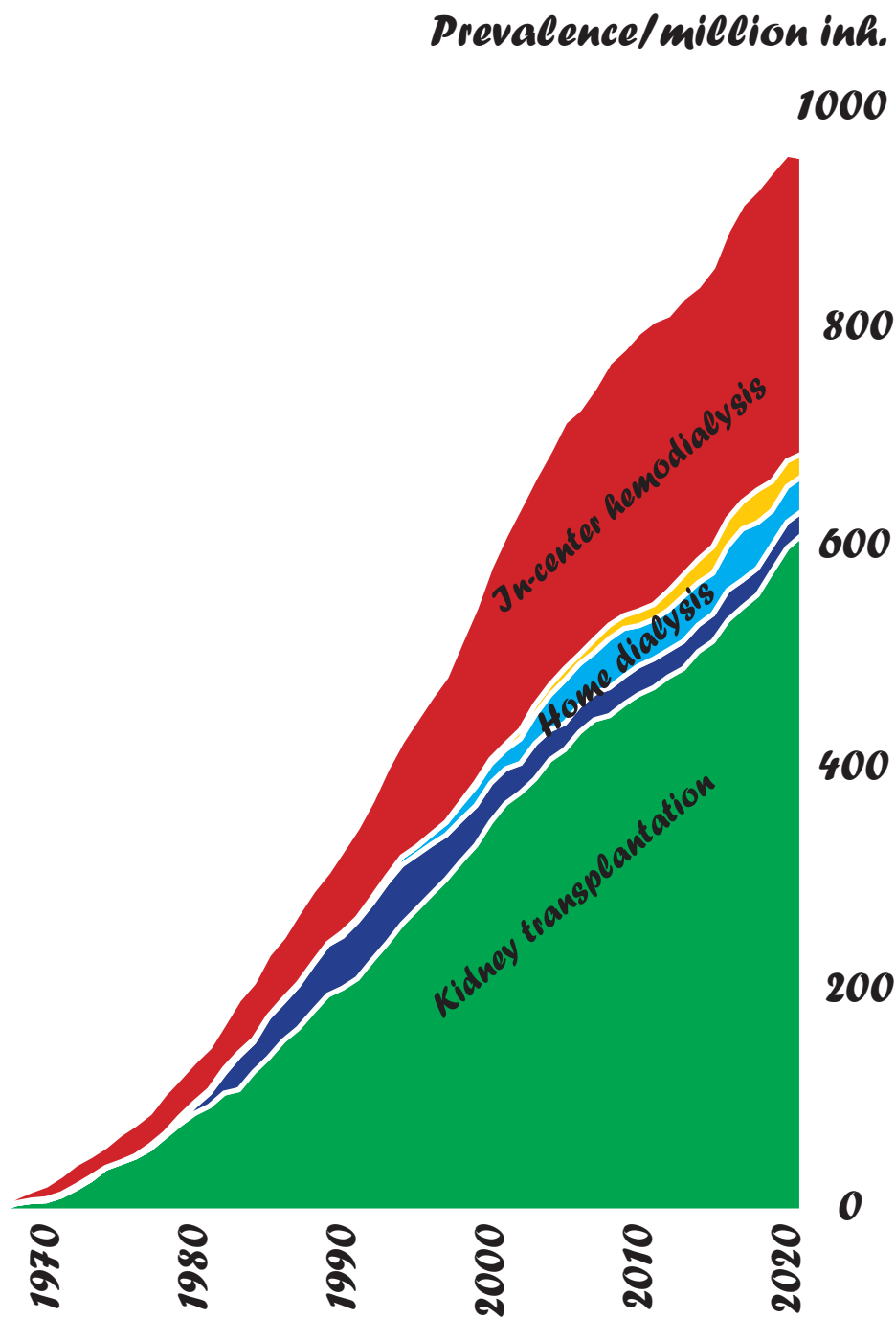


Report 2021

Finnish Registry for Kidney Diseases



Finnish Registry for Kidney Diseases – Report 2021

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Finnish Registry for Kidney Diseases 2021

The Finnish Registry for Kidney Diseases has collected data on almost all kidney replacement therapy patients in Finland since 1964 and has produced an annual report for more than 30 years of the most important results. Efforts had long been made to receive a statutory status for the registry, and on 1 January, 2023, the Finnish Registry for Kidney Diseases was finally awarded statutory status. At the same time, its transfer to the sphere of the Institute for Health and Welfare's responsibility was decided, along with eight other newly statutory healthcare quality registers. The Kidney and Liver Association will continue to maintain the register for the time being. Statutory status enables the collection of data from other databases as well, reducing the need for double data entry and allowing information to be collected more comprehensively. Permission from the patient for data collection will not be needed in the future. However, these new steps in the development of the registry require time and resources, and thus, there will be no immediate major changes to the operation of the registry.

In 2021, altogether 454 new patients started kidney replacement therapy, and the incidence was 82 patients / million inhabitants, which is lower than in previous years. The reason for this may be normal variation, a reporting gap caused by the workload of healthcare personnel, or an actual downward trend in the number of new patients. The number of patients on kidney replacement therapy had remained exactly the same as it was at the end of 2020, and at the end of 2021 there were a total of 5297 patients, of whom 1903 were on dialysis and 3394 had a functioning kidney transplant. This was the first time in the history of the registry that the number of patients did not increase from the previous year. In 2021, the Finnish Society of Nephrology published the Finnish strategy for managing the treatment of severe chronic kidney disease. The main goals of this strategy are to expedite the process of getting on the kidney transplant waitlist and receiving a kidney transplant as well as

to increase the share of home dialysis. The Finnish Registry for Kidney Diseases has an important task in monitoring the realization of these goals. Contrary to the goals, the number of home dialysis patients had, however, declined, and the decrease was greater than in in-center hemodialysis patients. Nevertheless, the numbers of patients accepted to the kidney transplant waitlist and patients who had received a kidney transplant before or soon after start of dialysis rose gratifyingly.

For years, the Finnish Registry for Kidney Diseases has had challenges in funding. However, an increased budget in 2022 made significant improvements possible. Currently, users can only log onto the system with a secure double login, and the database is now situated in a safer environment than before. The development should be continued in order to obtain smooth data transfer and better reports, yielding optimal benefit for the patients from the data collected. Unfortunately, the budget for the new statutory quality registers is significantly lower than expected. Because of this, we must focus on maintaining the registry database, with significant developments remaining for the future when the financial situation improves. To obtain sufficient funding, it is essential to show the significance of the quality registers, which are now even more important for patients in to ensure high-quality and equal treatment when the new welfare areas start operating in Finland in 2023.

Throughout these significant changes in the Finnish Registry for Kidney Diseases, the excellent ongoing cooperation with all partners is more critical than ever. Together, we will make an even better registry!

Jaakko Helve
Administrative Director

Patrik Finne
Chairman of the Board

Summary of Report

Finnish population (pages 9–10)

The Finnish population increased by 2.7% in 2011–2021. The population has grown in seven healthcare districts, most in Helsinki-Uusimaa, Åland, and Pirkanmaa, and decreased in 14 healthcare districts, most in Itä-Savo, Kainuu, Länsi-Pohja, and Etelä-Savo. The proportion of inhabitants older than 65 years has increased in all healthcare districts in 2011–2021. In 2021, the proportion of inhabitants aged under 20 years was highest in the northern region (23%), inhabitants aged 20–64 years in the southern region (59%), and inhabitants aged over 75 years in the eastern, western, and south-western regions (12%).

Incidence of KRT, number of patients entering KRT (pages 11–19)

In 2021, the incidence of kidney replacement therapy (KRT) was 82 patients per million inhabitants which is lower than in the last years. Age- and sex-standardized incidence increased in 2013–2016, decreasing thereafter. Variation between regions has been small. Significant variation has emerged in the incidence of KRT between healthcare districts in 2017–2021, ranging from 74 patients per year per million inhabitants in Åland to 155 in Keski-Pohjanmaa. The difference is explained at least partly by differences in the age structure of the population. Of new KRT patients in 2021, the incidence of KRT is the highest in the group of men aged 75 years or over. During the last five years the incidence of all patients was the highest in the age group 65–74 years in all regions. The incidence of RRT in Finland is still low in an international comparison.

In 2021, the most common kidney disease diagnosis of patients entering KRT was type 2 diabetes, as it has been for the last 20 years. Glomerulonephritis and type 1 diabetes were the second most common kidney disease diagnoses. The incidence of polycystic degeneration and nephrosclerosis has increased in this millennium, although there was decrease in 2021. The incidence of amyloidosis and tubulointerstitial nephritis has decreased. In 2021, three months

after the start of KRT, one-third of the patients were on home dialysis (peritoneal dialysis or home hemodialysis) or had received a kidney transplantation; this proportion has been stable over the past ten years. The proportion of patients receiving kidney transplantation within three months of KRT start has increased to 6%. The proportion of home dialysis has varied between 0% and 45% in healthcare districts in 2017–2021, but the variation was smaller between regions (24–36%).

Prevalence of KRT, number of patients at end of year (pages 20–28)

At the end of 2021, there were 1903 dialysis patients and 3394 kidney transplantation patients in Finland. The number of dialysis patients decreased by 4% and the number of kidney transplantation patients increased by 2% relative to the end of 2020. The prevalence of KRT was 955 per million inhabitants. The prevalence has increased by 18% in ten years, increasing in all regions. The prevalence has increased the most in the age group 75 years and over (30%) and the least in the age group 0–19 years (4%). The prevalence ranged from 824 to 1308 patients per million inhabitants in healthcare districts. Of all dialysis patients, 21% were on home dialysis (16% on peritoneal dialysis and 6% on home hemodialysis) at the end of 2021. In the healthcare districts, the proportion of home dialysis varied from 0% to 40%. The proportion of kidney transplant recipients was 64% of all KRT patients and has increased from previous years. The most frequent kidney disease diagnosis of all KRT patients and kidney transplantation patients was glomerulonephritis. 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 29)

In 2021, altogether 454 new patients started KRT, 440 patients died, and dialysis was discontinued in 12 patients after recovery of kidney function. Treat-

ment was terminated in 72 patients, most of whom had been on hemodialysis (66 patients). During the year 268 patients received a kidney transplant, which is at the same level as in previous years despite the impact of COVID-19. The number of kidney transplantation patients increased by 2%, the number of home hemodialysis patients decreased by 13%, and the number of peritoneal dialysis patients and in-center hemodialysis patients decreased by 3% in 2021.

KRT patients' mortality and survival (page 30–34)

In 2021, the mortality of KRT patients was 83 deaths per 1000 patient-years. During the past ten years age- and sex-standardized mortality has decreased. In 2017–2021, 92% of those who started KRT were alive at one year and 84% at 2 years from the start of treatment. There was a significant difference in the survival probability between regions. The survival probability has continuously improved in 2002–2021. Higher age at initiation of KRT decreases survival significantly, but gender did not have an effect on survival. After adjusting for age and gender, glomerulonephritis and polycystic kidney disease as a primary kidney disease were associated with the best survival prognosis, while the highest risk of death was associated with type 1 and type 2 diabetes and amyloidosis.

Quality of care (pages 35–45)

For already ten years since Report 2012, analyses of quality of care have been presented openly according to the healthcare district and region. The most central analyses are repeated in each annual report.

At the end of 2021, 82% of dialysis patients reached a hemoglobin concentration of ≥ 100 g/l, but the proportion of patients with a hemoglobin concentration < 100 g/l has increased in ten years from 13% to 18%. In patients using erythropoiesis stimulating agents hemoglobin concentration was > 120 g/l in 16% and < 100 g/l in 21%. No temporal changes have occurred

in serum phosphorus concentrations, but there are significant differences between healthcare districts and regions in the treatment of hyperphosphatemia.

The median estimated GFR of those who started KRT in 2021 was 7.6 ml/min/1.73 m². There were significant differences between healthcare districts and regions in estimated GFR levels of patients starting KRT between 2017 and 2021.

In 2021, the proportion of fistula or graft for vascular access in new hemodialysis patients was 44%. The proportion was at the same level as previously and varied significantly between healthcare districts and regions. In all patients on hemodialysis, the proportion of catheters was 16% at the end of 2021.

Of patients on hemodialysis at the end of 2021, the proportion reaching therapeutic goals in blood pressure management of $< 140/90$ mmHg was 44% and there were no differences between healthcare districts and regions. The proportion of kidney transplant patients reaching the blood pressure target level of $< 130/80$ mmHg has increased gradually but was still only 22%.

The number of peritonitis episodes related to peritoneal dialysis has decreased between 2012 and 2021. Across the country PD peritonitis incidence rate was 0.30 peritonitis episodes per patient-year, which is clearly below ISPD's 2022 international recommendation of less than 0.4 peritonitis episodes per patient-year.

In 2021, 11% of patients were waitlisted for kidney transplantation at the beginning of KRT. The proportion has increased significantly from previous years. However, the proportion of those who were waitlisted within 180 days of start of KRT was unchanged compared with previous years. Younger patients were waitlisted faster than older patients. Within 90 days of start of KRT, 13% of patients had been waitlisted, but the proportion varied significantly by region (8–16%).

Table 1. The Finnish population (as thousands of inhabitants) and its distribution in healthcare districts
Finnish Registry for Kidney Diseases 2011–2021

Healthcare district		Year					Change (%) 2011–2021
		2011	2016	2019	2020	2021	
1	Helsinki-Uusimaa	1545	1634	1686	1699	1711	10.7
3	Varsinais-Suomi	470	479	482	484	486	3.3
4	Satakunta	225	222	217	215	214	-4.9
5	Kanta-Häme	175	174	171	171	170	-2.9
6	Pirkanmaa	515	530	537	540	545	5.8
7	Päijät-Häme	213	213	210	209	209	-2.1
8	Kymenlaakso	175	171	164	163	161	-7.7
9	Etelä-Karjala	133	131	128	127	126	-4.8
10	Etelä-Savo	105	102	99	98	97	-8.4
11	Itä-Savo	45	43	40	40	40	-12.3
12	Pohjois-Karjala	170	168	164	164	163	-3.8
13	Pohjois-Savo	248	248	244	244	244	-1.8
14	Keski-Suomi	249	253	253	253	253	1.4
15	Etelä-Pohjanmaa	199	197	193	192	192	-3.5
16	Vaasa	167	170	169	169	170	1.3
17	Keski-Pohjanmaa	78	79	77	77	77	-1.4
18	Pohjois-Pohjanmaa	398	408	410	411	413	3.7
19	Kainuu	78	75	72	72	71	-8.6
20	Länsi-Pohja	65	63	60	60	59	-9.5
21	Lappi	118	118	117	117	118	-0.6
22	Åland	28	29	30	30	30	7.0
Region							
	South	2066	2148	2188	2198	2207	6.9
	Southwest	892	900	898	899	900	1.0
	West	888	900	901	903	906	2.0
	East	818	813	800	797	796	-2.7
	North	738	742	737	737	738	0.0
Entire country		5401	5503	5525	5534	5548	2.7

Figure 1. Healthcare districts and regions in Finland
Finnish Registry for Kidney Diseases 2021

On 31 December 2021, the population of Finland was 5.548 million (Table 1, Source: Statistics Finland). During the past ten years the population of the country has increased by 2.7%, 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.

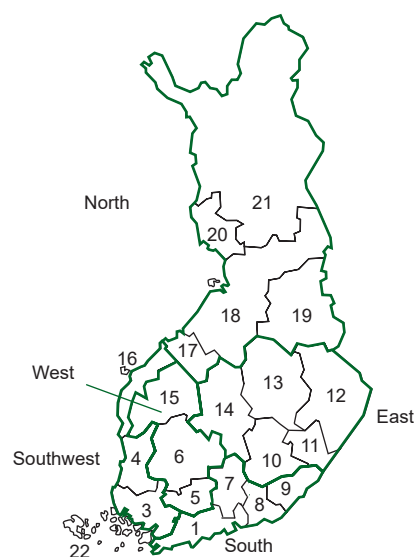


Table 2. The Finnish population (as thousands of inhabitants) according to region, age group, and sex
Finnish Registry for Kidney Diseases 2011–2021

Region	2011					2021				
	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	235 (23)	630 (63)	88 (9)	50 (5)	1003 (100)	235 (22)	654 (60)	113 (10)	79 (7)	1082 (100)
Women	227 (21)	637 (60)	106 (10)	93 (9)	1062 (100)	225 (20)	642 (57)	135 (12)	123 (11)	1125 (100)
Total	462 (22)	1267 (61)	194 (9)	143 (7)	2066 (100)	460 (21)	1297 (59)	248 (11)	202 (9)	2207 (100)
Southwest										
Men	100 (23)	262 (60)	45 (10)	31 (7)	438 (100)	93 (21)	253 (57)	57 (13)	43 (10)	446 (100)
Women	95 (21)	256 (57)	50 (11)	53 (12)	454 (100)	89 (19)	242 (53)	63 (14)	62 (14)	455 (100)
Total	195 (22)	519 (58)	95 (11)	83 (9)	892 (100)	182 (20)	494 (55)	120 (13)	105 (12)	900 (100)
West										
Men	102 (23)	264 (60)	42 (10)	29 (7)	437 (100)	96 (21)	256 (57)	57 (13)	40 (9)	449 (100)
Women	98 (22)	255 (56)	48 (11)	51 (11)	451 (100)	92 (20)	244 (53)	62 (14)	60 (13)	458 (100)
Total	200 (23)	519 (58)	90 (10)	79 (9)	888 (100)	188 (21)	500 (55)	119 (13)	100 (11)	906 (100)
East										
Men	90 (22)	244 (60)	42 (10)	29 (7)	404 (100)	79 (20)	220 (56)	58 (15)	38 (10)	395 (100)
Women	86 (21)	232 (56)	46 (11)	50 (12)	414 (100)	76 (19)	209 (52)	60 (15)	56 (14)	401 (100)
Total	175 (21)	476 (58)	88 (11)	79 (10)	818 (100)	154 (19)	429 (54)	119 (15)	94 (12)	796 (100)
North										
Men	95 (26)	220 (59)	33 (9)	23 (6)	370 (100)	87 (24)	205 (55)	48 (13)	31 (8)	371 (100)
Women	90 (25)	205 (56)	36 (10)	37 (10)	367 (100)	83 (23)	190 (52)	49 (13)	44 (12)	366 (100)
Total	185 (25)	425 (58)	69 (9)	59 (8)	738 (100)	171 (23)	395 (54)	97 (13)	75 (10)	738 (100)
Entire country										
Men	621 (23)	1619 (61)	251 (9)	161 (6)	2653 (100)	590 (22)	1587 (58)	333 (12)	232 (8)	2743 (100)
Women	595 (22)	1585 (58)	285 (10)	283 (10)	2749 (100)	564 (20)	1528 (54)	370 (13)	344 (12)	2805 (100)
Total	1217 (23)	3205 (59)	536 (10)	444 (8)	5401 (100)	1154 (21)	3115 (56)	703 (13)	576 (10)	5548 (100)

Table 2 shows the age and sex distribution of the Finnish population at the end of 2011 and 2021. 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 10%, and the proportion of 65–74-year-olds from 10% to 13%.

At the end of 2021, the proportion of inhabitants older than 65 years was the smallest, 20%, in the southern region, while it was 23–27% in the other regions. During the past ten years the proportion of inhabitants older than 65 years has increased by 31% in the entire country, and the

growth has been the largest in the southern and northern region.

The proportion of inhabitants aged 20–64 years was largest in the southern region, 59%, while it was 54–55% in the other regions. The proportion of 20–64-year-olds country-wide has decreased from 59% to 56%.

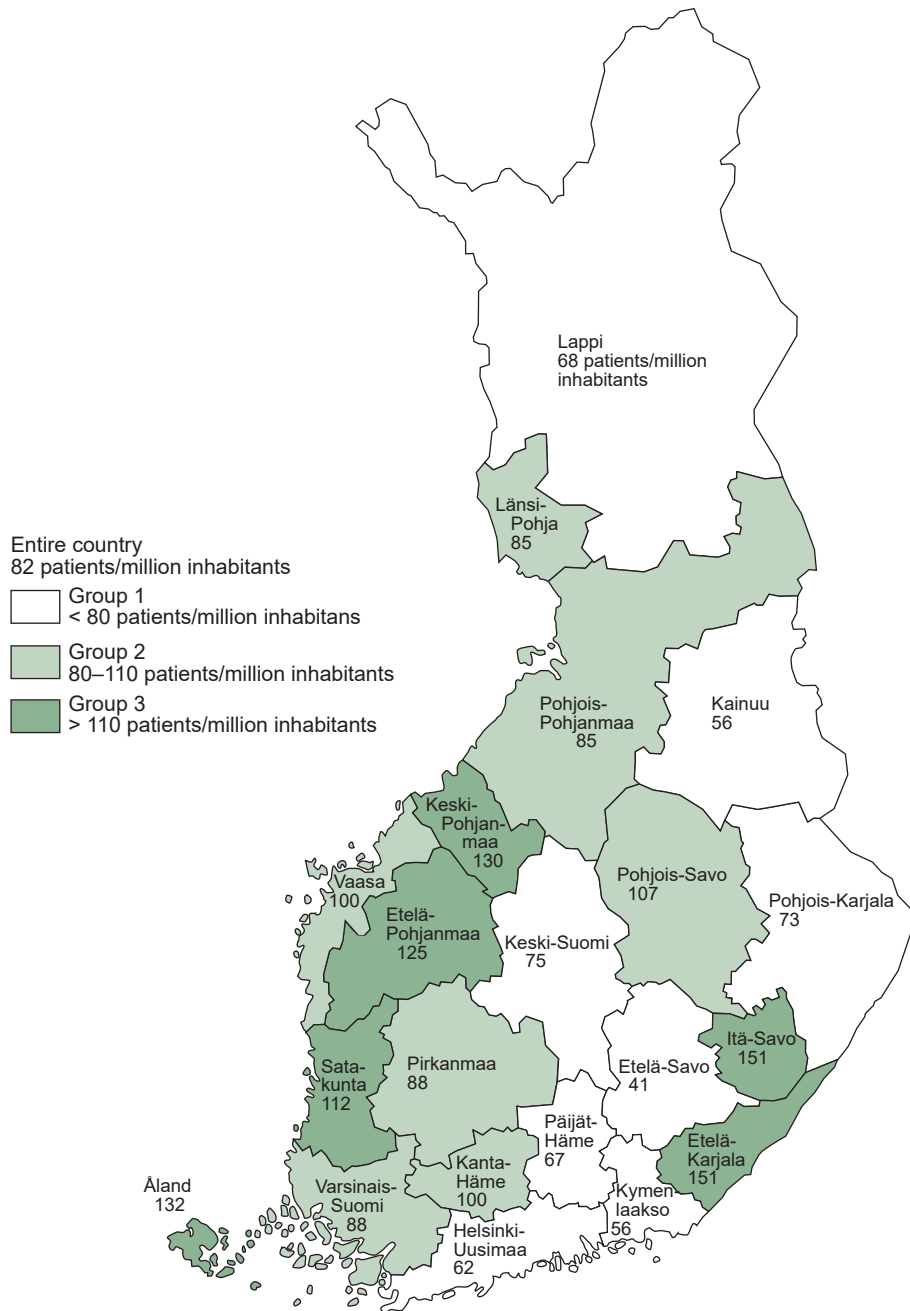
At the end of 2021, the proportion of inhabitants younger than 20 years was the largest, 23%, in the northern region, and it was 19–21% in the other regions. The number of inhabitants younger than 20 years has decreased by 5% during the past ten years.

Table 3. Number of new KRT patients and incidence of KRT by healthcare district and region
Finnish Registry for Kidney Diseases 2011–2021

Healthcare district		Number of new KRT patients						Incidence of KRT/million inhabitants					
		2011	2016	2019	2020	2021	2017–2021 on average	2011	2016	2019	2020	2021	2017–2021 on average
1	Helsinki-Uusimaa	114	148	150	126	106	136	74	91	89	74	62	81
3	Varsinais-Suomi	38	57	45	46	43	47	81	119	93	95	88	97
4	Satakunta	21	31	23	17	24	23	93	140	106	79	112	108
5	Kanta-Häme	28	22	21	18	17	19	160	127	123	106	100	113
6	Pirkanmaa	48	57	66	60	48	56	93	108	123	111	88	103
7	Päijät-Häme	20	25	19	19	14	18	94	118	90	91	67	86
8	Kymenlaakso	8	15	15	16	9	13	46	88	91	98	56	76
9	Etelä-Karjala	14	21	13	12	19	14	106	161	102	95	151	113
10	Etelä-Savo	8	10	6	11	4	8	76	98	61	113	41	85
11	Itä-Savo	5	4	3	3	6	4	111	93	75	75	151	94
12	Pohjois-Karjala	13	15	13	15	12	18	77	89	79	92	73	107
13	Pohjois-Savo	33	32	15	35	26	25	133	129	61	144	107	101
14	Keski-Suomi	21	25	23	20	19	21	84	99	91	79	75	83
15	Etelä-Pohjanmaa	24	25	18	21	24	21	121	127	93	109	125	108
16	Vaasa	16	18	17	17	17	18	96	106	100	100	100	104
17	Keski-Pohjanmaa	5	8	13	16	10	12	64	102	168	207	130	155
18	Pohjois-Pohjanmaa	23	34	45	50	35	41	58	83	110	122	85	101
19	Kainuu	6	11	11	8	4	7	77	147	152	112	56	102
20	Länsi-Pohja	3	6	13	6	5	8	46	96	216	101	85	133
21	Lappi	14	9	10	11	8	9	118	76	86	94	68	78
22	Åland	4	2	2	0	4	3	141	68	67	0	132	74
Region South		156	209	197	173	148	181	76	97	90	79	67	83
Southwest		79	108	87	80	88	90	89	120	97	89	98	100
West		100	104	105	99	89	96	113	116	116	110	98	106
East		80	86	60	84	67	75	98	106	75	105	84	94
North		51	68	92	91	62	78	69	92	125	124	84	106
Entire country		466	575	541	527	454	520	86	104	98	95	82	94
Children <15 y		6	3	5	8	10	8	7	3	6	9	12	10

Table 3 shows the number of new KRT (dialysis and kidney transplantation) patients and the incidence of KRT according to healthcare district and region. In 2021, the incidence was 82 new patients per million inhabitants. In 2017–2021, the average incidence was highest in the western and northern region and lowest in the southern region. In the healthcare districts, the average incidence during the same period was lowest in Åland (74 new KRT patients per million inhabitants) and highest in Keski-Pohjanmaa (155 per million inhabitants).

Figure 2. Incidence of KRT by healthcare district
Finnish Registry for Kidney Diseases 2021



The healthcare districts shown on the map are grouped according to the incidence of KRT at the end of 2021 (Figure 2). The incidence per million inhabitants was <80 in eight districts, 80–110 in seven districts, and >110 in six districts.

Table 4. Number of new KRT patients by age group in healthcare districts and regions
Finnish Registry for Kidney Diseases 2017–2021

Healthcare district		Average annual number of new KRT patients in 2017–2021 by age group (y)						Incidence*/million inhabitants in 2017–2021 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	4.2	23.0	44.0	37.0	27.8	136	11	38	105	214	225	81
3	Varsinais-Suomi	0.6	4.8	15.0	15.6	10.8	47	6	32	123	247	217	97
4	Satakunta	0.2	3.8	9.4	6.2	3.8	23	5	65	165	191	145	108
5	Kanta-Häme	0.4	3.2	7.0	4.4	4.4	19	11	70	151	180	236	113
6	Pirkanmaa	0.8	7.4	18.8	18.8	9.8	56	7	42	143	283	188	103
7	Päijät-Häme	0.2	1.6	7.2	5.6	3.4	18	5	28	129	175	141	86
8	Kymenlaakso	0.0	1.6	3.8	4.4	2.8	13	0	38	83	171	138	76
9	Etelä-Karjala	0.0	2.0	3.8	5.4	3.2	14	0	57	110	282	202	113
10	Etelä-Savo	0.0	1.6	3.6	2.0	1.2	8	0	67	131	121	91	85
11	Itä-Savo	0.0	0.8	1.2	1.0	0.8	4	0	90	103	137	134	94
12	Pohjois-Karjala	0.2	2.2	7.2	5.2	2.8	18	6	47	166	208	150	107
13	Pohjois-Savo	1.0	5.2	7.6	6.6	4.2	25	21	74	118	189	158	101
14	Keski-Suomi	0.8	3.4	8.4	6.4	2.0	21	15	42	137	198	82	83
15	Etelä-Pohjanmaa	0.8	2.6	7.0	5.6	4.8	21	18	50	142	205	221	108
16	Vaasa	0.6	2.6	2.8	5.0	6.6	18	16	50	70	240	367	104
17	Keski-Pohjanmaa	0.0	1.2	3.6	3.4	3.8	12	0	56	194	329	477	155
18	Pohjois-Pohjanmaa	1.0	4.2	11.6	15.8	8.8	41	10	33	120	342	258	101
19	Kainuu	0.2	0.6	2.8	2.0	1.8	7	15	33	139	173	201	102
20	Länsi-Pohja	0.0	0.6	3.2	2.6	1.6	8	0	39	198	280	235	133
21	Lappi	0.4	1.8	4.0	2.4	0.6	9	17	53	126	146	49	78
22	Åland	0.0	0.2	1.0	0.4	0.6	2	0	23	124	105	203	74
Region South		4.4	28.2	58.8	52.4	37.2	181	10	38	106	210	202	83
Southwest		1.4	11.4	28.2	27.2	21.8	90	8	42	124	226	225	100
West		2.0	13.2	32.8	28.8	19.0	96	10	48	144	244	205	106
East		2.0	13.2	28.0	21.2	11.0	75	13	58	134	183	124	94
North		1.6	8.4	25.2	26.2	16.6	78	9	39	137	279	237	106
Entire country		11.4	74.4	173.0	155.8	105.6	520	10	43	123	223	198	94

*Average annual incidence of KRT in subgroup

Table 4 presents the average annual number of new KRT patients and the incidence of KRT in 2017–2021 according to healthcare district, region, and age group. The incidence was highest among 65–74-year-olds and varied in this age group from 105 to 342 in the healthcare districts.

In the age group of 75 years and over, the incidence was 198 new KRT patients per million age-related inhabitants, with a range of 49–477 in healthcare districts and a range of 124–237 in regions.

Table 5. Number of new KRT patients by age group and sex
Finnish Registry for Kidney Diseases 2011–2021

Age group		Number of new KRT patients					Incidence of KRT/million inhabitants				
		2011	2016	2019	2020	2021	2011	2016	2019	2020	2021
0–19 y	Men	3	2	4	7	8	5	3	7	12	14
	Women	8	4	3	4	4	13	7	5	7	7
	Total	11	6	7	11	12	9	5	6	9	10
20–44 y	Men	38	61	44	45	45	44	69	49	51	50
	Women	21	31	28	43	21	26	37	33	51	25
	Total	59	92	72	88	66	35	54	42	51	38
45–64 y	Men	119	134	109	103	94	157	186	156	148	135
	Women	62	74	69	63	47	81	102	99	91	68
	Total	181	208	178	166	141	119	143	127	119	102
65–74 y	Men	89	106	106	106	86	355	344	316	316	258
	Women	43	46	58	53	44	151	135	156	142	119
	Total	132	152	164	159	130	246	234	232	225	185
≥75 y	Men	55	77	77	71	83	342	401	373	325	357
	Women	28	40	43	32	22	99	130	135	97	64
	Total	83	117	120	103	105	187	234	229	188	182
Total	Men	304	380	340	332	316	115	140	125	121	115
	Women	162	195	201	195	138	59	70	72	70	49
	Total	466	575	541	527	454	86	104	98	95	82

Table 5 shows the number of new KRT patients and the incidence of KRT according to age group and sex in 2011–2021. The number of new KRT patients was smaller in 2021 compared to the previous years. The incidence has increased in the age groups of 65 years during the last ten years. Of the new KRT patients in 2021, 70% were men.

The incidence was 82 new patients per million inhabitants in 2021. The highest incidence was in the group of men 75 years and over.

Figure 3. Standardized incidence of KRT in regions Finnish Registry for Kidney Diseases 2011–2021

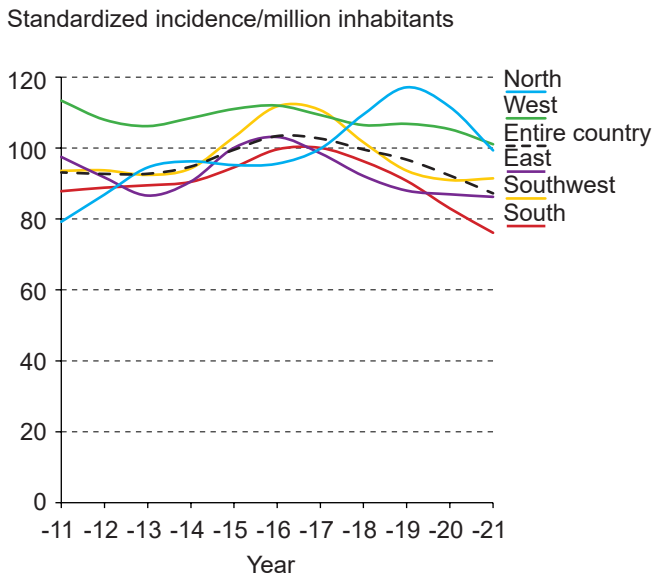


Figure 4. Standardized incidence of KRT in regions 90 days after start of KRT Finnish Registry for Kidney Diseases 2011–2021

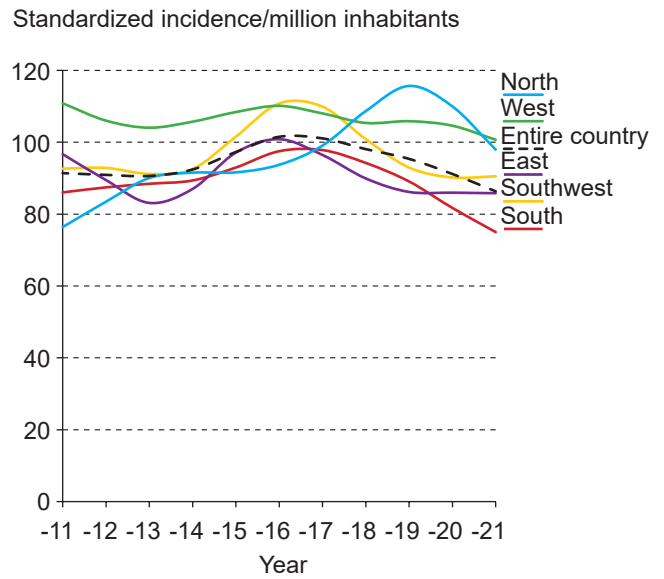
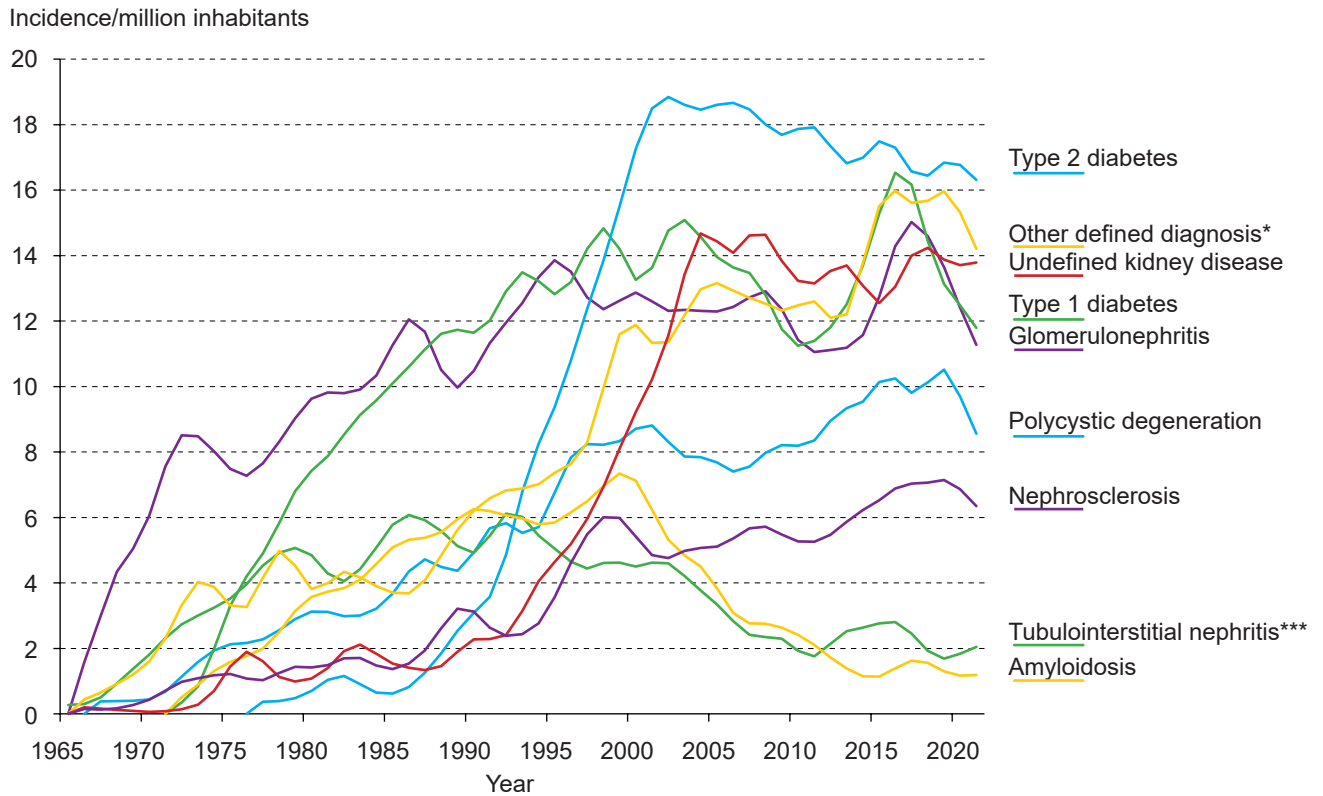


Figure 3 shows the regional incidence of KRT in 2011–2021 as smoothed averages. The incidence rates are age- and sex-standardized using the Finnish general population on 31 December 2021 as the reference. Population changes in 2011–2021 have been taken into consideration. Standardization removes the 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 4 shows the age- and sex-standardized regional incidence of KRT 90 days after the start of KRT. The Finnish Registry for Kidney Diseases does not store data on patients who have regained renal function within 90 days of start of KRT because in that case KRT is not considered chronic. However, the registry does store information on patients who died or moved abroad within 90 days of start of KRT, but these patients were excluded from Figure 4.

Figure 5. Incidence of KRT according to diagnosis
Finnish Registry for Kidney Diseases 1965–2021



*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 KRT according to diagnosis appears as smoothed averages in Figure 5. Until the end of the 1990s, the incidence increased in almost all diagnostic groups, but thereafter the increase stopped. In the beginning of the 2010s the incidence of type 1 diabetes and glomerulonephritis was larger than before, but now the incidence of these diagnoses have decreased. The incidence of nephrosclerosis and polycystic degeneration has steadily increased. The incidence of tubulointerstitial nephritis and amyloidosis has decreased.

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 group of other defined diagnoses has grown considerably, being the second largest diagnosis group in 2021.

In 2021, altogether 72 new KRT patients had been as-

signed the “other defined diagnosis”. The most common diagnoses were urinary tract obstruction (n=12), vasculitis (n=7), Goodpasture syndrome (n=6), myeloma (n=5), urinary tract cancer (n=4), Alport syndrome (n=3), systemic lupus erythematosus (n=2), and thrombotic microangiopathy (n=2).

Of the 72 patients, 20 had an ICD-10 code of N18.8, indicating other defined kidney disease, but no further specification was given. Of these patients, 19 had an ERA-EDTA diagnosis code, specifying the diagnosis for 8 patients, whereas for 11 patients the kidney disease remained unknown.

An ICD-10 code was N18.9, indicating undefined kidney disease, in 71 patients. Of these patients, ERA-EDTA diagnosis code specified the diagnosis for 4 patients.

Table 6. New RRT patients' primary renal disease according to the ERA coding system
Finnish Registry for Kidney Diseases 2021

ERA diagnosis		Number of patients	ICD-10-code	
Code	Description		Defined	Undefined
2337	Diabetic nephropathy in type II diabetes - no histology	76	75	1
3555	Chronic kidney disease (CKD) / chronic renal failure (CRF) - aetiology uncertain / unknown - no histology	67	4	63
2316	Diabetic nephropathy in type I diabetes - no histology	54	54	
2718	Autosomal dominant (AD) polycystic kidney disease	39	38	1
1128	IgA nephropathy - histologically proven	29	29	
2359	Chronic hypertensive nephropathy - no histology	27	26	1
2344	Diabetic nephropathy in type II diabetes - histologically proven	11	11	
3564	Chronic kidney disease (CKD) - aetiology uncertain / unknown - histologically proven	9	1	8
3708	Chronic renal failure	7		7
1035	Congenital nephrotic syndrome (CNS) - Finnish type - no histology	6	6	
1897	Tubulointerstitial nephritis - histologically proven	6	6	
3749	Glomerulonephritis - no histology	6	6	
1752	Acquired obstructive uropathy / nephropathy	5	4	1
1775	Obstructive nephropathy due to prostatic hypertrophy	5	3	2
1267	Primary focal segmental glomerulosclerosis (FSGS)	4	4	
1472	Anti-Glomerular basement membrane (GBM) disease / Goodpasture's syndrome - histologically proven	4	4	
2328	Diabetic nephropathy in type I diabetes - histologically proven	4	4	
2363	Chronic hypertensive nephropathy - histologically proven	4	3	1
2578	Myeloma kidney - no histology	4	4	
1185	Membranous nephropathy - idiopathic	3	3	
1377	Glomerulonephritis - histologically indeterminate	3	3	
1687	Posterior urethral valves	3	3	
1884	Tubulointerstitial nephritis - no histology	3	3	
2513	AA amyloid secondary to chronic inflammation	3	3	
2725	Autosomal dominant (AD) polycystic kidney disease type I	3	3	
1003	Adult nephrotic syndrome - no histology	2	2	
1222	Mesangiocapillary glomerulonephritis type 1	2	2	
1312	Focal segmental glomerulosclerosis (FSGS) secondary to obesity - no histology	2	1	1
1417	Granulomatosis with polyangiitis - histologically proven	2	2	
1429	Microscopic polyangiitis - histologically proven	2	2	
1464	Anti-Glomerular basement membrane (GBM) disease / Goodpasture's syndrome - no histology	2	2	
1493	Systemic lupus erythematosus / nephritis - histologically proven	2	2	
2149	Nephropathy due to lithium - no histology	2	2	
2424	Renal artery stenosis	2	2	
2509	Renal amyloidosis	2	2	
2521	AL amyloid secondary to plasma cell dyscrasia	2	2	
2623	Atypical haemolytic uraemic syndrome (HUS) - diarrhoea negative	2	1	1
2760	Alport syndrome - histologically proven	2	2	
2794	Cystic kidney disease	2	2	
3276	Tuberous sclerosis	2	2	
3529	Chronic kidney disease (CKD) / chronic renal failure (CRF) caused by tumour nephrectomy	2	1	1
3691	Renal failure	2		2
1251	Idiopathic rapidly progressive (crescentic) glomerulonephritis	1	1	
1349	Mesangial proliferative glomerulonephritis	1	1	
1354	Focal and segmental proliferative glomerulonephritis	1	1	
1383	Systemic vasculitis - ANCA negative - histologically proven	1	1	
1396	Systemic vasculitis - ANCA positive - no histology	1	1	
1401	Granulomatosis with polyangiitis - no histology	1	1	
1602	Primary reflux nephropathy - sporadic	1	1	
1660	Congenital pelvi-ureteric junction obstruction	1	1	
1706	Congenital neurogenic bladder	1	1	
1799	Obstructive nephropathy due to bladder cancer	1	1	
1809	Obstructive nephropathy due to other malignancies	1	1	
1813	Idiopathic retroperitoneal fibrosis	1	1	
1924	Tubulointerstitial nephritis associated with autoimmune disease - no histology	1	1	
1930	Tubulointerstitial nephritis associated with autoimmune disease - histologically proven	1	1	
2067	Nephropathy due to tacrolimus - no histology	1	1	
2385	Malignant hypertensive nephropathy / accelerated hypertensive nephropathy - histologically proven	1	1	
2407	Ischaemic nephropathy - no histology	1		1
2411	Ischaemic nephropathy / microvascular disease - histologically proven	1		1
2495	Hepatorenal syndrome	1	1	
2584	Myeloma cast nephropathy - histologically proven	1	1	
2597	Light chain deposition disease	1	1	
2610	Haemolytic uraemic syndrome (HUS) - diarrhoea associated	1	1	
2756	Alport syndrome - no histology	1	1	
2804	Medullary cystic kidney disease type I	1	1	
3380	Acute kidney injury	1		1
3403	Acute kidney injury due to circulatory failure	1		1
3419	Acute kidney injury due to sepsis	1		1
3442	Acute cortical necrosis	1		1
3474	Renal cell carcinoma - histologically proven	1	1	
	ERA diagnosis not reported	6	2	4
Total		454	354	100

Table 6 shows diagnoses according to the ERA coding system for primary renal disease of patients who entered KRT in 2021. Altogether, 71 different codes were used. Type 1 and type 2 diabetes were the most frequent diagnoses. Ac-

ording to the ICD-10 code, 100 patients had an undefined diagnosis, and in 22 of these cases the ERA code gave more specific information about the kidney disease.

Figure 6. Type of treatment at 90 days from start of KRT
Finnish Registry for Kidney Diseases 2011–2021

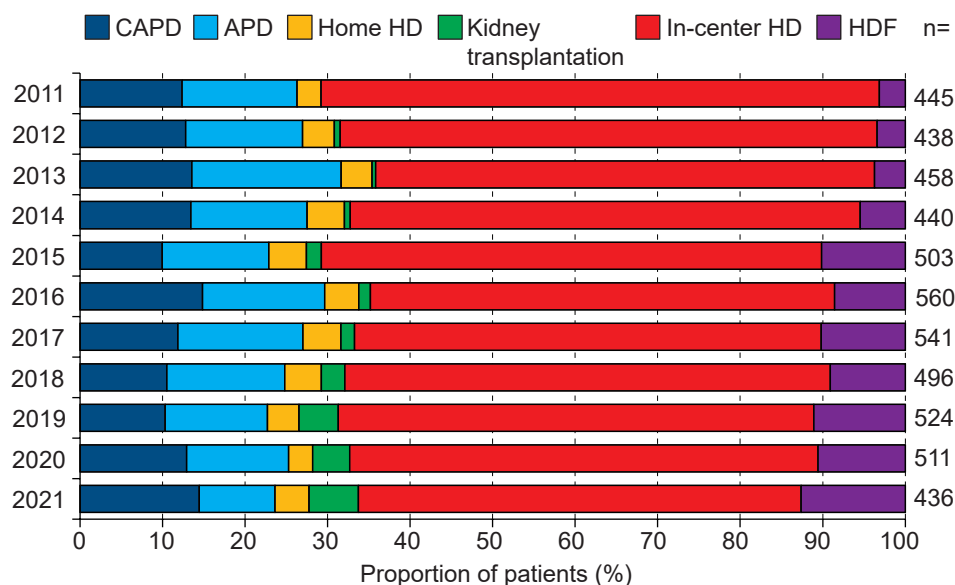
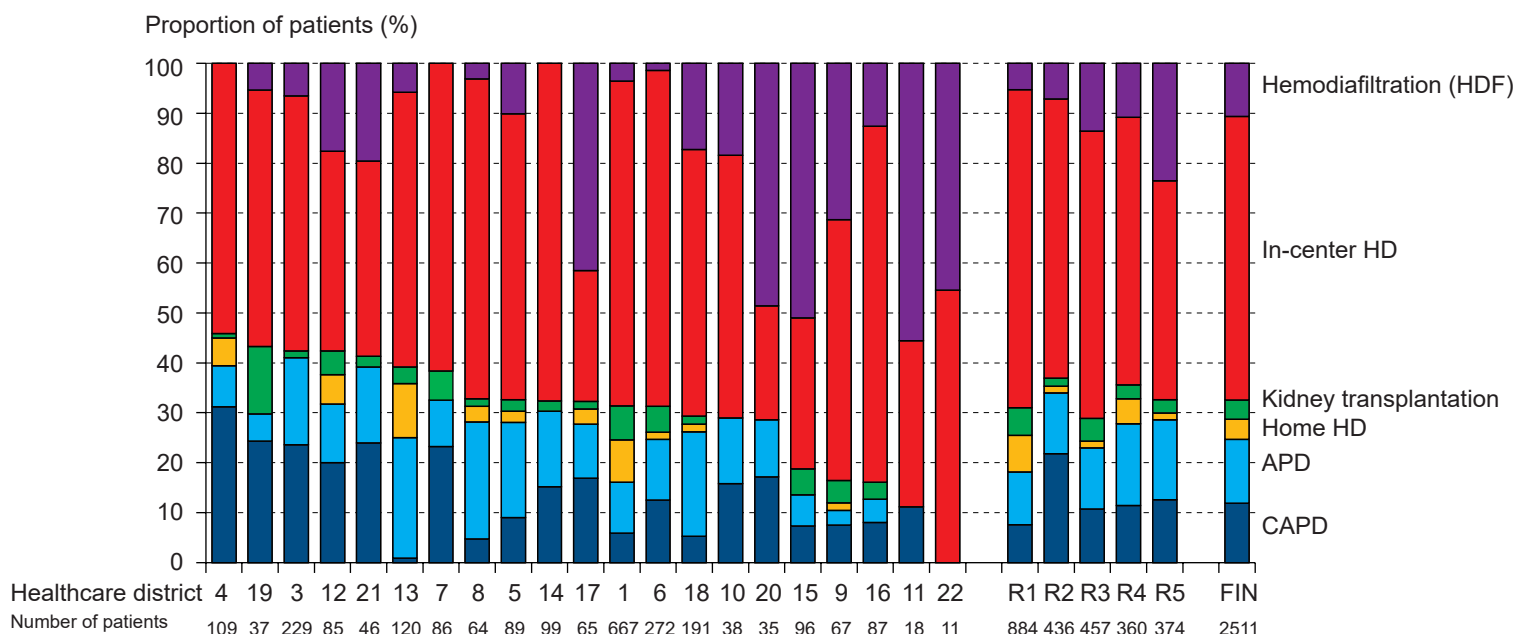


Figure 7. Type of treatment at 90 days from start of KRT in healthcare districts and regions
Finnish Registry for Kidney Diseases 2017–2021



The Finnish Society of Nephrology published the strategy for management of severe chronic kidney disease in 2021. The goal was to increase the proportion of home dialysis to at least 45% at 90 days from KRT start.

Figure 6 presents the number of KRT patients aged 20 years and over at 90 days from start of KRT in 2011–2021 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 last years the proportion of patients on home hemodialysis (home HD) has ranged from 3% to 5%. The proportion of patients receiving a kidney transplant at 90 days from start of KRT has increased to 6%, previously being less than 1%. The proportion of patients on continuous ambulatory peritoneal dialysis (CAPD) or automated peritoneal dialysis (APD) has varied between 23% and 30%. The proportion

of patients on APD of all peritoneal dialysis patients decreased in 2021 compared with previous years.

Figure 7 shows, according to healthcare district and region, the distribution of KRT modalities at 90 days from start of KRT in 2017–2021 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% ($p < 0.001$). The proportion of APD patients of all patients on peritoneal dialysis varied between 0% and 97% in healthcare districts. In southern and western regions, the proportion of home dialysis was 24–25%, compared with 30% or higher in other regions ($p < 0.001$). The proportion of patients receiving a kidney transplant was the highest in the southern region (6%). Otherwise, there was less variation in distribution of KRT modalities between regions than between healthcare districts. One-third of the patients were on home dialysis or had received a kidney transplant.

Figure 8. International comparison of incidence of KRT in 2020
Finnish Registry for Kidney Diseases 2021

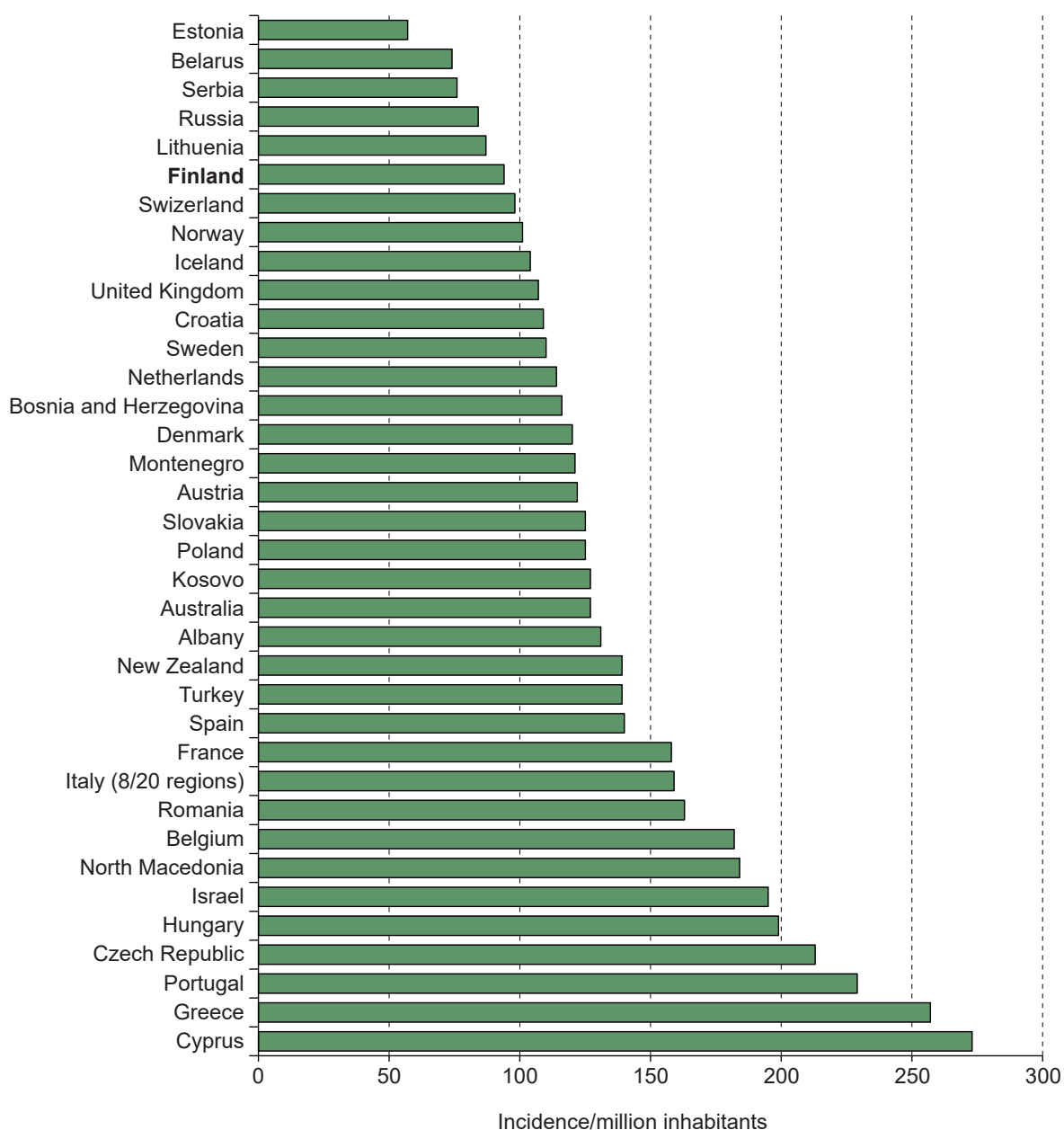


Figure 8 shows the incidence of KRT in 2020 in countries reporting to the ERA Registry (Annual Report 2020, www.era-online.org/wp-content/uploads/2022/12/ERA-Registry-Annual-Report-2020.pdf) and in Australia, and New Zealand (ANZDATA 44th Annual Report 2021, www.anzdata.org.au/report/anzdata-44th-annual-report-2021-data-to-2020/). In 2020, the incidence of KRT in Finland was one of the lowest in Europe. In the Nordic countries, relative to Finland, the incidence in Denmark was 28%, Sweden 17%, Iceland 11%, and Norway 7% higher. In Cyprus and Greece the incidence was more than 2.5-fold that in Finland.

Table 7. Patients on KRT at end of year according to healthcare district and region
Finnish Registry for Kidney Diseases 2011–2021

Healthcare district		Number of KRT patients					Prevalence of KRT/million inhabitants				
		2011	2016	2019	2020	2021	2011	2016	2019	2020	2021
1	Helsinki-Uusimaa	1170	1342	1459	1478	1477	757	821	865	870	863
3	Varsinais-Suomi	402	443	465	469	467	854	926	964	969	961
4	Satakunta	232	237	248	238	244	1030	1069	1144	1105	1139
5	Kanta-Häme	144	170	182	191	193	822	978	1065	1120	1134
6	Pirkanmaa	439	498	547	564	575	853	940	1018	1045	1056
7	Päijät-Häme	176	195	210	211	202	825	917	1000	1007	967
8	Kymenlaakso	137	140	133	135	134	784	820	809	829	830
9	Etelä-Karjala	153	167	160	162	165	1154	1280	1252	1276	1308
10	Etelä-Savo	91	101	101	102	97	863	986	1022	1046	1004
11	Itä-Savo	50	51	48	46	45	1105	1186	1192	1154	1134
12	Pohjois-Karjala	137	149	159	159	162	807	889	967	972	992
13	Pohjois-Savo	234	272	269	282	278	943	1098	1101	1158	1141
14	Keski-Suomi	165	196	208	214	222	662	776	823	847	878
15	Etelä-Pohjanmaa	134	139	162	171	174	674	707	838	890	907
16	Vaasa	116	151	164	170	172	693	888	968	1004	1014
17	Keski-Pohjanmaa	59	71	80	87	81	755	904	1035	1128	1051
18	Pohjois-Pohjanmaa	283	322	344	357	353	711	789	839	868	855
19	Kainuu	61	74	77	77	75	782	989	1065	1074	1053
20	Länsi-Pohja	58	55	65	61	56	892	880	1078	1023	952
21	Lappi	85	86	92	96	97	718	731	787	820	824
22	Åland	27	27	29	27	28	952	924	970	896	923
Region	South	1636	1844	1962	1986	1978	792	858	897	903	896
	Southwest	777	858	906	904	911	871	954	1009	1005	1012
	West	717	807	891	926	942	807	896	989	1026	1039
	East	677	769	785	803	804	828	945	981	1007	1010
	North	546	608	658	678	662	740	820	893	920	897
Entire country		4353	4886	5202	5297	5297	806	888	941	957	955

Table 7 presents the number of KRT patients and the prevalence of KRT on 31 December 2011–2021. In the entire country, the prevalence at the end of 2021 was 955 KRT patients per million inhabitants. On 31 December 2021, the prevalence was the highest in the western region and the lowest in the southern region. In the healthcare districts, the prevalence varied between 824 and 1308 patients per million inhabitants.

In the entire country, the prevalence has increased by

18% since 2011 and by 8% since 2016. Since 2016, the prevalence has increased in all regions, the least in the southern region (4%) and the most in the western region (16%). In the healthcare districts, the prevalence has increased over 15% during the past five years in Etelä-Pohjanmaa, Keski-Pohjanmaa, and Kanta-Häme. In Itä-Savo the prevalence slightly decreased and in Åland, Kymenlaakso, Etelä-Karjala, and Etelä-Savo the prevalence has increased the least.

Table 8. Patients on KRT according to age group and sex
Finnish Registry for Kidney Diseases 2011–2021

Age group		Number of KRT patients					Prevalence of KRT/million inhabitants				
		2011	2016	2019	2020	2021	2011	2016	2019	2020	2021
0–19 y	Men	66	70	70	73	73	106	115	117	123	124
	Women	54	51	52	54	45	91	88	91	95	80
	Total	120	121	122	127	118	99	101	104	110	102
20–44 y	Men	426	471	497	499	508	495	536	558	560	569
	Women	254	260	290	310	316	310	313	346	370	377
	Total	680	731	787	809	824	405	427	456	468	476
45–64 y	Men	1244	1254	1237	1243	1227	1638	1737	1769	1786	1769
	Women	726	758	800	795	762	947	1042	1144	1145	1104
	Total	1970	2012	2037	2038	1989	1291	1388	1456	1466	1437
65–74 y	Men	653	833	942	923	890	2606	2700	2812	2750	2669
	Women	367	443	491	507	529	1286	1297	1321	1361	1432
	Total	1020	1276	1433	1430	1419	1903	1963	2028	2019	2019
≥75 y	Men	352	482	513	555	603	2186	2508	2482	2540	2596
	Women	211	264	310	338	344	746	858	975	1026	1001
	Total	563	746	823	893	947	1269	1492	1569	1630	1644
Total	Men	2741	3110	3259	3293	3301	1033	1147	1195	1205	1203
	Women	1612	1776	1943	2004	1996	586	636	695	716	712
	Total	4353	4886	5202	5297	5297	806	888	941	957	955

Figure 9. Standardized prevalence of KRT in regions
Finnish Registry for Kidney Diseases 2011–2021

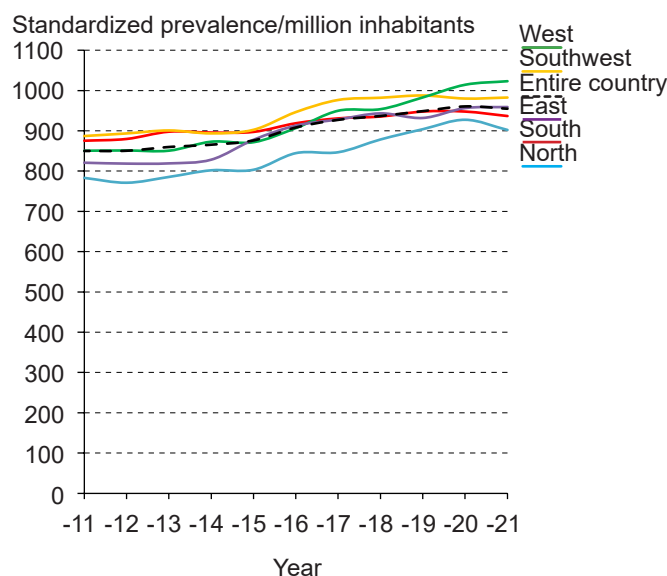
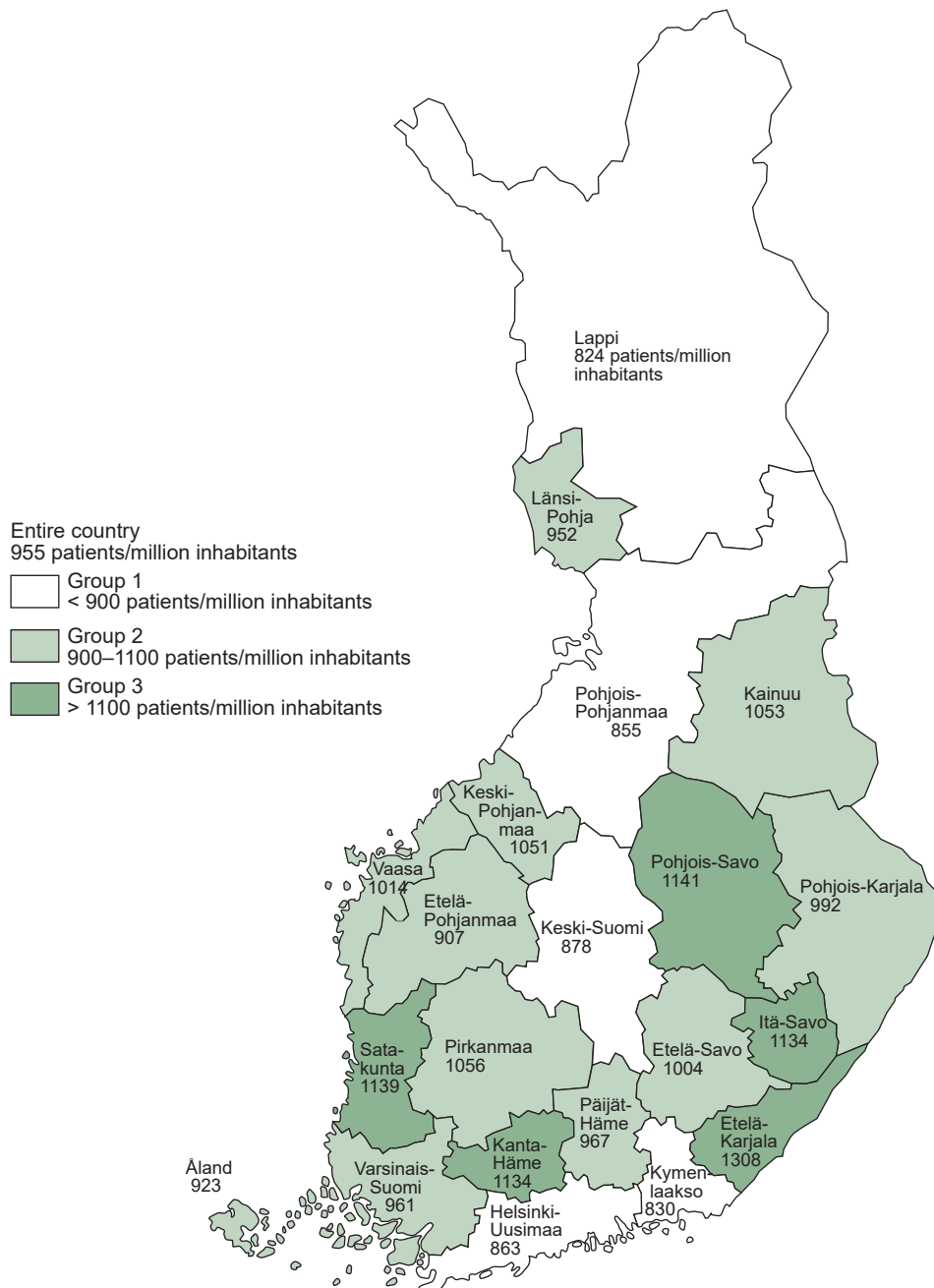


Table 8 shows the number of KRT patients and the prevalence of KRT on 31 December 2011–2021 according to age group and sex. The prevalence has increased by 30% in the age group 75 years and over, by 6% in 65–74-year-olds, by 11% in 45–64-year-olds, by 18% in 20–44-year-olds, and by 4% in 0–19-year-olds. The highest prevalence, observed among men aged 65–74 years at the end of 2021, was 2 669 cases per million age-related inhabitants. At the end of 2021, the prevalence was 69% greater among men than among women, and the sex difference was even more pronounced in the oldest age group, in which the prevalence was 2.6-fold higher in men than in women.

Figure 9 shows the age- and sex-standardized prevalence rates for 2011–2021 using the Finnish general population on 31 December 2021 as the reference. The changes in the distribution of age and sex in 2011–2021 have been taken into account. The standardized prevalence rates have increased slowly in recent years, and the differences between regions are small.

Figure 10. Prevalence of KRT on 31 December 2021
Finnish Registry for Kidney Diseases 2021



The healthcare districts shown on the map are grouped according to the prevalence of KRT at the end of 2021 (Figure 10). The prevalence per million inhabitants was <900 in five districts, 900–1100 in eleven districts, and >1100 in five districts.

Figure 11. Prevalence of KRT at end of year according to type of treatment
Finnish Registry for Kidney Diseases 1965–2021

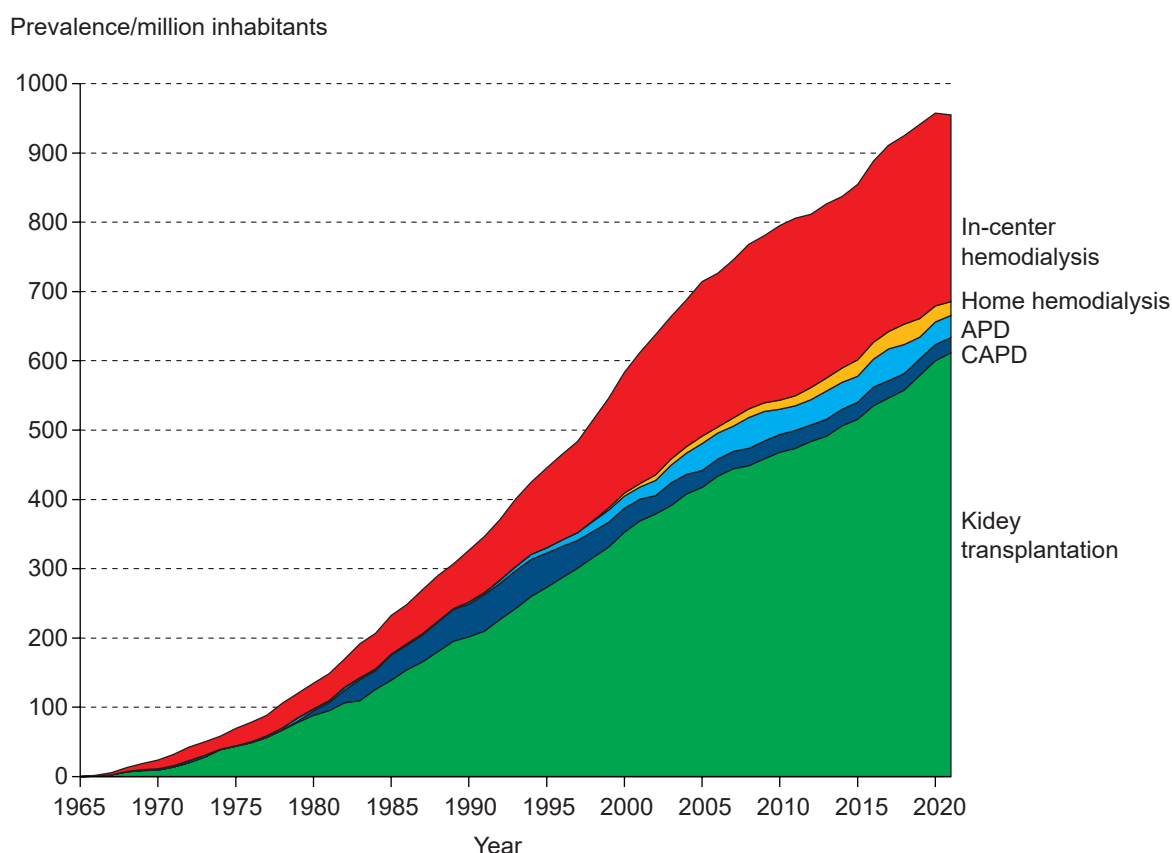


Figure 11 displays the prevalence of KRT according to treatment type. The prevalence of kidney transplantation has grown steadily, increasing by 29% during 2011–2021. At the same time the prevalence of in-center hemodialysis patients increased by 5%, the prevalence of peritoneal dialysis patients decreased by 13%, and the prevalence of home hemodialysis patients increased by 43%. In 2011–2021, the proportion of patients on in-center hemodialysis decreased from 32% to 28%, the proportion of patients with kidney transplantation increased from 59% to 64%, the proportion of patients on home hemodialysis stayed at 2%, and the proportion of patients on peritoneal dialysis decreased from 8% to 6%. Since 2011, the proportion of APD patients of all PD patients has been about 61%.

Last year, it became possible to report information on assisted peritoneal dialysis and self-care in-center hemodialysis (also retrospectively). In assisted peritoneal dialysis, the patient needs help outside the home to perform dialysis. In self-care in-center, hemodialysis the patient performs dialysis in the unit independently. In 2021, 4% of all peritoneal dialysis patients were on assisted peritoneal dialysis and 0.5% of all in-center hemodialysis patients performed self-care in-center hemodialysis.

Table 9. Prevalence of dialysis and kidney transplantation in healthcare districts and regions
Finnish Registry for Kidney Diseases 2011–2021

Healthcare district		Number of dialysis patients/ million inhabitants					Number of kidney transplant patients/ million inhabitants				
		2011	2016	2019	2020	2021	2011	2016	2019	2020	2021
1	Helsinki-Uusimaa	291	313	328	316	293	467	508	537	554	570
3	Varsinais-Suomi	329	389	384	376	374	525	537	581	593	586
4	Satakunta	360	424	429	334	387	670	645	715	771	751
5	Kanta-Häme	445	466	450	428	435	377	512	614	692	699
6	Pirkanmaa	365	368	374	394	373	488	572	644	650	683
7	Päijät-Häme	342	362	419	401	369	483	555	581	606	599
8	Kymenlaakso	389	381	365	375	366	395	439	444	455	465
9	Etelä-Karjala	558	536	446	457	500	596	743	806	819	809
10	Etelä-Savo	332	371	395	400	331	531	615	627	646	673
11	Itä-Savo	486	442	397	326	303	619	744	795	828	832
12	Pohjois-Karjala	324	388	371	342	294	483	501	596	630	698
13	Pohjois-Savo	395	351	356	374	382	548	747	745	784	759
14	Keski-Suomi	293	301	285	301	312	369	475	538	546	565
15	Etelä-Pohjanmaa	297	376	419	411	433	378	331	419	479	475
16	Vaasa	275	364	425	390	407	418	523	543	614	607
17	Keski-Pohjanmaa	358	382	453	506	454	397	522	582	622	597
18	Pohjois-Pohjanmaa	269	309	346	375	334	442	480	493	494	521
19	Kainuu	269	307	263	279	253	513	682	802	795	800
20	Länsi-Pohja	477	416	514	436	357	415	464	564	587	595
21	Lappi	313	221	205	239	212	406	510	582	581	612
22	Åland	529	308	301	232	264	423	616	669	664	659
Region	South	321	337	346	337	317	471	521	550	567	579
	Southwest	333	390	400	364	380	538	564	609	642	632
	West	366	389	398	404	397	441	508	590	621	642
	East	346	350	344	345	332	482	595	637	662	678
	North	304	311	341	362	321	437	508	552	558	576
Entire country		332	353	362	357	343	474	535	579	600	612

Table 9 presents the prevalence of dialysis and kidney transplantation per million inhabitants in healthcare districts and regions in 2011–2021. The prevalence of dialysis has increased by 3% and that of kidney transplantation by 29% during the past ten years. Over the past five years, the prevalence of kidney transplantation has increased by 17%, but the prevalence of dialysis has not changed. At the end of 2021, the prevalence of dialysis varied in healthcare

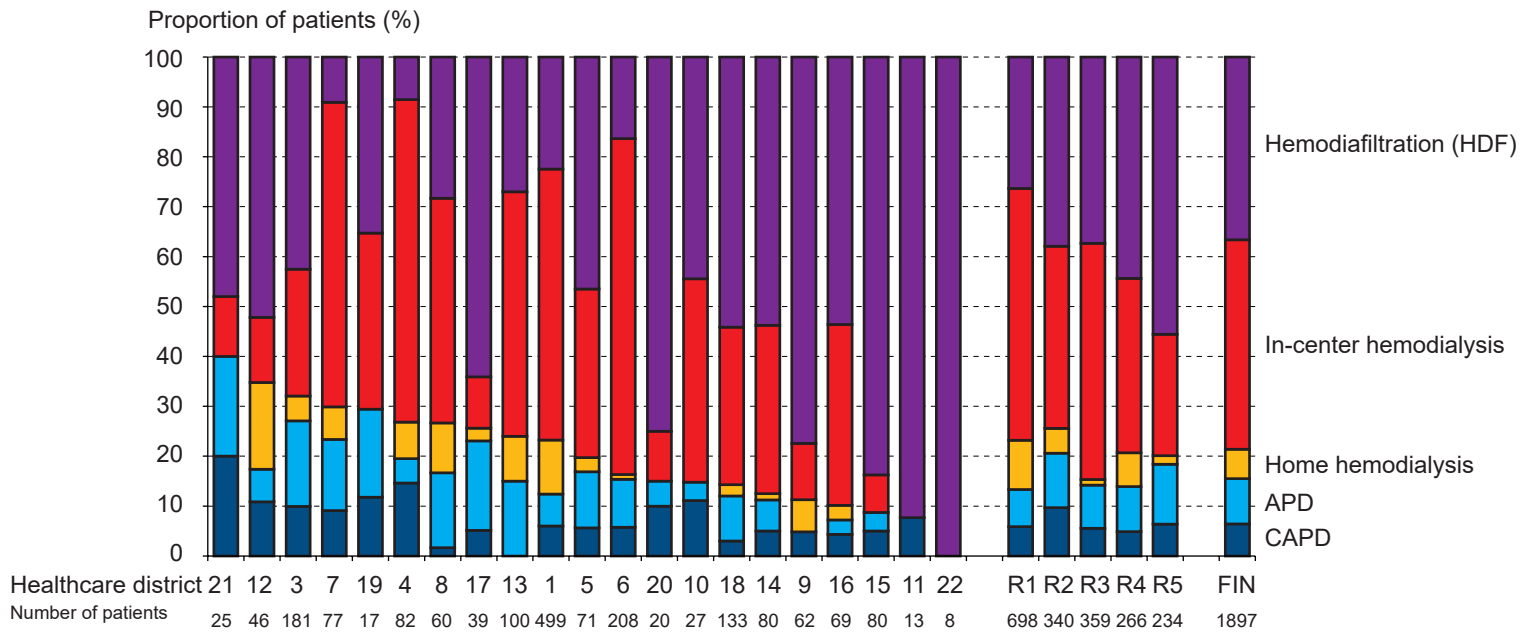
districts between 212 and 500 per million inhabitants and that of kidney transplantation between 465 and 832 per million inhabitants. In regions, the prevalence of dialysis varied between 317 and 397 per million inhabitants and that of kidney transplantation between 576 and 678 per million inhabitants. The proportion of kidney transplantation of all KRT patients increased from 59% to 64% between 2011 and 2021.

Table 10. Number of KRT patients at end of year according to type of treatment in healthcare districts and regions
Finnish Registry for Kidney Diseases 2021

Healthcare district		Number of patients on 31 December 2021 (%)						
		CAPD	APD	Home HD	In-center HD	HDF	Tx	Total
1	Helsinki-Uusimaa	30 (2)	34 (2)	54 (4)	271 (18)	112 (8)	976 (66)	1477 (100)
3	Varsinais-Suomi	18 (4)	32 (7)	8 (2)	47 (10)	77 (16)	285 (61)	467 (100)
4	Satakunta	12 (5)	5 (2)	6 (2)	53 (22)	7 (3)	161 (66)	244 (100)
5	Kanta-Häme	4 (2)	9 (5)	2 (1)	25 (13)	34 (18)	119 (62)	193 (100)
6	Pirkanmaa	13 (2)	19 (3)	2 (0)	136 (24)	33 (6)	372 (65)	575 (100)
7	Päijät-Häme	7 (3)	11 (5)	6 (3)	47 (23)	6 (3)	125 (62)	202 (100)
8	Kymenlaakso	1 (1)	9 (7)	6 (4)	26 (19)	17 (13)	75 (56)	134 (100)
9	Etelä-Karjala	3 (2)	0 (0)	4 (2)	7 (4)	49 (30)	102 (62)	165 (100)
10	Etelä-Savo	3 (3)	1 (1)	0 (0)	14 (14)	14 (14)	65 (67)	97 (100)
11	Itä-Savo	1 (2)	0 (0)	0 (0)	0 (0)	11 (24)	33 (73)	45 (100)
12	Pohjois-Karjala	5 (3)	3 (2)	8 (5)	6 (4)	26 (16)	114 (70)	162 (100)
13	Pohjois-Savo	0 (0)	14 (5)	9 (3)	46 (17)	24 (9)	185 (67)	278 (100)
14	Keski-Suomi	3 (1)	5 (2)	1 (0)	28 (13)	42 (19)	143 (64)	222 (100)
15	Etelä-Pohjanmaa	4 (2)	3 (2)	0 (0)	9 (5)	67 (39)	91 (52)	174 (100)
16	Vaasa	3 (2)	2 (1)	2 (1)	25 (15)	37 (22)	103 (60)	172 (100)
17	Keski-Pohjanmaa	2 (2)	5 (6)	1 (1)	4 (5)	23 (28)	46 (57)	81 (100)
18	Pohjois-Pohjanmaa	4 (1)	14 (4)	3 (1)	42 (12)	75 (21)	215 (61)	353 (100)
19	Kainuu	2 (3)	3 (4)	0 (0)	7 (9)	6 (8)	57 (76)	75 (100)
20	Länsi-Pohja	2 (4)	1 (2)	0 (0)	2 (4)	16 (29)	35 (63)	56 (100)
21	Lappi	5 (5)	5 (5)	0 (0)	3 (3)	12 (12)	72 (74)	97 (100)
22	Åland	0 (0)	0 (0)	0 (0)	0 (0)	8 (29)	20 (71)	28 (100)
Region South		41 (2)	54 (3)	70 (4)	351 (18)	184 (9)	1278 (65)	1978 (100)
Southwest		33 (4)	39 (4)	16 (2)	125 (14)	129 (14)	569 (62)	911 (100)
West		21 (2)	31 (3)	4 (0)	170 (18)	134 (14)	582 (62)	942 (100)
East		12 (1)	23 (3)	18 (2)	94 (12)	117 (15)	540 (67)	804 (100)
North		15 (2)	28 (4)	4 (1)	58 (9)	132 (20)	425 (64)	662 (100)
Entire country		122 (2)	175 (3)	112 (2)	798 (15)	696 (13)	3394 (64)	5297 (100)

Table 10 presents the number of KRT patients according to type of treatment in healthcare districts and regions at the end of 2021. Of all dialysis patients, 21% were on home dialysis (CAPD, APD, or home HD) at the end of 2021. Of patients on in-center hemodialysis, 47% were on hemodiafiltration and this proportion varied between 11% and 100% in healthcare districts and between 34% and 69% in regions. The proportion of kidney transplantation patients varied between 52% and 76% in healthcare districts and between 62% and 67% in regions.

Figure 12. Dialysis modality in patients older than 20 years on 31 December 2021 in healthcare districts and regions
Finnish Registry for Kidney Diseases 2021



The Finnish Society of Nephrology published a strategy for management of severe chronic kidney disease in 2021. The goal was to increase the proportion of home dialysis of all dialysis patients to at least 40% by the end of 2025.

Figure 12 shows the distribution of dialysis modalities in patients older than 20 years in healthcare districts and regions at the end of 2021. Of all dialysis patients, 21% were on home dialysis (CAPD, APD, or home HD) at the end of 2021. The proportion of home dialysis was highest (40%) in the healthcare district of Lappi and higher than 30% also in Varsinais-Suomi, Päijät-Häme, and Pohjois-Karjala, and lower than 10% in three healthcare districts. The proportion of peritoneal dialysis patients was the greatest in the healthcare district of Lappi, where 40% 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 was largest, 17%, in the healthcare district of Pohjois-Karjala. Seven healthcare districts had no home hemodialysis patients.

Figure 13. International comparison of prevalence of KRT on 31 December 2020
Finnish Registry for Kidney Diseases 2021

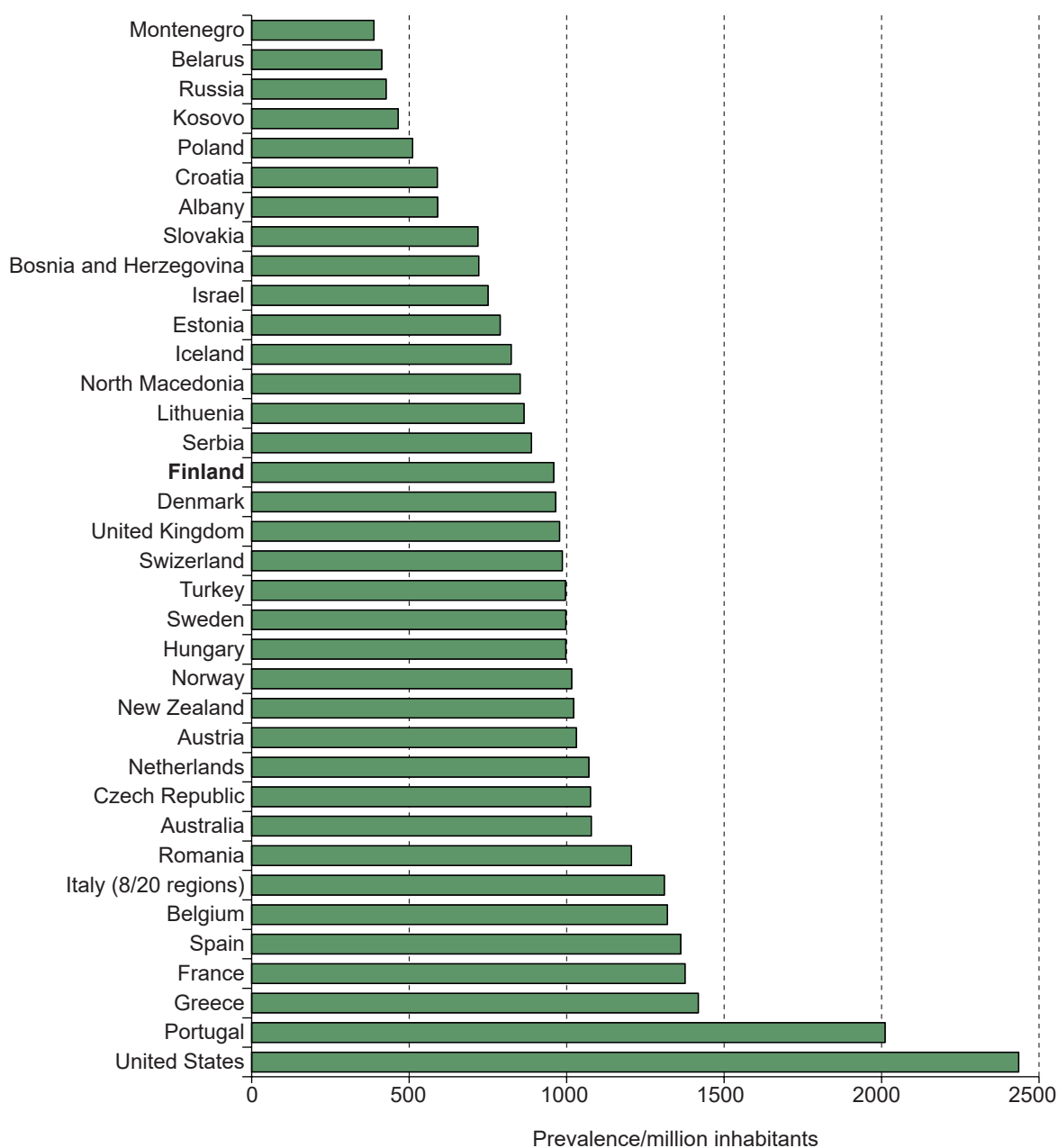


Figure 13 displays the prevalence of KRT on 31 December 2020 in countries reporting to the ERA-EDTA Registry (Annual Report 2020, www.era-online.org/wp-content/uploads/2022/12/ERA-Registry-Annual-Report-2020.pdf), in Australia and New Zealand (ANZDATA 44th Annual Report 2021, www.anzdata.org.au/report/anzdata-44th-annual-report-2021-data-to-2020/), and in the United States (USRDS 2022 Annual Report, <https://usrds-adr.niddk.nih.gov/>). The prevalence rates in the Nordic countries were similar. Relative to Finland, the prevalence in Denmark was 1% higher, in Sweden 4% higher, in Norway 6% higher, and in Iceland 14% lower. In Portugal the prevalence was more than two-fold and in the United States 2.5-fold compared to Finland.

Table 11. Number of patient-years of all KRT patients according to diagnosis and type of treatment
Finnish Registry for Kidney Diseases 2011–2021

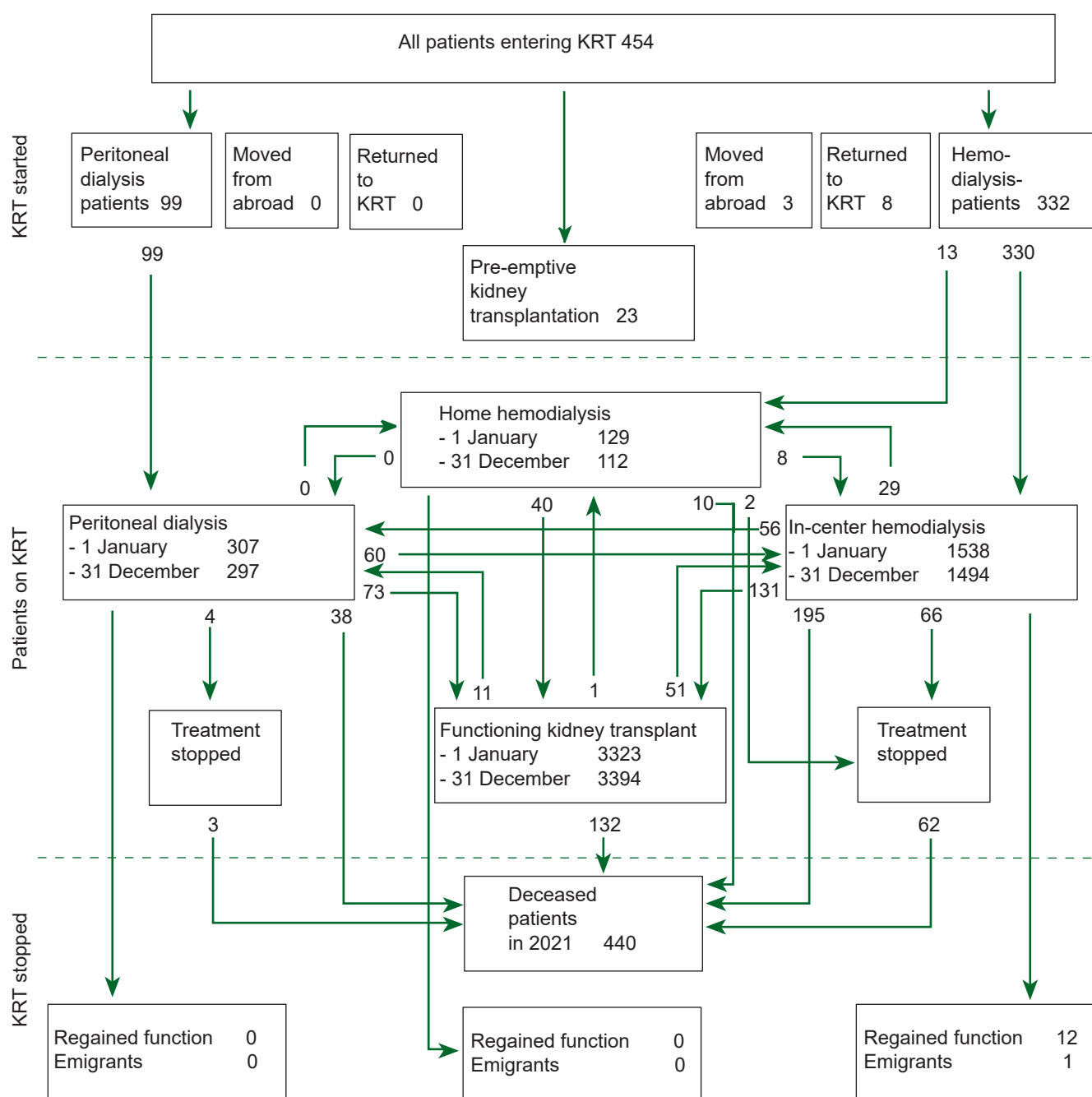
Diagnosis	Number of patient-years in 2011 (%)				Number of patient-years in 2021 (%)			
	Peritoneal dialysis	Hemo-dialysis	Trans-plantation	Total	Peritoneal dialysis	Hemo-dialysis	Trans-plantation	Total
Glomerulonephritis	67 (20.2)	215 (15)	673 (26.5)	955 (22.2)	45 (14.8)	249 (15.2)	853 (25.4)	1147 (21.7)
Type 1 diabetes	80 (24.2)	150 (10.5)	480 (18.8)	709 (16.5)	47 (15.6)	207 (12.7)	577 (17.2)	831 (15.7)
Polycystic degeneration	25 (7.6)	124 (8.7)	426 (16.7)	575 (13.4)	26 (8.5)	150 (9.2)	611 (18.2)	786 (14.9)
Undefined kidney disease	43 (12.9)	241 (16.9)	115 (4.5)	398 (9.3)	42 (13.9)	249 (15.2)	229 (6.8)	520 (9.8)
Type 2 diabetes	42 (12.6)	288 (20.1)	75 (2.9)	404 (9.4)	43 (14.3)	318 (19.5)	110 (3.3)	471 (8.9)
Tubulointerstitial nephritis	19 (5.7)	85 (6.0)	63 (2.5)	167 (3.9)	35 (11.7)	115 (7.0)	108 (3.2)	258 (4.9)
Nephrosclerosis	8 (2.5)	48 (3.3)	64 (2.5)	120 (2.8)	18 (5.8)	95 (5.8)	109 (3.3)	222 (4.2)
Urinary tract obstruction	7 (2.1)	53 (3.7)	95 (3.7)	155 (3.6)	12 (3.9)	61 (3.7)	148 (4.4)	220 (4.2)
Other systemic diseases	7 (2.1)	46 (3.2)	201 (7.9)	254 (5.9)	10 (3.4)	35 (2.2)	173 (5.2)	219 (4.1)
Other kidney diseases	13 (4.0)	66 (4.6)	98 (3.8)	177 (4.1)	13 (4.4)	60 (3.7)	132 (3.9)	205 (3.9)
Congenital diseases	5 (1.6)	20 (1.4)	107 (4.2)	132 (3.1)	7 (2.2)	20 (1.2)	145 (4.3)	171 (3.2)
Congenital nephrosis. Finnish type	5 (1.4)	7 (0.5)	68 (2.7)	80 (1.9)	1 (0.5)	6 (0.4)	105 (3.1)	112 (2.1)
Amyloidosis	2 (0.5)	34 (2.4)	10 (0.4)	45 (1.1)	1 (0.3)	41 (2.5)	13 (0.4)	55 (1.0)
Malignancies	7 (2.1)	41 (2.9)	38 (1.5)	86 (2.0)	2 (0.6)	16 (1.0)	22 (0.7)	40 (0.8)
Pyelonephritis	1 (0.4)	5 (0.4)	15 (0.6)	21 (0.5)	0 (0.1)	7 (0.4)	12 (0.4)	19 (0.4)
Metabolic diseases	0 (0.0)	6 (0.4)	19 (0.7)	25 (0.6)	0 (0.0)	6 (0.4)	11 (0.3)	17 (0.3)
Total	330 (100)	1427 (100)	2546 (100)	4304 (100)	303 (100)	1634 (100)	3357 (100)	5294 (100)

Table 11 presents the number of patient-years according to diagnosis of kidney disease and type of treatment in 2011 and 2021. The number of patient-years indicates time spent by patients in KRT during the year. Overall, the number of patient-years has increased by 23% since 2011. The number of patient-years has increased by 15% in hemodialysis and by 32% in kidney transplantation, and decreased by 8% in peritoneal dialysis.

Glomerulonephritis is the most common diagnosis among all KRT patients and among kidney transplantation patients; the proportion of patient-years due to glomerulonephritis was 22% in 2021. Type 1 diabetes is the second most com-

mon diagnosis among all KRT 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 47% within the last ten years. The number of patient-years of all KRT patients with 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 KRT patients with amyloidosis and pyelonephritis has decreased over 30% during the last ten years.

Figure 14. Net changes in type of treatment
Finnish Registry for Kidney Diseases 2021



During 2021 altogether 454 new patients entered KRT (Figure 14) and eight patients returned to KRT. In all, 5297 patients were receiving KRT at the beginning of the year and exactly the same number at the end of the year. Altogether 440 patients died, and dialysis was discontinued for 12 patients because the patient's own kidney function resumed. Of those who died, 132 had a functioning kidney transplant, 38 were receiving peritoneal dialysis, 10 were on home hemodialysis, and 195 were on in-center hemodialysis. During 2021 KRT was discontinued for 72 uremic patients. At the end of 2021, the number of home hemodialysis patients was 13% smaller and the number of peritoneal dialysis patients and hemodialysis patients 3% smaller than at the beginning of the year. The number of kidney trans-

plantation patients was 2% larger. At the end of 2021, there were 8 patients on self-care in-center hemodialysis and 11 patients on assisted peritoneal dialysis.

A total of 268 patients received a kidney transplant, which is at the same level as in previous years. Of these patients, 30 received a combined pancreas and kidney transplantation and two a combined liver and kidney transplantation (source: Kidney Transplantation Unit, Helsinki University Central Hospital). Forty-six kidney transplants were received from living donors, more than previously, of which 24 were from relatives and four were ABO-incompatible. Of the kidney transplantations, 216 came from donors after brain death and six from donors after circulatory death.

Table 12. Mortality of KRT patients by region
Finnish Registry for Kidney Diseases 2011–2021

Region	Deaths/1000 patient-years						Deaths/1000 patient-years ¹⁾					
	2011	2016	2019	2020	2021	2017–2021	2011	2016	2019	2020	2021	2017–2021
South	76	75	76	74	76	77	75	72	74	74	74	76
Southwest	87	71	81	90	93	88	86	71	81	89	92	87
West	110	91	77	70	80	77	104	88	74	70	79	76
East	91	79	99	79	77	85	91	76	98	79	76	84
North	94	72	104	94	102	95	92	70	102	91	102	94
Entire country	88	77	84	80	83	83	86	75	83	79	82	81

¹⁾Patients who died within 90 days of start of KRT excluded

Figure 15. Standardized mortality of KRT patients by region
Finnish Registry for Kidney Diseases 2011–2021

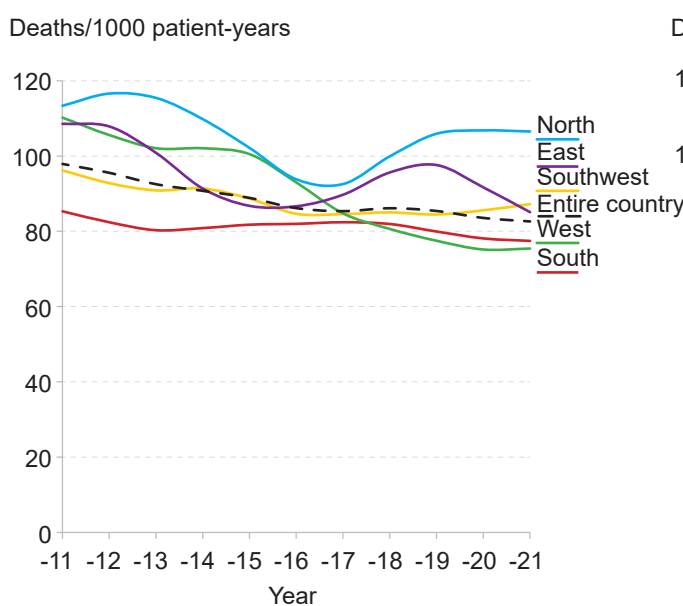


Figure 16. Standardized mortality of KRT patients by region (patients who died within 90 days of start of KRT excluded)
Finnish Registry for Kidney Diseases 2011–2021

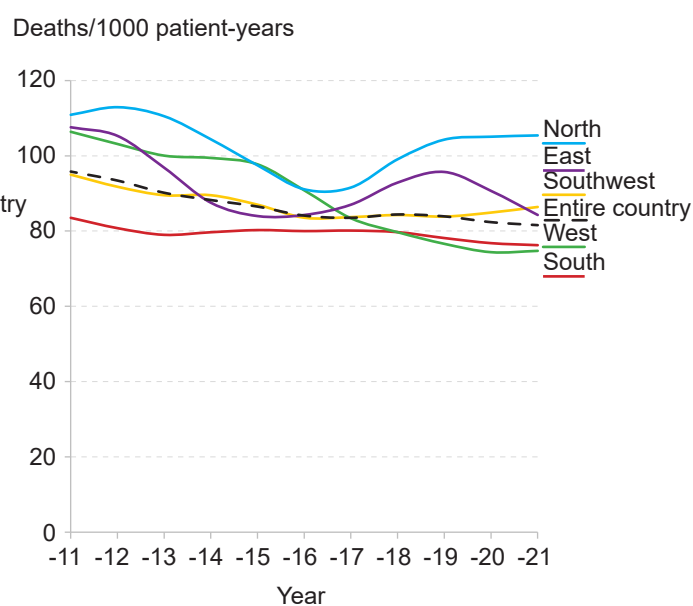


Table 12 shows KRT patients' mortality in 2011–2021 according to region. The mortality of patients who had been on KRT for at least 90 days is presented separately. The average mortality in 2017–2021 was lower in the southern and western region than elsewhere.

Figures 15 and 16 show regional mortality as smoothed averages. The regional mortality rates for 2011–2021 have

been age- and sex-standardized using all patient-years in 2021 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 KRT were excluded from Figure 16. During 2011–2021 the standardized mortality rate has declined.

Figure 17. KRT patients' survival by region
Finnish Registry for Kidney Diseases 2017–2021

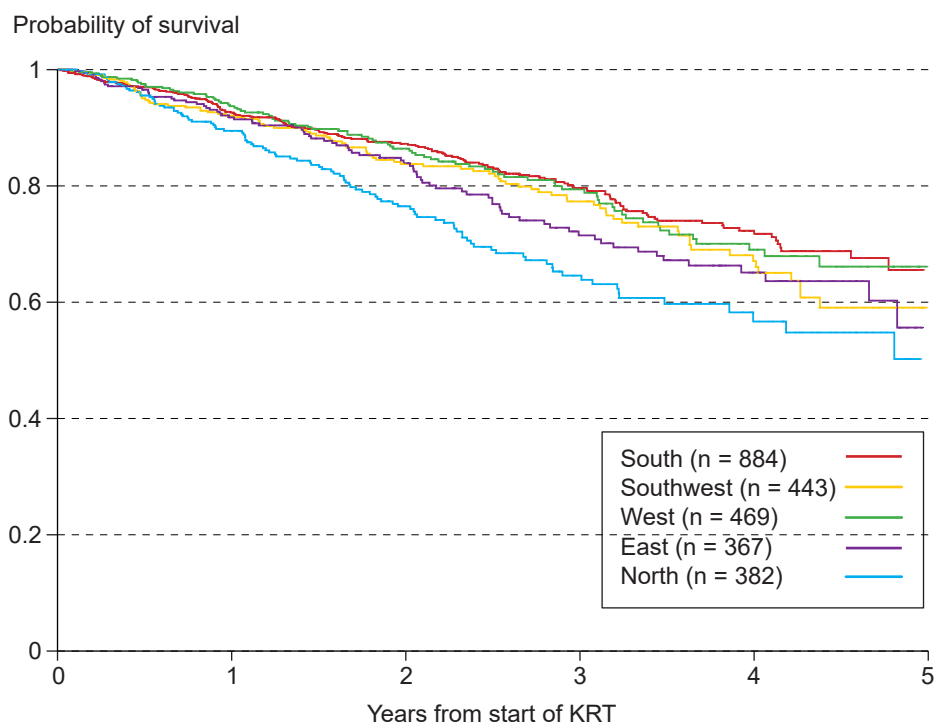


Figure 17 shows survival of patients who entered KRT in 2017–2021 at the age of 20 years or over. Survival probabilities were estimated by region using Kaplan-Meier curves. A total of 2545 patients commenced KRT and 518 patients died during a median follow-up of 2.1 years. Altogether 635 patients received a kidney transplant. Patients were censored from the analysis if kidney function returned (n=54), if moving abroad (n=3), if they disappeared from follow-up (n=2), or at the latest on 31 December 2021 (n=1968).

For the entire cohort, the survival probability was 0.92 at one year and 0.84 at two years from start of KRT. The survival probability differed significantly between regions ($P < 0.001$), and this did not change after adjusting for age and sex using Cox regression ($P < 0.001$).

According to a study based on data from the Finnish Registry for Kidney Diseases, age, diagnosis of end-stage renal disease, heart failure, peripheral vascular disease, and plasma concentrations of albumin and C-reactive protein have independent effects on RRT patients' survival (Haapio et al., *Kidney International Reports* 2017;2:1176–1185). Because of this, these variables were used for multivariable adjustment, but still the result for the regional comparison in Figure 17 remained unchanged ($P < 0.001$). Factors not recorded in this registry may explain these regional differences on survival.

Figure 18. KRT patients' survival by start period of KRT
Finnish Registry for Kidney Diseases 2002–2021

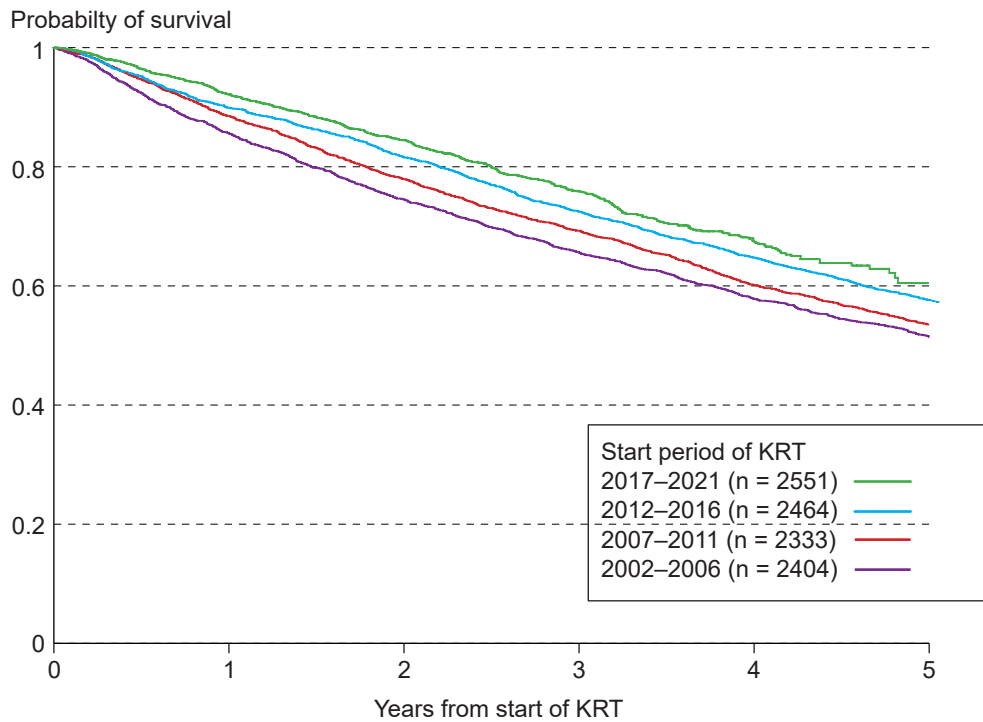


Figure 18 presents the survival probability of patients aged 20 years or over who started RRT in 2002–2021 according to time period. Survival probabilities were estimated using Kaplan-Meier curves. A total of 9752 patients entered KRT 5360 of whom died during a median follow-up of 3.8 years. Altogether 3206 patients received a kidney transplant. Patients were censored from the analysis if kidney function resumed (n=194), if moving abroad (n=23), if they disappeared from follow-up (n=6), or at the latest on 31 December 2021 (n=4169).

The survival prognosis improved continuously during 2002–2021 (log rank test, $P < 0.001$). Of patients who started

KRT in 2017–2021, survival probability was 0.92 at one year and 0.84 at two years from start of KRT. For patients who started RRT in 2002–2006, the corresponding probabilities were 0.86 and 0.75. The survival prognosis improved despite the increasing median age at start of RRT: 62.1 years in 2002–2006 and 65.4 years in 2017–2021.

After adjusting the analysis in Figure 18 for age and sex using Cox regression, the relative risk of death of patients who started KRT in 2017–2021 compared with 2002–2006 was 0.62 (95% confidence interval 0.56–0.69, $P < 0.001$). Multivariable adjustment (as described on page 31) did not change the result

Figure 19. KRT patients' survival by age group
Finnish Registry for Kidney Diseases 2017–2021

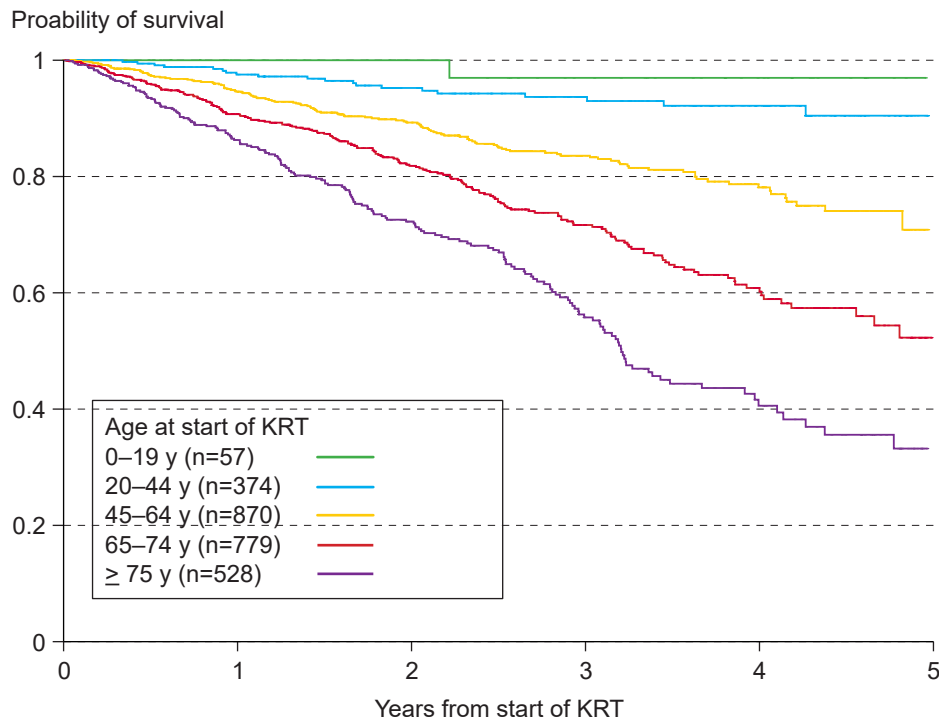


Figure 19 displays survival probabilities according to age group of patients entering KRT in 2017–2021. A total of 2608 patients commenced KRT, and 519 patients died during a median follow-up of 2.1 years. Altogether 689 patients received a kidney transplant. Patients were censored from the analysis if kidney function returned (n=54), if moving abroad (n=4), if they disappeared from follow-up (n=2), or at the latest on 31 December 2021 (n=2029).

Age at start of KRT was associated strongly with survival prognosis. The survival probability at two years from start of RRT was 1.00 for 0–19-year-olds, 0.95 for 20–44-year-olds, 0.89 for 45–64-year-olds, 0.82 for 65–74-year-olds, and 0.72 for patients aged 75 years or over.

The difference in survival probability between males and females was not statistically significant (age-adjusted $P=0.52$).

Figure 20. KRT patients' survival by diagnosis
Finnish Registry for Kidney Diseases 2017–2021

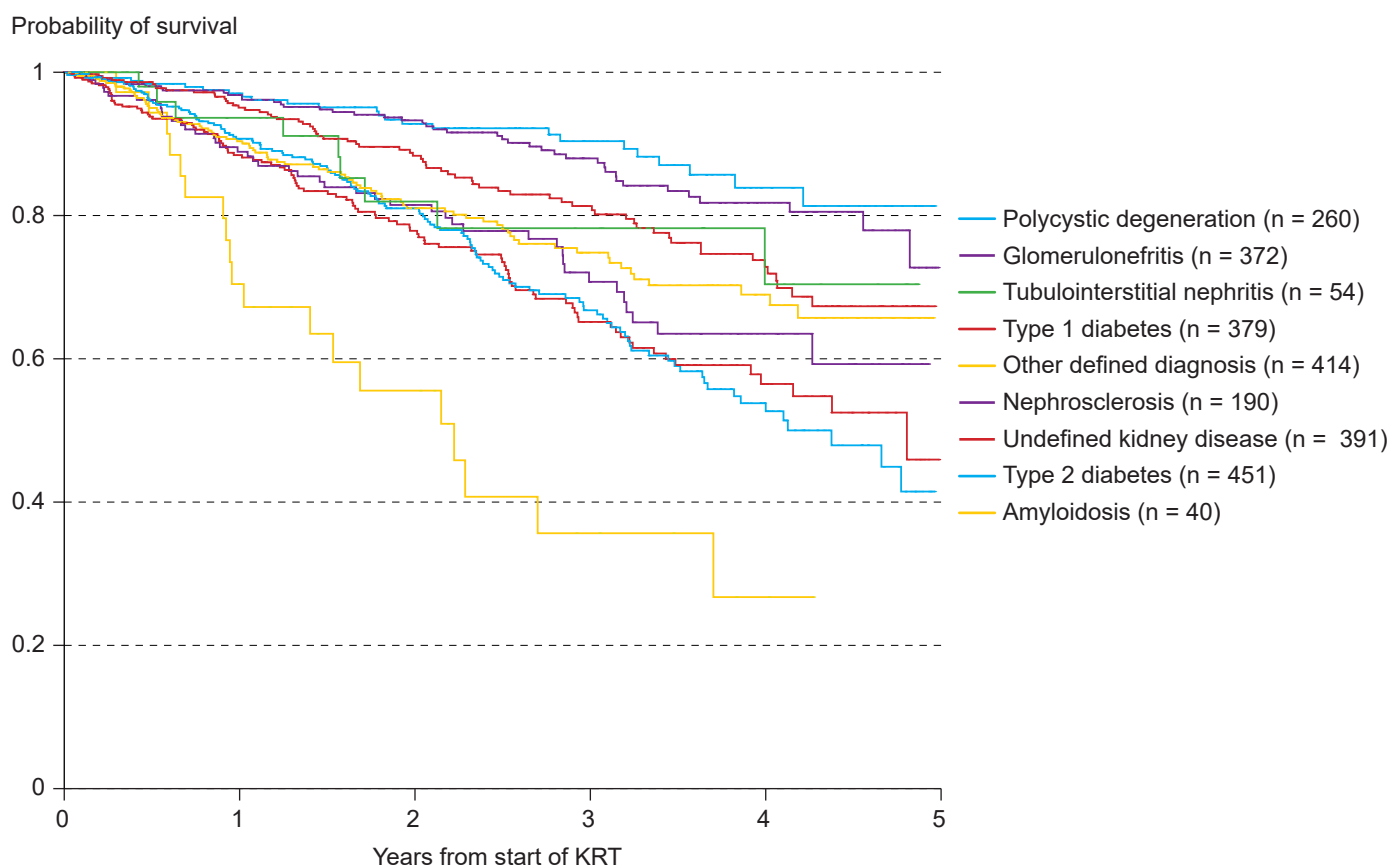


Figure 20 shows the survival probability of patients aged 20 years or older who started KRT in 2017–2021 according to diagnosis of primary kidney disease. A total of 2551 patients started KRT, 518 of whom died during a median follow-up of 2.1 years. Altogether 636 patients received a kidney transplant. Patients were censored from the analysis if kidney function returned (n=54), if moving abroad (n=3), if they disappeared from follow-up (n=2), or at the latest on 31 December 2021 (n=1977).

The survival probability differed between diagnosis groups (log rank test, $P < 0.001$). After adjustment for age

and sex using Cox regression, diagnosis of end-stage renal disease remained significant ($P < 0.001$). In the analysis, glomerulonephritis was used as the reference group to which other diagnoses were compared. Patients with type 1 diabetes (relative risk of death 2.5, $P < 0.001$), type 2 diabetes (RR 2.1, $P < 0.001$), undefined kidney disease (RR 2.0, $P < 0.001$), and amyloidosis (RR 6.0, $P < 0.001$) had a higher risk of death. Patient with polycystic kidney degeneration had the smallest risk of death, but the difference compared with glomerulonephritis patients was not significant (RR 0.93, $P = 0.77$)

Table 13. Number of KRT patients older than 20 years in hospitals
Finnish Registry for Kidney Diseases 2021

Region	Healthcare district	Hospital	KRT patients (≥20 y) on 31/12/2021			
			PD	HD	Tx	Total
South (R1)			93	605	1237	1935
	Helsinki-Uusimaa (1)		62	437	943	1442
		Helsinki University Central Hospital	62	313	803	1178
		Nephrology Polyclinic			803	803
		Dialysis unit DHK		48		48
		Dialysis unit DOK	62	81		143
		B. Braun Malmi		98		98
		B. Braun Pitäjänmäki		86		86
		Hyvinkää Hospital		47	44	91
		Lohja Hospital		31	42	73
		Länsi-Uusimaa Hospital		23	17	40
		Porvoo Hospital		23	37	60
	Päijät-Häme (7)		18	59	124	201
		Päijät-Häme Central Hospital	18	59	124	201
	Kymenlaakso (8)		10	50	71	131
		Kymenlaakso Central Hospital	10	50	71	131
	Etelä-Karjala (9)		3	59	99	161
		South Karelia Central Hospital	3	38	99	140
		Honkajarju Hospital		21		21
Southwest (R2)			70	270	547	887
	Varsinais-Suomi (3)		49	132	279	460
		Turku University Central Hospital	49	132	279	460
	Satakunta (4)		16	66	154	236
		Satakunta Central Hospital	16	66	154	236
	Vaasa (16)		5	64	94	163
		Vaasa Central Hospital	5	46	93	144
		Pietarsaari Hospital		18	1	19
	Åland (22)			8	20	28
		Åland Central Hospital		8	20	28
West (R3)			51	308	556	915
	Kanta-Häme (5)		12	59	117	188
		Central Hospital of Tavastia	12	59	117	188
	Pirkanmaa (6)		32	176	357	565
		Tampere University Hospital	32	176	357	565
	Etelä-Pohjanmaa (15)		7	73	82	162
		Southern Ostrobothnia Central Hospital	7	73	82	162
East (R4)			37	229	528	794
	Etelä-Savo (10)		4	23	56	83
		Mikkeli Central Hospital	4	23	56	83
	Itä-Savo (11)		1	12	34	47
		Central Hospital of Savonlinna	1	12	34	47
	Pohjois-Karjala (12)		8	38	113	159
		North Karelia Central Hospital	8	38	113	159
	Pohjois-Savo (13)		15	85	185	285
		Kuopio University Hospital	15	63	160	238
		Regional Hospital of Iisalmi		9	14	23
		Regional Hospital of Varkaus		13	11	24
	Keski-Suomi (14)		9	71	140	220
		Central Finland Central Hospital	9	71	140	220
North (R5)			43	191	414	648
	Keski-Pohjanmaa (17)		9	30	46	85
		Central Hospital of Keski-Pohjanmaa	9	30	46	85
	Pohjois-Pohjanmaa (18)		16	117	205	338
		Oulu University Hospital	16	117	205	338
	Kainuu (19)		5	12	58	75
		Kainuu Central Hospital	5	12	58	75
	Länsi-Pohja (20)		3	17	33	53
		Central Hospital of Länsi-Pohja	3	17	33	53
	Lappi (21)		10	15	72	97
		Lapland Central Hospital	10	15	72	97
Entire country			294	1603	3282	5179

At the end of 2021, dialysis and kidney transplantation patients were treated and followed up in 29 hospitals of 21 healthcare districts in five regions (Table 13). 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 31–45, healthcare

district of the patient is determined according to treating unit. In the entire country, 99% of patients lived in the same healthcare district in which they were treated.

Päijät-Häme healthcare district changed in 2018 to southern region and is shown accordingly in this report.

Figure 21. Hemoglobin distribution of dialysis patients older than 20 years at end of year
Finnish Registry for Kidney Diseases 2011–2021

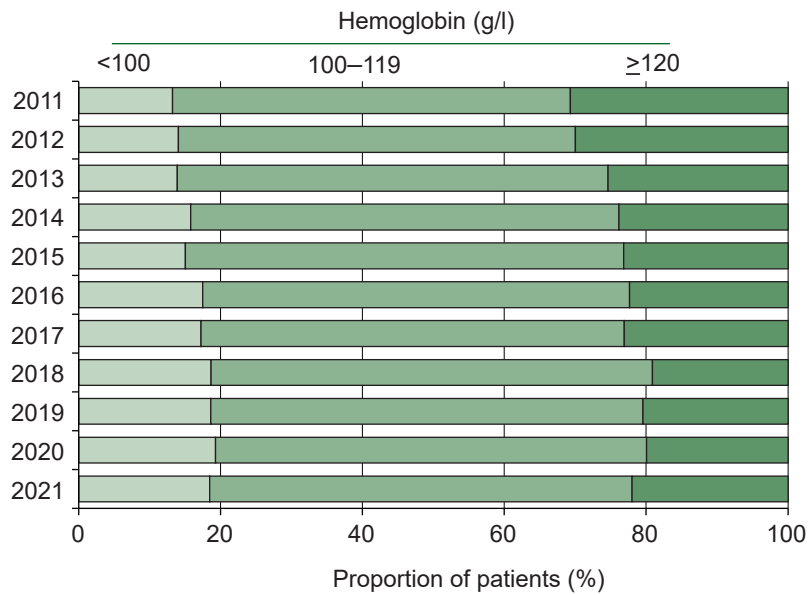
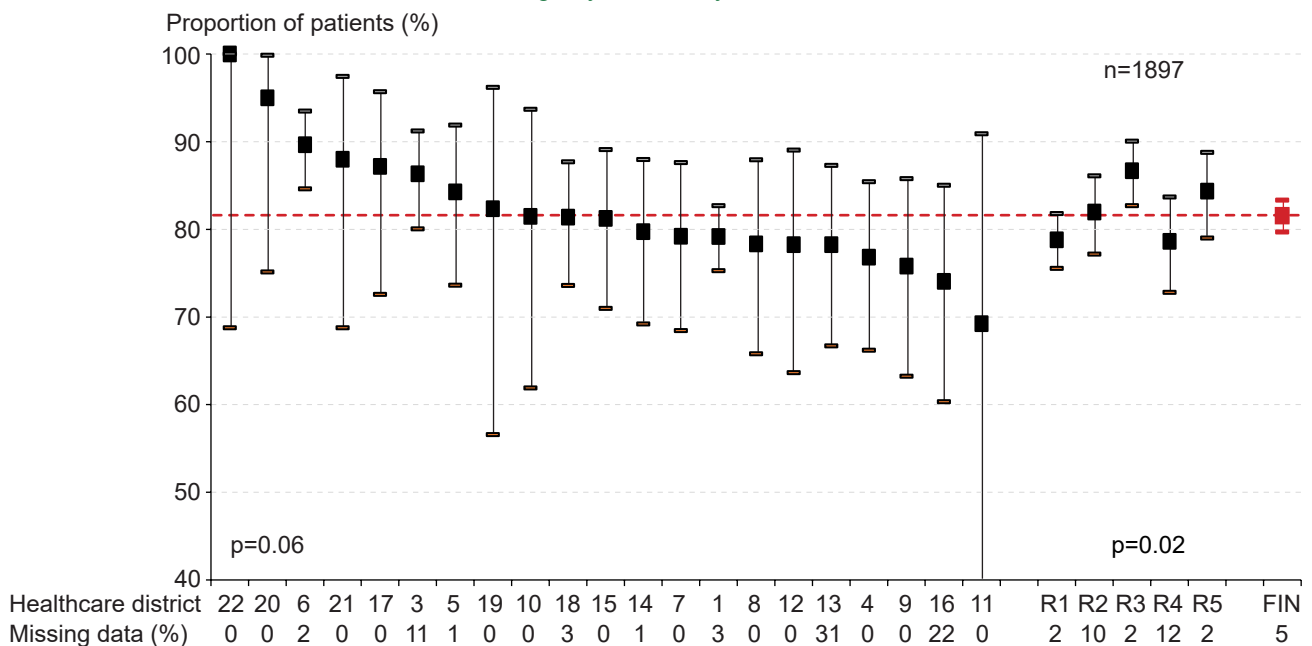


Figure 22. Proportion of dialysis patients older than 20 years with hemoglobin concentration ≥ 100 g/l in healthcare districts and regions
Finnish Registry for Kidney Diseases 2021



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 ≥ 100 g/l. For sake of comparison, we have chosen these same cut-offs.

The distribution of dialysis patients' hemoglobin concentration has changed during 2011–2021 (Figure 21). The proportion of patients with a hemoglobin concentration

< 100 g/l has increased from 13% to 18%, while the proportion of patients with a hemoglobin concentration ≥ 120 g/l has decreased from 31% to 22%. Figures 21 and 22 include all hemodialysis patients, also those who did not use ESAs. In 2021, 81% of the patients used ESAs and hemoglobin concentration was < 100 g/l in 21% and > 120 g/l in 16% of these patients.

In Figure 22, the hemoglobin target is ≥ 100 g/l. At the end of 2021, the proportion of dialysis patients reaching this target was 82%, varying from 69% to 100% in the healthcare districts ($p=0.06$) and from 79% to 87% in the regions ($p=0.02$). No significant difference was present in the proportions of men and women with a hemoglobin concentration ≥ 100 g/l.

Figure 23. Distribution of serum phosphate among dialysis patients older than 20 years at end of year Finnish Registry for Kidney Diseases 2011–2021

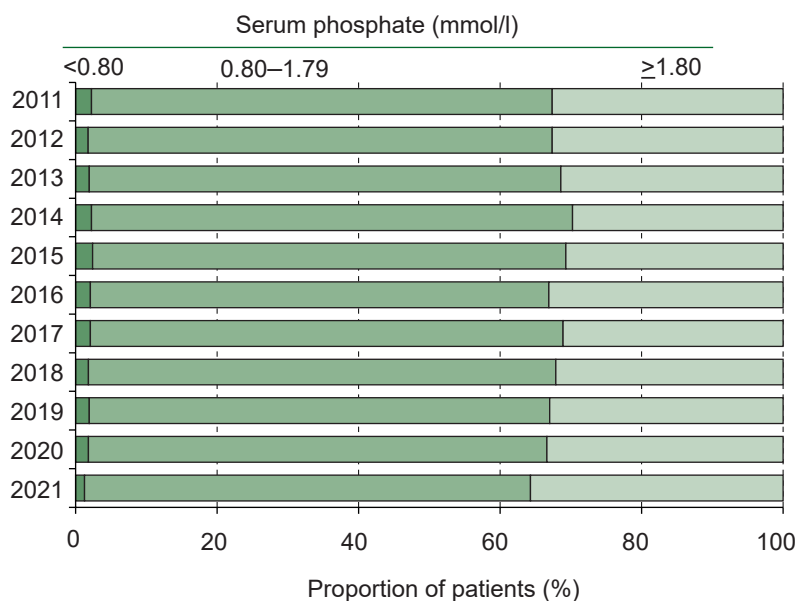
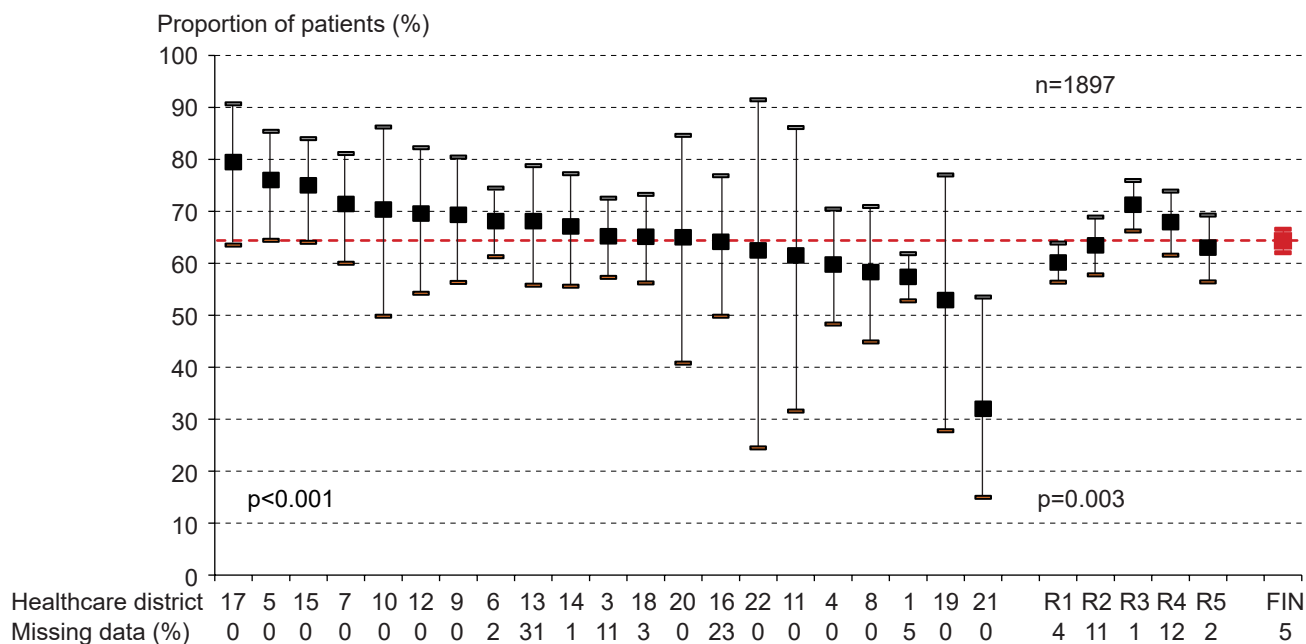


Figure 24. Proportion of dialysis patients older than 20 years with serum phosphate <1.8 mmol/l in healthcare districts and regions Finnish Registry for Kidney Diseases 2021



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 2021, 64% of hemodialysis and peritoneal dialysis patients had concentrations of serum phosphate <1.8 mmol/l; this proportion has decreased slightly during

recent years (Figure 23). Only 1% 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 32% and 79% in the healthcare districts ($p<0.001$) and between 64% and 76% in the regions ($p=0.003$) (Figure 24). No significant difference was present in the proportions of men and women with a phosphate concentration <1.8 mmol/l.

Figure 25. Estimated GFR of new KRT patients older than 20 years
Finnish Registry for Kidney Diseases 2011–2021

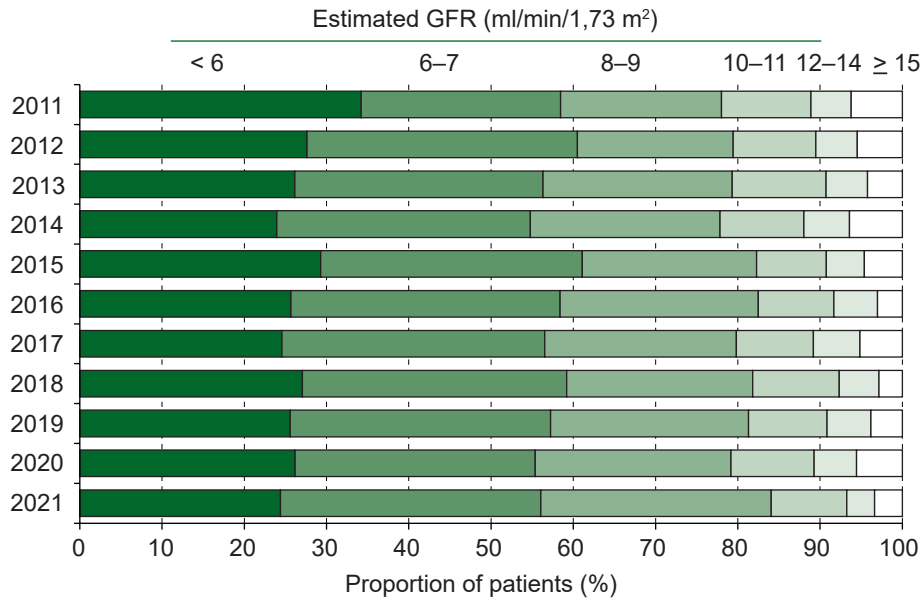


Figure 26. Estimated GFR of new KRT patients older than 20 years in healthcare districts
Finnish Registry for Kidney Diseases 2017–2021

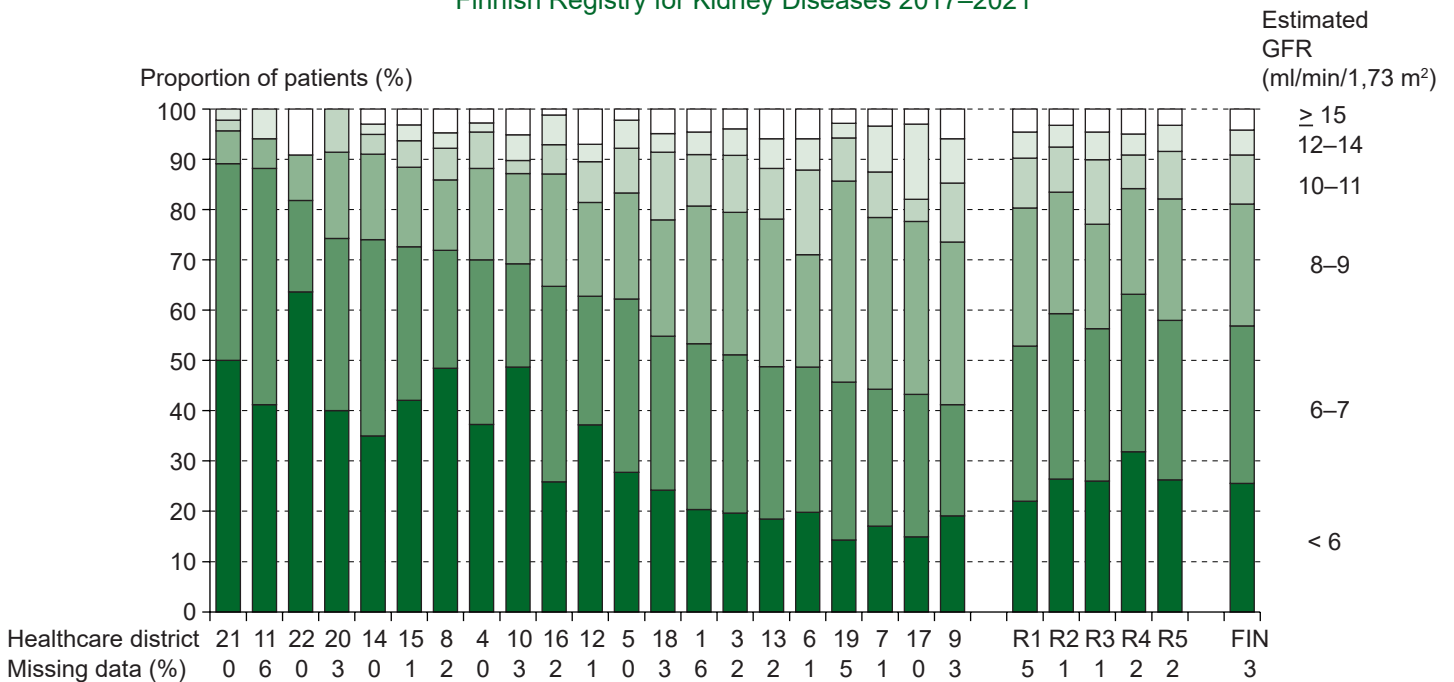


Figure 25 shows the estimated glomerular filtration rate (GFR), calculated with the CKD-EPI formula, of patients who entered KRT in 2011–2021. The estimated GFR is based on serum creatinine concentration measured before first KRT. The decision to start KRT is not based on estimated GFR alone; the patient’s symptoms and clinical condition also affect the decision. Research on timing of KRT start has not supported a very early start (at high estimated GFR).

In 2011, the median estimated GFR was 7.3 ml/min/1.73

m² and in 2021 it was 7.6 ml/min/1.73 m².

Figure 26 presents estimated GFR of patients who entered KRT in 2017–2021 according to healthcare district and region. The healthcare districts are sorted based on the proportion of patients with an estimated GFR < 8 ml/min/1.73 m². This proportion for the entire country was 57% but varied by healthcare districts in the range of 41–89% (p<0.001) and by region in the range of 53–63% (p=0.01). Estimated GFR was < 8 ml/min/1.73 m² in women more often than in men (p<0.001).

Figure 27. Vascular access of new hemodialysis patients older than 20 years at end of year
Finnish Registry for Kidney Diseases 2014–2021

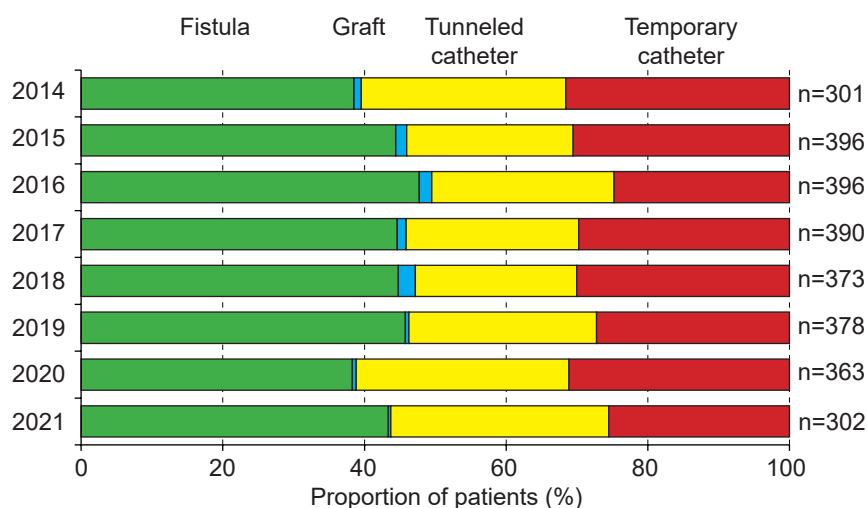
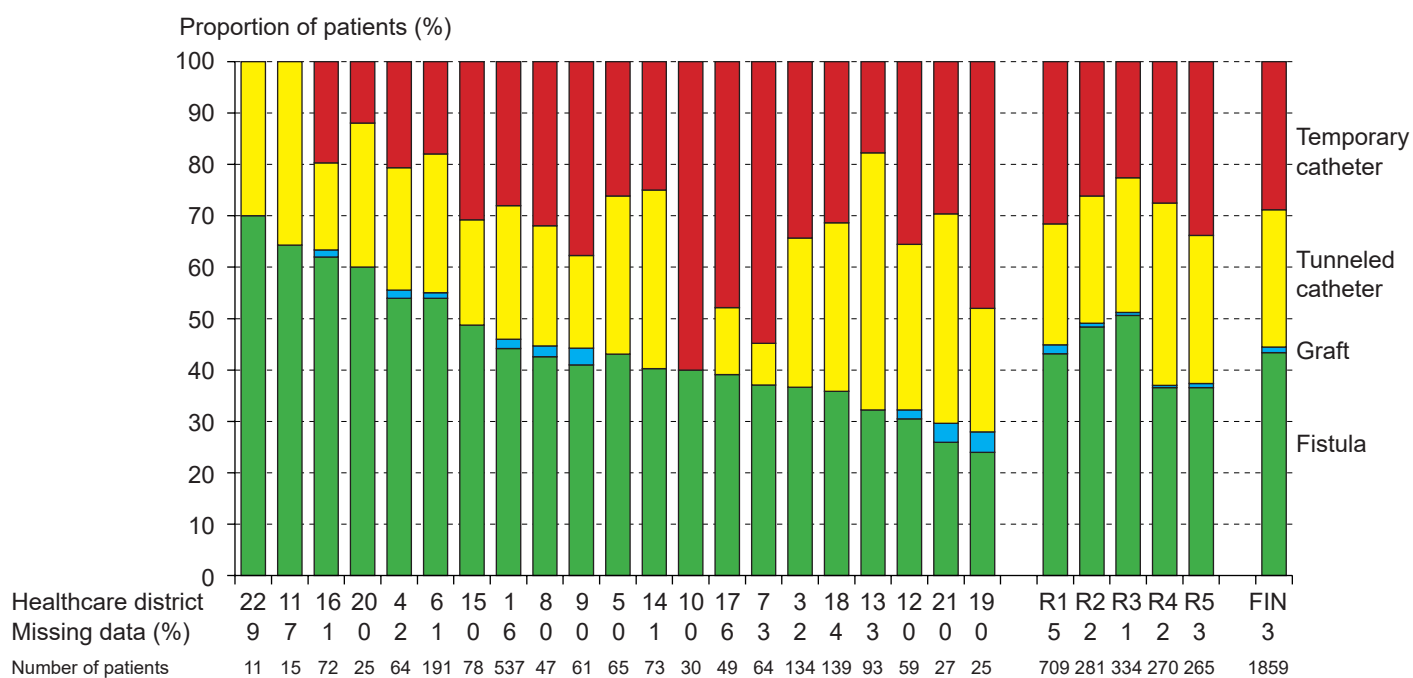


Figure 28. Vascular access of new hemodialysis patients older than 20 years in healthcare districts
Finnish Registry for Kidney Diseases 2017–2021



The Finnish Registry for Kidney Diseases has since 2014 collected data on vascular access of patients entering hemodialysis as the first type of KRT. 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 2021, 44% of patients older than 20 years who entered hemodialysis had an arteriovenous fistula or graft, and the proportion was at the same level compared to previous

years (Figure 27). Of new hemodialysis patients in 2021, 25% started with a temporary catheter and this proportion decreased.

Figure 28 presents the distribution of types of first vascular access among patients who entered hemodialysis in 2017–2021. In the entire country, 44% of patients had a fistula or graft, but the proportion varied between 28% and 70% in healthcare districts ($p < 0.001$) and between 37% and 51% in regions ($p < 0.001$). The proportion of patients with a fistula or graft did not differ between the sexes.

Figure 29. Vascular access of hemodialysis patients older than 20 years at end of year
Finnish Registry for Kidney Diseases 2011–2021

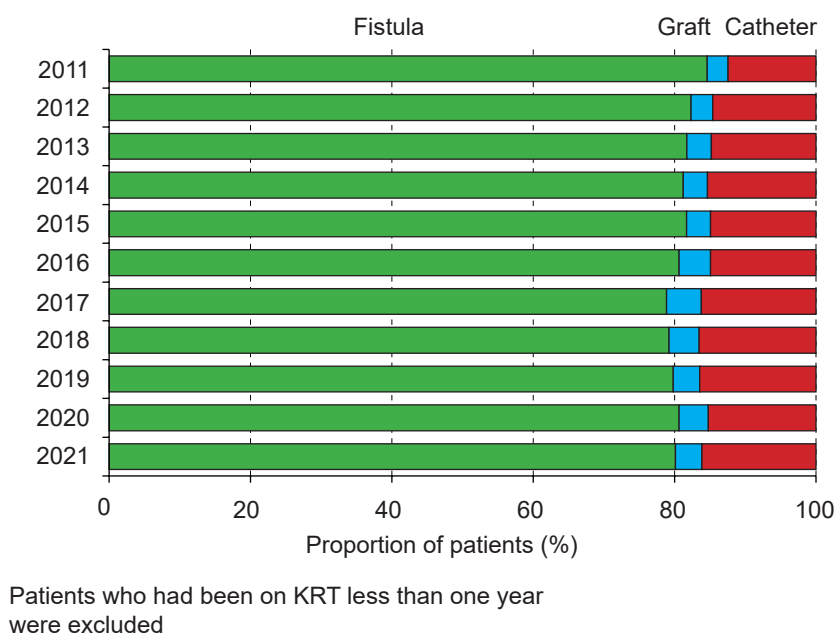
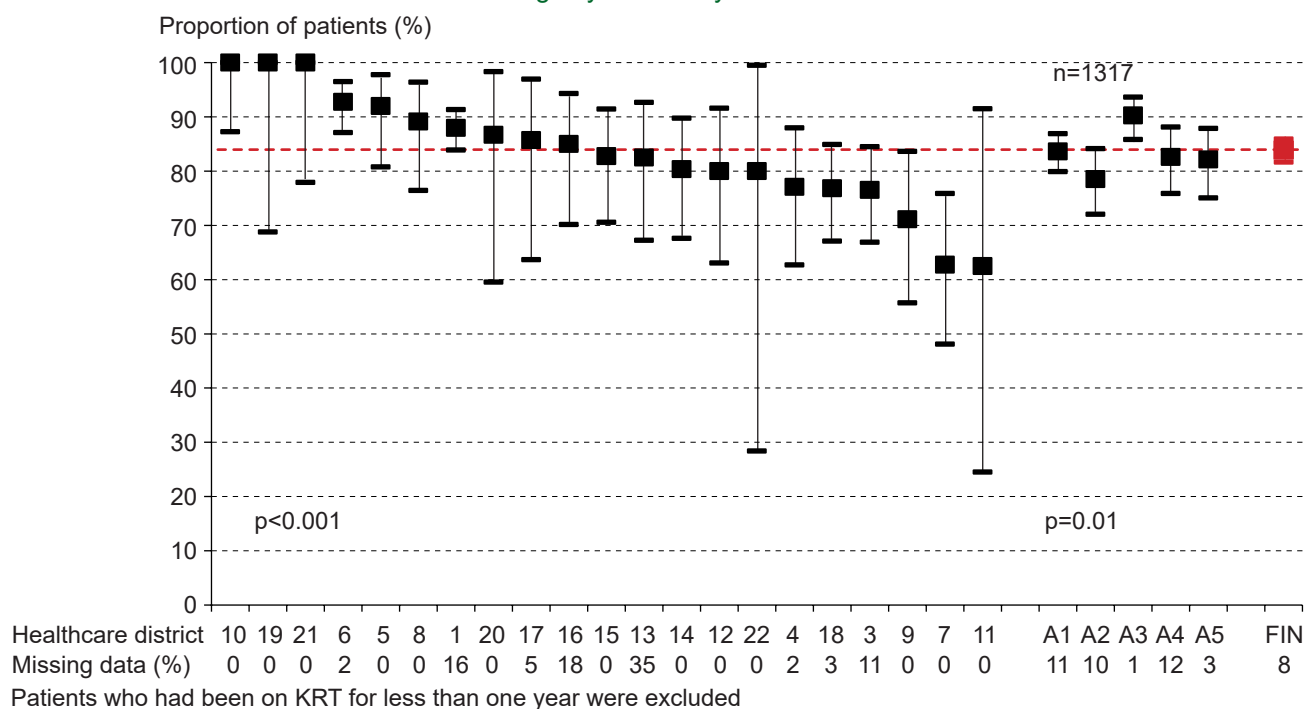


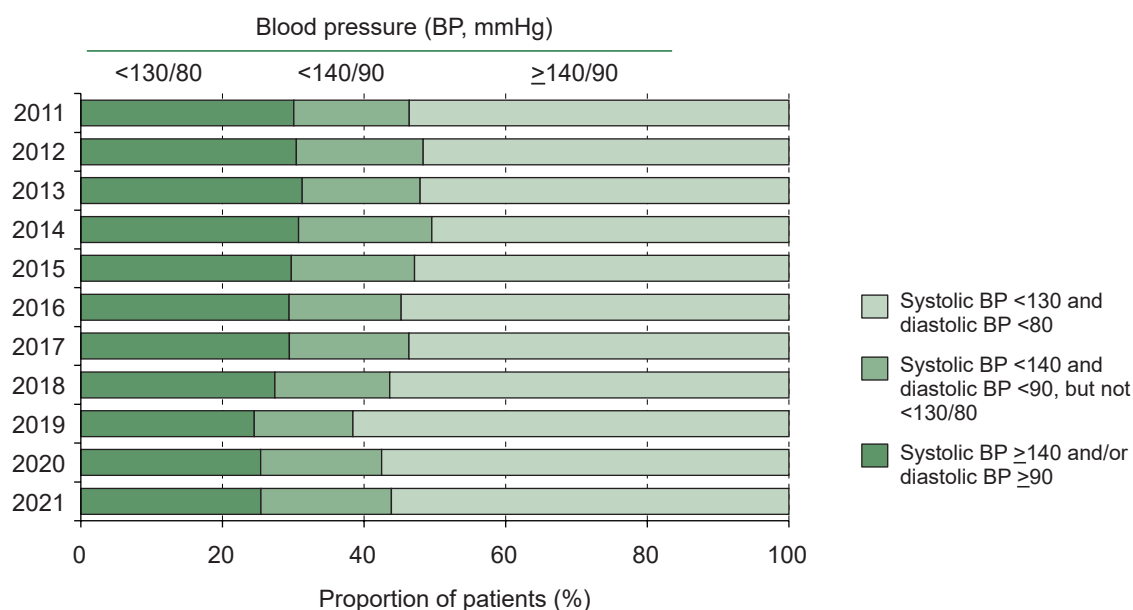
Figure 30. Proportion of hemodialysis patients older than 20 years with a fistula or graft
in healthcare districts and regions
Finnish Registry for Kidney Diseases 2021



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 KRT for at least one year, the proportion with a fistula or graft had decreased from 87% in 2011 to 84% in 2021 (Figure 29).

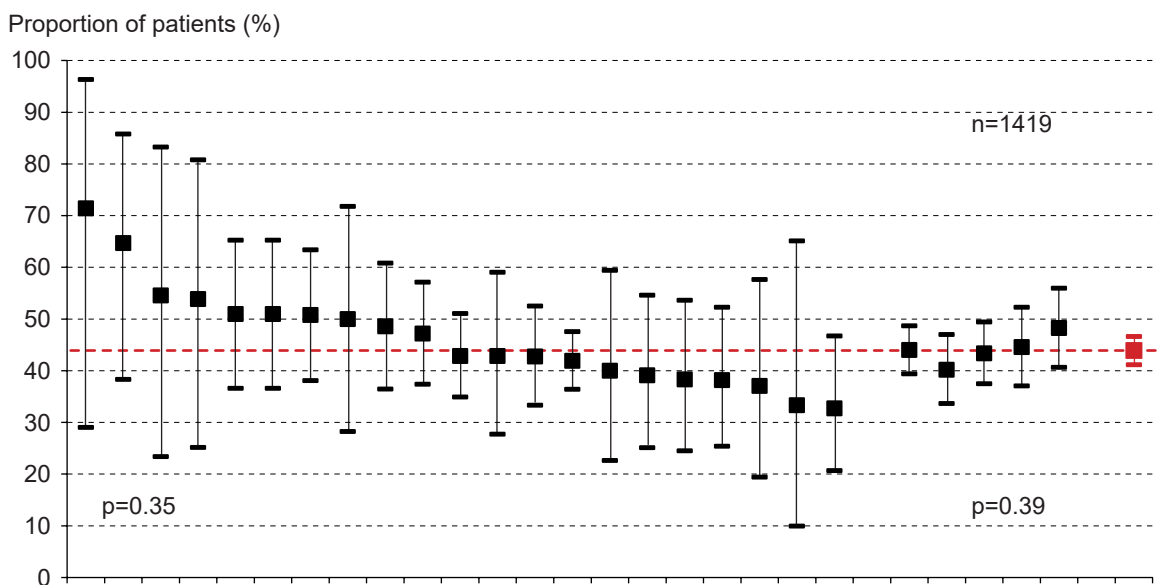
At the end of 2021, the proportion of patients with a fistula or graft varied between 63% and 100% in healthcare districts ($p<0.001$) and between 79% and 90% in regions ($p=0.01$) (Figure 30). At the end of 2021, female hemodialysis patients less frequently than male patients had a fistula or graft (81% vs. 85%, $p=0.05$). A fistula or graft was as common in patients over 75 years as in younger patients.

Figure 31. Distribution of predialytic blood pressure among hemodialysis patients older than 20 years
Finnish Registry for Kidney Diseases 2011–2021



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

Figure 32. 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 2021



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

According to the guidelines of the Kidney Disease Outcome Quality Initiative (KDOQI), hemodialysis patients' target predialytic blood pressure is <140/90 mmHg. In hemodialysis patients however, the blood pressure often varies significantly during dialysis and after dialysis compared to predialytic blood pressure, so optimal blood pressure level for the patient is also affected by these values.

At the end of 2021, 44% of hemodialysis patients reached this target and the proportion remained at the same level (Figure 31).

The proportion of patients attaining the target varied between 33% and 71% in healthcare districts ($p=0.35$) and between 40% and 48% in regions ($p=0.39$) (Figure 32). No significant difference was observed between the sexes.

Figure 33. Distribution of blood pressure in kidney transplantation patients older than 20 years
Finnish Registry for Kidney Diseases 2011–2021

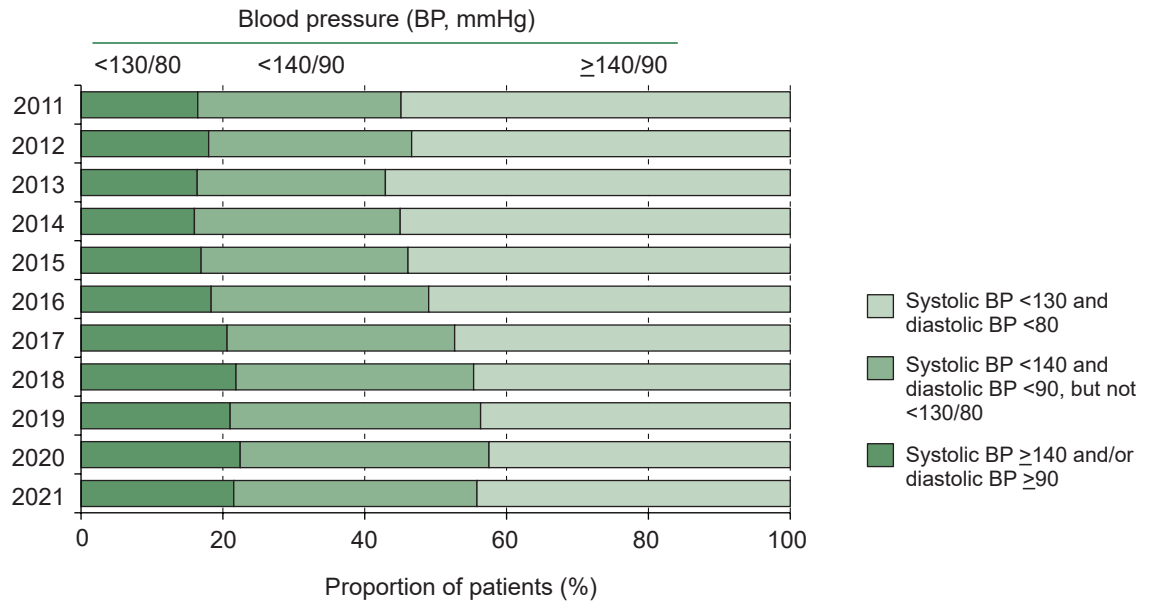
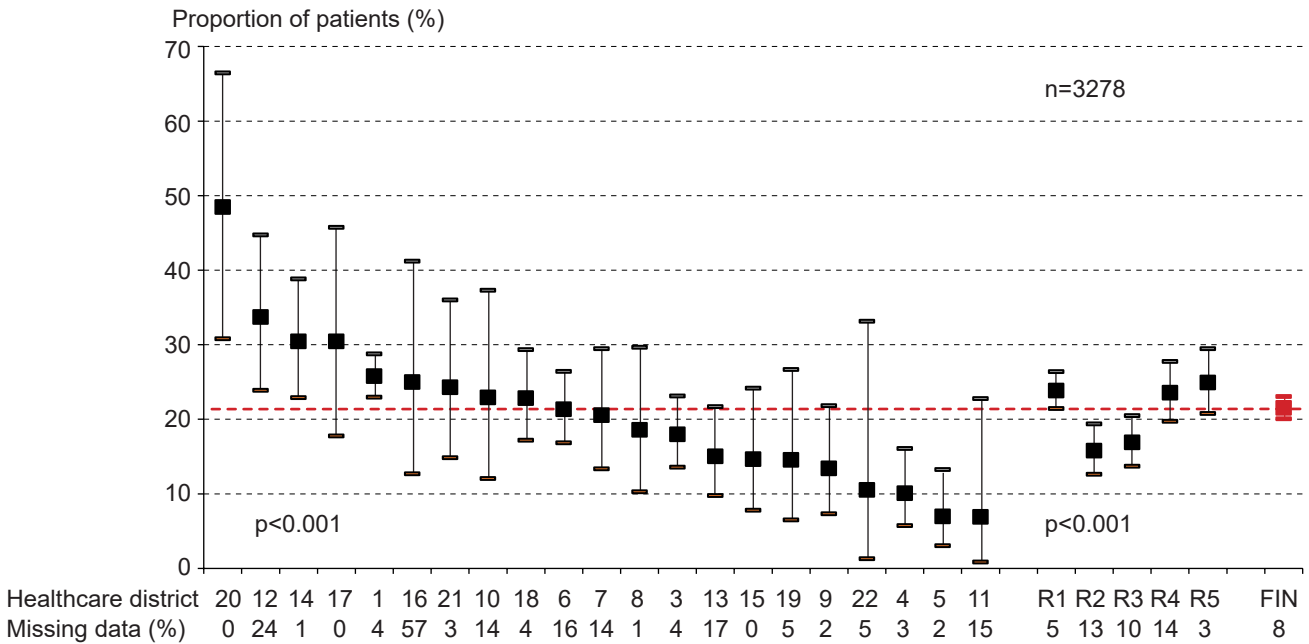


Figure 34. Proportion of kidney transplantation patients older than 20 years with blood pressure <130/80 mmHg in healthcare districts and regions
Finnish Registry for Kidney Diseases 2021



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 33 shows the blood pressure distribution of kidney transplantation patients at the end of the years 2011–2021. The proportion of patients reaching the target (<130/80 mmHg) was 16% in 2010 and 22% in 2020. The

proportion of patients with blood pressure <140/90 mmHg increased from 45% in 2011 to 56% in 2021.

At the end of 2021, the proportion of kidney transplantation patients attaining the blood pressure target varied between 7% and 48% in healthcare districts ($p<0.001$) and between 16% and 25% in regions ($p<0.001$) (Figure 34). No significant difference was observed between the sexes.

Figure 35. Number of PD peritonitis patients older than 20 years according to annual number of episodes of peritonitis Finnish Registry for Kidney Diseases 2011–2021

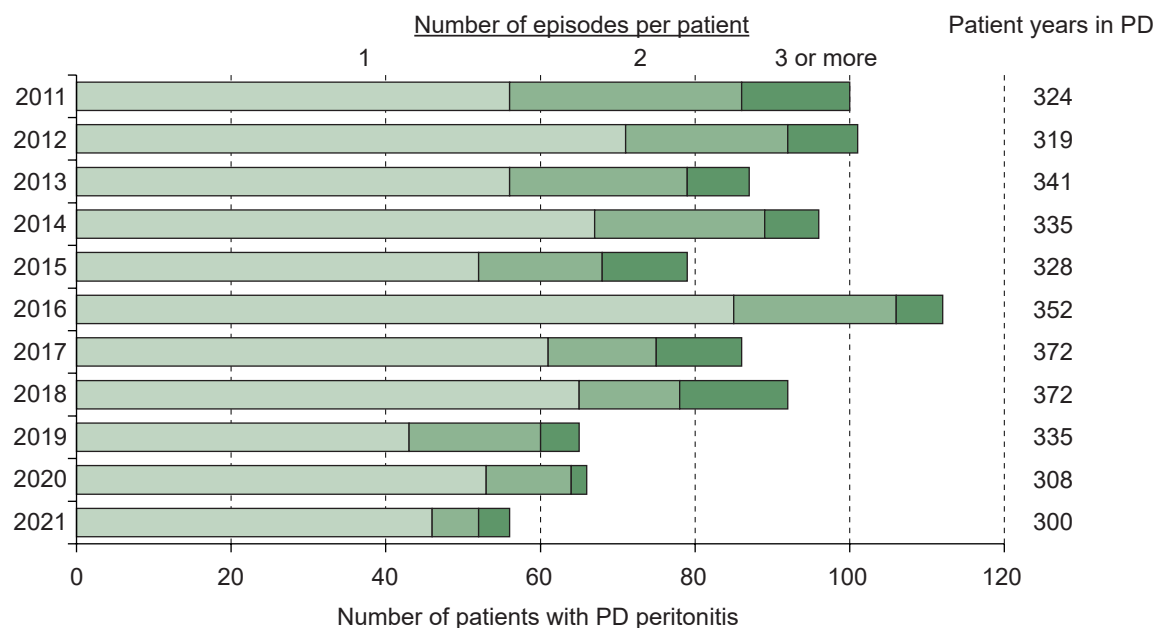


Figure 36. Incidence density of peritonitis among PD patients older than 20 years in regions. Finnish Registry for Kidney Diseases 2012–2021

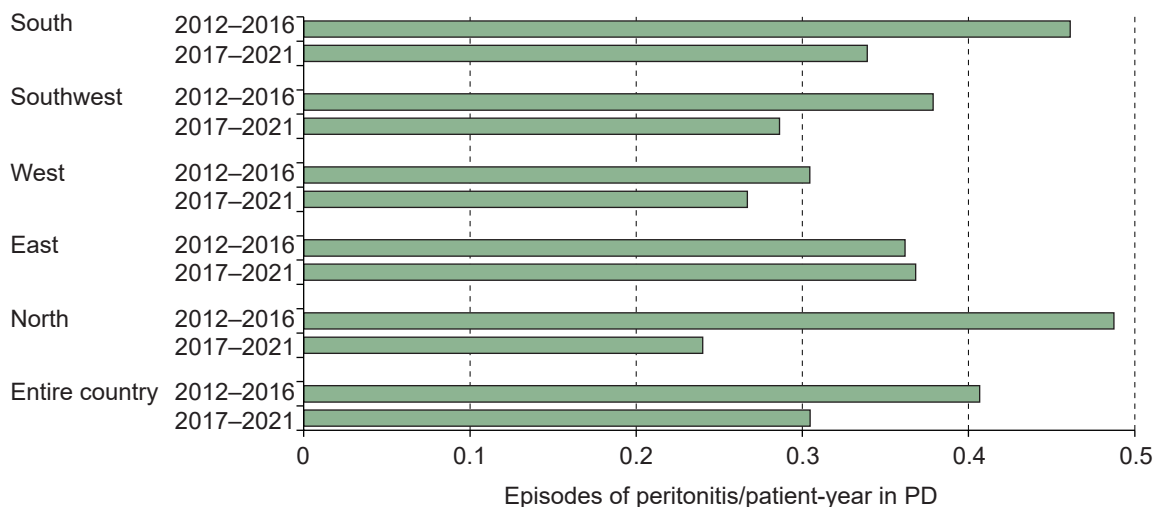


Figure 35 presents the number of peritoneal dialysis (PD) patients who had had at least one episode of peritonitis per calendar year during 2011–2021. Of PD patients with peritonitis in 2021, 18% had had more than one episode, and this proportion had decreased.

According to the recommendation of the International Society for Peritoneal Dialysis (ISPD) in 2022, the number of peritonitis episodes should be less than 0.4 per patient-year. Figure 36 shows PD patients' incidence density of

peritonitis, i.e. the number of peritonitis episodes per patient-year in PD. If the patient had more than three episodes of peritonitis during one calendar year, only the first three episodes were considered. In the entire country, the incidence density of PD peritonitis was 0.30 per patient-year in 2017–2021, and this was 25% less than in 2012–2016. The incidence density of PD peritonitis has declined in most regions.

Figure 37. Time to waitlisting for kidney transplantation of new KRT patients older than 20 years
Finnish Registry for Kidney Diseases 2011–2021

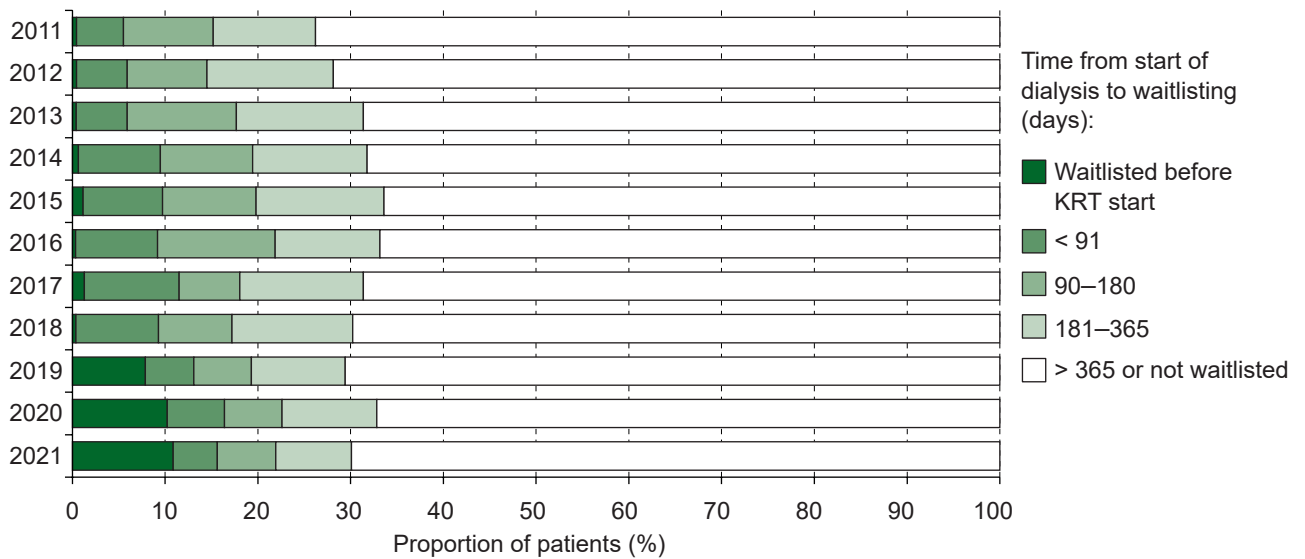
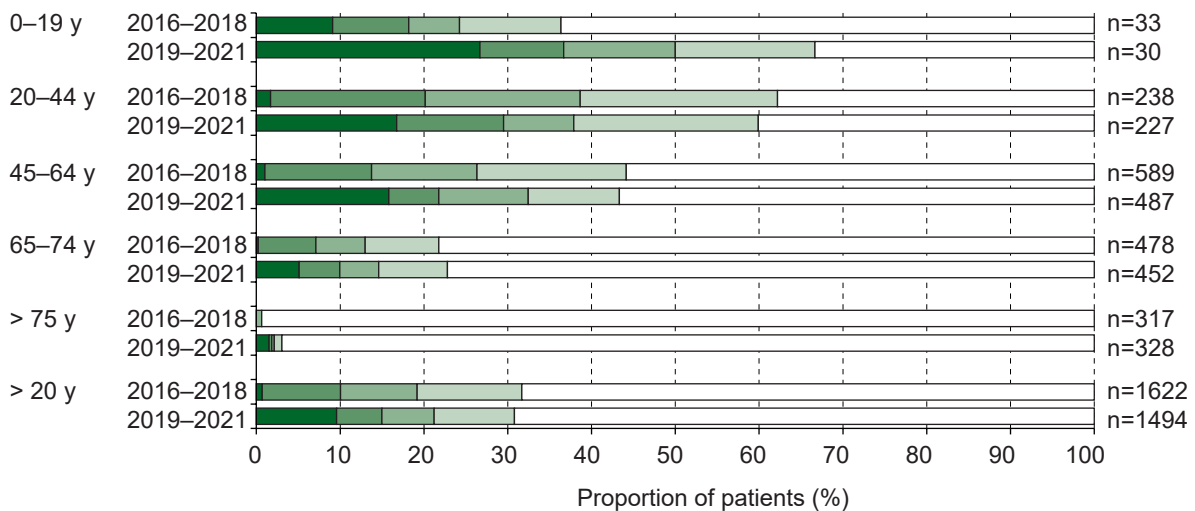


Figure 38. Time to waitlisting for kidney transplantation by age group of new KRT patients
Finnish Registry for Kidney Diseases 2016–2021



The colors of the columns in the figure correspond to the explanations of the colors in figure 37

In 2011–2021, altogether 5453 patients older than 20 years entered KRT. Figure 37 shows the time from initiation of KRT 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 KRT in 2021, 11% were already waitlisted at the start of KRT and this proportion has increased markedly, as well as those waitlisted within 90 days of KRT start. Nevertheless, within 180 days of KRT initiation, the proportion of patients waitlisted, which was 21% in 2021, had not increased relative to previous years.

Information on waitlisting received from the Transplantation Registry at Helsinki University Hospital covered the period up to 12 September 2022. Because of this, a complete follow-up data of 365 days on waitlisting for kid-

ney transplantation were not available for patient starting KRT after 12 September 2021 (n=141) in the analyses of Figures 37–40. If the follow-up period were complete, the proportion of patients who started KRT in 2021 and were waitlisted in less than a year would increase by about 2–3% in Figure 37.

Figure 38 shows the time from start of KRT until waitlisting for kidney transplantation by age groups in 2016–2018 and in 2019–2021. Patients aged 0–19 years were waitlisted the most quickly in 2019–2021, with the proportion of patients waitlisted decreasing in older age groups. In patients who started KRT in 2019–2021, 16% of those aged 20–64 years, 5% of those aged 65–74 years, and 2% of those aged over 75 years were waitlisted before start of KRT.

Figure 39. Time to waitlisting for kidney transplantation of new KRT patients older than 20 years in healthcare regions
Finnish Registry for Kidney Diseases 2016–2021

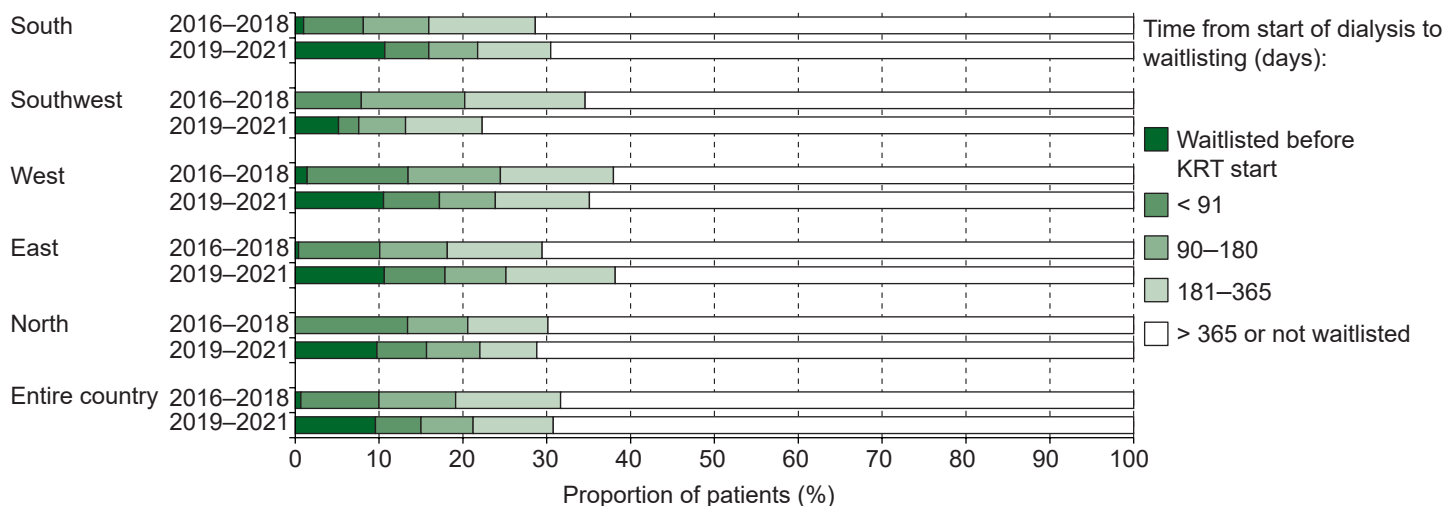


Figure 40. Time to waitlisting for kidney transplantation of new KRT patients older than 20 years
in healthcare districts and regions
Finnish Registry for Kidney Diseases 2017–2021

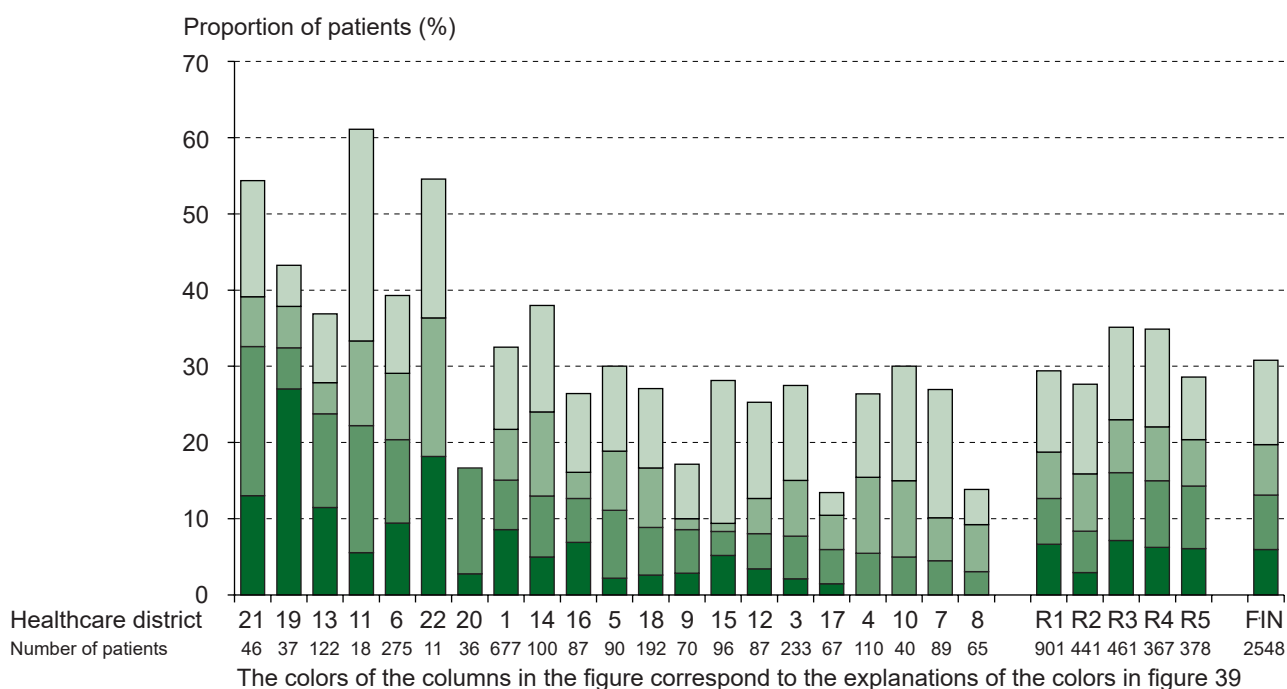


Figure 39 shows the time from start of KRT until waitlisting for kidney transplantation by region in 2016–2018 and in 2019–2021. In all regions, a new practice had been adopted, according to which patients can be waitlisted for kidney transplantation from a deceased donor after 1 September 2018. In 2019–2021, 10% of patients who started KRT had been waitlisted before start of KRT. The proportion was lowest in the southwestern region (5%) and highest in the southern, eastern, and western region (11%), but there was no statistically significant difference between the regions ($p=0.10$). In the entire country, 12% of women and 8% of men who started KRT in 2019–2021 had been waitlisted before start of KRT ($p=0.03$).

Figure 40 shows the proportions of patients waitlisted within one year of start of KRT in 2017–2021. Of the patients, 13% were waitlisted (or had already received a kidney transplant) within 90 days of start of KRT. This proportion ranged from 3% to 33% in healthcare districts ($p<0.001$) and from 8% to 16% in regions ($p=0.005$). Within 90 days of start of KRT, 15% of women and 12% of men were waitlisted for kidney transplantation ($p=0.02$).

Within 180 days of start of KRT, 20% of patients were waitlisted, with the proportion varying between 9% and 39% in healthcare districts ($p<0.001$) and between 16% and 23% in regions ($p=0.06$). Of women, 23%, and of men 18% had been waitlisted within 180 days of start of KRT ($p=0.001$).

- Age
 at end of year 2013:16, 2014:17, 2017:22–23, 2018:19, 2019:19, 2020:20, 2021:21
 of new KRT patients 2013:9–10, 2014:9–10, 2017:12–14, 2018:13, 2019:13, 2020:13–14, 2021:13–14
- Alport's syndrome 2011:25,27
- Amyloidosis 2014:12,13,23, 2016:14,27, 2017:16–18,29–30, 2018:15,31, 2019:15,25, 2020:16,26, 2021:16,17,28
- APD (automated peritoneal dialysis) 2010:12,18, 2011:11,17,18,25,27, 2012:23,25, 2013:18,27, 2014:14,19,21, 2015:13,14,19,21, 2016:15,18,23,25, 2017:19,25,27,29–30, 2018:16,21,23, 2019:16,21,23,39,40, 2020:17,22,24, 2021:18,23,25,26
- Blood pressure-lowering medication 2012:31,34, 2013:41,43, 2014:34,36
- CAPD (continuous ambulatory peritoneal dialysis) 2010:12,18, 2011:11,17,18,25,27, 2012:23,25, 2013:18,27, 2014:14,19,21, 2015:13,14,19,21, 2016:15,18,23,25, 2017:19,25,27,29–30, 2018:16,21,23, 2019:16,21,23,39,40, 2020:17,22,24, 2021:18,23,25,26
- Changes in type of treatment 2011:21, 2012:20, 2013:23, 2014:24, 2015:24, 2016:28–29, 2017:31, 2018:26, 2019:26, 2020:27, 2021:29
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- Goodpasture syndrome 2016:14, 2017:17–18, 2019:15, 2021:17
- Graft survival
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- Granulomatosis with polyangiitis 2017:17, 2021:17
- Hemodiafiltration 2010:18, 2011:11,18, 2012:23,25, 2013:27, 2014:14,21, 2015:13,14,21, 2016:15,18,25, 2017:19,27, 2018:16,23, 2019:16,23, 2020:17,24, 2021:18,25,26
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- High blood pressure, see comorbidity
- Home dialysis 2012:24, 2014:21, 2015:13,14,19,21, 2016:15,18,23,25,29, 2017:19,25,27, 2018:16,21,23, 2019:16,21,23,39–42, 2020:17,22,24, 2021:18,23,25,26
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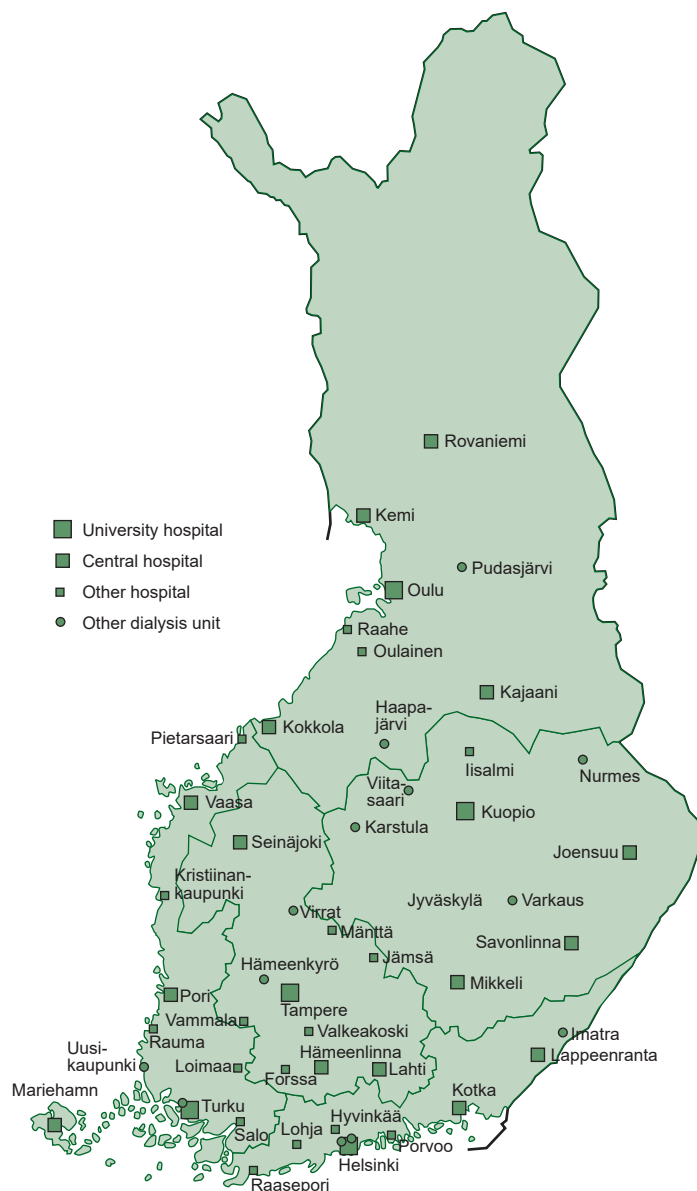
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Report 2021



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