisting policy, this proportion has increased to 24% from 1 September 2018 to 31 December 2019. During this time 336 patients (252 patients per year) without a previous kidney transplant were waitlisted.

Figure 31. Time to waitlisting for kidney transplantation of new RRT patients older than 20 years in healthcare regions  
Finnish Registry for Kidney Diseases 2015–2019

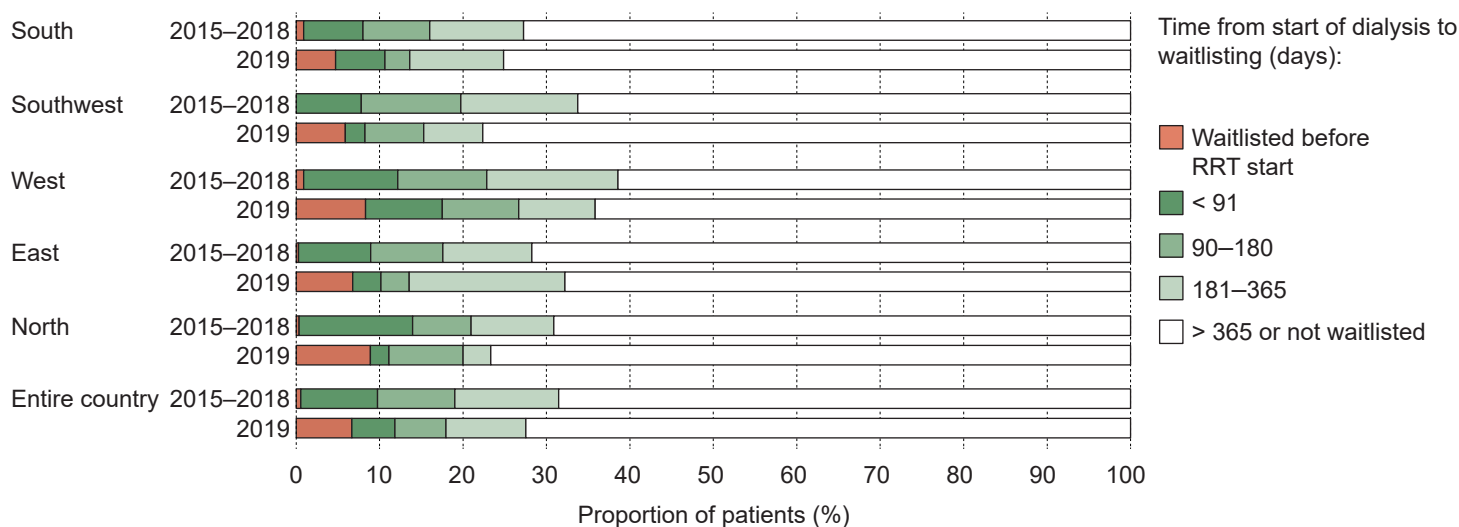


Figure 32. Time to waitlisting for kidney transplantation of new RRT patients older than 20 years  
in healthcare districts and regions  
Finnish Registry for Kidney Diseases 2015–2019

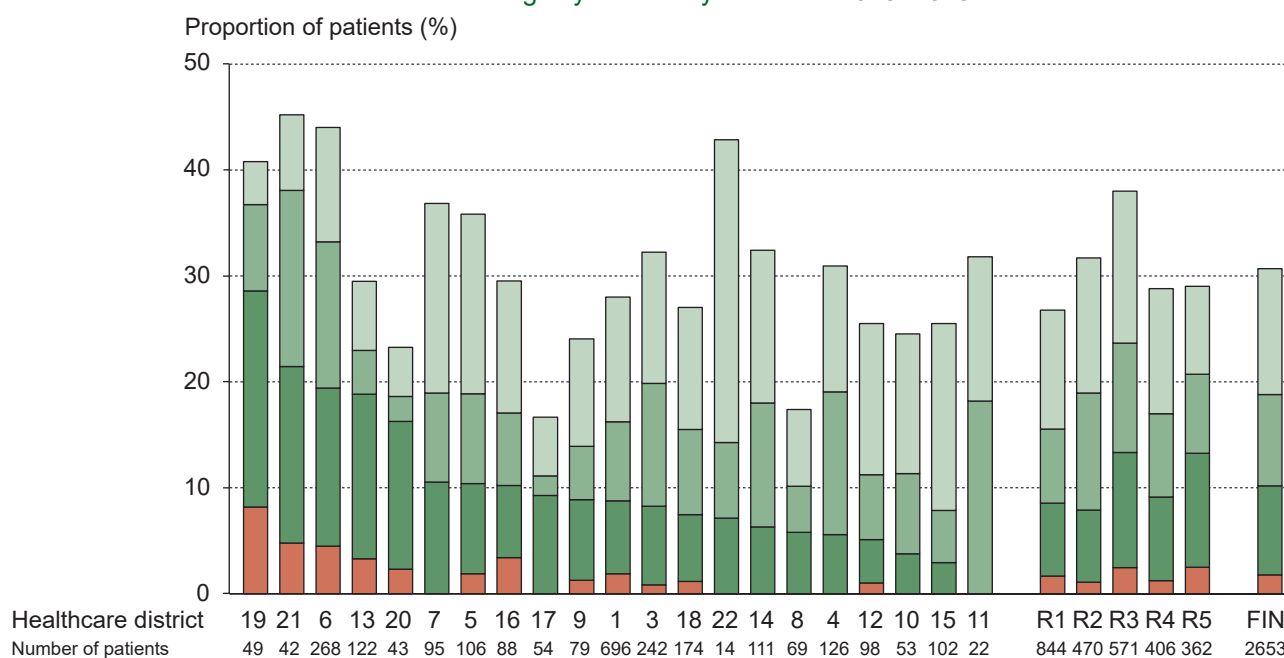


Figure 31 shows the time from start of RRT until waitlisting for kidney transplantation by region in 2015–2018 and in 2019. In all regions, a new practice had been adopted, according to which patients can be waitlisted for kidney transplantation from a deceased donor after 1 September 2018. In 2019, 7% of patients who started RRT had been waitlisted before start of RRT. The proportion was lowest in the southern region (5%) and highest in the northern region (9%), but there was no statistically significant difference between the regions ( $P=0.50$ ). In the entire country, 9% of women and 5% of men who started RRT in 2019 had been waitlisted before start of RRT ( $P=0.07$ ).

Figure 32 shows the proportions of patients waitlisted within

one year of start of RRT in 2015–2019. Of the patients, 10% were waitlisted (or had already received a kidney transplant) within 90 days of start of RRT. This proportion ranged from 0% to 29% in healthcare districts ( $P<0.001$ ) and from 8% to 13% in regions ( $P=0.002$ ). Within 90 days of start of RRT, 12% of women and 9% of men were waitlisted for kidney transplantation ( $P=0.17$ ). Within 180 days of start of RRT, 19% of patients were waitlisted, with the proportion varying between 8% and 38% in healthcare districts ( $P<0.001$ ) and between 16% and 24% in regions ( $P=0.001$ ). Of women, 21%, and of men 18% had been waitlisted within 180 days of start of RRT ( $P=0.12$ ).

Figure 33. Time on dialysis before first kidney transplantation  
Finnish Registry for Kidney Diseases 1970–2019

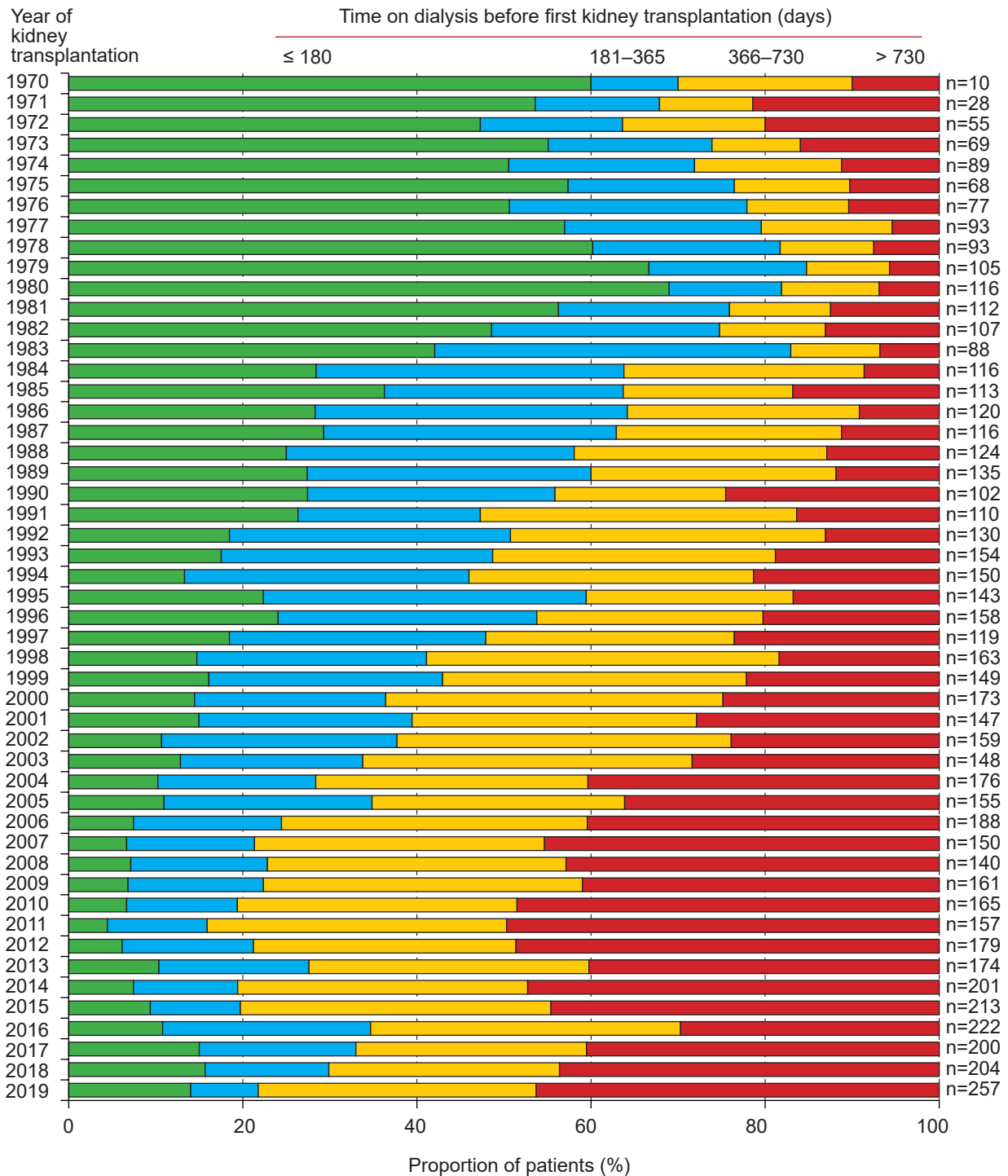


Figure 33 shows time on dialysis before receiving first kidney transplantation in 1970–2019. The proportion of patients receiving kidney transplantation within six months of start of RRT decreased continually between 1970 and 2011, but thereafter the proportion started to increase.

However, the proportion has decreased again during the last four years. A corresponding trend was observed among patients on dialysis over two years before first kidney transplantation.

Figure 34. Prevalence of dialysis modality of patients older than 20 years in age groups  
Finnish Registry for Kidney Diseases 2009-2019

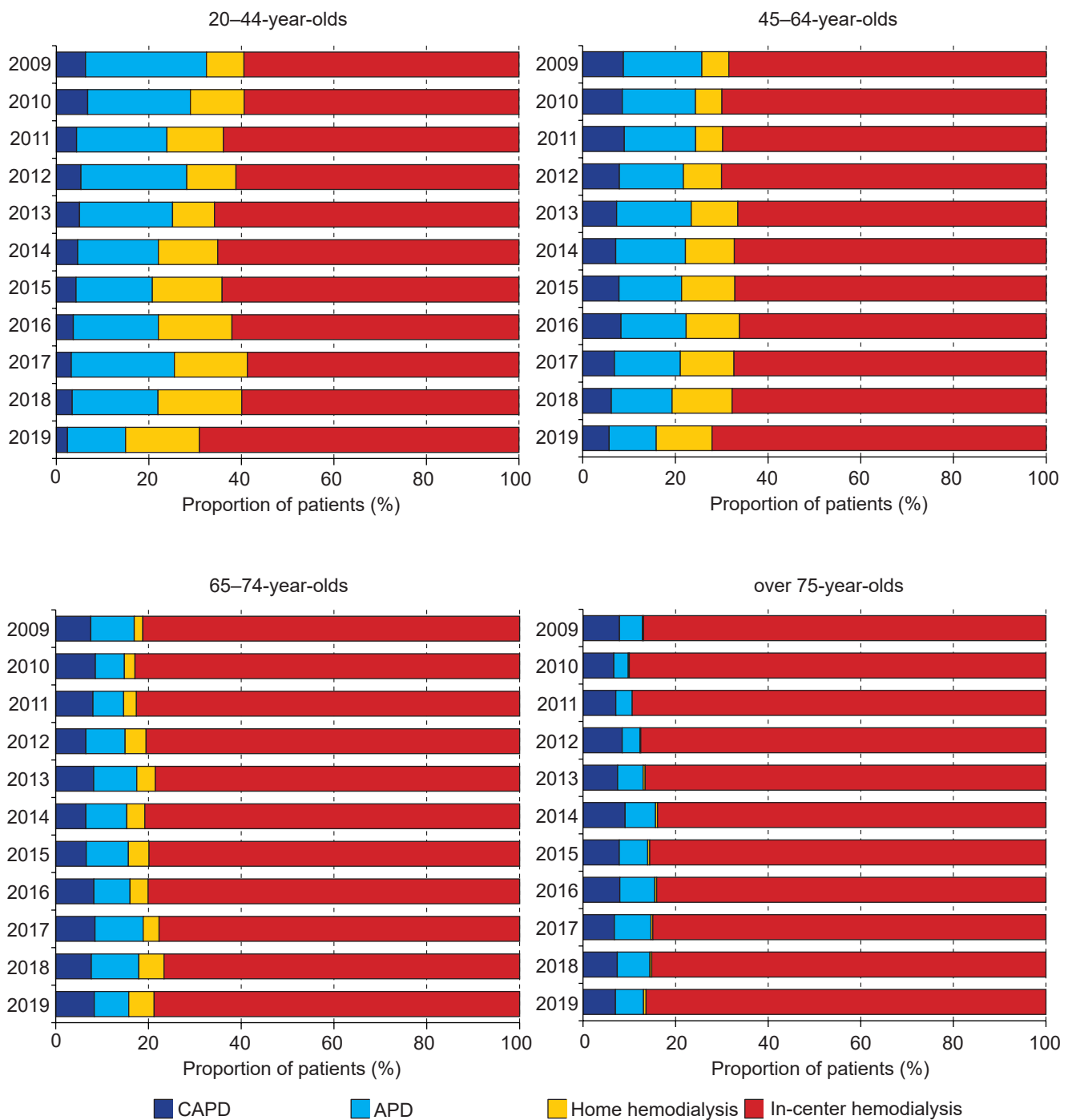


Figure 34 shows the prevalence of dialysis modality in patients older than 20 years at the end of the year by age group. The proportion of home dialysis (CAPD, APD, and home hemodialysis) decreased from 41% to 31% in 20–44-year-olds and from 32% to 28% in 45–64-year-olds between 2009 and 2019, while the proportion of home dialysis in older patients remained stable. The proportion of

home hemodialysis increased in all age groups in 2009–2019. The proportion of peritoneal dialysis decreased from 32% to 15% in patients aged 20–44 years and from 26% to 16% in patients aged 45–64 years, but there was no significant change in older age groups. The changes in peritoneal dialysis were similar in CAPD and APD.

Figure 35. Number of patients older than 20 years on peritoneal dialysis at the end of year  
Finnish Registry for Kidney Diseases 2009-2019

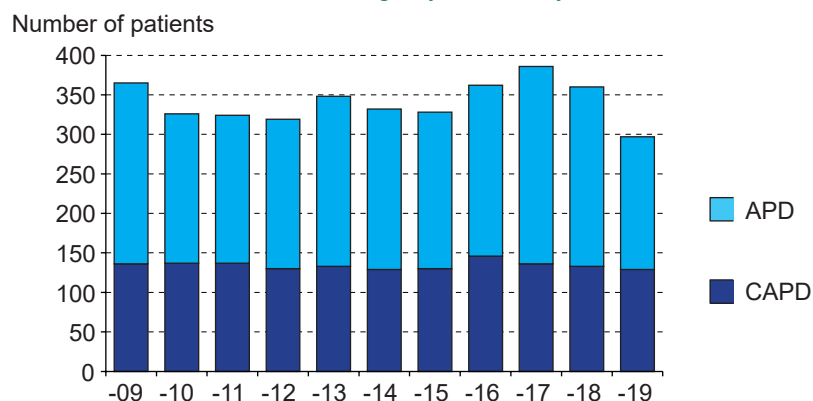


Figure 36. Number of patients older than 20 years changing to peritoneal dialysis  
Finnish Registry for Kidney Diseases 2009-2019

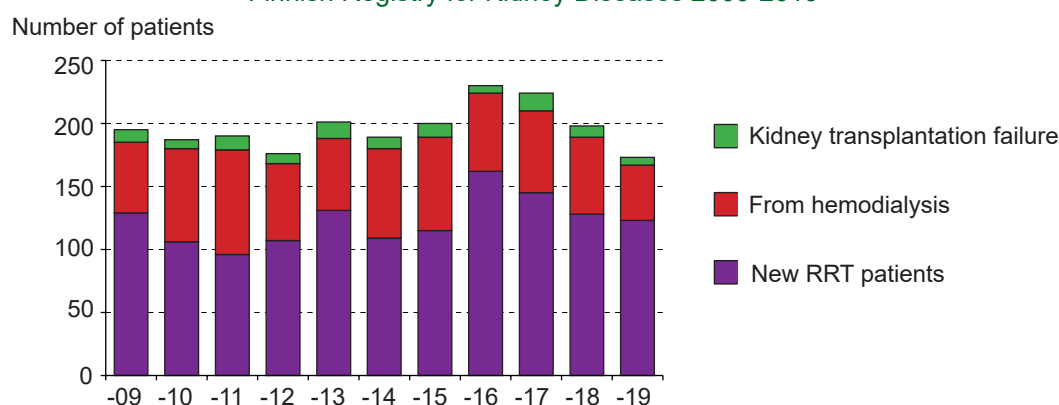


Figure 37. Incidence density of reasons for discontinuation of peritoneal dialysis  
Finnish Registry for Kidney Diseases 2009-2019

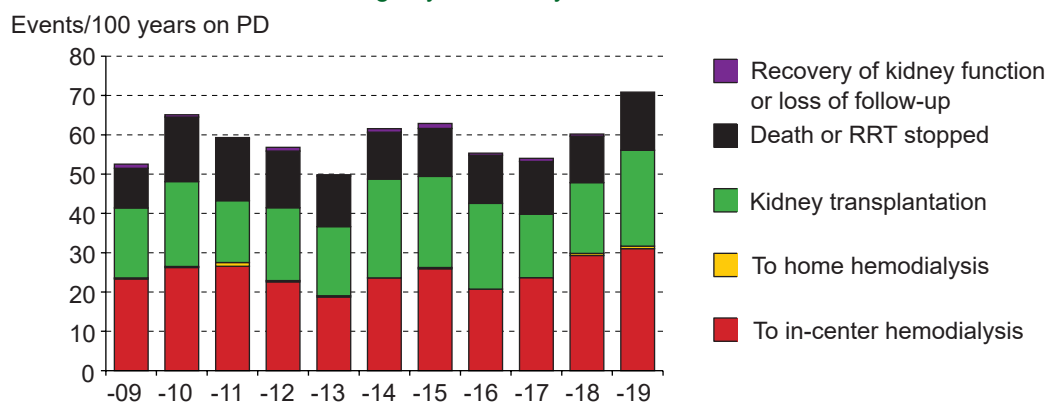


Figure 35 shows the number of peritoneal dialysis patients older than 20 years at the end of the year in 2009–2019. The number of patients varied between 386 patients in 2017 and 297 patients in 2019. Thus, at the end of the follow-up period the number of patients decreased by 23% in two years. The variability in the number of patients was mainly due to changes in APD, while the number of CAPD patients remained stable.

Figure 36 shows the number of patients who changed to peritoneal dialysis according to previous treatment modality. The group of new RRT patients also includes patients whose kidney function was temporarily regained (1%). On average, 62% of those who started peritoneal dialysis in 2009–2019 were new RRT patients, 33% changed from hemodialysis, and 5% had kidney transplant failure. In

2016–2019, the number of patients starting peritoneal dialysis decreased by 25%, the change in the number of new RRT patients being the most significant (from 162 to 123 patients).

Figure 37 shows the incidence density of reasons for discontinuation of peritoneal dialysis in patients older than 20 years in 2009–2019. Change to in-center hemodialysis (52%), receiving a kidney transplant (20%), and death or cessation of RRT (13%) were the most common reasons for discontinuation of peritoneal dialysis relative to patient-years in peritoneal dialysis. Between 2017 and 2019, the incidence density of discontinuation of peritoneal dialysis increased by 41%. The change was mainly due to an increase in kidney transplantation (by 51%) and a change to in-center hemodialysis (increased by 31%).



Figure 38. Number of patients older than 20 years on home hemodialysis at the end of year  
Finnish Registry for Kidney Diseases 2009-2019

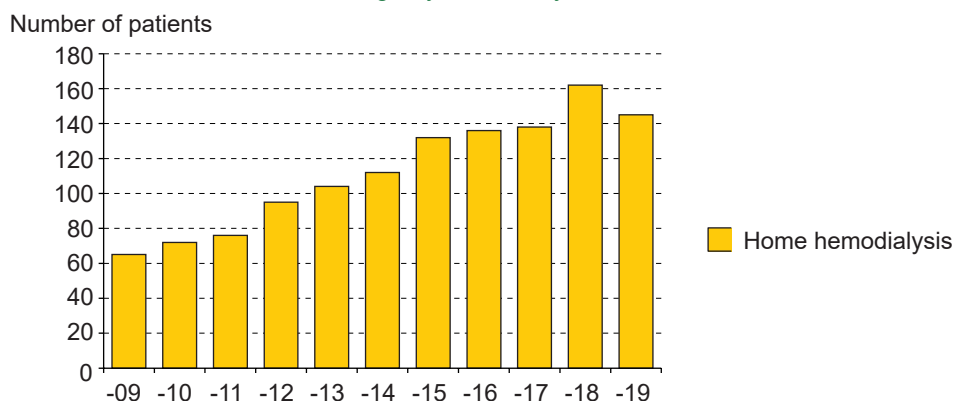


Figure 39. Number of patients older than 20 years changing to home hemodialysis  
Finnish Registry for Kidney Diseases 2009-2019

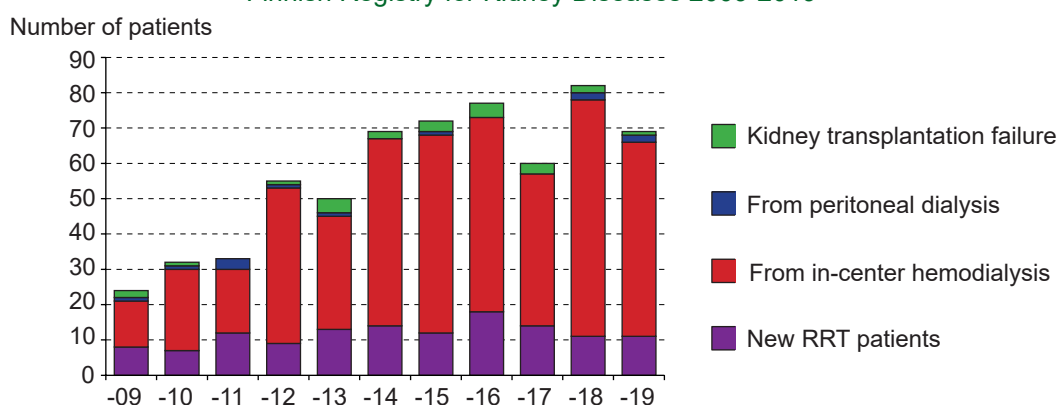


Figure 40. Incidence density of reasons for discontinuation of home hemodialysis  
Finnish Registry for Kidney Diseases 2009-2019

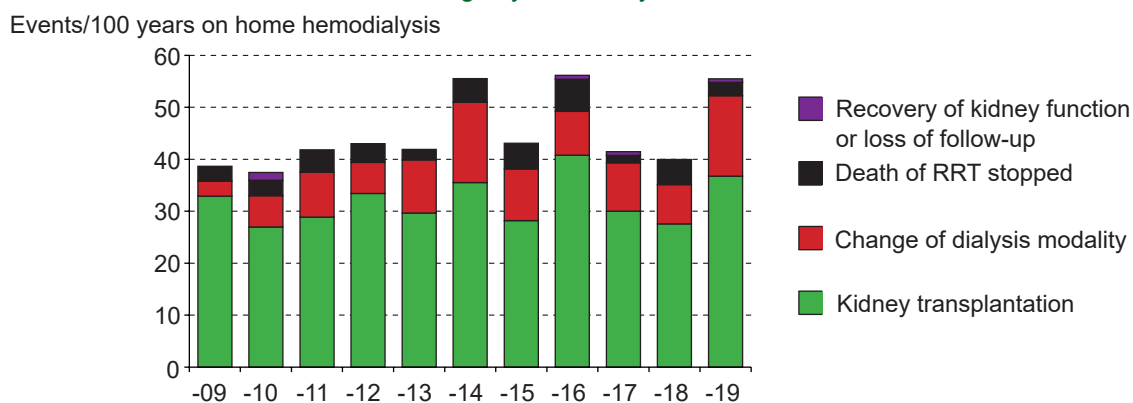


Figure 38 shows the number of home hemodialysis patients older than 20 years at end of year in 2009–2019. The number of patients increased 2.5-fold between 2009 and 2018, but decreased by 10% from 2018 to 2019.

Figure 39 summarizes the number of patients who changed to home hemodialysis according to previous treatment modality in 2009–2019. The majority (74%) of those who started home hemodialysis changed from in-center hemodialysis, and 21% were new RRT patients. Since 2014, the number of patients starting home hemodialysis has remained at the same level, but the proportion of those changing from in-center hemodialysis has increased in recent years.

Figure 40 shows the incidence density of reasons for discontinuation of home hemodialysis in patients older than 20 years in 2009–2019. Kidney transplantation (71%), change in dialysis modality (20%), and death or cessation of RRT (8%) were the most common reasons for discontinuation of home hemodialysis relative to patient-years of home hemodialysis. In 2009–2019, there was no clear trend of change in the incidence density of home hemodialysis discontinuation. The decrease in the number of home hemodialysis patients in 2019 can be explained by the higher number of patients receiving a kidney transplant or changing dialysis modality and the lower number of patients starting home hemodialysis than in the previous year.

Figure 41. Continuing in peritoneal dialysis after dialysis modality start in patients older than 20 years  
Finnish Registry for Kidney Diseases 2010-2019

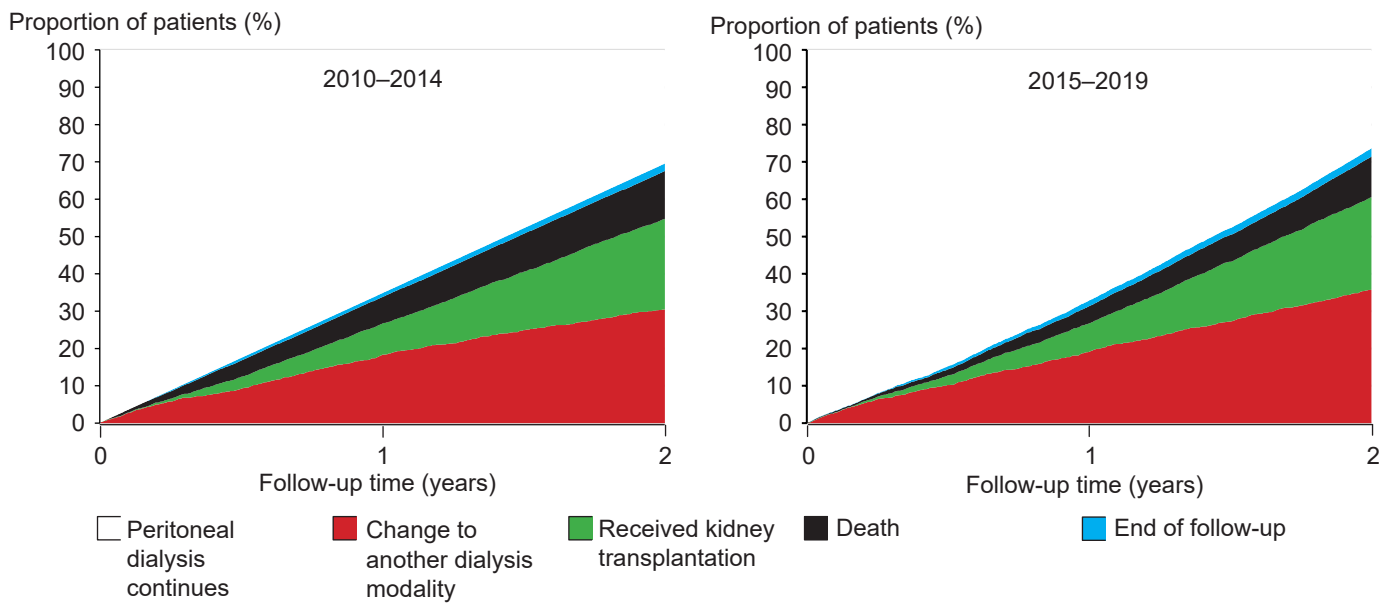
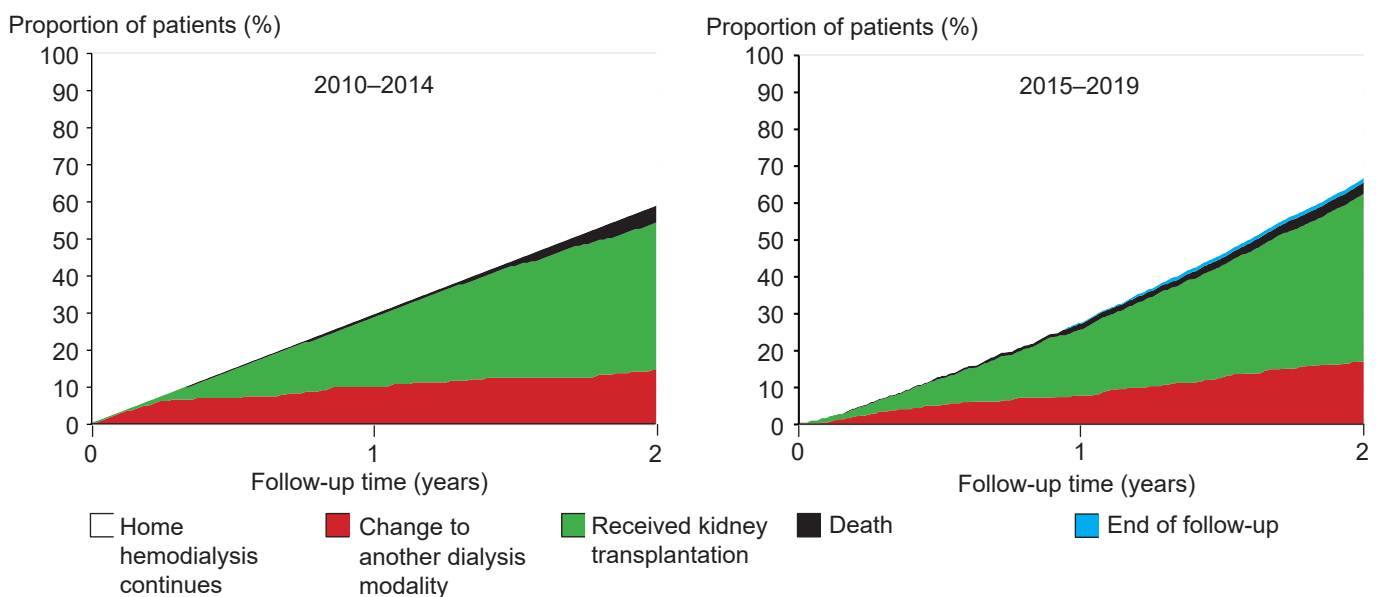


Figure 42. Continuing in home hemodialysis after dialysis modality start in patients older than 20 years  
Finnish Registry for Kidney Diseases 2010-2019



Figures 41 and 42 show the continuation of patients in the initiated home dialysis during the first two years of the treatment modality. The figures presents the proportions of patients who remained on initiated home dialysis modality, switched to another dialysis modality, received a kidney transplant, or died in relation to follow-up time. If patients regained their own renal function, active treatment for uremia was discontinued, or if patients moved abroad, the follow-up ended.

Figure 41 shows the continuation of patients on peritoneal dialysis, comparing those who started this treatment modality in 2010-2014 and with those who started in 2015-2019. Two years after start of treatment, the proportion of those on peritoneal dialysis decreased from 30% to 26%. Correspondingly, the proportion of patients who changed to

another dialysis modality increased from 30% to 36% and the proportion of deceased patients decreased from 13% to 11%. The proportion of those who received a kidney transplant remained at 24-25%.

Figure 42 depicts the continuation of patients on home hemodialysis, comparing those who started home hemodialysis in 2010-2014 with those who started in 2015-2019. Two years after start of treatment, the proportion of those on home hemodialysis decreased from 41% to 33%. Correspondingly, the proportion of patients who changed to another dialysis modality increased from 15% to 17%, the proportion of those who received a kidney transplant increased from 40% to 46%, and the proportion of deceased patients decreased from 5% to 3%.

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# Finnish Registry for Kidney Diseases

## Report 2019



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