TABLE 27. *Doses of erythropoietin in 2005 and 2006 (entire dialysis patient population)*

	Doses of erythropoietin (U/week)										
	Not used	1–1499	1500–2999	3000–4499	4500–5999	6000–8999	≥9000	Subtotal	Unspecified	Not available	Total
Number of patients in 2005	19 592	3982	18 475	19 349	25 496	19 669	30 265	136 828	345	30 939	168 112
(%)	(14.3)	(2.9)	(13.5)	(14.1)	(18.6)	(14.4)	(22.1)	(100.0)			
Number of patients in 2006	34 359	8166	36 006	32 896	43 380	24 141	31 222	210 170	151	39 636	249 957
(%)	(16.3)	(3.9)	(17.1)	(15.7)	(20.6)	(11.5)	(14.9)	(100.0)			

the erythropoietin doses were classified as shown in Table 27, and the respondents selected one of the ranges as the suitable dose for the patient. Therefore, it is not possible to simply compare the mean erythropoietin dose in 2005 and 2006; however, the results suggest that the erythropoietin dose generally decreased from the end of 2005 to the end of 2006.

3. Hemoglobin concentration and iron metabolism related indices. Table 28 shows a summary of the mean serum iron concentrations with respect to hemoglobin concentration range in all the chronic dialysis patients in 2005 and 2006. Table 29 shows a summary of the mean transferrin saturation levels with respect to hemoglobin concentration range in all the chronic dialysis patients in 2005 and 2006. In 2005 and 2006 the serum iron concentration and transferrin saturation level increased with hemoglobin concentration; however, the increase in transferrin saturation level with hemoglobin concentration was slight. For all hemoglobin concentration ranges, the serum iron concentration and transferrin saturation level in 2006 were higher than those in 2005.

Table 30 shows a summary of the mean serum ferritin concentration with respect to hemoglobin concentration range for the prevalent patients in 2005 and 2006. In all hemoglobin concentration ranges, the serum ferritin concentration in 2006 was markedly higher than that in 2005. In addition, the serum ferritin concentration of the group of patients with hemoglobin concentration of 10–11 g/dL was the lowest; the serum ferritin concentration was higher

TABLE 28. *Relationship between hemoglobin concentration and serum iron concentration (comparison between entire dialysis patient populations in 2005 and that in 2006)*

	Hemoglobin concentration (g/dL)						
	<8.0	8.0–8.9	9.0–9.9	10.0–10.9	11.0–11.9	≥12.0	Unspecified
Serum iron concentration in 2005 (μg/dL)	54.77	54.50	59.39	63.43	66.71	69.06	63.43
Serum iron concentration in 2006 (μg/dL)	56.85	58.70	62.71	65.76	67.70	70.24	64.05

TABLE 29. *Relationship between hemoglobin concentration and iron saturation level (TSAT) (comparison between entire dialysis patient populations in 2005 and that in 2006)*

	Hemoglobin concentration (g/dL)						
	<8.0	8.0–8.9	9.0–9.9	10.0–10.9	11.0–11.9	≥12.0	Unspecified
Iron saturation level in 2005 (%)	25.48	24.06	25.32	26.65	28.02	28.86	27.74
Iron saturation level in 2006 (%)	27.68	27.00	27.92	28.68	29.03	29.13	27.16

TABLE 30. *Hemoglobin and serum ferritin concentrations (comparison between entire dialysis patient population in 2005 and that in 2006)*

	Hemoglobin concentration (g/dL)						
	<8.0	8.0–8.9	9.0–9.9	10.0–10.9	11.0–11.9	≥12.0	Unspecified
Serum ferritin concentration in 2005 (ng/mL)	278.54	219.70	181.18	174.70	190.13	211.44	191.51
Serum ferritin concentration in 2006 (ng/mL)	368.56	270.72	239.80	223.31	227.74	231.22	246.50

TABLE 31. *Doses of erythropoietin and hemoglobin concentrations (comparison between entire dialysis patient population in 2005 and that in 2006)*

	Dose of erythropoietin (U/week)							
	Not used	1–1499	1500–2999	3000–4499	4500–5999	6000–8999	≥9000	Unspecified
Hemoglobin concentration in 2005 (g/dL)	11.09	10.64	10.55	10.35	10.25	10.00	9.50	10.57
Hemoglobin concentration in 2006 (g/dL)	11.17	10.63	10.44	10.25	10.08	9.88	9.36	9.91

when the hemoglobin concentration was <10 g/dL or >11 g/dL. On the other hand, in 2006 the serum ferritin concentration generally increased compared with that in the previous year; the increase in the serum ferritin concentration in the group of patients with a hemoglobin concentration of 11 g/dL or higher was not observed. That is, in the group of patients with hemoglobin concentrations <10 g/dL, the serum ferritin concentration decreased with increasing hemoglobin concentration, and the serum ferritin concentration remained nearly constant at approximately 225 ng/mL for those with a hemoglobin concentration of ≥11 g/dL.

4. Erythropoietin dose and iron metabolism related indices. Table 31 shows a summary of mean hemoglobin concentrations with respect to the erythropoietin dose range for the prevalent patients in 2005 and 2006 (1). In 2005 and 2006, the mean hemoglobin concentration tended to decrease as the erythropoietin dose increased. There was no significant difference in this tendency of the results between 2005 and 2006.

Tables 32, 33, and 34 show the summaries of mean serum iron concentrations, mean total iron binding capacities, and transferrin saturation levels, respectively, with respect to the erythropoietin dose range for all the chronic dialysis patients in 2005 and 2006 (1). In 2005 and 2006 the mean serum iron concentration and transferrin saturation level tended to decrease as the erythropoietin dose increased. There was no significant difference in these tendencies of the results between 2005 and 2006.

Table 35 shows a summary of mean serum ferritin concentrations with respect to the erythropoietin dose range for the prevalent patients in 2005 and 2006 (1). In any erythropoietin dose range (including those not used), the mean serum ferritin concentration in 2006 was higher than that in 2005. In 2005 and

TABLE 32. *Doses of erythropoietin and serum iron concentrations (comparison between entire dialysis patient population in 2005 and that in 2006)*

	Dose of erythropoietin (U/week)							
	Not used	1–1499	1500–2999	3000–4499	4500–5999	6000–8999	≥9000	Unspecified
Serum iron concentration in 2005 (μg/dL)	64.66	69.75	69.20	67.11	61.52	61.25	53.53	65.50
Serum iron concentration in 2006 (μg/dL)	66.97	72.87	70.65	68.16	62.02	61.79	54.76	64.30

TABLE 33. *Doses of erythropoietin and total iron binding capacities (comparison between entire dialysis patient population in 2005 and that in 2006)*

	Dose of erythropoietin (U/week)							
	Not used	1–1499	1500–2999	3000–4499	4500–5999	6000–8999	≥9000	Unspecified
Total iron binding capacity in 2005 (μg/dL)	271.11	252.15	245.81	242.49	243.21	240.46	238.65	177.56
Total iron binding capacity in 2006 (μg/dL)	265.38	240.97	235.88	232.86	232.00	228.84	223.74	237.80

TABLE 34. *Doses of erythropoietin and iron saturation levels (comparison between entire dialysis patient population in 2005 and that in 2006)*

	Dose of erythropoietin (U/week)							
	Not used	1–1499	1500–2999	3000–4499	4500–5999	6000–8999	≥9000	Unspecified
Iron saturation level in 2005 (%)	25.53	28.82	29.17	28.53	26.44	26.66	23.59	36.58
Iron saturation level in 2006 (%)	26.65	31.01	30.85	30.18	27.78	28.01	25.91	28.60

TABLE 35. *Doses of erythropoietin and serum ferritin concentrations (comparison between entire dialysis patient population in 2005 and that in 2006)*

	Dose of erythropoietin (U/week)							
	Not used	1–1499	1500–2999	3000–4499	4500–5999	6000–8999	≥9000	Unspecified
Serum ferritin concentration in 2005 (ng/mL)	144.64	194.98	202.33	203.65	180.32	190.48	210.12	173.40
Serum ferritin concentration in 2006 (ng/mL)	175.26	239.30	257.05	249.07	232.78	248.43	279.71	196.76

2006, the serum ferritin concentration of the patients not administered erythropoietin was lower than that of the patients administered erythropoietin.

Table 36 shows a summary of the distribution of erythropoietin dose with respect to the hemoglobin concentration range. The subjects were the prevalent patients in 2006. The patients with lower hemoglobin concentrations were administered higher erythropoietin doses. This finding agrees with the tendency of the mean hemoglobin concentration with respect to the erythropoietin dose range. In some patients, erythropoietin was not administered although their hemoglobin concentration was low (<9.0 g/dL), or a high erythropoietin dose was administered although their hemoglobin concentration was high (≥12.0 g/dL).

Table 37 shows a summary of the distribution of erythropoietin dose with respect to the iron saturation level range. The subjects were the prevalent patients in 2006. The percentage of patients administered erythropoietin at a dose of ≥6000 U/week in the patient group whose iron saturation level was ≥20% was lower than that in the patient group whose iron saturation level was <20%. Furthermore, the percentage of patients not administered erythropoietin and that of patients administered erythropoietin at a high dose of ≥9000 U/week were higher in the group whose transferrin saturation level was <20% than in the group whose transferrin saturation level was ≥20%.

Table 38 shows a summary of the distribution of erythropoietin dose with respect to the serum ferritin concentration range. The subjects were the prevalent patients in 2006. The number of patients not administered erythropoietin was high in the group with a serum ferritin concentration <50 ng/mL. Moreover, there was no significant difference in erythropoietin dose distribution when the serum ferritin concentration of the patients increased; rather, the number of patients administered erythropoietin at a high dose tended to increase. In particular, in the group with a serum ferritin concentration of ≥600 ng/mL, the percentage of patients administered erythropoietin at a dose of ≥9000 U/week was high.

TABLE 36. *Hemoglobin concentrations and doses of erythropoietin (entire dialysis patient population)*

Dose of erythropoietin (U/week)	Hemoglobin concentration (g/dL)										
	<8.0	8.0–8.9	9.0–9.9	10.0–10.9	11.0–11.9	≥12.0	Subtotal	Not available	Total	Mean	SD
Not used	467	1 146	4 253	9 316	9 606	8 976	33 764	595	34 359	11.17	1.44
(%)	(1.4)	(3.4)	(12.6)	(27.6)	(28.5)	(26.6)	(100.0)				
1–1499	93	313	1 565	3 103	2 110	843	8 027	139	8 166	10.63	1.11
(%)	(1.2)	(3.9)	(19.5)	(38.7)	(26.3)	(10.5)	(100.0)				
1500–2999	482	1 968	8 424	13 829	8 233	2 538	35 474	532	36 006	10.44	1.08
(%)	(1.4)	(5.5)	(23.7)	(39.0)	(23.2)	(7.2)	(100.0)				
3000–4499	747	2 607	8 824	12 303	6 445	1 600	32 526	370	32 896	10.25	1.10
(%)	(2.3)	(8.0)	(27.1)	(37.8)	(19.8)	(4.9)	(100.0)				
4500–5999	1342	4 492	12 865	15 441	6 934	1 645	42 719	661	43 380	10.08	1.10
(%)	(3.1)	(10.5)	(30.1)	(36.1)	(16.2)	(3.9)	(100.0)				
6000–8999	1479	3 253	7 224	7 646	3 336	847	23 785	356	24 141	9.88	1.24
(%)	(6.2)	(13.7)	(30.4)	(32.1)	(14.0)	(3.6)	(100.0)				
≥9000	4403	6 711	9 307	7 087	2 411	695	30 614	608	31 222	9.36	1.35
(%)	(14.4)	(21.9)	(30.4)	(23.1)	(7.9)	(2.3)	(100.0)				
Subtotal	9013	20 490	52 462	68 725	39 075	17 144	206 909	3 261	210 170	10.24	1.33
(%)	(4.4)	(9.9)	(25.4)	(33.2)	(18.9)	(8.3)	(100.0)				
Unspecified	13	18	35	30	26	7	129	22	151	9.91	1.41
(%)	(10.1)	(14.0)	(27.1)	(23.3)	(20.2)	(5.4)	(100.0)				
No information available	503	1 114	2 381	2 899	1 518	725	9 140	30 496	39 636	10.11	1.39
(%)	(5.5)	(12.2)	(26.1)	(31.7)	(16.6)	(7.9)	(100.0)				
Total	9529	21 622	54 878	71 654	40 619	17 876	216 178	33 779	249 957	10.23	1.33
(%)	(4.4)	(10.0)	(25.4)	(33.1)	(18.8)	(8.3)	(100.0)				

TABLE 37. *Iron saturation levels and doses of erythropoietin (entire dialysis patient population)*

Dose of erythropoietin (U/week)	Iron saturation level (%)										
	<10	10–19	20–29	30–39	40–49	≥50	Subtotal	No information available	Total	Mean	SD
Not used	1829	6 052	6 664	4 012	1 729	1397	21 683	12 676	34 359	26.65	15.09
(%)	(8.4)	(27.9)	(30.7)	(18.5)	(8.0)	(6.4)	(100.0)				
1499	134	964	1 724	1 357	577	459	5 215	2 951	8 166	31.01	14.95
(%)	(2.6)	(18.5)	(33.1)	(26.0)	(11.1)	(8.8)	(100.0)				
1500–2999	493	4 289	8 274	5 933	2 577	2041	23 607	12 399	36 006	30.85	14.40
(%)	(2.1)	(18.2)	(35.0)	(25.1)	(10.9)	(8.6)	(100.0)				
3000–4499	435	4 113	7 679	5 358	2 113	1549	21 247	11 649	32 896	30.18	14.13
(%)	(2.0)	(19.4)	(36.1)	(25.2)	(9.9)	(7.3)	(100.0)				
4500–5999	962	7 303	10 738	5 800	2 201	1741	28 745	14 635	43 380	27.78	13.75
(%)	(3.3)	(25.4)	(37.4)	(20.2)	(7.7)	(6.1)	(100.0)				
6000–8999	507	3 921	5 687	3 158	1 194	1022	15 489	8 652	24 141	28.01	14.12
(%)	(3.3)	(25.3)	(36.7)	(20.4)	(7.7)	(6.6)	(100.0)				
≥9000	1395	6 650	6 418	3 014	1 252	1297	20 026	11 196	31 222	25.91	15.43
(%)	(7.0)	(33.2)	(32.0)	(15.1)	(6.3)	(6.5)	(100.0)				
Subtotal	5755	33 292	47 184	28 632	11 643	9506	136 012	74 158	210 170	28.38	14.60
(%)	(4.2)	(24.5)	(34.7)	(21.1)	(8.6)	(7.0)	(100.0)				
Unspecified	1	18	14	18	6	3	60	91	151	28.60	12.56
(%)	(1.7)	(30.0)	(23.3)	(30.0)	(10.0)	(5.0)	(100.0)				
No information available	202	1 062	1 488	905	398	323	4 378	35 258	39 636	28.63	14.85
(%)	(4.6)	(24.3)	(34.0)	(20.7)	(9.1)	(7.4)	(100.0)				
Total	5958	34 372	48 686	29 555	12 047	9832	140 450	109 507	249 957	28.39	14.60
(%)	(4.2)	(24.5)	(34.7)	(21.0)	(8.6)	(7.0)	(100.0)				

5. Hemoglobin concentration and vascular complications. The relationships of hemoglobin concentration with histories of brain infarction (Table 39), brain hemorrhage (Table 40), and myocardial infarction (Table 41) are summarized. There was no significant difference in the distribution of hemoglobin concentration between patients with and without such histories.

TABLE 38. *Serum ferritin concentrations and doses of erythropoietin (entire dialysis patient population)*

Dose of erythropoietin (U/week)	Serum ferritin concentration (ng/mL)												
	<50	50–99	100–199	200–399	400–599	600–799	800–999	≥1000	Subtotal	No information available	Total	Mean	SD
Not used	11 445	4 909	5 061	4 165	1 441	565	403	598	28 587	5 772	34 359	175.26	336.75
(%)	(40.0)	(17.2)	(17.7)	(14.6)	(5.0)	(2.0)	(1.4)	(2.1)	(100.0)				
1–1499	1 455	1 112	1 659	1 612	573	203	141	182	6 937	1 229	8 166	239.30	340.46
(%)	(21.0)	(16.0)	(23.9)	(23.2)	(8.3)	(2.9)	(2.0)	(2.6)	(100.0)				
1500–2999	5 441	5 051	7 631	7 389	2 738	1085	680	932	30 947	5 059	36 006	257.05	375.17
(%)	(17.6)	(16.3)	(24.7)	(23.9)	(8.8)	(3.5)	(2.2)	(3.0)	(100.0)				
3000–4499	5 044	4 771	7 203	6 561	2 221	919	567	828	28 114	4 782	32 896	249.07	377.31
(%)	(17.9)	(17.0)	(25.6)	(23.3)	(7.9)	(3.3)	(2.0)	(2.9)	(100.0)				
4500–5999	7 984	6 531	9 223	8 237	2 815	1105	679	954	37 528	5 852	43 380	232.78	360.59
(%)	(21.3)	(17.4)	(24.6)	(21.9)	(7.5)	(2.9)	(1.8)	(2.5)	(100.0)				
6000–8999	3 932	3 459	5 253	4 722	1 640	711	420	582	20 719	3 422	24 141	248.43	386.93
(%)	(19.0)	(16.7)	(25.4)	(22.8)	(7.9)	(3.4)	(2.0)	(2.8)	(100.0)				
≥9000	5 481	4 158	6 099	5 756	2 226	1132	629	1140	26 621	4 601	31 222	279.71	451.50
(%)	(20.6)	(15.6)	(22.9)	(21.6)	(8.4)	(4.3)	(2.4)	(4.3)	(100.0)				
Subtotal	40 782	29 991	42 129	38 442	13 654	5720	3519	5216	179 453	30 717	210 170	239.38	380.55
(%)	(22.7)	(16.7)	(23.5)	(21.4)	(7.6)	(3.2)	(2.0)	(2.9)	(100.0)				
Unspecified	21	15	25	23	9	1	1	1	96	55	151	196.76	241.38
(%)	(21.9)	(15.6)	(26.0)	(24.0)	(9.4)	(1.0)	(1.0)	(1.0)	(100.0)				
No information available	1 516	1 102	1 469	1 260	382	189	102	222	6 242	33 394	39 636	246.21	456.43
(%)	(24.3)	(17.7)	(23.5)	(20.2)	(6.1)	(3.0)	(1.6)	(3.6)	(100.0)				
Total	42 319	31 108	43 623	39 725	14 045	5910	3622	5439	185 791	64 166	249 957	239.59	383.29
(%)	(22.8)	(16.7)	(23.5)	(21.4)	(7.6)	(3.2)	(1.9)	(2.9)	(100.0)				

TABLE 39. *Hemoglobin concentrations and history of brain infarction (entire dialysis patient population)*

	Hemoglobin concentration (g/dL)										
History of brain infarction	<8.0	8.0–8.9	9.0–9.9	10.0–10.9	11.0–11.9	≥12.0	Subtotal	No information available	Total	Mean	SD
Without history	6916	15 992	41 188	54 524	31 406	13 854	163 880	3 071	166 951	10.25	1.33
(%)	(4.2)	(9.8)	(25.1)	(33.3)	(19.2)	(8.5)	(100.0)				
With history	1166	2 428	5 424	6 695	3 784	1 664	21 161	389	21 550	10.14	1.38
(%)	(5.5)	(11.5)	(25.6)	(31.6)	(17.9)	(7.9)	(100.0)				
Under acute-phase treatment	6	16	17	30	16	11	96	6	102	10.12	1.64
(%)	(6.3)	(16.7)	(17.7)	(31.3)	(16.7)	(11.5)	(100.0)				
Lacunar infarction	112	311	765	934	535	225	2 882	24	2 906	10.21	1.29
(%)	(3.9)	(10.8)	(26.5)	(32.4)	(18.6)	(7.8)	(100.0)				
Subtotal	8200	18 747	47 394	62 183	35 741	15 754	188 019	3 490	191 509	10.24	1.33
(%)	(4.4)	(10.0)	(25.2)	(33.1)	(19.0)	(8.4)	(100.0)				
Unspecified	152	284	684	767	311	140	2 338	91	2 429	9.98	1.33
(%)	(6.5)	(12.1)	(29.3)	(32.8)	(13.3)	(6.0)	(100.0)				
No information available	1177	2 591	6 800	8 704	4 567	1 982	25 821	30 198	56 019	10.19	1.32
(%)	(4.6)	(10.0)	(26.3)	(33.7)	(17.7)	(7.7)	(100.0)				
Total	9529	21 622	54 878	71 654	40 619	17 876	216 178	33 779	249 957	10.23	1.33
(%)	(4.4)	(10.0)	(25.4)	(33.1)	(18.8)	(8.3)	(100.0)				

TABLE 40. *Hemoglobin concentrations and history of brain hemorrhage (entire dialysis patient population)*

	Hemoglobin concentration (g/dL)										
History of brain hemorrhage	<8.0	8.0–8.9	9.0–9.9	10.0–10.9	11.0–11.9	≥12.0	Subtotal	No information available	Total	Mean	SD
Without history	7829	17 978	45 686	60 047	34 558	15 153	181 251	3 328	184 579	10.24	1.33
(%)	(4.3)	(9.9)	(25.2)	(33.1)	(19.1)	(8.4)	(100.0)				
With history	385	790	1 784	2 289	1 294	655	7 197	130	7 327	10.21	1.42
(%)	(5.3)	(11.0)	(24.8)	(31.8)	(18.0)	(9.1)	(100.0)				
Under acute-phase treatment	13	12	18	23	9	4	79	5	84	9.58	1.70
(%)	(16.5)	(15.2)	(22.8)	(29.1)	(11.4)	(5.1)	(100.0)				
Subtotal	8227	18 780	47 488	62 359	35 861	15 812	188 527	3 463	191 990	10.24	1.33
(%)	(4.4)	(10.0)	(25.2)	(33.1)	(19.0)	(8.4)	(100.0)				
Unspecified	124	266	644	698	243	106	2 081	108	2 189	9.92	1.28
(%)	(6.0)	(12.8)	(30.9)	(33.5)	(11.7)	(5.1)	(100.0)				
No information available	1178	2 576	6 746	8 597	4 515	1 958	25 570	30 208	55 778	10.19	1.33
(%)	(4.6)	(10.1)	(26.4)	(33.6)	(17.7)	(7.7)	(100.0)				
Total	9529	21 622	54 878	71 654	40 619	17 876	216 178	33 779	249 957	10.23	1.33
(%)	(4.4)	(10.0)	(25.4)	(33.1)	(18.8)	(8.3)	(100.0)				

TABLE 41. *Hemoglobin concentrations and history of cardiac infarction (entire dialysis patient population)*

	Hemoglobin concentration (g/dL)										
History of cardiac infarction	<8.0	8.0–8.9	9.0–9.9	10.0–10.9	11.0–11.9	≥12.0	Subtotal	No information available	Total	Mean	SD
Without history	7681	17 571	44 486	58 620	33 514	14 644	176 516	3 244	179 760	10.24	1.33
(%)	(4.4)	(10.0)	(25.2)	(33.2)	(19.0)	(8.3)	(100.0)				
With history	523	1 200	2 956	3 663	2 283	1 127	11 752	245	11 997	10.27	1.39
(%)	(4.5)	(10.2)	(25.2)	(31.2)	(19.4)	(9.6)	(100.0)				
Under acute-phase treatment	10	20	44	34	24	8	140	2	142	9.98	1.31
(%)	(7.1)	(14.3)	(31.4)	(24.3)	(17.1)	(5.7)	(100.0)				
Subtotal	8214	18 791	47 486	62 317	35 821	15 779	188 408	3 491	191 899	10.24	1.33
(%)	(4.4)	(10.0)	(25.2)	(33.1)	(19.0)	(8.4)	(100.0)				
Unspecified	122	264	628	689	285	115	2 103	102	2 205	9.98	1.31
(%)	(5.8)	(12.6)	(29.9)	(32.8)	(13.6)	(5.5)	(100.0)				
No information available	1193	2 567	6 764	8 648	4 513	1 982	25 667	30 186	55 853	10.19	1.33
(%)	(4.6)	(10.0)	(26.4)	(33.7)	(17.6)	(7.7)	(100.0)				
Total	9529	21 622	54 878	71 654	40 619	17 876	216 178	33 779	249 957	10.23	1.33
(%)	(4.4)	(10.0)	(25.4)	(33.1)	(18.8)	(8.3)	(100.0)				

C. Clinical condition of patients at introduction onto dialysis

In the latest survey conducted at the end of 2006, the clinical data and condition of the patients at the start of dialysis treatment were examined for the first time in 17 years. In this report, as part of the surveyed results, data on the treatment method of end-stage renal disease, renal function, as well as the symptoms of tumors of the patients at the start of dialysis were collected and the results are shown here. A detailed analysis of the pathological condition of the patients at introduction onto dialysis and their short-term prognosis (life expectancy of the patients within one year and prognosis in terms of various complications) will be performed in the survey at the end of 2007 or later.

1. Dialysis modalities at the end of year for newly introduced patients. The subjects of the survey on pathological conditions were the patients who had newly started dialysis in 2006. Data were available in the questionnaire in floppy disks from the dialysis facilities. The number of patients who satisfied these conditions was 28 353 (male: 18 295, female: 10 055, not specified: 3).

Table 42 shows a summary of dialysis modalities at the end of 2006 for the incident patients ($n = 28\,353$). Of these, 26 209 (92.4%) were treated by facility dialysis and 1414 (5.0%) were treated by 24-h continuous ambulatory peritoneal dialysis (CAPD), with the bag changed manually.

2. Clinical symptoms of patients at the introduction to dialysis. In the latest survey, the presence or absence of various clinical symptoms of the patients at the introduction to dialysis was studied (Table 43). The major symptoms were as follows: digestive symptoms, retention of body fluid, and acid–base and electrolyte abnormalities were noted in approximately one-half of the patients. Following these signs and symptoms, blood abnormality and cardiovascular

TABLE 42. *Methods of dialysis at the end of the year of introduction onto dialysis (patients whose clinical condition at introduction onto dialysis were surveyed)*

	Method of dialysis							
	Facility hemodialysis	Hemo-diafiltration	Hemo-filtration	Hemo-adsorption	Home hemodialysis	CAPD	IPD	Total
Number of patients	26 209	634	48	2	3	1414	43	28 353
(%)	(92.4)	(2.2)	(0.2)	(0.0)	(0.0)	(5.0)	(0.2)	(100.0)

CAPD, continuous ambulatory peritoneal dialysis; IPD, intermittent peritoneal dialysis.

TABLE 43. *Clinical conditions at introduction onto dialysis (patients whose clinical conditions at introduction onto dialysis were surveyed)*

Clinical condition	Without symptoms	With symptoms	Subtotal	Unspecified	No information available	Total
History of cardiac infarction before start of dialysis	13 076	1288	14 364	306	13 683	28 353
(%)	(91.0)	(9.0)	(100.0)			
Congestive cardiac failure	10 007	4276	14 283	362	13 708	28 353
(%)	(70.1)	(29.9)	(100.0)			
History of quadruple amputation, complication of arteriosclerosis obliterans or aortic aneurysm of ≥6 cm	13 627	866	14 493	211	13 649	28 353
(%)	(94.0)	(6.0)	(100.0)			
History of brain infarction or transient ischemic attack	12 076	2232	14 308	347	13 698	28 353
(%)	(84.4)	(15.6)	(100.0)			
Dementia	13 155	1233	14 388	250	13 715	28 353
(%)	(91.4)	(8.6)	(100.0)			
Chronic lung disease	13 801	486	14 287	215	13 851	28 353
(%)	(96.6)	(3.4)	(100.0)			
Collagen disease	13 889	342	14 231	275	13 847	28 353
(%)	(97.6)	(2.4)	(100.0)			
Chronic hepatic disease (without portal hypertension) or chronic hepatitis	13 436	792	14 228	215	13 910	28 353
(%)	(94.4)	(5.6)	(100.0)			
Diabetes (without end-stage organ damage, patients treated only by dietary therapy are not included)	10 626	3521	14 147	238	13 968	28 353
(%)	(75.1)	(24.9)	(100.0)			
Hemiplegia	13 545	773	14 318	155	13 880	28 353
(%)	(94.6)	(5.4)	(100.0)			
Diabetes (severe retinopathy, nervous disorder, renal disorder, labile diabetes)	9 195	5018	14 213	242	13 898	28 353
(%)	(64.7)	(35.3)	(100.0)			
Malignant tumors (those without metastasis and five years has passed since diagnosis are not included)	13 421	813	14 234	245	13 874	28 353
(%)	(94.3)	(5.7)	(100.0)			
Leukemia (acute and chronic)	14 308	49	14 357	169	13 827	28 353
(%)	(99.7)	(0.3)	(100.0)			
Lymphoma	14 224	56	14 280	214	13 859	28 353
(%)	(99.6)	(0.4)	(100.0)			
Moderate and end-stage hepatic disease	13 884	346	14 230	228	13 895	28 353
(%)	(97.6)	(2.4)	(100.0)			
Metastasizing malignant tumors	14 024	204	14 228	241	13 884	28 353
(%)	(98.6)	(1.4)	(100.0)			
Acquired immunodeficiency syndrome	11 981	12	11 993	2531	13 829	28 353
(%)	(99.9)	(0.1)	(100.0)			
With or without retention of body fluid (generalized edema, severe hypoproteinemia, pneumonedema)	6 629	6687	13 316	575	14 462	28 353
(%)	(49.8)	(50.2)	(100.0)			
With or without fluid abnormality (uncontrollable electrolyte and acid-base imbalance)	6 571	6262	12 833	1032	14 488	28 353
(%)	(51.2)	(48.8)	(100.0)			
With or without digestive symptoms (nausea, vomiting, loss of appetite, diarrhea)	6 231	6865	13 096	751	14 506	28 353
(%)	(47.6)	(52.4)	(100.0)			
With or without cardiovascular symptoms (serious hypertension, cardiac failure, pericarditis)	7 888	5283	13 171	625	14 557	28 353
(%)	(59.9)	(40.1)	(100.0)			
With or without nervous disorder symptoms (central and peripheral nervous disorder, mental disorder)	11 289	1770	13 059	787	14 507	28 353
(%)	(86.4)	(13.6)	(100.0)			
With or without blood disorder (severe anemia, bleeding tendency)	7 518	5666	13 184	610	14 559	28 353
(%)	(57.0)	(43.0)	(100.0)			
With or without impaired eyesight (uremic retinopathy, diabetic retinopathy)	9 808	3248	13 056	876	14 421	28 353
(%)	(75.1)	(24.9)	(100.0)			

TABLE 44. *Serum creatinine levels prior to first dialysis and gender (patients whose clinical conditions at introduction onto dialysis were surveyed)*

	Serum creatinine levels (mg/dL) prior to first dialysis																							
Gender	<2	2–2.9	3–3.9	4–4.9	5–5.9	6–6.9	7–7.9	8–8.9	9–9.9	10–10.9	11–11.9	12–12.9	13–13.9	14–14.9	15–15.9	16–16.9	17–17.9	18–18.9	19–19.9	≥20	Subtotal	No information available	Total	Mean	SD
Male	34	131	300	537	892	1190	1472	1699	1193	875	549	382	256	203	143	84	83	54	33	120	10 230	8065	18 295	8.72	3.67
(%)	(0.3)	(1.3)	(2.9)	(5.2)	(8.7)	(11.6)	(14.4)	(16.6)	(11.7)	(8.6)	(5.4)	(3.7)	(2.5)	(2.0)	(1.4)	(0.8)	(0.8)	(0.5)	(0.3)	(1.2)	(100.0)				
Female	52	144	300	462	670	725	821	832	588	363	242	150	111	37	31	23	16	16	10	30	5 623	4 432	10 055	7.73	3.32
(%)	(0.9)	(2.6)	(5.3)	(8.2)	(11.9)	(12.9)	(14.6)	(14.8)	(10.5)	(6.5)	(4.3)	(2.7)	(2.0)	(0.7)	(0.6)	(0.4)	(0.3)	(0.3)	(0.2)	(0.5)	(100.0)				
Subtotal	86	275	600	999	1 562	1915	2293	2531	1781	1238	791	532	367	240	174	107	99	70	43	150	15 853	12 497	28 350	8.37	3.58
(%)	(0.5)	(1.7)	(3.8)	(6.3)	(9.9)	(12.1)	(14.5)	(16.0)	(11.2)	(7.8)	(5.0)	(3.4)	(2.3)	(1.5)	(1.1)	(0.7)	(0.6)	(0.4)	(0.3)	(0.9)	(100.0)				
No information available	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3		
(%)																									
Total	86	275	600	999	1 562	1915	2293	2531	1781	1238	791	532	367	240	174	107	99	70	43	150	15 853	12 500	28 353	8.37	3.58
(%)	(0.5)	(1.7)	(3.8)	(6.3)	(9.9)	(12.1)	(14.5)	(16.0)	(11.2)	(7.8)	(5.0)	(3.4)	(2.3)	(1.5)	(1.1)	(0.7)	(0.6)	(0.4)	(0.3)	(0.9)	(100.0)				

Values in parentheses below each figure represent percentage relative to the subtotal of each row.

symptoms were noted in approximately 40% of the patients. Moreover, impaired vision was noted in 24.8% and nerve system disorder symptoms were noted in 13.6% of the patients.

3. Serum creatinine level in patients at the introduction to dialysis. The mean serum creatinine level at the introduction to dialysis in the patients whose data were available ($n = 15\,853$) was 8.37 ± 3.58 mg/dL. The mean serum creatinine levels in male and female patients at introduction onto dialysis were 8.72 ± 3.67 mg/dL and 7.73 ± 3.32 mg/dL, respectively (Table 44). The serum creatinine level at the introduction to dialysis in the patients aged <15 years was low and that in the patients aged =15 years tended to decrease with age (Table 45). Regarding the relationship between the treatment method and serum creatinine level (Table 46), the mean serum creatinine level was lowest in patients who were on hemofiltration; however, no clear relationship was observed in patients on other dialysis modalities. According to the distribution of the number of patients in terms of the serum creatinine level at the introduction to dialysis and primary renal disease (Table 47), the mean serum creatinine level was lower in patients with diabetic nephropathy than in patients with chronic glomerulonephritis.

4. Estimated glomerular filtration rate of patients at the introduction to dialysis. The estimated glomerular filtration rate (eGFR) (mL/min/1.73 m^2) of patients at the introduction to dialysis was calculated and tabulated in terms of gender, age, and serum creatinine level of the patients at the time of their introduction to dialysis. The eGFR was obtained by multiplying the Modification of Diet in Renal Disease (MDRD) Study equation corrected by the Japanese factor (4). When the serum creatinine level was measured by the Jaffe method, the following equation was used:

$$\text{eGFR of male patients} = 186 \times \left\{\text{serum creatinine}^{(-1.154)}\right\} \times \left\{\text{age}^{(-0.203)}\right\} \times 0.881$$

When the serum creatinine level was determined by the enzyme method, the following equation was used:

$$\text{eGFR of male patients} = 175 \times \left\{\text{serum creatinine}^{(-1.154)}\right\} \times \left\{\text{age}^{(-0.203)}\right\} \times 0.741$$

The eGFR of female patients was calculated by multiplying the value obtained using the above equa-

TABLE 45. *Serum creatinine levels (mg/dL) prior to first dialysis and ages (patients whose clinical conditions at introduction onto dialysis were surveyed)*

	Serum creatinine levels (mg/dL) prior to first dialysis																								
Age	<2	2–2.9	3–3.9	4–4.9	5–5.9	6–6.9	7–7.9	8–8.9	9–9.9	10–10.9	11–11.9	12–12.9	13–13.9	14–14.9	15–15.9	16–16.9	17–17.9	18–18.9	19–19.9	≥20	Sub-total	No information available	Total	Mean	SD
<15	3	1	1	1	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	12	15	27	5.46	3.80
(%)	(25.0)	(8.3)	(8.3)	(8.3)	(16.7)	(0.0)	(0.0)	(16.7)	(0.0)	(8.3)	(0.0)	(0.0)	(8.3)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
15–29	0	0	3	4	4	4	10	11	20	9	15	7	2	3	6	7	5	0	5	7	122	106	228	11.66	5.29
(%)	(0.0)	(0.0)	(2.5)	(3.3)	(3.3)	(3.3)	(8.2)	(9.0)	(16.4)	(7.4)	(12.3)	(5.7)	(1.6)	(2.5)	(4.9)	(5.7)	(4.1)	(0.0)	(4.1)	(5.7)	(100.0)				
30–44	1	3	5	17	31	46	92	123	112	102	71	51	63	33	32	20	18	17	3	45	885	691	1 576	11.13	4.87
(%)	(0.1)	(0.3)	(0.6)	(1.9)	(3.5)	(5.2)	(10.4)	(13.9)	(12.7)	(11.5)	(8.0)	(5.8)	(7.1)	(3.7)	(3.6)	(2.3)	(2.0)	(1.9)	(0.3)	(5.1)	(100.0)				
45–59	9	32	68	129	224	311	429	557	429	327	242	171	106	84	51	44	31	26	17	50	3 337	2 500	5 837	9.35	3.84
(%)	(0.3)	(1.0)	(2.0)	(3.9)	(6.7)	(9.3)	(12.9)	(16.7)	(12.9)	(9.8)	(7.3)	(5.1)	(3.2)	(2.5)	(1.5)	(1.3)	(0.9)	(0.8)	(0.5)	(1.5)	(100.0)				
60–74	29	102	238	340	602	783	986	1135	756	547	304	209	147	88	67	28	43	23	12	38	6 477	5 049	11 526	8.34	3.32
(%)	(0.4)	(1.6)	(3.7)	(5.2)	(9.3)	(12.1)	(15.2)	(17.5)	(11.7)	(8.4)	(4.7)	(3.2)	(2.3)	(1.4)	(1.0)	(0.4)	(0.7)	(0.4)	(0.2)	(0.6)	(100.0)				
75–89	42	124	266	472	660	737	744	681	449	242	156	92	46	31	16	8	2	4	5	10	4 787	3 865	8 652	7.23	2.82
(%)	(0.9)	(2.6)	(5.6)	(9.9)	(13.8)	(15.4)	(15.5)	(14.2)	(9.4)	(5.1)	(3.3)	(1.9)	(1.0)	(0.6)	(0.3)	(0.2)	(0.0)	(0.1)	(0.1)	(0.2)	(100.0)				
≥90	2	13	19	36	39	33	32	22	15	10	3	2	2	1	2	0	0	0	1	0	232	213	445	6.49	2.69
(%)	(0.9)	(5.6)	(8.2)	(15.5)	(16.8)	(14.2)	(13.8)	(9.5)	(6.5)	(4.3)	(1.3)	(0.9)	(0.9)	(0.4)	(0.9)	(0.0)	(0.0)	(0.0)	(0.4)	(0.0)	(100.0)				
Subtotal	86	275	600	999	1562	1914	2293	2531	1781	1238	791	532	367	240	174	107	99	70	43	150	15 852	12 439	28 291	8.37	3.58
(%)	(0.5)	(1.7)	(3.8)	(6.3)	(9.9)	(12.1)	(14.5)	(16.0)	(11.2)	(7.8)	(5.0)	(3.4)	(2.3)	(1.5)	(1.1)	(0.7)	(0.6)	(0.4)	(0.3)	(0.9)	(100.0)				
No information available	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	61	62	6.70	
(%)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Total	86	275	600	999	1562	1915	2293	2531	1781	1238	791	532	367	240	174	107	99	70	43	150	15 853	12 500	28 353	8.37	3.58
(%)	(0.5)	(1.7)	(3.8)	(6.3)	(9.9)	(12.1)	(14.5)	(16.0)	(11.2)	(7.8)	(5.0)	(3.4)	(2.3)	(1.5)	(1.1)	(0.7)	(0.6)	(0.4)	(0.3)	(0.9)	(100.0)				
Mean	70.19	72.79	72.69	72.37	71.17	70.25	68.17	66.51	65.20	63.60	62.07	61.53	59.45	59.20	57.48	53.19	55.14	54.93	55.23	51.92	66.88	67.17	67.00		
SD	16.37	11.86	11.45	11.90	11.89	11.54	12.16	12.29	12.86	12.85	13.48	13.48	13.89	13.57	14.88	14.44	13.59	13.48	16.95	14.94	13.21	13.43	13.31		

Values in parentheses below each figure represent percentage relative to the subtotal of each row.

TABLE 46. *Serum creatinine levels (mg/dL) prior to first dialysis and methods of dialysis at the end of the year of introduction onto dialysis (patients whose clinical conditions at introduction onto dialysis were surveyed)*

	Serum creatinine levels (mg/dL) prior to first dialysis																								
Method of dialysis	<2	2–2.9	3–3.9	4–4.9	5–5.9	6–6.9	7–7.9	8–8.9	9–9.9	10–10.9	11–11.9	12–12.9	13–13.9	14–14.9	15–15.9	16–16.9	17–17.9	18–18.9	19–19.9	≥20	Sub-total	No information available	Total	Mean	SD
Facility hemodialysis	78	255	558	914	1452	1779	2108	2347	1648	1131	723	487	338	220	161	99	92	64	40	134	14 628	11 581	26 209	8.36	3.56
(%)	(0.5)	(1.7)	(3.8)	(6.2)	(9.9)	(12.2)	(14.4)	(16.0)	(11.3)	(7.7)	(4.9)	(3.3)	(2.3)	(1.5)	(1.1)	(0.7)	(0.6)	(0.4)	(0.3)	(0.9)	(100.0)				
Hemo-diafiltration	3	10	22	47	45	42	54	45	45	30	21	10	11	7	4	2	4	0	0	8	410	224	634	8.20	4.29
(%)	(0.7)	(2.4)	(5.4)	(11.5)	(11.0)	(10.2)	(13.2)	(11.0)	(11.0)	(7.3)	(5.1)	(2.4)	(2.7)	(1.7)	(1.0)	(0.5)	(1.0)	(0.0)	(0.0)	(2.0)	(100.0)				
Hemo-filtration	0	2	4	0	3	1	2	3	2	3	0	0	0	0	0	1	1	0	0	0	22	26	48	7.40	4.00
(%)	(0.0)	(9.1)	(18.2)	(0.0)	(13.6)	(4.5)	(9.1)	(13.6)	(9.1)	(13.6)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(4.5)	(4.5)	(0.0)	(0.0)	(0.0)	(100.0)				
Hemo-adsorption	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	9.00	
(%)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Home hemodialysis	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	8.20	
(%)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
CAPD	5	8	16	38	61	91	127	134	83	70	46	35	17	13	8	5	2	6	3	8	776	638	1 414	8.72	3.61
(%)	(0.6)	(1.0)	(2.1)	(4.9)	(7.9)	(11.7)	(16.4)	(17.3)	(10.7)	(9.0)	(5.9)	(4.5)	(2.2)	(1.7)	(1.0)	(0.6)	(0.3)	(0.8)	(0.4)	(1.0)	(100.0)				
IPD	0	0	0	0	1	2	2	1	2	4	1	0	1	0	1	0	0	0	0	0	15	28	43	9.46	2.85
(%)	(0.0)	(0.0)	(0.0)	(0.0)	(6.7)	(13.3)	(13.3)	(6.7)	(13.3)	(26.7)	(6.7)	(0.0)	(6.7)	(0.0)	(6.7)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Total	86	275	600	999	1562	1915	2293	2531	1781	1238	791	532	367	240	174	107	99	70	43	150	15 853	12 500	28 353	8.37	3.58
(%)	(0.5)	(1.7)	(3.8)	(6.3)	(9.9)	(12.1)	(14.5)	(16.0)	(11.2)	(7.8)	(5.0)	(3.4)	(2.3)	(1.5)	(1.1)	(0.7)	(0.6)	(0.4)	(0.3)	(0.9)	(100.0)				

Values in parentheses below each figure represent percentage relative to the total of each row. CAPD, continuous ambulatory peritoneal dialysis; IPD, intermittent peritoneal dialysis.

TABLE 47. *Serum creatinine levels (mg/dL) prior to first dialysis and primary diseases (patients whose clinical conditions at introduction onto dialysis were surveyed)*

	Serum creatinine levels (mg/dL) prior to first dialysis																							
Primary disease	<2	2–2.9	3–3.9	4–4.9	5–5.9	6–6.9	7–7.9	8–8.9	9–9.9	10–10.9	11–11.9	12–12.9	13–13.9	14–14.9	15–15.9	16–16.9	17–17.9	18–18.9	19–19.9	≥20	Sub-total	No information available	Total	Mean	SD
Chronic glomerulonephritis	15	45	114	185	312	388	512	601	449	366	237	174	124	92	59	50	38	25	12	56	3 854	2 927	6 781	9.07	3.89
(%)	(0.4)	(1.2)	(3.0)	(4.8)	(8.1)	(10.1)	(13.3)	(15.6)	(11.7)	(9.5)	(6.1)	(4.5)	(3.2)	(2.4)	(1.5)	(1.3)	(1.0)	(0.6)	(0.3)	(1.5)	(100.0)				
Chronic pyelonephritis	1	0	9	7	9	12	16	22	18	11	7	6	6	0	0	1	0	3	0	2	130	93	223	8.77	3.79
(%)	(0.8)	(0.0)	(6.9)	(5.4)	(6.9)	(9.2)	(12.3)	(16.9)	(13.8)	(8.5)	(5.4)	(4.6)	(4.6)	(0.0)	(0.0)	(0.8)	(0.0)	(2.3)	(0.0)	(1.5)	(100.0)				
Rapidly progressive glomerulonephritis	1	4	11	12	17	26	27	36	26	18	18	6	7	3	3	0	1	2	0	1	219	192	411	8.39	3.13
(%)	(0.5)	(1.8)	(5.0)	(5.5)	(7.8)	(11.9)	(12.3)	(16.4)	(11.9)	(8.2)	(8.2)	(2.7)	(3.2)	(1.4)	(1.4)	(0.0)	(0.5)	(0.9)	(0.0)	(0.5)	(100.0)				
Nephropathy of pregnancy/pregnancy toxemia	0	0	0	0	1	3	0	1	3	6	2	1	1	0	0	0	1	1	0	0	20	10	30	10.45	3.35
(%)	(0.0)	(0.0)	(0.0)	(0.0)	(5.0)	(15.0)	(0.0)	(5.0)	(15.0)	(30.0)	(10.0)	(5.0)	(5.0)	(0.0)	(0.0)	(0.0)	(5.0)	(5.0)	(0.0)	(0.0)	(100.0)				
Other unclassified nephritides	1	2	1	4	8	3	11	11	3	1	3	3	1	2	0	2	1	0	1	2	60	40	100	8.86	4.49
(%)	(1.7)	(3.3)	(1.7)	(6.7)	(13.3)	(5.0)	(18.3)	(18.3)	(5.0)	(1.7)	(5.0)	(5.0)	(1.7)	(3.3)	(0.0)	(3.3)	(1.7)	(0.0)	(1.7)	(3.3)	(100.0)				
Polycystic kidney disease	1	0	6	11	24	33	62	63	60	43	28	14	12	12	6	2	2	0	1	4	384	285	669	9.23	3.52
(%)	(0.3)	(0.0)	(1.6)	(2.9)	(6.3)	(8.6)	(16.1)	(16.4)	(15.6)	(11.2)	(7.3)	(3.6)	(3.1)	(3.1)	(1.6)	(0.5)	(0.5)	(0.0)	(0.3)	(1.0)	(100.0)				
Nephrosclerosis	6	27	56	115	187	248	276	268	181	128	98	60	29	18	21	10	7	7	4	14	1 760	1 316	3 076	8.23	3.43
(%)	(0.3)	(1.5)	(3.2)	(6.5)	(10.6)	(14.1)	(15.7)	(15.2)	(10.3)	(7.3)	(5.6)	(3.4)	(1.6)	(1.0)	(1.2)	(0.6)	(0.4)	(0.4)	(0.2)	(0.8)	(100.0)				
Malignant hypertension	0	0	3	12	14	17	14	12	22	8	8	5	8	2	2	2	0	1	0	3	133	81	214	9.01	4.19
(%)	(0.0)	(0.0)	(2.3)	(9.0)	(10.5)	(12.8)	(10.5)	(9.0)	(16.5)	(6.0)	(6.0)	(3.8)	(6.0)	(1.5)	(1.5)	(1.5)	(0.0)	(0.8)	(0.0)	(2.3)	(100.0)				
Diabetic nephropathy	43	135	303	481	749	911	1045	1180	783	499	283	180	119	83	51	29	34	16	14	41	6 979	5 245	12 224	7.98	3.28
(%)	(0.6)	(1.9)	(4.3)	(6.9)	(10.7)	(13.1)	(15.0)	(16.9)	(11.2)	(7.2)	(4.1)	(2.6)	(1.7)	(1.2)	(0.7)	(0.4)	(0.5)	(0.2)	(0.2)	(0.6)	(100.0)				
SLE nephritis	0	4	4	13	9	12	21	24	10	3	5	3	2	2	1	0	1	0	0	2	116	98	214	7.99	3.64
(%)	(0.0)	(3.4)	(3.4)	(11.2)	(7.8)	(10.3)	(18.1)	(20.7)	(8.6)	(2.6)	(4.3)	(2.6)	(1.7)	(1.7)	(0.9)	(0.0)	(0.9)	(0.0)	(0.0)	(1.7)	(100.0)				
Amyloidal kidney	0	5	6	8	7	12	8	21	6	4	1	5	2	0	2	1	0	0	0	1	89	51	140	7.85	4.14
(%)	(0.0)	(5.6)	(6.7)	(9.0)	(7.9)	(13.5)	(9.0)	(23.6)	(6.7)	(4.5)	(1.1)	(5.6)	(2.2)	(0.0)	(2.2)	(1.1)	(0.0)	(0.0)	(0.0)	(1.1)	(100.0)				
Gouty kidney	0	1	0	1	5	12	6	14	5	3	6	2	3	1	0	0	1	2	0	1	63	35	98	9.19	3.48
(%)	(0.0)	(1.6)	(0.0)	(1.6)	(7.9)	(19.0)	(9.5)	(22.2)	(7.9)	(4.8)	(9.5)	(3.2)	(4.8)	(1.6)	(0.0)	(0.0)	(1.6)	(3.2)	(0.0)	(1.6)	(100.0)				
Renal failure due to congenital abnormal metabolism	0	1	0	0	1	0	2	2	3	0	2	0	1	1	0	1	0	0	0	1	15	10	25	11.47	7.91
(%)	(0.0)	(6.7)	(0.0)	(0.0)	(6.7)	(0.0)	(13.3)	(13.3)	(20.0)	(0.0)	(13.3)	(0.0)	(6.7)	(6.7)	(0.0)	(6.7)	(0.0)	(0.0)	(0.0)	(6.7)	(100.0)				
Kidney and urinary tract tuberculosis	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	4	10	14	7.65	2.64
(%)	(0.0)	(0.0)	(0.0)	(25.0)	(0.0)	(25.0)	(25.0)	(0.0)	(0.0)	(0.0)	(25.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Kidney and urinary tract stone	0	1	1	2	3	3	8	4	2	1	3	2	1	0	1	1	0	0	0	0	33	27	60	8.43	3.25
(%)	(0.0)	(3.0)	(3.0)	(6.1)	(9.1)	(9.1)	(24.2)	(12.1)	(6.1)	(3.0)	(9.1)	(6.1)	(3.0)	(0.0)	(3.0)	(3.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Kidney and urinary tract tumor	2	2	3	9	7	11	10	10	5	1	1	5	1	0	1	1	0	0	1	0	70	71	141	7.48	3.41
(%)	(2.9)	(2.9)	(4.3)	(12.9)	(10.0)	(15.7)	(14.3)	(14.3)	(7.1)	(1.4)	(1.4)	(7.1)	(1.4)	(0.0)	(1.4)	(1.4)	(0.0)	(0.0)	(1.4)	(0.0)	(100.0)				
Obstructive urinary tract difficulty	0	0	3	5	3	5	14	6	8	2	2	2	2	2	0	0	1	0	0	1	56	45	101	8.45	3.43
(%)	(0.0)	(0.0)	(5.4)	(8.9)	(5.4)	(8.9)	(25.0)	(10.7)	(14.3)	(3.6)	(3.6)	(3.6)	(3.6)	(3.6)	(0.0)	(0.0)	(1.8)	(0.0)	(0.0)	(1.8)	(100.0)				
Myeloma	0	0	1	2	7	8	11	9	12	6	3	2	5	0	2	1	0	0	0	2	71	66	137	9.52	5.32
(%)	(0.0)	(0.0)	(1.4)	(2.8)	(9.9)	(11.3)	(15.5)	(12.7)	(16.9)	(8.5)	(4.2)	(2.8)	(7.0)	(0.0)	(2.8)	(1.4)	(0.0)	(0.0)	(0.0)	(2.8)	(100.0)				
Hypoplastic kidney	1	1	1	2	0	3	4	6	3	2	0	1	1	0	1	0	1	0	1	2	30	11	41	9.77	5.55
(%)	(3.3)	(3.3)	(3.3)	(6.7)	(0.0)	(10.0)	(13.3)	(20.0)	(10.0)	(6.7)	(0.0)	(3.3)	(3.3)	(0.0)	(3.3)	(0.0)	(3.3)	(0.0)	(3.3)	(6.7)	(100.0)				
Unspecified	10	32	52	95	147	156	191	199	153	107	71	46	30	18	17	4	10	11	8	14	1 371	1 341	2 712	8.33	3.68
(%)	(0.7)	(2.3)	(3.8)	(6.9)	(10.7)	(11.4)	(13.9)	(14.5)	(11.2)	(7.8)	(5.2)	(3.4)	(2.2)	(1.3)	(1.2)	(0.3)	(0.7)	(0.8)	(0.6)	(1.0)	(100.0)				
Reintroduction after transplantation	1	2	1	2	1	6	5	4	2	5	0	1	1	0	1	1	0	1	0	0	34	35	69	8.32	3.77
(%)	(2.9)	(5.9)	(2.9)	(5.9)	(2.9)	(17.6)	(14.7)	(11.8)	(5.9)	(14.7)	(0.0)	(2.9)	(2.9)	(0.0)	(2.9)	(2.9)	(0.0)	(2.9)	(0.0)	(0.0)	(100.0)				
Others	4	11	25	30	44	39	36	33	26	18	10	11	8	3	5	1	1	1	1	1	308	317	625	7.47	3.46
(%)	(1.3)	(3.6)	(8.1)	(9.7)	(14.3)	(12.7)	(11.7)	(10.7)	(8.4)	(5.8)	(3.2)	(3.6)	(2.6)	(1.0)	(1.6)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(100.0)				
Subtotal	86	273	600	997	1555	1909	2280	2526	1780	1232	789	529	364	239	173	107	99	70	43	148	15 799	12 306	28 105	8.37	3.58
(%)	(0.5)	(1.7)	(3.8)	(6.3)	(9.8)	(12.1)	(14.4)	(16.0)	(11.3)	(7.8)	(5.0)	(3.3)	(2.3)	(1.5)	(1.1)	(0.7)	(0.6)	(0.4)	(0.3)	(0.9)	(100.0)				
No information available	0	2	0	2	7	6	13	5	1	6	2	3	3	1	1	0	0	0	0	2	54	194	248	8.77	3.74
(%)	(0.0)	(3.7)	(0.0)	(3.7)	(13.0)	(11.1)	(24.1)	(9.3)	(1.9)	(11.1)	(3.7)	(5.6)	(5.6)	(1.9)	(1.9)	(0.0)	(0.0)	(0.0)	(0.0)	(3.7)	(100.0)				
Total	86	275	600	999	1562	1915	2293	2531	1781	1238	791	532	367	240	174	107	99	70	43	150	15 853	12 500	28 353	8.37	3.58
(%)	(0.5)	(1.7)	(3.8)	(6.3)	(9.9)	(12.1)	(14.5)	(16.0)	(11.2)	(7.8)	(5.0)	(3.4)	(2.3)	(1.5)	(1.1)	(0.7)	(0.6)	(0.4)	(0.3)	(0.9)	(100.0)				

Values in parentheses below each figure represent percentage relative to the subtotal of each row. SLE, systemic lupus erythematosus.

tions by 0.742; however, it was not calculated in patients <15 years old. The eGFR at the introduction to dialysis of all the patients ($n = 13\,857$) was 5.46 ± 6.60 mL/min/1.73 m^2. As shown in Table 44, the serum creatinine level at the introduction to dialysis of female patients was lower than that of the male patients. Nevertheless, the eGFR in the female patients was lower than that of the male patients (Table 48). The eGFR of the patients in the 35–45 years age range was the lowest, followed by that of the patients in the 15–30 and 45–60 years age ranges (Table 49).

Regarding the relationship between treatment method and serum creatinine level, the eGFR of patients who were treated by hemofiltration was the highest (Table 50), which reflects the result shown in Table 46; however, no significant difference in eGFR was found among the patients who were treated by other methods. The relationship between primary disease and eGFR is shown in Table 51.

CONCLUSION

The Japanese dialysis population is increasing year by year, especially those patients who are elderly or diabetic, and whose rates of complication are higher. Measures to control the increasing numbers of such patients are desired.

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TABLE 48. *Estimated glomerular filtration rates calculated from the serum creatinine level prior to first dialysis and gender (patients whose clinical condition was surveyed at the introduction to dialysis)*

	Estimated glomerular filtration rates (eGFR, mL/min/1.73 m^2) prior to first dialysis																							
Gender	<1	1–1.9	2–3.9	4–5.9	6–7.9	8–9.9	10–11.9	12–13.9	14–15.9	16–17.9	18–19.9	20–21.9	22–23.9	24–25.9	26–27.9	28–29.9	≥30	Subtotal	No information available	Total	Mean	SD
Male	14	138	2334	3794	1493	567	276	116	66	46	28	16	17	13	3	4	14	8 939	9 356	18 295	5.65	4.00
(%)	(0.2)	(1.5)	(26.1)	(42.4)	(16.7)	(6.3)	(3.1)	(1.3)	(0.7)	(0.5)	(0.3)	(0.2)	(0.2)	(0.1)	(0.0)	(0.0)	(0.2)	(100.0)				
Female	13	138	2224	1516	547	200	120	57	18	31	12	12	8	6	4	0	12	4 918	5 137	10 055	5.11	9.67
(%)	(0.3)	(2.8)	(45.2)	(30.8)	(11.1)	(4.1)	(2.4)	(1.2)	(0.4)	(0.6)	(0.2)	(0.2)	(0.2)	(0.1)	(0.1)	(0.0)	(0.2)	(100.0)				
Subtotal	27	276	4558	5310	2040	767	396	173	84	77	40	28	25	19	7	4	26	13 857	14 493	28 350	5.46	6.60
(%)	(0.2)	(2.0)	(32.9)	(38.3)	(14.7)	(5.5)	(2.9)	(1.2)	(0.6)	(0.6)	(0.3)	(0.2)	(0.2)	(0.1)	(0.1)	(0.0)	(0.2)	(100.0)				
No information available	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3		
(%)																						
Total	27	276	4558	5310	2040	767	396	173	84	77	40	28	25	19	7	4	26	13 857	14 496	28 353	5.46	6.60
(%)	(0.2)	(2.0)	(32.9)	(38.3)	(14.7)	(5.5)	(2.9)	(1.2)	(0.6)	(0.6)	(0.3)	(0.2)	(0.2)	(0.1)	(0.1)	(0.0)	(0.2)	(100.0)				

Values in parentheses below each figure represent percentage relative to the subtotal of each row.

TABLE 49. *Estimated glomerular filtration rates calculated from the serum creatinine level prior to first dialysis and ages (patients whose clinical condition was surveyed at the introduction to dialysis)*

	Estimated glomerular filtration rates (eGFR, mL/min/1.73 m²) prior to first dialysis																					
Age	<1	1–1.9	2–3.9	4–5.9	6–7.9	8–9.9	10–11.9	12–13.9	14–15.9	16–17.9	18–19.9	20–21.9	22–23.9	24–25.9	26–27.9	28–29.9	≥30	Subtotal	No information available	Total	Mean	SD
<15	2	0	1	0	2	1	0	1	1	0	1	0	0	0	0	0	2	11	16	27	23.25	38.23
(%)	(18.2)	(0.0)	(9.1)	(0.0)	(18.2)	(9.1)	(0.0)	(9.1)	(9.1)	(0.0)	(9.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(18.2)	(100.0)				
15–29	1	5	53	30	9	2	2	3	1	2	0	0	0	0	0	0	0	108	120	228	4.62	3.03
(%)	(0.9)	(4.6)	(49.1)	(27.8)	(8.3)	(1.9)	(1.9)	(2.8)	(0.9)	(1.9)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
30–44	5	49	343	267	71	25	10	0	1	1	2	0	1	1	0	0	0	776	800	1 576	4.32	2.33
(%)	(0.6)	(6.3)	(44.2)	(34.4)	(9.1)	(3.2)	(1.3)	(0.0)	(0.1)	(0.1)	(0.3)	(0.0)	(0.1)	(0.1)	(0.0)	(0.0)	(0.0)	(100.0)				
45–59	5	86	1142	1064	357	126	62	21	13	14	8	4	1	7	0	0	5	2 915	2 922	5 837	4.96	3.15
(%)	(0.2)	(3.0)	(39.2)	(36.5)	(12.2)	(4.3)	(2.1)	(0.7)	(0.4)	(0.5)	(0.3)	(0.1)	(0.0)	(0.2)	(0.0)	(0.0)	(0.2)	(100.0)				
60–74	10	100	1864	2258	796	304	150	70	34	26	14	11	11	4	3	0	7	5 662	5 864	11 526	5.41	8.45
(%)	(0.2)	(1.8)	(32.9)	(39.9)	(14.1)	(5.4)	(2.6)	(1.2)	(0.6)	(0.5)	(0.2)	(0.2)	(0.2)	(0.1)	(0.1)	(0.0)	(0.1)	(100.0)				
75–89	4	34	1115	1610	763	296	161	71	31	34	14	12	11	7	4	4	11	4 182	4 470	8 652	6.00	5.76
(%)	(0.1)	(0.8)	(26.7)	(38.5)	(18.2)	(7.1)	(3.8)	(1.7)	(0.7)	(0.8)	(0.3)	(0.3)	(0.3)	(0.2)	(0.1)	(0.1)	(0.3)	(100.0)				
≥90	0	2	40	81	42	13	11	7	3	0	1	1	1	0	0	0	1	203	242	445	6.54	5.44
(%)	(0.0)	(1.0)	(19.7)	(39.9)	(20.7)	(6.4)	(5.4)	(3.4)	(1.5)	(0.0)	(0.5)	(0.5)	(0.5)	(0.0)	(0.0)	(0.0)	(0.5)	(100.0)				
Subtotal	27	276	4558	5310	2040	767	396	173	84	77	40	28	25	19	7	4	26	13 857	14 434	28 291	5.46	6.60
(%)	(0.2)	(2.0)	(32.9)	(38.3)	(14.7)	(5.5)	(2.9)	(1.2)	(0.6)	(0.6)	(0.3)	(0.2)	(0.2)	(0.1)	(0.1)	(0.0)	(0.2)	(100.0)				
No information available	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	62		
(%)																						
Total	27	276	4558	5310	2040	767	396	173	84	77	40	28	25	19	7	4	26	13 857	14 496	28 353	5.46	6.60
(%)	(0.2)	(2.0)	(32.9)	(38.3)	(14.7)	(5.5)	(2.9)	(1.2)	(0.6)	(0.6)	(0.3)	(0.2)	(0.2)	(0.1)	(0.1)	(0.0)	(0.2)	(100.0)				
Mean	56.00	58.07	64.51	67.41	69.38	69.79	71.01	71.55	70.04	68.87	66.93	72.86	73.36	65.53	75.00	81.75	65.42	66.87	67.13	67.00		
SD	21.84	14.99	13.44	12.71	12.50	12.33	12.45	13.12	14.21	13.77	15.76	10.41	11.86	13.70	4.83	5.12	20.88	13.24	13.37	13.31		

Values in parentheses below each figure represent percentage relative to the subtotal of each row.

TABLE 50. *Estimated glomerular filtration rates calculated from the serum creatinine level prior to first dialysis and the methods of dialysis at the end of the year of introduction to dialysis (patients whose clinical condition was surveyed at the introduction to dialysis)*

	Estimated glomerular filtration rates (eGFR, mL/min/1.73 m²) prior to first dialysis																					
Method of dialysis	<1	1–1.9	2–3.9	4–5.9	6–7.9	8–9.9	10–11.9	12–13.9	14–15.9	16–17.9	18–19.9	20–21.9	22–23.9	24–25.9	26–27.9	28–29.9	≥30	Subtotal	No information available	Total	Mean	SD
Facility hemodialysis	23	254	4175	4908	1875	704	373	156	76	74	36	26	21	18	6	4	23	12 752	13 457	26 209	5.45	6.67
(%)	(0.2)	(2.0)	(32.7)	(38.5)	(14.7)	(5.5)	(2.9)	(1.2)	(0.6)	(0.6)	(0.3)	(0.2)	(0.2)	(0.1)	(0.0)	(0.0)	(0.2)	(100.0)				
Hemo-diafiltration	1	10	119	122	68	28	16	8	4	2	3	0	0	1	1	0	1	384	250	634	5.93	5.97
(%)	(0.3)	(2.6)	(31.0)	(31.8)	(17.7)	(7.3)	(4.2)	(2.1)	(1.0)	(0.5)	(0.8)	(0.0)	(0.0)	(0.3)	(0.3)	(0.0)	(0.3)	(100.0)				
Hemo-filtration	0	0	5	6	2	4	1	1	0	0	0	0	2	0	0	0	0	21	27	48	7.78	5.67
(%)	(0.0)	(0.0)	(23.8)	(28.6)	(9.5)	(19.0)	(4.8)	(4.8)	(0.0)	(0.0)	(0.0)	(0.0)	(9.5)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Hemo-adsorption	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4.16	–
(%)	(0.0)	(0.0)	(0.0)	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Home hemodialysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	–	–
(%)																						
CAPD	3	12	252	268	92	31	6	8	4	1	1	2	2	0	0	0	2	684	730	1 414	5.26	5.72
(%)	(0.4)	(1.8)	(36.8)	(39.2)	(13.5)	(4.5)	(0.9)	(1.2)	(0.6)	(0.1)	(0.1)	(0.3)	(0.3)	(0.0)	(0.0)	(0.0)	(0.3)	(100.0)				
IPD	0	0	7	5	3	0	0	0	0	0	0	0	0	0	0	0	0	15	28	43	4.61	1.66
(%)	(0.0)	(0.0)	(46.7)	(33.3)	(20.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Total	27	276	4558	5310	2040	767	396	173	84	77	40	28	25	19	7	4	26	13 857	14 496	28 353	5.46	6.60
(%)	(0.2)	(2.0)	(32.9)	(38.3)	(14.7)	(5.5)	(2.9)	(1.2)	(0.6)	(0.6)	(0.3)	(0.2)	(0.2)	(0.1)	(0.1)	(0.0)	(0.2)	(100.0)				

Values in parentheses below each figure represent percentage relative to the subtotal of each row. CAPD, continuous ambulatory peritoneal dialysis; IPD, intermittent peritoneal dialysis.

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TABLE 51. *Estimated glomerular filtration rates calculated from the serum creatinine level prior to first dialysis and primary diseases (patients whose clinical condition was surveyed at the introduction to dialysis)*

	Estimated glomerular filtration rates (eGFR, mL/min/1.73 m²) prior to first dialysis																				
Primary disease	<1	1–1.9	2–3.9	4–5.9	6–7.9	8–9.9	10–11.9	12–13.9	14–15.9	16–17.9	18–19.9	20–21.9	22–23.9	24–25.9	26–27.9	28–29.9	≥30	Subtotal	No information available	Total	Mean	SD
Chronic glomerulonephritis	6	100	1 405	1 148	379	123	78	31	11	12	4	6	8	5	0	1	5	3 322	3 459	6 781	4.88	3.25
(%)	(0.2)	(3.0)	(42.3)	(34.6)	(11.4)	(3.7)	(2.3)	(0.9)	(0.3)	(0.4)	(0.1)	(0.2)	(0.2)	(0.2)	(0.0)	(0.0)	(0.2)	(100.0)				
Chronic pyelonephritis	0	5	44	38	12	8	3	2	0	0	0	1	0	0	0	0	0	113	110	223	4.98	2.80
(%)	(0.0)	(4.4)	(38.9)	(33.6)	(10.6)	(7.1)	(2.7)	(1.8)	(0.0)	(0.0)	(0.0)	(0.9)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Rapidly progressive glomerulonephritis	0	4	80	71	24	10	3	3	2	1	0	1	0	0	0	1	0	200	211	411	5.14	3.23
(%)	(0.0)	(2.0)	(40.0)	(35.5)	(12.0)	(5.0)	(1.5)	(1.5)	(1.0)	(0.5)	(0.0)	(0.5)	(0.0)	(0.0)	(0.0)	(0.5)	(0.0)	(100.0)				
Nephropathy of pregnancy/pregnancy toxemia	0	2	14	2	1	0	0	0	0	0	0	0	0	0	0	0	0	19	11	30	3.16	1.20
(%)	(0.0)	(10.5)	(73.7)	(10.5)	(5.3)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Other unclassified nephritides	0	4	17	21	4	5	0	0	0	2	0	0	0	0	0	0	1	54	46	100	7.37	17.22
(%)	(0.0)	(7.4)	(31.5)	(38.9)	(7.4)	(9.3)	(0.0)	(0.0)	(0.0)	(3.7)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(1.9)	(100.0)				
Polycystic kidney disease	1	7	166	124	27	8	5	0	1	0	0	0	0	0	1	0	0	340	329	669	4.36	2.14
(%)	(0.3)	(2.1)	(48.8)	(36.5)	(7.9)	(2.4)	(1.5)	(0.0)	(0.3)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.3)	(0.0)	(0.0)	(100.0)				
Nephrosclerosis	4	29	508	602	265	74	37	17	6	11	1	0	3	0	1	0	2	1 560	1 516	3 076	5.60	15.05
(%)	(0.3)	(1.9)	(32.6)	(38.6)	(17.0)	(4.7)	(2.4)	(1.1)	(0.4)	(0.7)	(0.1)	(0.0)	(0.2)	(0.0)	(0.1)	(0.0)	(0.1)	(100.0)				
Malignant hypertension	1	3	41	37	12	8	3	0	0	0	1	0	0	0	0	0	0	106	108	214	4.86	2.47
(%)	(0.9)	(2.8)	(38.7)	(34.9)	(11.3)	(7.5)	(2.8)	(0.0)	(0.0)	(0.0)	(0.9)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Diabetic nephropathy	10	65	1 642	2 542	1 014	411	202	89	46	25	25	17	9	13	4	0	16	6 130	6 094	12 224	5.75	4.19
(%)	(0.2)	(1.1)	(26.8)	(41.5)	(16.5)	(6.7)	(3.3)	(1.5)	(0.8)	(0.4)	(0.4)	(0.3)	(0.1)	(0.2)	(0.1)	(0.0)	(0.3)	(100.0)				
SLE nephritis	1	3	27	37	15	9	1	1	1	0	1	0	0	0	0	0	0	96	118	214	5.38	2.77
(%)	(1.0)	(3.1)	(28.1)	(38.5)	(15.6)	(9.4)	(1.0)	(1.0)	(1.0)	(0.0)	(1.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Amyloidal kidney	0	1	25	28	14	1	3	2	1	2	1	0	0	0	0	0	0	78	62	140	5.80	3.57
(%)	(0.0)	(1.3)	(32.1)	(35.9)	(17.9)	(1.3)	(3.8)	(2.6)	(1.3)	(2.6)	(1.3)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Gouty kidney	0	2	18	22	8	4	0	1	0	0	0	0	0	0	0	0	0	55	43	98	4.83	2.05
(%)	(0.0)	(3.6)	(32.7)	(40.0)	(14.5)	(7.3)	(0.0)	(1.8)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Renal failure due to congenital abnormal metabolism	0	1	7	3	1	0	0	0	1	0	0	0	0	0	0	0	0	13	12	25	4.55	3.40
(%)	(0.0)	(7.7)	(53.8)	(23.1)	(7.7)	(0.0)	(0.0)	(0.0)	(7.7)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Kidney and urinary tract tuberculosis	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	12	14	6.21	0.44
(%)	(0.0)	(0.0)	(0.0)	(50.0)	(50.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Kidney and urinary tract stone	0	0	9	15	1	1	3	0	0	1	0	0	0	0	0	0	0	30	30	60	5.64	3.24
(%)	(0.0)	(0.0)	(30.0)	(50.0)	(3.3)	(3.3)	(10.0)	(0.0)	(0.0)	(3.3)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Kidney and urinary tract tumor	0	1	14	16	17	6	3	0	0	1	1	0	0	0	0	1	0	60	81	141	6.40	4.28
(%)	(0.0)	(1.7)	(23.3)	(26.7)	(28.3)	(10.0)	(5.0)	(0.0)	(0.0)	(1.7)	(1.7)	(0.0)	(0.0)	(0.0)	(0.0)	(1.7)	(0.0)	(100.0)				
Obstructive urinary tract difficulty	0	3	14	17	9	5	2	0	0	1	0	0	0	0	0	0	0	51	50	101	5.34	2.81
(%)	(0.0)	(5.9)	(27.5)	(33.3)	(17.6)	(9.8)	(3.9)	(0.0)	(0.0)	(2.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Myeloma	1	1	21	27	7	1	2	0	0	0	0	0	0	0	0	0	0	60	77	137	4.49	2.04
(%)	(1.7)	(1.7)	(35.0)	(45.0)	(11.7)	(1.7)	(3.3)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Hypoplastic kidney	2	3	6	12	2	0	0	1	0	0	1	0	0	0	0	0	0	27	14	41	4.96	3.80
(%)	(7.4)	(11.1)	(22.2)	(44.4)	(7.4)	(0.0)	(0.0)	(3.7)	(0.0)	(0.0)	(3.7)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Unspecified	1	35	406	439	173	67	34	17	8	15	3	1	4	1	1	1	2	1 208	1 504	2 712	5.61	7.90
(%)	(0.1)	(2.9)	(33.6)	(36.3)	(14.3)	(5.5)	(2.8)	(1.4)	(0.7)	(1.2)	(0.2)	(0.1)	(0.3)	(0.1)	(0.1)	(0.1)	(0.2)	(100.0)				
Reintroduction after transplantation	0	0	7	14	4	1	1	0	1	2	0	0	0	0	0	0	0	30	39	69	6.02	3.86
(%)	(0.0)	(0.0)	(23.3)	(46.7)	(13.3)	(3.3)	(3.3)	(0.0)	(3.3)	(6.7)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Others	0	5	69	80	47	22	16	7	6	4	2	2	1	0	0	0	0	261	364	625	6.34	3.74
(%)	(0.0)	(1.9)	(26.4)	(30.7)	(18.0)	(8.4)	(6.1)	(2.7)	(2.3)	(1.5)	(0.8)	(0.8)	(0.4)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Subtotal	27	274	4540	5296	2037	764	396	171	84	77	40	28	25	19	7	4	26	13 815	14 290	28 105	5.46	6.61
(%)	(0.2)	(2.0)	(32.9)	(38.3)	(14.7)	(5.5)	(2.9)	(1.2)	(0.6)	(0.6)	(0.3)	(0.2)	(0.2)	(0.1)	(0.1)	(0.0)	(0.2)	(100.0)				
No information available	0	2	18	14	3	3	0	2	0	0	0	0	0	0	0	0	0	42	206	248	4.81	2.52
(%)	(0.0)	(4.8)	(42.9)	(33.3)	(7.1)	(7.1)	(0.0)	(4.8)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)				
Total	27	276	4558	5310	2040	767	396	173	84	77	40	28	25	19	7	4	26	13 857	14 496	28 353	5.46	6.60
(%)	(0.2)	(2.0)	(32.9)	(38.3)	(14.7)	(5.5)	(2.9)	(1.2)	(0.6)	(0.6)	(0.3)	(0.2)	(0.2)	(0.1)	(0.1)	(0.0)	(0.2)	(100.0)				

Values in parentheses below each figure represent percentage relative to the subtotal of each row. SLE, systemic lupus erythematosus.

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ORIGINAL ARTICLE

Geographic difference in the prevalence of chronic kidney disease among Japanese screened subjects: Ibaraki versus Okinawa

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Abstract
Background In Japan, there is a geographic difference in the prevalence of end-stage renal disease (ESRD). Few epidemiologic studies, however, have compared the prevalence of chronic kidney disease (CKD) among different geographic areas. Other than genetic factors, socioeconomic conditions and lifestyle are targets for modification.
Methods We examined the prevalence of CKD among two large community-based screened populations, 40 years of age and older, in Japan: Ibaraki ($N = 187,863$) and Okinawa ($N = 83,150$). Prevalence of CKD was defined as an estimated glomerular filtration rate (eGFR) of less than 60 ml/min/1.73 m^2 using the coefficient modified abbreviated Modification of Diet in Renal Disease (aMDRD) study equation using a standardized serum creatinine value. CKD prevalence was compared among screenees with (+) or without (−) hypertension (systolic blood pressure ≥140 mmHg, diastolic blood pressure ≥90 mmHg) and hyperglycemia (plasma glucose ≥ 126 mg/dl).
Results Both male and female participants in Okinawa had a significantly lower prevalence of hypertension (−)/hyperglycemia (−) than did patients in Ibaraki. The prevalence of CKD in Okinawa was higher than that in Ibaraki among screenees with hypertension (−)/hyperglycemia (−), and highest among screenees with hypertension (+)/hyperglycemia (−).
Conclusion The regional difference in CKD prevalence may underlie the variation in ESRD prevalence observed in Japan.

Keywords Chronic kidney disease · Glomerular filtration rate · Prevalence · Screening

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Introduction

The prevalence of end-stage renal disease (ESRD) is linearly increasing and is as high as 2,000 per million people in Japan [1]. The geographic difference in the prevalence of ESRD in Japan is well known; Okinawa has the highest ESRD population, whereas the ESRD population in Ibaraki is smaller than the National average [1]. This trend might be explained by either a high prevalence of chronic kidney disease (CKD), a faster progression of CKD, or both. The north-south gradient in the incidence and prevalence of certain diseases, such as stroke and hypertension are also well known in Japan [2]. Populations in northern Japan have a higher salt intake and other dietary habits also vary [3]. People in Okinawa tend to be more obese and have a

higher prevalence of metabolic syndrome, which causes CKD [4, 5]. The prevalence of CKD may reflect the health and functional status of the community, such as the proportion of the population with diabetes and hypertension, as well as differences in muscle mass, diet, and lifestyle.

We compared the prevalence of CKD between two large community-based screening registries available in two target prefectures (Ibaraki and Okinawa). To define CKD, we applied the newly developed and modified abbreviated Modification of Diet in Renal Disease (MDRD) study equation as it provides the most accurate formula for this purpose [6]. Determining the factors related to the regional difference in CKD prevalence might be useful for preventing ESRD. The present study is the first to demonstrate a regional difference in CKD prevalence in Japan.

Methods

The Japanese Society of Nephrology has organized an epidemiology work group and has collected data to estimate CKD population in Japan [7, 8]. The authors are participating with the epidemiology work group. Among the community-based screening programs, we selected two cohorts because the details of these subjects were previously reported and the method of serum creatinine measurement was verified. Okinawa, 128°E 27°N, is in the southern-most part of Japan, and Ibaraki, 140°E 36°N, is in northern Japan. Screening was performed during April 2005 to March 2006. Hypertension was defined as 140/90 mmHg and over and hyperglycemia was defined as fasting plasma glucose 126 mg/dl and over.

Community-based screening registry

(Okinawa) Details of the screening in Okinawa were published previously [9, 10]. For this study, we used the 2005 Okinawa General Health Maintenance Association (OGHMA) registry, and analyzed data for those aged 40 years and over at the time of screening. There were 83,150 screenees, 13.0% of the target population of 0.64 million in 2005 (Total 1.36 million).

(Ibaraki) Details of the screening in Ibaraki were published previously [11–13]. For this study, we used the 2005 registry, and analyzed data for those aged 40 years and over at the time of screening. There were 187,863 screenees, 11.6% of the target population of 1.62 million in 2005 (Total 2.98 million). The central laboratory measured creatinine using an autoanalyzer (Hitachi 7170). Data were provided after written agreement by the research committee for each registry.

GFR estimation

GFR was estimated using the coefficient modified MDRD study equation after obtaining the standardized serum creatinine (SCr) from the Cleveland Clinic. Serum creatinine (C-SCr) was calibrated using the following formula: for Okinawa, C-SCr = 1.03557343 × SCr + 0.00736639; for Ibaraki, C-SCr = 1.01758277 × SCr − 0.0643799. Both laboratories measure SCr using an enzymatic method. We confirmed the accuracy of creatinine measurement using a calibration panel composed of 42 serum samples, whose values were determined by the Cleveland Clinic (kindly provided by Dr. Van Lente at the Cleveland Clinic). eGFR (ml/min/1.73 m^2) = 175 × $Age^{-0.203}$ × $S\text{-}Cr^{-1.154}$ × (if female × 0.742) × (if Japanese × 0.741). Performance of the IDMS aMDRD equation for evaluating Japanese CKD patients was recently published [6].

Statistical analyses

Data are expressed as means ± standard deviation (SD). The st CKD was defined as eGFR <60 ml/min/1.73 m^2 [6]. A statistical significance of differences in the characteristics among participants was examined using non-paired *t* test, the Wald chi-square test, and Wilcoxson test (categorical variables). Multivariate logistic analyses were performed using SAS (Version 8.2, SAS Institute Inc., Cary, NC). A *P* value of less than 0.05 was considered statistically significant.

Results

The demographics of the screened cohorts were different between the two community-based registries: 35.6% of the participants in Ibaraki and 42.6% of those in Okinawa were men. Therefore, the mean (SD) glomerular filtration rate (GFR) levels are summarized for each age-class for both men and women among the total number of screenees (Table 1). The mean GFR levels were significantly higher in Okinawa than in Ibaraki, except in those age 80 and over among both sexes. Prevalence of CKD in Ibaraki (Okinawa) was 18.1% (15.3%) in men and 16.0% (13.9%) in women, respectively. However, the fraction of screenees were different between the two cohorts. In Ibaraki (Okinawa), it was 8.9% (23.3%) in age 40–49, 18.7% (24.9%) in age 50–59, 35.1% (23.9%) in age 60–69, 30.6% (21.9%) in age 70–79, and 6.7% (6.0%) in age 80 and over in men. In women, that was 14.4% (21.2%) in age 40–49, 27.1% (25.1%) in age 50–59, 31.7% (23.9%) in age 60–69, 22.3% (22.1%) in age 70–79, and 4.5% (7.8%) in age 80 and over.

The proportion of screenees without either hypertension or high plasma glucose was significantly smaller in

Table 1 Comparison of GFR among screened subjects in Okinawa and Ibaraki: total screened

	Ibaraki	Okinawa	*P* value
Men			
40–49	76.8 (13.3), *N* = 5,961	78.4 (14.7), *N* = 8,238	<0.0001
50–59	74.8 (14.4), *N* = 12,485	75.6 (15.4), *N* = 8,810	<0.001
60–69	69.6 (14.3), *N* = 23,515	70.4 (15.1), *N* = 8,476	<0.0001
70–79	65.8 (14.8), *N* = 20,513	66.5 (15.5), *N* = 7,757	<0.001
80 and over	61.6 (15.6), *N* = 4,463	60.6 (15.9), *N* = 2,112	<0.05
Women			
40–49	80.7 (15.6), *N* = 17,388	86.1 (16.5), *N* = 10,120	<0.0001
50–59	77.1 (15.5), *N* = 32,798	80.8 (16.5), *N* = 11,991	<0.0001
60–69	72.8 (15.4), *N* = 38,309	74.7 (15.7), *N* = 11,401	<0.0001
70–79	67.8 (15.3), *N* = 27,008	68.7 (16.2), *N* = 10,541	<0.0001
80 and over	62.1 (15.7), *N* = 5,423	62.1 (19.3), *N* = 3,704	NS

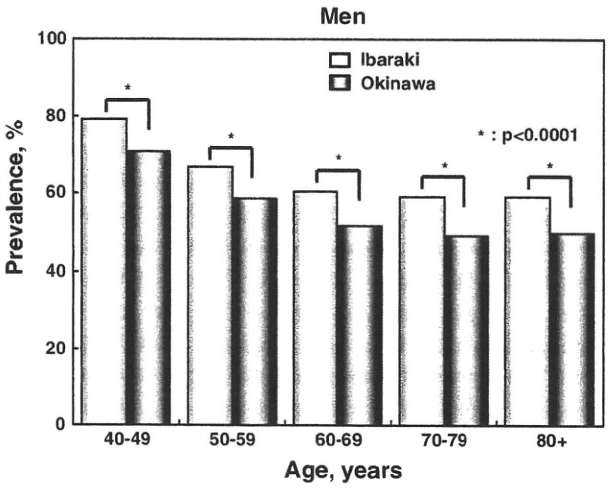

Fig. 1 Prevalence of screenees without hypertension or hyperglycemia in Okinawa and Ibaraki (men)

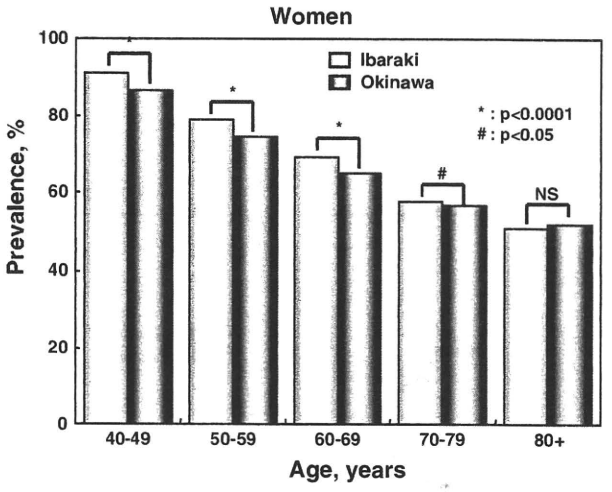

Fig. 2 Prevalence of screenees without hypertension or hyperglycemia in Okinawa and Ibaraki (women). *NS* not significant

Okinawa than in Ibaraki among men (Fig. 1) and women (Fig. 2) of all age-groups. Overall prevalence of hypertension and hyperglycemia in Okinawa was 29.9% and 10.4%: 35.5% and 14.2% in men, 26.2% and 7.6% in women, and that of Ibaraki was 27.9% and 5.1%: 31.9% and 8.4% in men, 25.9% and 3.4% in women. Among those 40–79 years of age, the prevalence of CKD of eGFR <45 ml/min/1.73 m^2, was higher in Okinawa than in Ibaraki in those with normal blood pressure and normal glucose levels, high plasma glucose, hypertension, and the total screened populations in men (Fig. 3). In each sex, the prevalence of CKD of eGFR <45 ml/min/1.73 m^2, was compared with Okinawa and Ibaraki (Fig. 4). The prevalence of CKD of eGFR <45 ml/min/1.73 m^2 among those with age 80 years and over in Okinawa (Ibaraki) was 12.6% (10.1%) in men ($P < 0.05$) and 13.0% (11.4%) in women ($P < 0.001$), respectively.

Similarly, mean GFR levels were high in Okinawa among those without either hypertension or high plasma glucose (Table 2). Compared to Ibaraki, the prevalence of low GFR (<45 ml/min/1.73 m^2) was significantly higher in Okinawa, particularly in those under 60 years of age (Table 3). Similar trends were observed among screenees without either hypertension or high plasma glucose (Table 4).

Discussion

We compared the CKD prevalence between two community-based screened cohorts using the standardized serum creatinine measurements and adopted a new, accurate GFR estimation formula for the screened Japanese populations. The strengths of the study include the large study population containing a comparable number of men and women

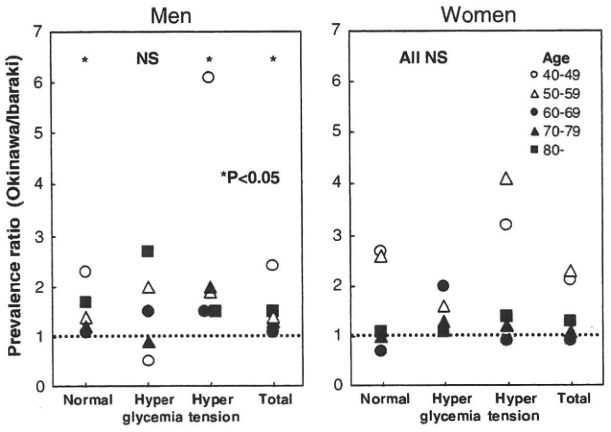

Fig. 3 Prevalence ratio of CKD, GFR <45 ml/min/1.73 m^2, in Okinawa and Ibaraki among screenees aged 40–79 years and those with age 80 years. Age-groups are 40–49 (*open circle*), 50–59 (*open triangle*), 60–69 (*filled circle*), 70–79 (*filled triangle*), and 80 and over (*open square*). In women, there was none with GFR <45 ml/min/1.73 m^2 among those with hyperglycemia age 40–49 years. $P < 0.05$ by the Wilcoxson test

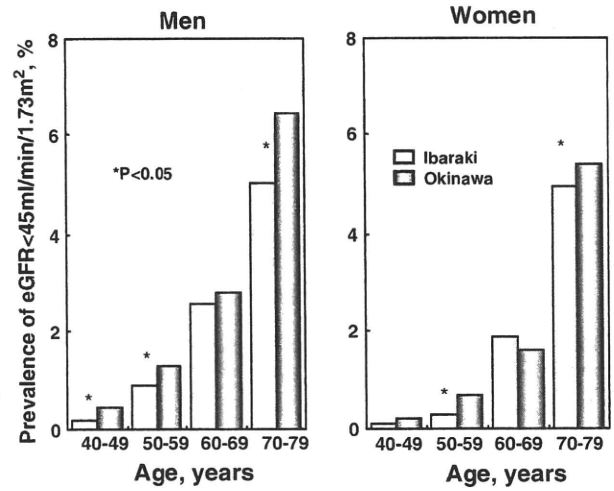

Fig. 4 Prevalence ratio of CKD, GFR <45 ml/min/1.73 m^2, by age in Okinawa and Ibaraki among screenees aged 40–79 years

and comparable age-groups, and the creatinine assays in each population were calibrated to standardized values. The key finding of the present study was that CKD prevalence was higher in Okinawa than in Ibaraki, even among groups of similar age and sex. As shown in Fig. 3, prevalence rate of GFR<45 ml/min/1.73 m^2 was higher in Okinawa, in particular age-class less than 60 years in both sexes. This may reflect the increase in obesity and metabolic syndrome in Okinawa. As a whole, mean levels of eGFR was higher in Okinawa (Table 1). This could be explained the two peaks of eGFR levels or wider distribution due to hyperfiltration related to obesity or hyperglycemia.

The findings of the present study may explain the high prevalence of ESRD in Okinawa [14]. According to the registry data of the Japanese Society for Dialysis Therapy, the prevalence of ESRD was 2,055 (Ibaraki), 2,704 (Okinawa), and 2,070 (Total) per million population in Japan in 2006 [1]. This number increased from the 2001 values of 1584 (Ibaraki), 2330 (Okinawa), and 1722 (Japan) per million population, respectively. The trend might also be explained by a rapid progression of CKD, insufficient therapy for CKD, or both.

Usami et al. [15] reported that the intake of angiotensin-converting enzyme inhibitors in Okinawa was lower than that in other parts of Japan, suggesting the insufficiency of CKD therapy in Okinawa. Because the income levels in Okinawa are the lowest in Japan, cheaper drugs are preferred. Other socioeconomically related conditions, such as a high smoking rate, a high motorization rate, and use of erythropoietin [16] may also be involved in the high prevalence of CKD.

The prevalence of CKD stages 3–5 differs among various ethnic groups. The CKD prevalence in Japan is one of the highest in the world [17–19]. The CKD prevalence might be explained by the age of the population in Japan, as more than 20% are 60 years and older. The prevalence of CKD is higher in those with hypertension and diabetes mellitus in the United States [20, 21]. In Okinawa, however, the prevalence of CKD was higher even in those without hypertension or hyperglycemia. GFR varies based on the presence of hyperglycemia, high protein intake, and obesity. Generally, Okinawan people are short in stature and have a higher prevalence of low birth weight than the national average [22]. A lower birth weight is associated with a lower nephron number and a significant risk of developing ESRD [23]. A low nephron number may result in the future development of hypertension and diabetes mellitus-related nephropathy [24]. Lifestyles have changed rapidly after the return of Okinawa to Japan in 1972, including a rapid increase in obesity.

In the present study, we applied the Japanese coefficient to improve the accuracy of the abbreviated MDRD equation to identify patients with stage 3 and 4 CKD. We used a coefficient of 0.741 obtained from the data of patients with a Cin <90 ml/min/1.73 m^2 as the Japanese coefficient with the IDMS traceable abbreviated MDRD (aMDRD) study equation. The equation provided a reasonably accurate GFR estimation in the range of less than 90 ml/min/1.73 m^2 [25]. This equation can be easily used by Japanese clinicians because the equation does not require that serum creatinine values be calibrated to the 1990 Cleveland Clinic values, where creatinine was measured using the non-compensated Jaffe method [26]. An accurate measurement of serum creatinine, however, is critical for use of IDMS aMDRD equation. In Japan, almost all clinical laboratories use the

Table 2 Comparison of GFR among screened subjects in Okinawa and Ibaraki: normal blood pressure and normal fasting plasma glucose

	Ibaraki	Okinawa	*P* value
Men			
40–49	76.5 (12.9), $N = 4,416$	77.9 (13.8), $N = 5,812$	<0.0001
50–59	74.4 (13.5), $N = 7,356$	74.9 (14.3), $N = 5,155$	NS
60–69	69.3 (13.6), $N = 12,093$	70.1 (14.2), $N = 4,364$	<0.01
70–79	65.7 (14.4), $N = 10,095$	66.7 (15.0), $N = 3,807$	<0.001
80 and over	61.4 (15.2), $N = 2,174$	61.2 (16.2), $N = 1,037$	NS
Women			
40–49	80.5 (15.3), $N = 15,428$	85.9 (16.1), $N = 8,765$	<0.0001
50–59	76.6 (15.0), $N = 24,392$	80.5 (16.1), $N = 8,921$	<0.0001
60–69	72.5 (15.0), $N = 24,103$	74.7 (15.1), $N = 7,419$	<0.0001
70–79	67.4 (14.9), $N = 13,801$	68.6 (15.5), $N = 5,946$	<0.0001
80 and over	61.9 (15.6), $N = 2,403$	62.1 (19.2), $N = 1,847$	NS

Table 3 Comparison of the prevalence of low GFR, <45 ml/min/1.73 m^2 and <60 ml/min/1.73 m^2 among screened subjects in Okinawa to those in Ibaraki (reference): total screened

	GFR <45	*P* value	GFR <60	*P* value
Men				
40–49	2.37	<0.01	0.93	NS
50–59	1.44	<0.01	1.42	<0.0001
60–69	1.10	NS	0.84	<0.0001
70–79	1.29	<0.0001	0.85	<0.0001
80 and over	1.50	<0.0001	1.06	<0.05
Total	1.04	NS	0.76	<0.0001
Women				
40–49	2.1	<0.05	0.65	<0.0001
50–59	2.34	<0.0001	1.40	<0.0001
60–69	0.86	NS	0.56	<0.0001
70–79	1.11	<0.05	0.76	<0.0001
80 and over	1.26	<0.0001	0.95	<0.05
Total	1.27	<0.0001	0.75	<0.0001

Table 4 Comparison of the prevalence of low GFR, <45 ml/min/1.73 m^2 and <60 ml/min/1.73 m^2 among screened subjects in Okinawa to those in Ibaraki (reference): normal blood pressure and normal fasting plasma glucose

	GFR < 45	*P* value	GFR < 60	*P* value
Men				
40–49	2.28	NS	0.86	<0.05
50–59	1.43	NS	1.47	<0.0001
60–69	1.08	NS	0.84	<0.0001
70–79	1.19	<0.05	0.84	<0.0001
80 and over	1.65	<0.0001	1.00	NS
Total	0.97	NS	0.73	<0.0001
Women				
40–49	2.72	<0.01	0.65	<0.0001
50–59	2.60	<0.0001	1.37	<0.0001
60–69	0.71	<0.01	0.53	<0.0001
70–79	1.01	NS	0.73	<0.0001
80 and over	1.14	NS	0.92	<0.05
Total	1.18	<0.001	0.72	<0.0001

enzymatic method to measure serum creatinine. The enzymatic method is more precise and accurate than the Jaffe method, which usually overestimates serum creatinine due to interference from the non-creatinine chromogen. Nevertheless, we further confirmed that the difference is still evident when using the original Japanese Society of Nephrology GFR estimation equation (S. Matsuo et al., personal observation).

The strengths of the present study were as follows: (1) eGFR was calculated using the serum creatinine value after calibration and standardization, (2) both cohorts were large enough to compare by age and sex, (3) CKD prevalence was also evaluated using the two equations currently available in Japan.

There were some limitations of the present study: (1) Serum creatinine was not measured at a single laboratory, although assay methods of the participating laboratories were evaluated by standard samples from the Cleveland Clinic and the inter-laboratory coefficient of variation was very small (0.88%), (2) The formula for estimating GFR was developed using CKD patients; therefore, it is not applicable to a healthy population. In particular, underestimation is possible in those with an eGFR of more than 60 ml/min/1.73 m^2 [6]. Serum creatinine concentration is affected not only by GFR, but by various other factors as well, such as muscle mass, sex, race, diet, drugs, and tubular function. Ideally, the clearance of exogenous GFR markers, such as inulin, should be measured for GFR estimation, but the method is time-consuming and difficult and is not feasible for community-based screening. The Kidney Disease Improving Global Outcomes (KDIGO) group has initiated an action to improve clinical practice by

introducing GFR estimating equations that were developed for a large cohort of a variety of racial and other groups for international comparisons [27–29]. Asian populations, including the Japanese, generally have low muscle mass and low protein intake, which could impair the performance of the MDRD study equation, (3) Clinical information, such as inflammation, nutritional status, or drug treatment, was not included in the registry data.

In conclusion, the findings of the present study revealed that there are significant regional differences in CKD prevalence among screened subjects in Japan. Although, our results may need to be confirmed in other parts of Japan. Reasons for the difference in CKD prevalence remain speculative. Generally, people in Okinawa are short in stature and have a larger body mass index. Lifestyle habits, such as smoking, drinking, and exercise among people in Okinawa also differ from those in Ibaraki. The observed differences in ESRD prevalence might be at least partly due to the difference in the CKD prevalence. Further studies on CKD progression and background demographics in the two cohorts are warranted.

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Conflict of interest statement We have no conflict of interest.

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