

## An Overview of Regular Dialysis Treatment in Japan (As of 31 December 2010)

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**Abstract:** A nationwide statistical survey of 4226 dialysis facilities was conducted at the end of 2010, and 4166 facilities (98.6%) responded. The number of new patients introduced into dialysis was 37 512 in 2010. This number has decreased for two consecutive years since it peaked in 2008. The number of patients who died in 2010 was 28 882, which has been increasing every year. The number of patients undergoing dialysis at the end of 2010 was 298 252, which is an increase of 7591 (2.6%) compared with that at the end of 2009. The number of dialysis patients per million at the end of 2010 was 2329.1. The crude death rate of dialysis patients in 2010 was 9.8%, and has been gradually increasing. The mean age of the new patients introduced into dialysis was 67.8 years and the mean age of the entire dialysis patient population was 66.2 years. Regarding the primary disease of the new patients introduced into dialysis, the percentage of patients with diabetic nephropathy was 43.6%, which is

a slight decrease from that in the previous year (44.5%). Patients with diabetic nephropathy as the primary disease accounted for 35.9% of the entire dialysis patient population, which approaches the percentage of patients with chronic glomerulonephritis as the primary disease (36.2%). The percentage of patients who had undergone carpal tunnel release surgery (CTx) was 4.3%, which is a slight decrease from that at the end of 1999 (5.5%). The decrease in the percentage of patients who had undergone CTx was significant among the patients with dialysis durations of 20–24 years (1999, 48.0%; 2010, 23.2%). A total weekly Kt/V attributable to peritoneal dialysis and their residual functional kidney was 1.7 or higher for 59.4% of patients who underwent peritoneal dialysis. **Key Words:** Combined use of peritoneal dialysis, Dementia, Dialysis patient population, Survey, Survival rate.

The Japanese Society for Dialysis Therapy (JSdT) has been conducting a statistical survey of dialysis facilities across the country annually since 1968. Initially, only the numbers of dialysis patients and beds for dialysis were investigated in the annual surveys

of dialysis facilities. However, data on all dialysis patients treated in facilities that participated in the surveys have been registered in an electronic database since 1983 (1).

The classification of the causes of death was changed in the 2010 survey. The classification was first changed in the 2003 survey and used until 2009 (2). The purpose of the change in the classification in the 2003 survey was to become compliant with the tenth revision of the International Classification of Diseases (ICD-10). However, some criticized the ICD-10 code classification for not necessarily capturing the actual conditions of dialysis patients in Japan. Therefore, we modified part of the conventionally used classification to more appropriately reflect the actual

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conditions of dialysis patients in Japan while retaining consistency with the conventional classification in the 2003 survey.

In the 2010 survey, the following items were investigated in addition to the basic survey items.

First, items associated with dialysis amyloidosis were investigated after the first 1999 survey (3). Dialyzers capable of efficiently eliminating  $\beta_2$ -microglobulin ( $\beta_2m$ ), a substance causing dialysis amyloidosis, are widely used today (4). However, the prevalence of dialysis amyloidosis had not been examined since the 1999 survey. In the 2010 survey, the history of undergoing carpal tunnel release surgery (CTx) was investigated as a surrogate index of dialysis amyloidosis.

Second, dementia, activities of daily living (ADL), and the place of residence of individual patients were investigated as was done in the 2009 survey. The surveys in two consecutive years revealed changes in these items over one year, enabling the analysis of the factors associated with these changes. The surveys on the above items in two consecutive years are expected to yield data that can be used to establish guidelines for hemodialysis therapy, which are currently being prepared by JSDT.

Third, the current status of patients who underwent peritoneal dialysis (PD) was investigated as in the 2009 survey. In the facility survey, the number of patients who underwent PD and another blood purification therapy (PD + another therapy patients) was investigated. A detailed investigation of patients who underwent PD was carried out only in the patient survey using electronic media (specifically, items associated with PD were not investigated in the patient survey using paper media).

Fourth, the quality of dialysate has been investigated continuously since the 2006 survey. From 2010, facilities that maintain a certain quality of dialysate can request additional points in the medical insurance system in Japan. This is due to the fact that high quality dialysate is associated with a good prognosis for dialysis patients, as demonstrated from analyses of previous surveys.

In this report, we summarize data obtained from the 2010 survey on the following items:

1. Basic demographics
2. Current status of dialysate quality control
3. History of undergoing CTx
4. Items associated with dementia
5. Items associated with PD

The annual rapid report of survey is published on the JSDT homepage (<http://www.jsdt.or.jp/>) as “The Illustrated, Current Status of Chronic Dialysis in

Japan” (hereafter, the Report) in order to widely distribute survey findings among JSDT members. However, a CD-ROM that contains detailed data from each annual survey (“Current Status of Chronic Dialysis in Japan, (the CD-ROM Report”, hereafter referred to as the CD-ROM) had been distributed to a limited number of members, such as facility members, supporting members, and the board of trustees. But from June 2012, each member can use the CD-ROM to search for necessary information also on the JSDT homepage.

Moreover, in 2010 we received many proposals on open recruitment research projects that were started 3 years before. The results of accepted open recruitment research projects and research carried out by the Committee have been published in journals. Findings from this survey are also used as the basis for establishing various guidelines, which are being prepared by JSDT and which contribute to the improvement of dialysis care in Japan.

## PATIENTS AND METHODS

### Method of survey

This survey is conducted every year by sending questionnaires to target dialysis facilities. A total of 4226 facilities surveyed were either member facilities of JSDT, nonmember facilities offering chronic hemodialysis (HD), or nonmember facilities offering PD but not HD as of December 31, 2010. The number of facilities participating in this survey increased by 30 (0.7%) from the previous year (4196 facilities) (5).

The questionnaires were mainly sent and collected by postal mail; some were also faxed. Electronic media (universal serial bus or USB memory drives) were sent to facilities that requested them in advance instead of paper questionnaires. Microsoft Excel worksheets stored on the USB memory drives were used to collect survey results.

In this survey, two sets of questionnaires were used. The facility survey investigated items related to dialysis facilities such as the number of patients, the number of staff members, and the number of bedside consoles used at individual facilities (using the questionnaire referred to as “Sheet I”). The other survey was the patient survey, which captured the epidemiological background, treatment conditions, and outcome of treatment of individual dialysis patients (using the questionnaires referred to as “Sheets II, III, and IV”).

The acceptance of responses ended at the end of January 2011. The acceptance of additional responses received after this deadline finally ended on 20 April

2011 for the preparation of the Report and on 20 September 2011 for the preparation of the CD-ROM.

For the CD-ROM, the number of facilities that sent their responses to the facility survey (Sheet I) was 4166 (98.6%), and the number of facilities that responded to both the facility and patient surveys (Sheets I–IV) was 4066 (96.2%). Moreover, the number of facilities that sent their responses using electronic media was 3545 (83.9%). The number of facilities that responded to the questionnaires using electronic media was higher than that in the 2009 survey (3352 facilities, 81.1%). This increase in the number of facilities using electronic media contributes to the accurate and simple analysis of survey data.

This report is based on the data tabulated for the CD-ROM.

### Survey items

The following items were investigated in the 2010 survey.

#### Facility survey

The following items were also investigated in the 2009 survey (5).

- Name and address of facilities
- Year and month when the facility started dialysis treatment
- Total number of patients who can simultaneously receive dialysis
- Maximum capacity
- Number of bedside consoles
- Number of workers engaged in dialysis treatment (e.g. doctors, nurses, clinical engineers, nutritionists, caseworkers)
- Number of patients who underwent dialysis at the end of 2010 (daytime dialysis, nighttime dialysis, home HD, PD)
- Number of patients who did not undergo PD despite having a peritoneal catheter for PD (including those who underwent only peritoneal lavage) among those who underwent daytime dialysis, nighttime dialysis, or home HD (hereafter, denoted as non-PD + catheter patients)
- Number of patients who underwent both PD and another blood purification therapy by extracorporeal circulation such as HD and hemodiafiltration (HDF) (hereafter, denoted as PD + another therapy patients)
- Number of patients who underwent dialysis in 2010 and were hospitalized
- Number of new patients who were started on dialysis in 2010
- Number of new patients who were started on PD during 2010 but introduced to other blood purification therapies in 2010 as a fraction of all patients started on dialysis in 2010 (hereafter, denoted as PD dropout patients)
- Number of bedside consoles equipped with an endotoxin retentive filter (ETRF)
- Use or nonuse of ETRFs for collecting dialysate samples
- Site from which dialysate was sampled for dialysate test
- Frequency of measurement of endotoxin concentration in dialysate
- Endotoxin concentration in dialysate
- Frequency of measurement of bacterial count in dialysate
- Volume of sample for measurement of bacterial count in dialysate
- Medium used for cultivation of bacteria in dialysate
- Bacterial count in dialysate

#### Patient survey

The following are the basic survey items that have been continuously collected since 1983.

- Anonymous name of patient
- Gender
- Date of birth
- Year and month of starting dialysis
- Year and month of transfer to another hospital
- Primary disease
- Prefecture where the patient lives
- Treatment method
- Month of transfer (Code of facility to which the patient is transferred)
- Month and cause of death
- Year and month of changing treatment and change in code

The following items were collected in addition to the basic survey items using both the paper and electronic media. There were no new survey items.

- Current status of combined use of PD and another blood purification therapy such as HD and HDF (hereafter, denoted as current status of combined use of PD and another therapy)
- Number of years on ongoing PD (PD duration)
- Frequency of dialysis (e.g. HD) per week
- Duration of one session of dialysis (e.g. HD) (dialysis duration)
- Type of dialyzer membrane used
- Area of dialyzer membrane
- Height

- Predialysis and postdialysis weights
- Predialysis and postdialysis blood urea nitrogen (BUN) levels
- Predialysis and postdialysis serum creatinine levels
- Predialysis serum calcium level
- Predialysis serum phosphorus level
- Predialysis serum albumin level
- Predialysis serum C-reactive protein (CRP) level
- Predialysis blood hemoglobin level
- Measurement method for serum parathyroid hormone (PTH) level
- Serum PTH level
- Predialysis and postdialysis serum  $\beta_2$ m levels
- History of undergoing CTx
- Complications of dementia
- Activities of daily living (ADL)
- Place of residence
- History of cardiac infarction
- History of cerebral hemorrhage
- History of cerebral infarction
- History of quadruple amputation
- History of femoral neck fracture

The following are the items collected through the electronic media in addition to the basic survey items in the facility survey. These survey items target PD patients only. New survey items are asterisked.

- Four-hour creatinine dialysate/plasma ratio in peritoneal equilibrium test (PET) (PET Cr D/P ratio)
- Type of dialysate used for PD (Type of PD solution)
- Volume of PD solution used per day (Volume of PD solution)
- Daily urine output
- Kt/V for residual kidney\* (residual-kidney Kt/V)
- Kt/V for PD\* (PD Kt/V)
- Number of times peritonitis occurred per year
- Complications with encapsulating peritoneal sclerosis (EPS) and its history\*

### Calculation of survival rate

The cumulative survival rate after initiation of dialysis was actuarially calculated (6).

## RESULTS AND DISCUSSION

### Basic demographics

#### Number of patients

Table 1 shows a summary of the dynamics of the dialysis patient population in Japan at the end of 2010 obtained in this survey. As mentioned above, the number of facilities that responded to the questionnaire (the facility survey) in the 2010 survey was 4166. Data on the number of years on dialysis (dialy-

sis duration) and the longest duration on dialysis were obtained from the patient survey. All the other results were obtained from the facility survey.

As determined from the facility survey, the number of new patients who were started on dialysis each year continuously decreased from 38 180 in 2008 to 37 566 in 2009 then 37 512 in 2010 (Table 2). The number of new patients each year had increased since the first survey in 1968, but this upward trend appeared to have reversed in recent years, although this cannot be confirmed due to slight differences in questionnaire collection rate across survey years. Nevertheless, recent measures of chronic kidney disease (CKD) promoted by the Japan Association of Chronic Kidney Disease Initiative (J-CKDI) have produced favorable results and a potential explanation for the downward trend in the number of new dialysis patients.

On the other hand, the total number of dialysis patients who died in 2010 was 28 882 (Table 1). Unfortunately, the number of dialysis patients who died each year has continued to increase since the first survey (Table 2).

The total number of dialysis patients in Japan at the end of 2010 was 298 252 (Table 1), an increase of 2.6% from the end of 2009 to the end of 2010 (Table 2). The annual increase in the dialysis patient population in Japan was 4.5% in 2000; the growth rate has clearly slowed down in recent years. If the number of new patients who are started on dialysis continues to decrease while the number of dialysis patients who die continues to increase, the dialysis patient population in Japan is expected to start decreasing in the near future.

Among the 4166 facilities that responded to the questionnaire, the number of bedside consoles was 118 622, an increase of 3643 (3.2%) from the previous year. The total number of patients who received dialysis therapy in all facilities was 116 819 and the maximum dialysis capacity was 395 724 patients in 2010, increases of 2.9% and 3.2% from the previous year, respectively.

The percentage of patients who underwent daytime dialysis increased to 82.5%, an increase of 0.3% from the previous year (82.2%). In contrast, 14.1% of patients underwent nighttime dialysis, a decrease of 0.3% from the previous year (14.4%). The trends toward more daytime dialysis patients and less nighttime dialysis patients were continuously observed over the last 10 years.

The number of patients who underwent home HD was 277, an increase of 41 (17.4%) from the previous year (236 patients). The number of patients who underwent home HD was almost 100 between 1983

**TABLE 1.** Current status of chronic dialysis therapy in Japan (as of 31 December 2010)

Number of facilities		4 166	Increase of 33 (0.8%)		
Equipment	Number of bedside consoles	118 622	Increase of 3643 (3.2%)		
Capacity	Simultaneous dialysis (people)	116 819	Increase of 3332 (2.9%)		
	Maximum accommodation capacity (people)	395 724	Increase of 12 194 (3.2%)		
Chronic dialysis patients		298 252	Increase of 7591 (2.6%)		
Patients per million		2 329.1	Increase of 49.6 (2.2%)		
Daytime dialysis		246 146	(82.5%)		
Nighttime dialysis		42 052	(14.1%)		
Home dialysis		277	(0.1%)		
Peritoneal dialysis		9 773	(3.3%)		
Number of PD + another therapy patients <sup>†</sup>		1 983			
Number of non-PD + catheter patients <sup>‡</sup>		406			
Number of PD dropout patients <sup>§</sup>		137			
Number of patients newly introduced to dialysis		37 512	Decrease of 54 (0.1%)		
Number of deceased patients		28 882	Increase of 1236 (4.5%)		
(The above data were obtained from the facility survey)					
Duration of dialysis		Male	Female	Unknown	Total
0 < 5		90 816	48 555	0	139 371 (48.2%)
≥5 < 10		45 556	27 764	0	73 320 (25.3%)
≥10 < 15		21 485	14 853	0	36 338 (12.6%)
≥15 < 20		10 571	8 281	0	18 852 (6.5%)
≥20 < 25		5 564	4 771	0	10 335 (3.6%)
≥25		6 128	5 105	0	11 233 (3.9%)
Total		180 120	109 329	0	289 449 (100.0%)
Longest dialysis history		42 years and 8 months			
(The above data were obtained from the patient survey)					

<sup>†</sup>Number of peritoneal dialysis (PD) + another therapy patients: Number of patients who underwent both PD and another blood purification therapy such as hemodialysis (HD), hemodiafiltration (HDF), hemoadsorption, or hemofiltration (HF) (excluding those who underwent only peritoneal lavage). <sup>‡</sup>Number of non-PD + catheter patients: Number of patients who did not undergo PD despite having a peritoneal catheter but underwent another blood purification therapy such as HD, HDF, hemoadsorption, or HF (including those who underwent only peritoneal lavage). <sup>§</sup>Number of PD dropout patients: Number of new patients who were started on PD in 2010 but introduced to another blood purification therapy within 2010.

and 2005 and has rapidly increased since 2006 although the absolute number of such home HD patients has remained low.

The number of PD + another therapy patients, which started to be investigated in the previous

survey, was 1983 at the end of 2010. The number of non-PD + catheter patients was 406. The number of PD dropout patients in 2010 was 137.

According to the patient survey, the longest duration on dialysis was 42 years and 8 months.

**TABLE 2.** Changes in number of dialysis patients (tabulated results of facility survey)

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Chronic dialysis patients	116 303	123 926	134 298	143 709	154 413	167 192	175 988	185 322	197 213	206 134
Number of patients newly introduced to dialysis	20 877	22 475	23 874	24 296	26 398	28 409	28 870	29 641	31 483	32 018
Number of deceased patients	9 722	11 621	12 143	13 187	14 406	15 174	16 102	16 687	18 524	18 938
Patients per million	943.8	995.8	1 076.4	1 149.4	1 229.7	1 328.4	1 394.9	1 465.2	1 556.7	1 624.1
Response rate of facility survey (%)	99.3	99.4	99.5	99.7	99.8	99.8	99.7	99.7	99.7	99.9
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Chronic dialysis patients	219 183	229 538	237 710	248 166	257 765	264 473	275 242	283 421	290 661	298 252
Number of patients newly introduced to dialysis	33 243	33 710	33 966	35 094	36 063	36 373	36 934	38 180	37 566	37 512
Number of deceased patients	19 850	20 614	21 672	22 715	23 983	24 034	25 253	27 266	27 646	28 882
Patients per million	1 721.9	1 801.2	1 862.7	1 943.5	2 017.6	2 069.9	2 154.2	2 219.6	2 279.5	2 329.1
Response rate of facility survey (%)	99.0	99.6	99.1	98.7	98.9	98.4	98.9	99.0	98.5	98.6

**TABLE 3.** Numbers of chronic dialysis patients in prefectures

Names of administrative divisions	Daytime	Nighttime	Home hemodialysis	Peritoneal dialysis	Total <sup>†</sup>
Hokkaido	12 610	1 341	8	493	14 452
Aomori prefecture	2 908	218	0	103	3 229
Iwate prefecture	2 434	339	0	130	2 903
Miyagi prefecture	3 831	900	0	63	4 794
Akita prefecture	1 656	145	0	62	1 863
Yamagata prefecture	1 986	290	2	115	2 393
Fukushima prefecture	4 006	349	0	148	4 503
Ibaraki prefecture	6 055	847	1	130	7 033
Tochigi prefecture	4 639	795	2	55	5 491
Gunma prefecture	4 370	754	0	115	5 239
Saitama prefecture	12 630	2 139	63	359	15 191
Chiba prefecture	10 768	1 719	1	271	12 759
Tokyo	22 623	4 936	12	1048	28 620
Kanagawa prefecture	14 608	3 036	20	594	18 258
Niigata prefecture	3 605	1 037	1	167	4 810
Toyama prefecture	1 996	260	1	76	2 333
Ishikawa prefecture	2 031	380	0	93	2 504
Fukui prefecture	1 474	177	0	75	1 726
Yamanashi prefecture	1 925	207	1	59	2 192
Nagano prefecture	3 694	745	1	134	4 574
Gifu prefecture	3 649	641	5	145	4 440
Shizuoka prefecture	8 147	1 303	4	264	9 718
Aichi prefecture	12 296	3 238	34	631	16 201
Mie prefecture	3 324	580	5	117	4 026
Shiga prefecture	2 218	442	17	121	2 798
Kyoto prefecture	4 607	1 057	2	232	5 898
Osaka prefecture	18 071	2 858	39	613	21 581
Hyogo prefecture	10 403	1 741	29	296	12 469
Nara prefecture	2 859	218	5	101	3 184
Wakayama prefecture	2 453	267	1	26	2 747
Tottori prefecture	1 148	133	0	95	1 376
Shimane prefecture	1 226	151	0	86	1 463
Okayama prefecture	3 628	568	1	227	4 424
Hiroshima prefecture	6 064	574	5	484	7 127
Yamaguchi prefecture	2 840	372	0	152	3 364
Tokushima prefecture	2 013	274	0	191	2 478
Kagawa prefecture	2 103	150	5	235	2 493
Ehime prefecture	2 983	403	1	156	3 543
Kochi prefecture	1 950	248	0	32	2 230
Fukuoka prefecture	10 524	2 327	4	584	13 439
Saga prefecture	1 772	309	1	22	2 104
Nagasaki prefecture	3 057	492	3	183	3 735
Kumamoto prefecture	4 896	964	1	140	6 001
Oita prefecture	3 278	348	1	138	3 765
Miyazaki prefecture	2 966	593	0	53	3 612
Kagoshima prefecture	4 417	557	1	103	5 078
Okinawa prefecture	3 405	630	0	56	4 091
Total	246 146	42 052	277	9773	298 252

The number of dialysis patients was calculated based on facility survey data. <sup>†</sup>The total number of chronic dialysis patients is the total of the column for the number of patients in sheet I, and does not necessarily agree with the total number of patients counted according to the method of treatment.

The number of dialysis patients per million has increased continuously, reaching 2329.1 at the end of 2010 (Tables 1 and 2). According to a data report from the United States Renal Data System (USRDS) (7), Japan has the second largest dialysis patient population per general population after Taiwan (a comparison based on the data at the end of 2009). Japan also has the second largest number of dialysis patients after the US. Table 3 shows the total number of dialysis patients in each prefecture of Japan determined from the facility survey.

#### Mean age

The dialysis patient population in Japan is getting older yearly. Table 4 shows changes in the mean age of patients obtained from the patient survey. As shown in this table, the mean age of new patients who were started on dialysis in 2010 was 67.8 years ( $\pm 13.3$ ,  $\pm$ SD here and hereafter) compared to a mean age of 66.2 years ( $\pm 12.6$ ) among patients who started dialysis in 2010. The dialysis patient population aged by 6.7 years from the end of 1990 to the end of 2000 and by 5.0 years from the end of 2000 to the

**TABLE 4.** Changes in mean age of new patients started on dialysis and of patients at the end of each year

Year	Mean age of patients newly introduced into dialysis treatment (years old)		Mean age of patients at the end of each year (years old)	
	Mean	± SD	Mean	±SD
1983	51.9	15.5	48.3	13.8
1984	53.2	15.3	49.2	13.8
1985	54.4	15.4	50.3	13.7
1986	55.1	15.2	51.1	13.6
1987	55.9	14.9	52.1	13.7
1988	56.9	14.9	52.9	13.6
1989	57.4	14.7	53.8	13.5
1990	58.1	14.6	54.5	13.5
1991	58.1	14.6	55.3	13.5
1992	59.5	14.5	56.0	13.5
1993	59.8	14.4	56.6	13.5
1994	60.4	14.3	57.3	13.5
1995	61.0	14.2	58.0	13.4
1996	61.5	14.2	58.6	13.4
1997	62.2	14.0	59.2	13.4
1998	62.7	13.9	59.9	13.3
1999	63.4	13.9	60.6	13.3
2000	63.8	13.9	61.2	13.2
2001	64.2	13.7	61.6	13.1
2002	64.7	13.6	62.2	13.0
2003	65.4	13.5	62.8	12.9
2004	65.8	13.4	63.3	12.9
2005	66.2	13.4	63.9	12.8
2006	66.4	13.4	64.4	12.8
2007	66.8	13.3	64.9	12.7
2008	67.2	13.3	65.3	12.7
2009	67.3	13.3	65.8	12.6
2010	67.8	13.3	66.2	12.6

end of 2010. Thus, the rate of aging of the dialysis patient population decreased. Similarly, the mean age of incident patients increased by 5.7 years from the end of 1990 to the end of 2000, but by only 4.0 years from the end of 2000 to the end of 2010. These findings show that the rate of aging of new dialysis patients also decreased.

Tables 5 and 6 show the gender and age distributions of patients who started dialysis in 2010 and all dialysis patients in 2010, respectively. Tables 7 and 8 summarize the primary diseases of patients who were started on dialysis in 2010 and all dialysis patients in 2010, respectively. The data in these tables were obtained from the patient survey.

#### Primary diseases of dialysis patients

Table 7 shows a summary of the primary diseases of patients who were started on dialysis in 2010. Table 8 shows a summary of the primary diseases of all dialysis patients at the end of 2010.

Table 9 shows changes in the percentage of new patients who were started on dialysis each year with various primary causes of renal failure (primary diseases). The number of new patients with diabetic nephropathy as the primary disease continued to increase until the end of 2009. However, the number

of new patients who had diabetic nephropathy as the primary disease and were started on dialysis decreased at the end of 2010; this decrease was observed for the first time in the 20 year history of the survey (16 549 in 2009 and 16 247 in 2010) (5). The percentage of patients with diabetic nephropathy among new patients also decreased to 43.6%, a decrease of 0.9% from 2009 (44.5%). According to the 2007 report of National Health and Nutrition Survey from the Ministry of Health, Labour and Welfare, the number of diabetic patients has continued to increase (8). If the trend of increasing number of diabetic patients among the general population still continues today, the decrease in the number of new patients with diabetic nephropathy who were started on dialysis may indicate that the treatment for diabetic nephropathy has achieved positive results.

The number and percentage of patients with chronic glomerulonephritis, which is currently the second most common primary disease after diabetic nephropathy, have continuously declined in this decade. The percentage of patients with nephrosclerosis as the primary disease was the third highest (11.7%). In relation to the aging of new dialysis patients, the number and percentage of patients with

**TABLE 5.** Number of new patients started on dialysis in 2010 according to age and sex

Age of the patients when newly introduced into dialysis (years old)	Male (%) <sup>†</sup>	Female (%) <sup>†</sup>	Subtotal (%) <sup>†</sup>	No information available	Total (%) <sup>†</sup>
<5	8 (0.0)	9 (0.1)	17 (0.0)		17 (0.0)
5-9		2 (0.0)	2 (0.0)		2 (0.0)
10-14	7 (0.0)	2 (0.0)	9 (0.0)		9 (0.0)
15-19	26 (0.1)	15 (0.1)	41 (0.1)		41 (0.1)
20-24	58 (0.2)	30 (0.2)	88 (0.2)		88 (0.2)
25-29	107 (0.4)	52 (0.4)	159 (0.4)		159 (0.4)
30-34	198 (0.8)	109 (0.9)	307 (0.8)		307 (0.8)
35-39	455 (1.9)	215 (1.7)	670 (1.8)		670 (1.8)
40-44	722 (2.9)	271 (2.2)	993 (2.7)		993 (2.7)
45-49	1 024 (4.2)	409 (3.3)	1 433 (3.9)		1 433 (3.9)
50-54	1 344 (5.5)	563 (4.5)	1 907 (5.1)		1 907 (5.1)
55-59	2 180 (8.9)	872 (6.9)	3 052 (8.2)		3 052 (8.2)
60-64	3 389 (13.8)	1 407 (11.2)	4 796 (12.9)		4 796 (12.9)
65-69	3 505 (14.3)	1 574 (12.5)	5 079 (13.7)		5 079 (13.7)
70-74	3 811 (15.5)	1 734 (13.8)	5 545 (14.9)		5 545 (14.9)
75-79	3 781 (15.4)	2 059 (16.4)	5 840 (15.7)		5 840 (15.7)
80-84	2 605 (10.6)	1 893 (15.1)	4 498 (12.1)		4 498 (12.1)
85-89	1 115 (4.5)	1 063 (8.5)	2 178 (5.9)		2 178 (5.9)
90-94	229 (0.9)	242 (1.9)	471 (1.3)		471 (1.3)
95≤	28 (0.1)	27 (0.2)	55 (0.1)		55 (0.1)
Total	24 592 (100.0)	12 548 (100.0)	37 140 (100.0)		37 140 (100.0)
No information available	68	30	98		98
Total	24 660	12 578	37 238		37 238
Mean	66.91	69.52	67.79		67.79
SD	13.01	13.60	13.27		13.27

<sup>†</sup>The values in parentheses on the right side of each figure represent the percentage relative to the total in each column.

**TABLE 6.** Number of all dialysis patients in 2010 according to age and sex

Age (years old)	Male (%) <sup>†</sup>	Female (%) <sup>†</sup>	Subtotal (%) <sup>†</sup>	No information available	Total (%) <sup>†</sup>
<5	17 (0.0)	22 (0.0)	39 (0.0)		39 (0.0)
5-9	7 (0.0)	12 (0.0)	19 (0.0)		19 (0.0)
10-14	15 (0.0)	8 (0.0)	23 (0.0)		23 (0.0)
15-19	60 (0.0)	38 (0.0)	98 (0.0)		98 (0.0)
20-24	226 (0.1)	115 (0.1)	341 (0.1)		341 (0.1)
25-29	582 (0.3)	337 (0.3)	919 (0.3)		919 (0.3)
30-34	1 453 (0.8)	746 (0.7)	2 199 (0.8)		2 199 (0.8)
35-39	3 394 (1.9)	1 719 (1.6)	5 113 (1.8)		5 113 (1.8)
40-44	5 688 (3.2)	2 689 (2.5)	8 377 (2.9)		8 377 (2.9)
45-49	8 491 (4.7)	4 131 (3.8)	12 622 (4.4)		12 622 (4.4)
50-54	11 574 (6.4)	6 151 (5.6)	17 725 (6.1)		17 725 (6.1)
55-59	19 077 (10.6)	10 459 (9.6)	29 536 (10.2)		29 536 (10.2)
60-64	30 449 (16.9)	16 445 (15.0)	46 894 (16.2)		46 894 (16.2)
65-69	27 343 (15.2)	15 817 (14.5)	43 160 (14.9)		43 160 (14.9)
70-74	26 679 (14.8)	15 959 (14.6)	42 638 (14.7)		42 638 (14.7)
75-79	23 180 (12.9)	14 771 (13.5)	37 951 (13.1)		37 951 (13.1)
80-84	14 445 (8.0)	11 442 (10.5)	25 887 (8.9)		25 887 (8.9)
85-89	5 845 (3.2)	6 296 (5.8)	12 141 (4.2)		12 141 (4.2)
90-94	1 421 (0.8)	1 872 (1.7)	3 293 (1.1)		3 293 (1.1)
95≤	169 (0.1)	300 (0.3)	469 (0.2)		469 (0.2)
Total	180 115 (100.0)	109 329 (100.0)	289 444 (100.0)		289 444 (100.0)
No information available	5		5		5
Total	180 120	109 329	289 449		289 449
Mean	65.44	67.47	66.21		66.21
SD	12.39	12.78	12.57		12.57

<sup>†</sup>The values in parentheses on the right side of each figure represent the percentage relative to the total in each column.



**TABLE 7.** Number of new patients started on dialysis in 2010 according to primary disease and their mean age

Primary disease	Number of patients	No information on birth date	Total	Mean age	SD
Chronic glomerulonephritis (%)	7 792 (21.0)	41 (41.8)	7 833 (21.0)	67.60	14.42
Chronic pyelonephritis (%)	301 (0.8)		301 (0.8)	66.38	15.22
Rapidly progressive glomerulonephritis (%)	444 (1.2)	2 (2.0)	446 (1.2)	69.17	13.87
Nephropathy of pregnancy/pregnancy toxemia (%)	47 (0.1)		47 (0.1)	60.85	12.54
Other nephritides that cannot be classified (%)	147 (0.4)	4 (4.1)	151 (0.4)	62.58	18.2
Polycystic kidney (%)	894 (2.4)	3 (3.1)	897 (2.4)	61.26	13.44
Nephrosclerosis (%)	4 345 (11.7)	3 (3.1)	4 348 (11.7)	74.67	10.92
Malignant hypertension (%)	331 (0.9)	1 (1.0)	332 (0.9)	63.79	17.26
Diabetic nephropathy (%)	16 225 (43.7)	22 (22.4)	16 247 (43.6)	66.09	11.71
SLE nephritis (%)	281 (0.8)	1 (1.0)	282 (0.8)	61.48	15.46
Amyloid kidney (%)	127 (0.3)		127 (0.3)	66.38	10.93
Gouty kidney (%)	84 (0.2)		84 (0.2)	63.20	12.44
Renal failure due to congenital abnormality of metabolism (%)	30 (0.1)		30 (0.1)	47.50	24.93
Kidney and urinary tract tuberculosis (%)	13 (0.0)		13 (0.0)	74.00	10.84
Kidney and urinary tract stone (%)	67 (0.2)		67 (0.2)	69.63	11.07
Kidney and urinary tract tumor (%)	182 (0.5)	2 (2.0)	184 (0.5)	69.84	10.76
Obstructive urinary tract disease (%)	86 (0.2)		86 (0.2)	69.64	15.51
Myeloma (%)	138 (0.4)		138 (0.4)	69.77	10.81
Hypoplastic kidney (%)	62 (0.2)	1 (1.0)	63 (0.2)	38.50	28.83
Undetermined (%)	3 963 (10.7)	10 (10.2)	3 973 (10.7)	71.21	13.05
Reintroduction after transplantation (%)	227 (0.6)	1 (1.0)	228 (0.6)	55.19	15.19
Others (%)	1 345 (3.6)	7 (7.1)	1 352 (3.6)	67.99	14.45
Total (%)	37 131 (100.0)	98 (100.0)	37 229 (100.0)	67.79	13.27
No information available	9		9	73.11	13.72
Total	37 140	98	37 238	67.79	13.27

The values in parentheses on the right side of each figure represent the percentage relative to the total in each column. The column "No information on birth date" shows the number of patients who provided no date of birth, such that the calculation of age was impossible.

**TABLE 8.** Number of all dialysis patients in 2010 according to primary disease and their mean age

Primary disease	Number of patients	No information on birth date	Total	Mean age	SD
Chronic glomerulonephritis (%)	104 762 (36.2)	1 (20.0)	104 763 (36.2)	65	12.7
Chronic pyelonephritis (%)	3 091 (1.1)		3 091 (1.1)	63.95	14.11
Rapidly progressive glomerulonephritis (%)	2 050 (0.7)		2 050 (0.7)	66.55	13.8
Nephropathy of pregnancy/pregnancy toxemia (%)	1 745 (0.6)		1 745 (0.6)	61.94	9.79
Other nephritides that cannot be classified (%)	1 324 (0.5)		1 324 (0.5)	59.7	16.51
Polycystic kidney (%)	9 765 (3.4)		9 765 (3.4)	63.78	11.11
Nephrosclerosis (%)	21 816 (7.5)		21 816 (7.5)	73.56	11.82
Malignant hypertension (%)	2 329 (0.8)		2 329 (0.8)	63.47	14.78
Diabetic nephropathy (%)	103 820 (35.9)	2 (40.0)	103 822 (35.9)	66.51	11.07
SLE nephritis (%)	2 403 (0.8)		2 403 (0.8)	59.03	13.91
Amyloid kidney (%)	494 (0.2)		494 (0.2)	65.83	11.58
Gouty kidney (%)	1 206 (0.4)		1 206 (0.4)	66.48	11.67
Renal failure due to congenital abnormality of metabolism (%)	280 (0.1)		280 (0.1)	48.31	17.21
Kidney and urinary tract tuberculosis (%)	299 (0.1)		299 (0.1)	70.47	9.4
Kidney and urinary tract stone (%)	576 (0.2)		576 (0.2)	69.76	11.25
Kidney and urinary tract tumor (%)	762 (0.3)		762 (0.3)	70.23	11.67
Obstructive urinary tract disease (%)	685 (0.2)	1 (20.0)	686 (0.2)	61.49	18.07
Myeloma (%)	215 (0.1)		215 (0.1)	70.21	11.17
Hypoplastic kidney (%)	582 (0.2)		582 (0.2)	41.62	19.55
Undetermined (%)	23 071 (8.0)	1 (20.0)	23 072 (8.0)	68.64	13.24
Reintroduction after transplantation (%)	2 119 (0.7)		2 119 (0.7)	54.82	12.68
Others (%)	6 042 (2.1)		6 042 (2.1)	64.29	15.64
Total (%)	289 436 (100.0)	5 (100.0)	289 441 (100.0)	66.21	12.57
No information available	8		8	71.5	13.93
Total	289 444	5	289 449	66.21	12.57

The values in parentheses on the right side of each figure represent the percentage relative to the total in each column. The column "No information on birth date" shows the number of patients who provided no date of birth, such that the calculation of age was impossible.

**TABLE 9.** Changes in percentage of new patients started on dialysis for each year in terms of primary disease

Year	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Diabetic nephropathy	15.6	17.4	19.6	21.3	22.1	24.3	26.5	26.2	28.1	28.4	29.9	30.7	31.9	33.1
Chronic glomerulonephritis	60.5	58.7	56.0	54.8	54.2	49.9	47.4	46.1	44.2	42.2	41.4	40.5	39.4	38.9
Nephrosclerosis	3.0	3.3	3.5	3.7	3.9	3.9	4.1	5.4	5.5	5.9	6.2	6.1	6.3	6.4
Polycystic kidney	2.8	2.8	3.1	2.9	3.2	3.1	3.1	2.9	3.0	2.7	2.6	2.5	2.4	2.5
Rapidly progressive glomerulonephritis	0.9	0.7	0.9	1.0	0.8	0.9	0.8	0.7	0.6	0.7	0.8	0.8	0.8	0.8
SLE nephritis	1.1	1.1	1.1	1.2	0.9	0.9	1.0	1.1	1.3	1.3	1.2	1.2	1.1	1.3
Chronic pyelonephritis	2.4	2.2	2.1	2.0	1.8	1.8	1.5	1.5	1.7	1.6	1.1	1.4	1.2	1.1
Undetermined	4.4	4.0	4.8	4.2	4.1	3.8	4.0	3.3	3.7	3.7	3.3	3.9	4.5	5.0
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Diabetic nephropathy	33.9	35.7	36.2	36.6	38.1	39.1	41.0	41.3	42.0	42.9	43.4	43.3	44.5	43.6
Chronic glomerulonephritis	36.6	35.0	33.6	32.5	32.4	31.9	29.1	28.1	27.4	25.6	23.8	22.8	21.9	21.0
Nephrosclerosis	6.8	6.7	7.0	7.6	7.6	7.8	8.5	8.8	9.0	9.4	10.0	10.6	10.7	11.7
Polycystic kidney	2.4	2.4	2.2	2.4	2.3	2.4	2.3	2.7	2.3	2.4	2.3	2.5	2.3	2.4
Rapidly progressive glomerulonephritis	1.1	0.9	0.9	1.0	1.0	1.1	1.2	1.1	1.1	1.2	1.3	1.2	1.2	1.2
SLE nephritis	1.0	1.1	1.2	0.9	1.0	0.9	0.7	0.8	0.8	0.8	0.8	0.8	0.7	0.8
Chronic pyelonephritis	1.2	1.1	1.1	1.0	1.1	0.9	1.0	0.9	1.0	0.8	0.8	0.7	0.7	0.8
Undetermined	5.5	5.6	6.1	7.6	9.0	8.4	8.8	9.3	9.5	9.9	10.2	10.6	10.7	10.7

nephrosclerosis continued to increase. The percentage of patients with “unspecified” primary diseases was the fourth highest (10.7%). In addition, polycystic kidney disease, rapidly progressive glomerulonephritis, systemic lupus erythematosus (SLE) nephritis, and chronic pyelonephritis were also observed as primary diseases. However, the percentages of new patients with these primary diseases among all new dialysis patients were 0.8–2.4%, which was much smaller than the percentages of patients

with the above top four primary diseases, and showed no marked increase or decrease over 20 years.

Table 10 shows changes in the percentages of all dialysis patients with various primary diseases at the end of each year. Among all dialysis patients, chronic glomerulonephritis was still the most common primary disease. However, the percentage of patients with this primary disease among all dialysis patients continuously decreased. The number of patients with chronic glomerulonephritis at the end of 2010 was

**TABLE 10.** Changes in percentage of patients at the end of each year in terms of primary disease

Year	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Chronic glomerulonephritis	74.5	72.1	72.3	70.6	69.4	67.9	65.9	64.1	61.7	60.4	58.8	57.7	56.6	55.4
Diabetic nephropathy	7.4	8.4	9.4	10.5	11.7	12.8	14.0	14.9	16.4	17.1	18.2	19.2	20.4	21.6
Nephrosclerosis	1.5	1.7	1.9	2.0	2.1	2.1	2.3	2.6	2.9	3.1	3.4	3.6	3.8	4.0
Polycystic kidney	2.7	2.9	3.0	3.1	3.1	3.2	3.2	3.3	3.3	3.3	3.3	3.2	3.2	3.2
Chronic pyelonephritis	3.1	3.3	2.6	2.4	2.4	2.3	2.2	2.2	2.1	2.0	1.9	1.8	1.7	1.6
SLE nephritis	0.8	0.8	0.9	0.9	0.9	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.1	1.1
Rapidly progressive glomerulonephritis	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Undetermined	2.2	2.3	2.3	2.5	2.6	2.5	2.6	2.6	2.9	2.9	2.9	3.1	3.2	3.6
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Chronic glomerulonephritis	54.1	52.5	51.1	49.7	49.6	48.2	46.6	45.1	43.6	42.2	40.4	39.0	37.6	36.2
Diabetic nephropathy	22.7	24.0	25.1	26.0	27.2	28.1	29.2	30.2	31.4	32.3	33.4	34.2	35.1	35.9
Nephrosclerosis	4.2	4.4	4.5	4.8	5.0	5.1	5.3	5.7	5.9	6.2	6.5	6.8	7.1	7.5
Polycystic kidney	3.2	3.2	3.2	3.2	3.3	3.3	3.3	3.4	3.3	3.4	3.4	3.4	3.4	3.4
Chronic pyelonephritis	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1
SLE nephritis	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
Rapidly progressive glomerulonephritis	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7
Undetermined	3.9	4.2	4.4	5.0	5.6	5.9	6.3	6.4	6.6	7.0	7.4	7.6	7.7	8.0

104 763, which also decreased from 2009 (106 002). In contrast, both the number and percentage of patients with diabetic nephropathy continuously increased. The percentage of patients with chronic glomerulonephritis (36.2%) was still slightly higher than that of patients with diabetic nephropathy (35.9%) at the end of 2010. However, diabetic nephropathy will become the most common primary disease among all dialysis patients by the end of 2011 considering the above trends. The primary diseases with the third and fourth highest percentages of patients among all dialysis patients in 2010 were unspecified primary diseases (8.0%) and nephrosclerosis (7.5%), respectively. The percentage of patients with nephrosclerosis among all dialysis patients continuously increased. In addition, polycystic kidney disease, chronic pyelonephritis, SLE nephritis, and rapidly progressive glomerulonephritis were also observed as primary diseases. However, the percentages of patients with these primary diseases were only 0.7–3.4% and showed no marked increase or decrease over the 20-year survey period.

#### *Causes of death*

As described above, the classification codes for the causes of death were changed in the 2010 survey. Table 11 shows the classification codes for the causes of death used in the 2003–2009 surveys. Table 12 shows the new classification codes adopted in the 2010 survey. In the classification with new codes, various causes of death were reclassified into several groups, each of which was given a group name, to facilitate the search for the name of the corresponding cause of death. The terms of the causes of death basically followed the previous terms that had been used until the 2009 survey. Moreover, acute myocardial infarction leading to death within 30 days after onset was separately classified as a cause of death. Some other terms of the causes of death were also revised for better understanding of respondents. Because these changes led to some items becoming inconsistent with the ICD-10 codes, the ICD-10 codes corresponding to such items were removed.

In Table 13, the causes of death shown in Table 12 were further classified. Table 13 shows the correspondence between the items used in the following tables and the causes of death in Table 12.

Table 14 shows the classification of causes of death of patients who were started on dialysis in 2010 and who died by the end of 2010. Similar to the 2009 results, the leading cause of death of patients who were started on dialysis in 2010 was infectious diseases (26.5%). The second, third, fourth, and fifth leading causes were cardiac failure (24.9%), unspeci-

fied causes (9.2%), malignant tumors (12.5%), and cerebrovascular disorder (4.8%), respectively.

Table 15 shows the classification of the causes of death of all dialysis patients who died in 2010. Table 16 shows changes in the percentages of the leading causes of death in all dialysis patients. Among all dialysis patients, the leading cause of death was cardiac failure; the percentage of patients who died of cardiac failure in 2010 was 27.0%, a marked increase of 3.4 percentage points from 2009 (23.6%). The percentage of patients who died of cardiac failure among all dialysis patients markedly decreased in the 1990s and remained at nearly 23–26% until 2009. Therefore, the above marked increase in the percentage of patients who died of cardiac failure might have been due to the change in the classification of the causes of death in the 2010 survey. The percentage of patients who died of infectious diseases among all dialysis patients was 20.3% in 2010 and tended to gradually increase over the last 20 years. In contrast, the percentage of patients who died of cerebrovascular disorder tended to decrease and reached 8.1% in 2010. The percentage of patients who died of myocardial infarction also tended to decrease from a peak of 8.4% in 1997; however, it was 4.7% in 2010, an increase of 0.7% from 2009 (4.0%). This might also have been due to the change in the classification of the causes of death in this survey. The percentage of patients who died of malignant tumors tended to increase slightly and reached 9.8% in 2010.

#### *Annual crude death rate*

The annual crude death rate was calculated from the facility survey data. It shows the percentage of patients who died in a given year with respect to the mean annual number of dialysis patients. The annual crude death rate in 2010 was 9.8%. Table 17 shows the trend of annual crude death rates since 1983. It is expected that the annual crude death rate will increase because of the increase in the number of patients with a poor prognosis, such as older patients who were started on dialysis and patients with diabetic nephropathy and nephrosclerosis. In fact, the annual crude death rate has gradually increased since 2000.

#### *Cumulative survival rate of new patients who were started on dialysis each year*

The cumulative survival rates of new patients who were started on dialysis from 1983 are summarized by year of introduction (Table 18). Moreover, the one-, five-, 10-, 15-, 20-, and 25-year survival rates of patients who were started on dialysis were extracted from the table and plotted in Figure 1.

**TABLE 11.** Classification of causes of death used from 2003 to 2009 survey

Cause of death	ICD10 code	Code	
		Without definite diagnosis	With definite diagnosis
Tuberculosis	A15-A19	010	011
Septicemia	A40-A41	020	021
Acute viral hepatitis	B159,B161,B169,B17	030	031
Fulminant viral hepatitis	B150,B160,B162,K720	040	041
Human immunodeficiency virus (HIV) infection	B20-B24	050	051
Other infectious diseases	A00-A09,A20-A39,A42-A99,B00-B09, B25-B99,G00-G09	060	061
Malignant neoplasm of digestive system	C00-C26	070	071
Malignant neoplasm of respiratory system	C30-C39	080	081
Malignant neoplasm of bone and cartilage	C40-C41	090	091
Malignant neoplasm of skin and soft tissue	C43-C49	100	101
Malignant neoplasm of breast	C50	110	111
Malignant neoplasm of female genitals	C51-C58	120	121
Malignant neoplasm of kidney	C64	130	131
Malignant neoplasm of urinary tract and male genitals	C60-C63,C65-C68	140	141
Malignant neoplasm of eyes, brain, and central nervous system	C69-C72	150	151
Malignant neoplasm of endocrine glands	C73-C75	160	161
Malignant neoplasm of lymphatic and hematopoietic tissues	C81-C96,D45-D47	170	171
Other neoplasms and cachexia	C76-C80,C97,D00-D44,D48	180	181
Hyperkalemia	E875	190	191
Dementia	F00-F024,F03	200	201
Dialytic encephalopathy	F028	210	211
Ischemic heart disease	I20-I25	220	221
Pulmonary embolism	I26	230	231
Cor pulmonale	I27	240	241
Pericarditis	I30-I32	250	251
Endocarditis and valvular disease	I33-I39	260	261
Myocarditis	I40-I41	270	271
Cardiomyopathy	I42-I43	280	281
Conduction defect	I44-I45	290	291
Cardiac arrest (sudden death)	I46	300	301
Arrhythmia	I47-I49	310	311
Cardiac failure	I50	320	321
Subarachnoid hemorrhage	I60	330	331
Intracerebral hemorrhage	I61	340	341
Cerebral infarction	I63	350	351
Other cerebrovascular diseases	I62,I64-I69	360	361
Influenza	J10-J11	370	371
Pneumonia	J12-J18	380	381
Pulmonary edema	J81	390	391
Intestinal hematogenous disorder	K55	400	401
Ileus	K56	410	411
Peritonitis	K65	420	421
Hepatic fibrosis and cirrhosis	K74	430	431
Gallbladder and biliary tract diseases	K80-K83	440	441
Acute pancreatitis	K85	450	451
Gastrointestinal bleeding and others	K92	460	461
Uremia	N180	470	471
Cachexia	R64	530	531
Suicide	X60-X84	480	481
Death due to disaster or accident	V01-X59,X85-Y36	490	491
Unspecified	R95-R99	500	501
Refusal of treatment (refusal of dialysis)	Z531,Z532	510	
Others	B18-B19,D50-D89,E00-E874,E876-E90, F04-F99,G10-G99,H00,H95,I00-I15,I28, I51-I52,I70-I99,J00-J06,J20-J80,J82-J99, K00-K52,K57-K63,K66-K71,K721-K73, K75-K77,K86-K87,K90-K91,K93,L00-L99, M00-M99,N00-N17,N188-N99,O00-O99, P00-P96,Q00-Q99,R00-R63,R68-R94,S00-S99, T00-T98	520	521

**TABLE 12.** Classification of causes of death used from 2010 survey

Classification of causes of death		Code	
		Without clinical definite diagnosis	With clinical definite diagnosis
Heart disease	Cardiac failure	110	111
	Pulmonary edema (overhydration)	120	121
	Acute cardiac infarction (death within 30 days after onset)	130	131
	Ischemic heart disease (other than acute cardiac infarction)	140	141
	Arrhythmia and conduction defect	150	151
	Endocarditis and valvular disease	160	161
Cerebrovascular disease	Other cardiac diseases	100	101
	Subarachnoid hemorrhage	210	211
	Intracerebral hemorrhage	220	221
	Cerebral infarction	230	231
Infectious disease	Other cerebrovascular diseases	200	201
	Septicemia	310	311
	Central nervous system infection	320	321
	Pneumonia	330	331
	Influenza	340	341
	Urinary tract infection	350	351
	Infection of gastrointestinal and biliary tracts and peritonitis	360	361
	Fulminant (acute) viral hepatitis	370	371
	Tuberculosis	380	381
	Human immunodeficiency virus (HIV) infection	390	391
	Other infectious diseases	300	301
Malignant tumor	Malignant neoplasm of central nervous system	410	411
	Malignant neoplasm of respiratory system	420	421
	Liver cancer	430	431
	Malignant neoplasm of digestive system excluding liver cancer	440	441
	Malignant neoplasm of breast	450	451
	Malignant neoplasm of genitals	460	461
	Malignant neoplasm of kidney	470	471
	Malignant neoplasm of endocrine glands	480	481
	Malignant neoplasm of hematopoietic and lymphatic tissues	490	491
	Other malignant neoplasms	400	401
Liver cirrhosis	Viral cirrhosis	510	511
	Nonviral cirrhosis	520	521
Digestive disease	Intestinal hematogenous disorder	610	611
	Ileus	620	621
	Gastrointestinal bleeding	630	631
	Encapsulating peritoneal sclerosis	640	641
	Other gastrointestinal diseases	600	601
Pulmonary infarction and embolism	Pulmonary infarction and embolism	710	711
Cachexia/uremia	Cachexia	810	811
	Uremia	820	821
	Dementia	830	831
	Other cachexia/uremia	800	801
Sudden death	Hyperkalemia	910	911
	Sudden death of uncertain cause	920	921
Suicide/refusal/ death due to disaster or accident/ others/Unspecified	Suicide	010	
	Refusal of treatment (refusal of dialysis)	020	
others/Unspecified	Death due to disaster or accident	030	031
	Others	080	081
	Unspecified	090	

The one- to 10-year survival rates have been increasing since 1992 for patients who were started on dialysis around 1992 or later. This trend may be due to the improvement of anemia therapy using erythropoietin starting at the initial phase of dialysis because the clinical use of genetically modified erythropoietin started around this time.

### Current status of dialysate quality control

#### Frequency of measurement of endotoxin concentration in dialysate (Table 19)

Among 4124 facilities that have at least one console, 3980 facilities (96.5%) responded to questions regarding the frequency of measurement of

**TABLE 13.** Correspondence between classification of causes of death in questionnaire and tabulation

Cause of death in tabulation		Cause of death in questionnaire																													
		1983–2002		2003–2009		2010 or after																									
1	Cardiac failure	01	Pericarditis	24	Cor pulmonale	11	Cardiac failure																								
		02	Pulmonary edema/congestive cardiac failure	25	Pericarditis	12	Pulmonary edema (overhydration)																								
		05	Other cardiac failures	26	Endocarditis and valvular disease	15	Arrhythmia and conduction defect																								
				29	Conduction defect	16	Endocarditis and valvular disease																								
				31	Arrhythmia	10	Other cardiac diseases																								
				32	Cardiac failure																										
				39	Pulmonary edema																										
				33	Subarachnoid hemorrhage	21	Subarachnoid hemorrhage																								
				34	Intracerebral hemorrhage	22	Intracerebral hemorrhage																								
				35	Cerebral infarction	23	Cerebral infarction																								
2	Cerebrovascular disorder	09	Cerebrovascular disorder	36	Other cerebrovascular diseases	20	Other cerebrovascular diseases																								
				01	Tuberculosis	31	Septicemia																								
				02	Septicemia	32	Central nervous system infection																								
				03	Acute viral hepatitis	33	Pneumonia																								
				04	Fulminant viral hepatitis	34	Influenza																								
				05	Human immunodeficiency virus (HIV) infection	35	Urinary tract infection																								
				06	Other infectious diseases	36	Infection of gastrointestinal and biliary tracts and peritonitis																								
				37	Influenza	37	Fulminant (acute) viral hepatitis																								
				38	Pneumonia	38	Tuberculosis																								
				42	Peritonitis	39	Human immunodeficiency virus (HIV) infection																								
3	Infectious disease	14	Septicemia/bacteremia	45	Acute pancreatitis	30	Other infectious diseases																								
		15	Pneumonia/lung suppuration	46	Gastrointestinal bleeding and others	63	Gastrointestinal bleeding																								
		16	Acute pancreatitis	07	Malignant neoplasm of digestive system	41	Malignant neoplasm of central nervous system																								
		19	Peritonitis	08	Malignant neoplasm of respiratory system	42	Malignant neoplasm of respiratory system																								
		20	Tuberculosis	09	Malignant neoplasm of bone and cartilage	43	Liver cancer																								
		4	Hemorrhage	12	Gastrointestinal bleeding	10	Malignant neoplasm of skin and soft tissue	44	Malignant neoplasm of digestive system excluding liver cancer																						
						11	Malignant neoplasm of breast	45	Malignant neoplasm of breast																						
						12	Malignant neoplasm of female genitals	46	Malignant neoplasm of genitals																						
						13	Malignant neoplasm of kidney	47	Malignant neoplasm of kidney																						
						14	Malignant neoplasm of urinary tract and male genitals	48	Malignant neoplasm of endocrine glands																						
15	Malignant neoplasm of eyes, brain, and central nervous system					49	Malignant neoplasm of hematopoietic and lymphatic tissues																								
16	Malignant neoplasm of endocrine glands					40	Other malignant neoplasms																								
17	Malignant neoplasm of lymphatic and hematopoietic tissues																														
18	Other neoplasms and cachexia					81	Cachexia																								
47	Uremia					82	Uremia																								
5	Malignant tumor	25	Malignant tumor (digestive organs)	48	Malignant neoplasm of endocrine glands	83	Dementia																								
				53	Cachexia	80	Other cachexia/uremia																								
				26	Malignant tumor (renal and urinary organs)	22	Ischemic heart disease	13	Acute cardiac infarction (death within 30 days after onset)																						
				27	Malignant tumor (others)	27	Myocarditis	14	Ischemic heart disease (other than acute cardiac infarction)																						
				6	Cachexia/Uremia	28	Cachexia	28	Cardiomyopathy	91	Hyperkalemia																				
								19	Hyperkalemia	92	Sudden death of uncertain cause																				
								30	Cardiac arrest (sudden death)																						
								43	Hepatic fibrosis and cirrhosis	51	Viral cirrhosis																				
								23	Cirrhosis	52	Nonviral cirrhosis																				
								7	Cardiac infarction	03	Cardiomyopathy/Cardiac infarction	21	Dialytic encephalopathy																		
48	Suicide	01	Suicide																												
51	Refusal of treatment (refusal of dialysis)	02	Refusal of treatment (refusal of dialysis)																												
40	Intestinal hematogenous disorder	61	Intestinal hematogenous disorder																												
41	Ileus	62	Ileus																												
8	Potassium poisoning/Sudden death	06	Hyperkalemia	23	Pulmonary embolism	64	Encapsulating peritoneal sclerosis																								
				07	Sudden death	30	Cardiac arrest (sudden death)					71	Pulmonary infarction and embolism																		
				22	Hepatitis	49	Death due to disaster or accident					03	Death due to disaster or accident																		
				23	Cirrhosis																										
				9	Chronic hepatitis/Cirrhosis	11	Dialytic encephalopathy					20	Dementia	08	Others																
								44	Gallbladder and biliary tract diseases	60	Other gastrointestinal diseases																				
								52	Others																						
								50	Unspecified	09	Unspecified																				
								10	Encephalopathy	30	Suicide																				
												31	Refusal of dialysis																		
11	Suicide/Refusal of treatment (dialysis)	34	Others																												
												12	Intestinal obstruction	24	Intestinal obstruction/ischemic enteritis																
																13	Pulmonary thrombus/Pulmonary embolus	08	Pulmonary thrombus/pulmonary infarction												
																				14	Death due to disaster	32	Death due to disaster/Death due to accident								
				15	Other causes	34	Others																								
																								16	Unspecified	33	Unspecified				

**TABLE 14.** Classification of causes of death of new patients who were started on dialysis and died in 2010

Cause of death	Male	Female	Subtotal	No information available	Total
Cardiac failure (%)	441 (23.2)	280 (28.1)	721 (24.9)		721 (24.9)
Cerebrovascular disorder (%)	87 (4.6)	51 (5.1)	138 (4.8)		138 (4.8)
Infectious disease (%)	518 (27.3)	248 (24.9)	766 (26.5)		766 (26.5)
Hemorrhage (%)	45 (2.4)	17 (1.7)	62 (2.1)		62 (2.1)
Malignant tumor (%)	254 (13.4)	108 (10.8)	362 (12.5)		362 (12.5)
Cachexia/Uremia (%)	70 (3.7)	43 (4.3)	113 (3.9)		113 (3.9)
Cardiac infarction (%)	58 (3.1)	29 (2.9)	87 (3.0)		87 (3.0)
Potassium poisoning/Sudden death (%)	41 (2.2)	24 (2.4)	65 (2.2)		65 (2.2)
Chronic hepatitis/Cirrhosis (%)	29 (1.5)	18 (1.8)	47 (1.6)		47 (1.6)
Suicide/Refusal of treatment (dialysis) (%)	20 (1.1)	10 (1.0)	30 (1.0)		30 (1.0)
Intestinal obstruction (%)	10 (0.5)	10 (1.0)	20 (0.7)		20 (0.7)
Pulmonary thrombus/Pulmonary embolus (%)	7 (0.4)	1 (0.1)	8 (0.3)		8 (0.3)
Death due to disaster (%)	5 (0.3)	3 (0.3)	8 (0.3)		8 (0.3)
Other causes (%)	140 (7.4)	61 (6.1)	201 (6.9)		201 (6.9)
Unspecified (%)	172 (9.1)	93 (9.3)	265 (9.2)		265 (9.2)
Subtotal (%)	1897 (100.0)	996 (100.0)	2893 (100.0)		2893 (100.0)
No information available	4		4		4
Total	1901	996	2897		2897

The values in parentheses under each figure represent the percentage relative to the total in each column.

endotoxin concentration in the dialysate. The collection rate for these questions increased by 2.5 percentage points from the previous year (94.0%). The endotoxin concentration in the dialysate was measured at least once a year in 95.2% of the facilities that responded to the questionnaire, an increase of 6.0 percentage points from the previous year (89.2%). The number of facilities that carried out the measurement at least once a month, as recommended by the JSJT dialysate quality control standard (9), was 2810 (70.6% of the 3980 facilities that responded to the questions on this item), about a twofold increase from 2009 (1373 facilities, 36.0%). This may

be because additional points can be given to facilities that maintain a certain quality of dialysate upon request from the medical insurance system in Japan starting in 2010.

#### *Endotoxin concentration in dialysate (Table 20)*

There were 3772 facilities that responded to questions regarding the endotoxin concentration in the dialysate (91.5% of the 4124 facilities that have at least one console). The JSJT dialysate quality control standard (9) was less than 0.05 EU/mL, and the number of facilities that satisfied this standard was 3458 (91.7% of the 3772 facilities that responded

**TABLE 15.** Classification of causes of death of patients who died in 2010

Cause of death	Male	Female	Subtotal	No information available	Total
Cardiac failure (%)	4 467 (25.7)	2 877 (29.3)	7 344 (27.0)		7 344 (27.0)
Cerebrovascular disorder (%)	1 377 (7.9)	820 (8.4)	2 197 (8.1)		2 197 (8.1)
Infectious disease (%)	3 586 (20.6)	1 941 (19.8)	5 527 (20.3)		5 527 (20.3)
Hemorrhage (%)	289 (1.7)	191 (1.9)	480 (1.8)		480 (1.8)
Malignant tumor (%)	1 932 (11.1)	744 (7.6)	2 676 (9.8)		2 676 (9.8)
Cachexia/Uremia (%)	608 (3.5)	529 (5.4)	1 137 (4.2)		1 137 (4.2)
Cardiac infarction (%)	881 (5.1)	406 (4.1)	1 287 (4.7)		1 287 (4.7)
Potassium poisoning/Sudden death (%)	546 (3.1)	266 (2.7)	812 (3.0)		812 (3.0)
Chronic hepatitis/Cirrhosis (%)	211 (1.2)	94 (1.0)	305 (1.1)		305 (1.1)
Suicide/Refusal of treatment (dialysis) (%)	178 (1.0)	48 (0.5)	226 (0.8)		226 (0.8)
Intestinal obstruction (%)	149 (0.9)	91 (0.9)	240 (0.9)		240 (0.9)
Pulmonary thrombus/Pulmonary embolus (%)	48 (0.3)	34 (0.3)	82 (0.3)		82 (0.3)
Death due to disaster (%)	100 (0.6)	44 (0.4)	144 (0.5)		144 (0.5)
Other causes (%)	1 046 (6.0)	745 (7.6)	1 791 (6.6)		1 791 (6.6)
Unspecified (%)	1 974 (11.4)	986 (10.0)	2 960 (10.9)		2 960 (10.9)
Subtotal (%)	17 392 (100.0)	9 816 (100.0)	27 208 (100.0)		27 208 (100.0)
No information available	21	12	33		33
Total	17 413	9 828	27 241		27 241

The values in parentheses under each figure represent the percentage relative to the total in each column.

**TABLE 16.** Annual changes in major causes of death

Year	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Cardiac failure	30.3	30.5	31.3	33.2	32.7	36.5	33.4	30.4	30.5	31.1	29.9	28.2	25.4	24.1
Infectious disease	11.0	11.5	11.5	12.0	12.0	12.2	11.7	11.6	12.1	11.3	12.2	12.6	13.8	14.6
Malignant tumor	7.7	6.9	6.4	6.9	5.8	6.9	7.6	8.2	7.6	7.1	7.4	7.3	7.2	7.7
Cerebrovascular disease	14.2	15.4	14.2	14.0	14.2	12.9	13.2	13.9	13.7	13.6	13.5	14.1	13.5	12.9
Cardiac infarction	5.3	4.8	5.3	6.1	6.0	5.4	5.3	5.8	5.8	5.8	5.7	7.1	7.5	7.4
Others	5.1	4.9	5.7	4.7	5.2	4.8	4.4	4.6	4.4	4.5	4.1	4.5	5.8	6.3
Unspecified	1.9	2.0	2.8	2.2	2.4	1.6	1.9	2.1	1.8	2.5	2.6	2.8	3.2	2.5
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Cardiac failure	23.9	24.1	24.3	23.2	25.5	25.1	25.0	25.1	25.8	24.9	24.0	23.7	23.6	27.0
Infectious disease	14.9	15.0	16.3	16.6	16.3	15.9	18.5	18.8	19.2	19.9	18.9	19.9	20.7	20.3
Malignant tumor	8.1	7.7	7.6	8.3	8.5	8.5	8.5	9.0	9.0	9.2	9.2	9.2	9.4	9.8
Cerebrovascular disease	12.6	12.1	11.3	11.3	11.6	11.2	10.7	10.6	9.8	9.4	8.9	8.6	8.4	8.1
Cardiac infarction	8.4	7.9	7.4	7.0	7.4	7.4	6.2	5.4	5.1	4.4	4.4	4.1	4.0	4.7
Others	6.7	7.0	7.7	7.9	9.1	9.0	9.7	10.3	9.1	9.5	9.7	9.7	10.0	6.6
Unspecified	3.5	3.9	3.6	8.1	5.7	6.6	5.6	6.5	7.3	8.3	10.3	10.9	10.6	10.9

The values in this table are the percentage of each cause of death relative to the total number of deceased patients in each year.

to the questions on this item). This was a marked increase from 2009 (2798 facilities, 84.2%). The percentage of facilities that reported an endotoxin concentration of 0.5 EU/mL or more decreased to 1.0% from 3.2% in the 2009 survey. It is considered that the change in the unit of endotoxin concentration (from EU/L to EU/mL) in 2008 has become widely known.

#### *Frequency of measurement of bacterial count in dialysate (Table 21)*

There were 3909 facilities that responded to questions regarding the frequency of measurement of the bacterial count in the dialysate (94.8% of the 4124 facilities that have at least one console). A bacterial test was carried out at 89.2% of the 3909 facilities, a marked increase of 28.5 percentage points from the end of 2009 (60.7%). The percentage of facilities that carried out the test at least once a month, as recommended by the JSDT dialysate quality control stan-

dard (9), was 67.8% in 2010, a marked increase from 2009 (25.8%). Similar to the frequency of measurement of endotoxin concentration in the dialysate, this increase is considered to be affected by the change in the medical insurance system in 2010 in which facilities that maintain a certain dialysate quality can request additional points.

#### *Bacterial count in dialysate (Table 22)*

Bacterial counts in the dialysate were reported by 3423 facilities, 98.2% of which satisfied the JSDT dialysate quality control standard (i.e. less than 100 cfu/mL) (9). The percentage of facilities that satisfied a bacterial count of less than 0.1 cfu/mL in ultrapure dialysate was 53.1%, similar to that at the end of 2009 (54.5%).

#### *Media used for cultivation of bacteria in dialysate (Table 22)*

According to the JSDT dialysate quality control standard, oligotrophic media (e.g. Reasoner's no. 2 agar [R2A] and tryptone glucose extract agar [TGEA]) are recommended for the cultivation of bacteria in the dialysate (9). The survey results showed that these media were used by 84.0% of the 3333 facilities that responded to questions regarding the media used for the cultivation of bacteria.

#### *Volume of sample for measurement of bacterial count in dialysate (Table 23)*

Generally, the volume of dialysate sampled to measure bacterial count in plate media is less than 1 mL. However, at least 10 mL of a dialysate sample is required to measure a bacterial count lower than 0.1 cfu/mL, which is the count required to maintain an

**TALBE 17.** Changes in annual crude death rate

Year	Crude death rate (%)	Year	Crude death rate (%)
1983	9.0	1997	9.4
1984	8.9	1998	9.2
1985	9.1	1999	9.7
1986	9.0	2000	9.2
1987	8.5	2001	9.3
1988	9.2	2002	9.2
1989	7.9	2003	9.3
1990	9.6	2004	9.4
1991	8.9	2005	9.5
1992	9.7	2006	9.2
1993	9.4	2007	9.4
1994	9.5	2008	9.8
1995	9.7	2009	9.6
1996	9.4	2010	9.8

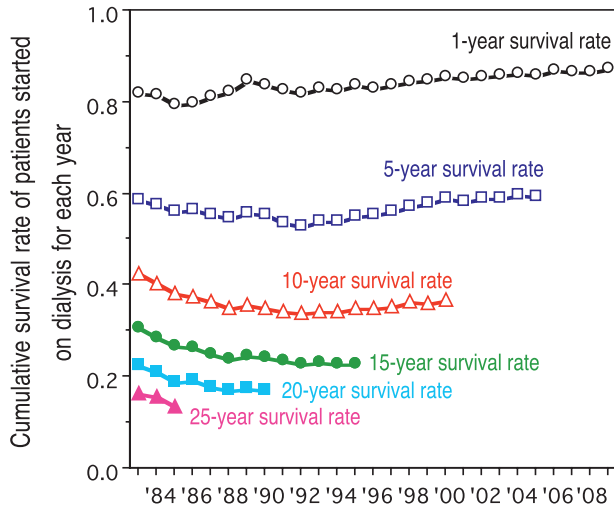


**TABLE 18.** Cumulative survival rates of new patients started on dialysis since 1983

Year of introduction	Number of patients	1-year survival rate	2-year survival rate	3-year survival rate	4-year survival rate	5-year survival rate	6-year survival rate	7-year survival rate	8-year survival rate	9-year survival rate	10-year survival rate	11-year survival rate	12-year survival rate	13-year survival rate	14-year survival rate
1983	9 880	0.819	0.747	0.682	0.633	0.589	0.556	0.523	0.485	0.456	0.425	0.395	0.372	0.348	0.329
1984	10 699	0.817	0.735	0.671	0.620	0.576	0.538	0.497	0.464	0.434	0.406	0.377	0.352	0.328	0.306
1985	11 609	0.795	0.720	0.660	0.609	0.563	0.520	0.485	0.444	0.412	0.385	0.360	0.335	0.310	0.288
1986	12 618	0.799	0.724	0.666	0.617	0.565	0.520	0.479	0.444	0.407	0.378	0.351	0.327	0.305	0.283
1987	13 546	0.815	0.738	0.670	0.607	0.556	0.506	0.462	0.425	0.393	0.364	0.338	0.313	0.293	0.270
1988	14 744	0.824	0.739	0.665	0.602	0.547	0.498	0.455	0.417	0.382	0.352	0.325	0.301	0.280	0.258
1989	14 549	0.848	0.760	0.686	0.617	0.560	0.511	0.465	0.426	0.391	0.359	0.333	0.308	0.286	0.265
1990	16 519	0.839	0.749	0.662	0.610	0.555	0.501	0.459	0.419	0.384	0.353	0.325	0.300	0.278	0.260
1991	18 189	0.828	0.735	0.652	0.598	0.538	0.487	0.444	0.406	0.374	0.344	0.317	0.292	0.271	0.252
1992	19 879	0.821	0.727	0.650	0.587	0.530	0.481	0.437	0.399	0.367	0.339	0.313	0.289	0.270	0.248
1993	20 871	0.832	0.742	0.666	0.597	0.541	0.490	0.445	0.407	0.374	0.344	0.317	0.293	0.269	0.251
1994	21 381	0.829	0.742	0.669	0.603	0.543	0.491	0.448	0.410	0.374	0.345	0.313	0.291	0.269	0.248
1995	22 854	0.840	0.753	0.678	0.609	0.545	0.503	0.460	0.421	0.385	0.353	0.324	0.299	0.275	0.252
1996	24 874	0.832	0.750	0.674	0.611	0.556	0.508	0.468	0.420	0.384	0.351	0.322	0.295	0.270	0.249
1997	25 474	0.838	0.752	0.680	0.620	0.563	0.513	0.468	0.425	0.389	0.355	0.326	0.297	0.273	
1998	26 791	0.845	0.765	0.697	0.635	0.574	0.524	0.475	0.433	0.397	0.366	0.334	0.306		
1999	27 731	0.850	0.773	0.705	0.639	0.580	0.528	0.481	0.440	0.401	0.363	0.331			
2000	29 204	0.855	0.776	0.710	0.647	0.590	0.535	0.489	0.444	0.404	0.368				
2001	30 785	0.854	0.774	0.705	0.639	0.584	0.532	0.484	0.441	0.401					
2002	31 497	0.858	0.780	0.712	0.649	0.590	0.538	0.486	0.442						
2003	32 508	0.859	0.781	0.714	0.651	0.593	0.538	0.489							
2004	33 655	0.865	0.788	0.722	0.660	0.600	0.546								
2005	34 778	0.862	0.786	0.718	0.654	0.596									
2006	36 141	0.871	0.794	0.727	0.665										
2007	36 918	0.867	0.795	0.727											
2008	37 934	0.867	0.798												
2009	38 341	0.873													

Year of introduction	Number of patients	15-year survival rate	16-year survival rate	17-year survival rate	18-year survival rate	19-year survival rate	20-year survival rate	21-year survival rate	22-year survival rate	23-year survival rate	24-year survival rate	25-year survival rate	26-year survival rate	27-year survival rate
1983	9 880	0.307	0.288	0.272	0.255	0.241	0.226	0.213	0.199	0.189	0.179	0.166	0.156	0.144
1984	10 699	0.286	0.269	0.252	0.237	0.225	0.210	0.196	0.186	0.178	0.166	0.156	0.148	
1985	11 609	0.269	0.252	0.234	0.220	0.207	0.191	0.178	0.166	0.154	0.146	0.136		
1986	12 618	0.267	0.250	0.233	0.220	0.208	0.195	0.182	0.172	0.161	0.153			
1987	13 546	0.252	0.237	0.219	0.202	0.189	0.179	0.169	0.158	0.148				
1988	14 744	0.240	0.224	0.209	0.195	0.184	0.172	0.160	0.149					
1989	14 549	0.247	0.231	0.215	0.201	0.191	0.177	0.166						
1990	16 519	0.243	0.227	0.211	0.195	0.182	0.172							
1991	18 189	0.235	0.219	0.204	0.191	0.178								
1992	19 879	0.230	0.214	0.199	0.184									
1993	20 871	0.234	0.217	0.201	0.184									
1994	21 381	0.228	0.213											
1995	22 854	0.231												
1996	24 874													
1997	25 474													
1998	26 791													
1999	27 731													
2000	29 204													
2001	30 785													
2002	31 497													
2003	32 508													
2004	33 655													
2005	34 778													
2006	36 141													
2007	36 918													
2008	37 934													
2009	38 341													



**FIG. 1.** Changes in cumulative survival rate of patients started on dialysis for each year.

ultrapure dialysate (9). The volume of the sample dialysate used for measurement of bacterial count was 10 mL or higher at 65.2% of the 3470 facilities that responded to questions regarding the volume of the sample.

*Installation of ETRFs (Tables 24–27)*

There were 4084 facilities that responded to questions regarding the installation of ETRFs. The percentage of facilities that have at least one bedside console equipped with an ETRF was 90.8% (Table 24), an increase of 3.9 percentage points from 2009 (86.9%). (These data were obtained on the basis of the number of facilities.)

The survey found that 74.4% of bedside consoles were equipped with an ETRF (87 502 of 117 632 bedside consoles) in facilities that responded to the question (Table 25). The percentage of bedside consoles equipped with an ETRF was 68.4% at the end of 2009 and had increased by 6.0 percentage points at the end of 2010.

The facilities that responded to questions regarding endotoxin concentration in the dialysate were divided into two groups: facilities that have at least one bedside console equipped with an ETRF (ETRF facilities) and facilities that have no bedside console equipped with an ETRF (non-ETRF facilities). The endotoxin concentration in the dialysate was compared between the two groups. The percentages of facilities that satisfied an endotoxin concentration below 0.05 EU/mL, which is recommended by the JSDT dialysate quality control standard (9), were 93.0% for ETRF facilities and 87.9% for non-ETRF facilities (Table 26). The percentages of facilities that

**TABLE 19.** Frequencies of measurement of endotoxin concentration in dialysis fluid in different medical organizations (number of bedside consoles  $\geq 1$ )

Kind of facility	Measurement frequency of endotoxin concentration								Subtotal	Unspecified	No information available	Total
	None	Every day	Every week	Every 2 weeks	Every month	Several times per year	Once a year					
National Public university hospital (%)	2 (3.8)	1 (1.6)	3 (4.8)	2 (3.8)	32 (61.5)	14 (26.9)	2 (3.8)		52 (100.0)			52
Private university hospital (%)	2 (3.2)			8 (12.7)	37 (58.7)	8 (12.7)	4 (6.3)		63 (100.0)		2	65
National hospital (%)	3 (7.7)			1 (2.6)	18 (46.2)	12 (30.8)	5 (12.8)		39 (100.0)	1		40
Prefectural Municipal Village hospital (%)	19 (4.6)	2 (0.5)	2 (0.5)	9 (2.2)	247 (60.4)	94 (23.0)	36 (8.8)		409 (100.0)	11	8	428
Social insurance hospital (%)	2 (3.4)		1 (1.7)	6 (10.2)	33 (55.9)	12 (20.3)	5 (8.5)		59 (100.0)	1		60
“Kouseiren” hospital (%)	5 (4.2)		1 (0.8)	6 (5.1)	82 (69.5)	9 (7.6)	15 (12.7)		118 (100.0)	2	1	121
Other public hospital (%)	7 (3.9)		7 (3.9)	7 (3.9)	121 (67.6)	23 (12.8)	14 (7.8)		179 (100.0)	2		181
Private general hospital (%)	4 (3.7)		3 (2.8)	6 (5.5)	68 (62.4)	16 (14.7)	11 (10.1)		109 (100.0)	3	1	113
Private hospital (%)	54 (4.9)	6 (0.5)	23 (2.1)	57 (5.2)	693 (63.1)	161 (14.7)	104 (9.5)		1098 (100.0)	30	13	1141
Private clinic (%)	92 (5.0)	11 (0.6)	59 (3.2)	101 (5.4)	1156 (62.4)	242 (13.1)	193 (10.4)		1854 (100.0)	42	27	1923
Total (%)	190 (4.8)	21 (0.5)	99 (2.5)	203 (5.1)	2487 (62.5)	591 (14.8)	389 (9.8)		3980 (100.0)	92	52	4124

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**TABLE 20.** Endotoxin concentration in dialysis fluid (EU/mL) in different medical organizations (number of bedside consoles  $\geq 1$ )

Kind of facility	Endotoxin concentration (EU/mL) in dialysis fluid										Subtotal	Unspecified	No information available	Total
	<0.001	$\geq 0.001 < 0.01$	$\geq 0.01 < 0.05$	$\geq 0.05 < 0.1$	$\geq 0.1 < 0.25$	$\geq 0.25 < 0.5$	$\geq 0.5$							
National Public university hospital (%)	29 (58.0)	15 (30.0)	3 (6.0)	1 (2.0)	1 (2.0)	1 (2.0)	1 (2.0)	1 (2.0)	1 (2.0)	1 (2.0)	50 (100.0)		2	52
Private university hospital (%)	37 (60.7)	14 (23.0)	4 (6.6)	1 (1.6)	2 (3.3)	1 (1.6)	2 (3.3)	2 (3.3)	2 (3.3)	2 (3.3)	61 (100.0)		4	65
National hospital (%)	26 (72.2)	5 (13.9)	3 (8.3)		2 (5.6)						36 (100.0)		1	40
Prefectural Municipal Village hospital (%)	252 (65.3)	66 (17.1)	36 (9.3)	12 (3.1)	13 (3.4)	4 (1.0)	3 (0.8)	3 (0.8)	3 (0.8)	3 (0.8)	386 (100.0)		15	428
Social insurance hospital (%)	36 (64.3)	10 (17.9)	3 (5.4)	2 (3.6)	5 (8.9)						56 (100.0)		2	60
“Kouseiren” hospital (%)	71 (63.4)	27 (24.1)	9 (8.0)	3 (2.7)	1 (0.9)						112 (100.0)		3	121
Other public hospital (%)	125 (73.1)	24 (14.0)	12 (7.0)	3 (1.8)	3 (1.8)	3 (1.8)	3 (1.8)	3 (1.8)	3 (1.8)	3 (1.8)	171 (100.0)		3	181
Private general hospital (%)	59 (56.2)	23 (21.9)	10 (9.5)	10 (9.5)	1 (1.0)	1 (1.0)	1 (1.0)	1 (1.0)	1 (1.0)	1 (1.0)	105 (100.0)		3	113
Private hospital (%)	616 (59.0)	244 (23.4)	98 (9.4)	35 (3.4)	27 (2.6)	13 (1.2)	11 (1.1)	11 (1.1)	11 (1.1)	11 (1.1)	1044 (100.0)		28	1141
Private clinic (%)	1092 (62.4)	334 (19.1)	175 (10.0)	67 (3.8)	39 (2.2)	25 (1.4)	19 (1.1)	19 (1.1)	19 (1.1)	19 (1.1)	1751 (100.0)		50	1923
Total (%)	2343 (62.1)	762 (20.2)	353 (9.4)	134 (3.6)	94 (2.5)	48 (1.3)	38 (1.0)	38 (1.0)	38 (1.0)	38 (1.0)	3772 (100.0)		105	4124

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**TABLE 21.** Frequencies of measurement of bacterial count in dialysis fluid in different medical organizations (number of bedside consoles  $\geq 1$ )

Kind of facility	Measurement frequency of bacterial count in the dialysis fluid										Subtotal	Unspecified	No information available	Total
	None	Every day	Every week	Every two weeks	Every month	Several times per year	Once a year							
National Public university hospital (%)	7 (14.0)			1 (2.0)	31 (62.0)	9 (18.0)	2 (4.0)	2 (4.0)	2 (4.0)	2 (4.0)	50 (100.0)		2	52
Private university hospital (%)	6 (9.5)	1 (1.6)	2 (3.2)	6 (9.5)	35 (55.6)	9 (14.3)	4 (6.3)	4 (6.3)	4 (6.3)	4 (6.3)	63 (100.0)		2	65
National hospital (%)	9 (23.1)			2 (5.1)	15 (38.5)	9 (23.1)	4 (10.3)	4 (10.3)	4 (10.3)	4 (10.3)	39 (100.0)		1	40
Prefectural-Municipal-Village hospital (%)	66 (16.3)	3 (0.7)	1 (0.2)	8 (2.0)	242 (59.6)	58 (14.3)	28 (6.9)	28 (6.9)	28 (6.9)	28 (6.9)	406 (100.0)		13	428
Social insurance hospital (%)	5 (8.8)		1 (1.8)	5 (8.8)	27 (47.4)	13 (22.8)	6 (10.5)	6 (10.5)	6 (10.5)	6 (10.5)	57 (100.0)		3	60
“Kouseiren” hospital (%)	7 (5.9)			5 (4.2)	82 (68.9)	9 (7.6)	16 (13.4)	16 (13.4)	16 (13.4)	16 (13.4)	119 (100.0)		1	121
Other public hospital (%)	16 (9.1)		4 (2.3)	5 (2.9)	117 (66.9)	18 (10.3)	15 (8.6)	15 (8.6)	15 (8.6)	15 (8.6)	175 (100.0)		5	181
Private general hospital (%)	7 (6.4)		2 (1.8)	7 (6.4)	65 (59.6)	16 (14.7)	12 (11.0)	12 (11.0)	12 (11.0)	12 (11.0)	109 (100.0)		3	113
Private hospital (%)	111 (10.3)	2 (0.2)	23 (2.1)	47 (4.4)	667 (62.1)	131 (12.2)	93 (8.7)	93 (8.7)	93 (8.7)	93 (8.7)	1074 (100.0)		53	1141
Private clinic (%)	190 (10.5)	10 (0.6)	44 (2.4)	94 (5.2)	1095 (60.3)	211 (11.6)	173 (9.5)	173 (9.5)	173 (9.5)	173 (9.5)	1817 (100.0)		77	1923
Total (%)	424 (10.8)	16 (0.4)	77 (2.0)	180 (4.6)	2376 (60.8)	483 (12.4)	353 (9.0)	353 (9.0)	353 (9.0)	353 (9.0)	3909 (100.0)		158	4124

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**TABLE 22.** Number of facilities for different bacterial counts in dialysis fluid (cfu/mL) and cultivation media (number of bedside consoles  $\geq 1$ )

Media used for bacterial cultivation of dialysis fluid	Bacterial count in dialysis fluid (cfu/mL)						Subtotal	Unspecified	No information available	Total
	Less than 0.1	0.1~	1~	10~	100~	1000~				
General agar medium (%)	137 (57.6)	42 (17.6)	32 (13.4)	26 (10.9)	1 (0.4)		238 (100.0)	7	1	246
R2A <sup>†</sup> medium (%)	1065 (50.7)	361 (17.2)	401 (19.1)	225 (10.7)	50 (2.4)		2,102 (100.0)	27	1	2130
TGEA <sup>‡</sup> medium (%)	391 (58.7)	130 (19.5)	108 (16.2)	31 (4.7)	6 (0.9)		666 (100.0)	3		669
Blood agar medium (%)	12 (57.1)	3 (14.3)	4 (19.0)	2 (9.5)			21 (100.0)	2		23
TSA <sup>§</sup> medium (%)	13 (72.2)	2 (11.1)	3 (16.7)				18 (100.0)	1		19
Other media (%)	115 (47.9)	48 (20.0)	52 (21.7)	21 (8.8)	4 (1.7)		240 (100.0)	6		246
Subtotal (%)	1733 (52.8)	586 (17.8)	600 (18.3)	305 (9.3)	61 (1.9)		3285 (100.0)	46	2	3333
Unspecified (%)	83 (61.9)	24 (17.9)	17 (12.7)	9 (6.7)	1 (0.7)		134 (100.0)	170	280	584
No information available (%)	3 (75.0)		1 (25.0)				4 (100.0)		203	207
Total (%)	1819 (53.1)	610 (17.8)	618 (18.1)	314 (9.2)	62 (1.8)		3423 (100.0)	216	485	4124

<sup>†</sup>R2A, Reasoner's No. 2 agar, <sup>‡</sup>TGEA, tryptone glucose extract agar, <sup>§</sup>TSA, tryptic soy agar. The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 23.** Number of facilities for different bacterial counts in dialysis fluid (cfu/mL) and sampling volumes for measurement of bacterial count (number of bedside consoles  $\geq 1$ )

Amount of sample	Bacterial count in dialysis fluid (cfu/mL)						Subtotal	Unspecified	No information available	Total
	Less than 0.1	0.1~	1~	10~	100~	1000~				
Less than 1 mL (%)	176 (66.4)	45 (17.0)	33 (12.5)	11 (4.2)			265 (100.0)	13		278
1 mL~ (%)	423 (47.1)	155 (17.3)	187 (20.8)	114 (12.7)	19 (2.1)		898 (100.0)	30	2	930
10 mL~ (%)	517 (50.2)	206 (20.0)	187 (18.2)	100 (9.7)	19 (1.8)		1029 (100.0)	11	1	1041
50 mL~ (%)	493 (56.2)	152 (17.3)	154 (17.5)	63 (7.2)	16 (1.8)		878 (100.0)	6		884
100 mL~ (%)	172 (58.9)	45 (15.4)	52 (17.8)	17 (5.8)	6 (2.1)		292 (100.0)	3		295
500 mL~ (%)	14 (63.6)	3 (13.6)	2 (9.1)	2 (9.1)	1 (4.5)		22 (100.0)			22
1 L~ (%)	9 (75.0)	2 (16.7)		1 (8.3)			12 (100.0)	2		14
10 L~ (%)	3 (75.0)		1 (25.0)				4 (100.0)	2		6
Subtotal (%)	1807 (53.1)	608 (17.9)	616 (18.1)	308 (9.1)	61 (1.8)		3400 (100.0)	67	3	3470
Unspecified (%)	12 (52.2)	2 (8.7)	2 (8.7)	6 (26.1)	1 (4.3)		23 (100.0)	149	280	452
No information available (%)									202	202
Total (%)	1819 (53.1)	610 (17.8)	618 (18.1)	314 (9.2)	62 (1.8)		3423 (100.0)	216	485	4124

The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 24.** Percentages of facilities that have bedside consoles with endotoxin retentive filter (ETRF) in different medical organizations (number of bedside consoles  $\geq 1$ )

Kind of facility	Percentages of facilities that have bedside consoles with ETRF (%)										Subtotal	No information available	Total	Mean	SD	
	0% (No ETRF)	<10%	10~	20~	30~	40~	50~	60~	70~	80~						90~
National Public university hospital (%)	2 (3.8)											45 (86.5)	52 (100.0)	52	95.33	19.42
Private university hospital (%)	1 (1.5)		1 (1.5)	1 (1.5)	1 (1.5)	1 (1.5)	1 (1.5)	2 (3.1)	1 (1.5)	1 (1.5)	1 (1.5)	55 (84.6)	65 (100.0)	65	92.77	20.81
National hospital (%)	1 (2.5)											33 (82.5)	40 (100.0)	40	93.61	18.52
Prefectural/Municipal-Village hospital (%)	19 (4.5)	16 (3.8)	11 (2.6)	5 (1.2)	11 (2.6)	5 (1.2)	4 (0.9)	1 (2.5)	8 (1.9)	14 (3.3)	21 (5.0)	301 (71.3)	422 (100.0)	428	84.07	31.83
Social insurance hospital (%)	4 (6.7)		2 (3.3)	2 (3.3)	3 (5.0)	7 (5.8)	5 (4.2)	2 (3.3)	2 (3.3)	2 (3.3)	7 (11.7)	34 (56.7)	60 (100.0)	60	80.11	32.69
"Kouseiren" hospital (%)	3 (2.5)	4 (3.3)	1 (0.8)									80 (66.7)	120 (100.0)	121	83.65	29.37
Other public hospital (%)	9 (5.0)	3 (1.7)	8 (4.4)	3 (1.7)	4 (2.2)							126 (69.6)	181 (100.0)	181	83.47	31.62
Private general hospital (%)	8 (7.1)	6 (5.3)	6 (5.3)	4 (3.5)		1 (0.9)	2 (1.8)	1 (0.9)	3 (2.7)	8 (7.1)		73 (64.6)	113 (100.0)	113	78.15	37.39
Private hospital (%)	91 (8.1)	45 (4.0)	48 (4.3)	31 (2.7)	30 (2.7)	27 (2.4)	23 (2.0)	14 (1.2)	16 (1.4)	32 (2.8)	55 (4.9)	717 (63.5)	1129 (100.0)	1141	76.91	37.01
Private clinic (%)	237 (12.5)	107 (5.6)	93 (4.9)	57 (3.0)	49 (2.6)	26 (1.4)	41 (2.2)	41 (2.2)	49 (2.6)	94 (4.9)		1068 (56.2)	1902 (100.0)	1923	70.37	40.66
Total (%)	375 (9.2)	181 (4.4)	170 (4.2)	103 (2.5)	104 (2.5)	65 (1.6)	85 (2.1)	72 (1.8)	78 (1.9)	113 (2.8)	206 (5.0)	2532 (62.0)	4084 (100.0)	4124	75.83	37.80

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**TABLE 25.** Numbers of consoles equipped with endotoxin retentive filter (ETRF) and those without ETRF and rate of ETRF installation in different medical organizations (number of bedside consoles  $\geq 1$ )

Kind of facility	Number of consoles with ETRF		Number of consoles without ETRF		Mean rate of ETRF installation		Number of facilities that responded to questions regarding ETRFs		Total number of consoles		Number of facilities that did not provide the number of consoles with ETRF		Total number of facilities
	(Number)	(%)	(Number)	(%)	(%)	(%)	(Number)	(%)	(Number)	(%)	(Number)	(%)	
National Public university hospital	486	0.56	31	0.10	95.33		52		517	0.44			52
Private university hospital	1 062	1.21	110	0.37	92.77		65		1 172	1.00			65
National hospital	349	0.40	28	0.09	93.61		40		377	0.32			40
Prefectural Municipal Village hospital	6 654	7.60	1 431	4.75	84.07		422		8 085	6.87	6		428
Social insurance hospital	1 186	1.36	298	0.99	80.11		60		1 484	1.26			60
"Kouseiren" hospital	2 808	3.21	617	2.05	83.65		120		3 425	2.91	1		121
Other public hospital	3 544	4.05	754	2.50	83.47		181		4 298	3.65			181
Private general hospital	2 452	2.80	763	2.53	78.15		113		3 215	2.73			113
Private hospital	24 882	28.44	8 171	27.12	76.91		1129		33 053	28.10	12		1141
Private clinic	44 079	50.37	17 927	59.50	70.37		1902		62 006	52.71	21		1923
Total	87 502	100.00	30 130	100.00	75.82		4084		117 632	100.00	40		4124

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**TABLE 26.** Endotoxin concentration in dialysate (EU/mL) in endotoxin retentive filter (ETRF) and non-ETRF facilities (number of bedside consoles  $\geq 1$ )

ETRF	Endotoxin concentration (EU/mL) in dialysis fluid								Subtotal	Unspecified	No information available	Total
	Less than 0.001	0.001~	0.01~	0.05~	0.1~	0.25~	0.5~					
Without ETRF (%)	431 (47.2)	246 (26.9)	126 (13.8)	49 (5.4)	35 (3.8)	16 (1.8)	11 (1.2)	914 (100.0)	30	106	1050	
With ETRF (%)	1896 (67.3)	501 (17.8)	222 (7.9)	83 (2.9)	57 (2.0)	31 (1.1)	27 (1.0)	2817 (100.0)	34	18	2869	
Subtotal (%)	2327 (62.4)	747 (20.0)	348 (9.3)	132 (3.5)	92 (2.5)	47 (1.3)	38 (1.0)	3731 (100.0)	64	124	3919	
Unspecified (%)	16 (39.0)	15 (36.6)	5 (12.2)	2 (4.9)	2 (4.9)	1 (2.4)		41 (100.0)	41	37	119	
No information available (%)										86	86	
Total (%)	2343 (62.1)	762 (20.2)	353 (9.4)	134 (3.6)	94 (2.5)	48 (1.3)	38 (1.0)	3772 (100.0)	105	247	4124	

Values in parentheses under each figure represent the percentages relative to the total in each row.

**TABLE 27.** Bacterial counts in dialysis fluid (cfu/mL) in endotoxin retentive filter (ETRF) and non-ETRF facilities (number of bedside consoles  $\geq 1$ )

ETRF	Bacterial count in dialysis fluid (cfu/mL)							Subtotal	Unspecified	No information available	Total
	Less than 0.1	0.1~	1~	10~	100~						
Without ETRF (%)	354 (44.1)	158 (19.7)	164 (20.4)	108 (13.5)	18 (2.2)	802 (100.0)	54	194	1050		
With ETRF (%)	1456 (56.4)	443 (17.2)	443 (17.2)	197 (7.6)	43 (1.7)	2582 (100.0)	116	171	2869		
Subtotal (%)	1810 (53.5)	601 (17.8)	607 (17.9)	305 (9.0)	61 (1.8)	3384 (100.0)	170	365	3919		
Unspecified (%)	9 (23.1)	9 (23.1)	11 (28.2)	9 (23.1)	1 (2.6)	39 (100.0)	46	34	119		
No information available (%)								86	86		
Total (%)	1819 (53.1)	610 (17.8)	618 (18.1)	314 (9.2)	62 (1.8)	3423 (100.0)	216	485	4124		

Values in parentheses under each figure represent the percentages relative to the total in each row.

satisfied a bacterial count below 100 cfu/mL, which is also recommended by the JSDT dialysate quality control standard (9), were 98.3% for ETRF facilities and 97.8% for non-ETRF facilities (Table 27).

*Endotoxin concentration and bacterial count in dialysate (Table 28)*

Table 28 shows the endotoxin concentrations and bacterial counts in the dialysate in the facilities. Among the 4124 facilities, 1512 (36.7%) satisfied both an endotoxin concentration below 0.001 EU/mL (lower than the detection limit) and a bacterial count below 0.1 cfu/mL, which define an ultrapure dialysate. There were facilities that reported an endotoxin concentration higher than the standards and a bacterial count lower than the standards, and vice versa. These facilities are required to optimize the method of sampling dialysate for measurement, the method of managing ETRFs, and cleaning and sterilization of dialysis equipment. According to the JSDT dialysate quality control standard (9), both the endotoxin concentration and bacterial count in the dialysate must be measured

**History of undergoing CTx**

*History of undergoing CTx by different dialysis methods (Table 29)*

The 2010 survey investigated the current status of dialysis amyloidosis for the first time in 11 years by inquiring about the history of patients undergoing CTx, an indicator of this complication. As a result, valid responses were obtained from 231 696 patients (collection rate of 80.0%). The percentage of patients who had undergone CTx was 4.3%, which was smaller than that determined in the 1999 survey (5.5%) (3). The patients who had undergone CTx were treated by HDF or hemoadsorption at high percentages.

*History of undergoing CTx for each gender and various age groups (Tables 30 and 31)*

The percentage of patients who had undergone CTx was higher among females (5.6%) than males (3.5%) (Table 30). The percentage of patients who had undergone CTx was the highest for patients aged 60–74 years, above and below which the percentages of such patients were low (Table 31). The dialysis duration for the patients aged 60–74 years may be related to the above-mentioned high percentage of such patients because there is a strong association between dialysis duration and the history of undergoing CTx, as described in the following section.

**TABLE 28.** Endotoxin concentration in dialysate (EU/mL) in different bacterial counts in dialysis fluid (cfu/mL) (number of bedside consoles  $\geq 1$ )

Bacterial counts in dialysis fluid (cfu/mL)	Endotoxin concentration (EU/mL) in dialysis fluid										Subtotal	Unspecified	No information available	Total
	Less than 0.001	0.001~	0.01~	0.05~	0.1~	0.25~	0.5~							
Less than 0.1 (%)	1512 (83.5)	189 (10.4)	64 (3.5)	19 (1.0)	17 (0.9)	5 (0.3)	5 (0.3)	1811 (100.0)	5	3	1819			
0.1~ (%)	341 (56.2)	183 (30.1)	43 (7.1)	19 (3.1)	10 (1.6)	9 (1.5)	2 (0.3)	607 (100.0)	1	2	610			
1~ (%)	220 (35.8)	216 (35.2)	122 (19.9)	30 (4.9)	14 (2.3)	6 (1.0)	6 (1.0)	614 (100.0)	2	2	618			
10~ (%)	76 (24.4)	79 (25.4)	79 (25.4)	32 (10.3)	24 (7.7)	14 (4.5)	7 (2.3)	311 (100.0)	1	2	314			
100~ (%)	15 (24.6)	9 (14.8)	8 (13.1)	7 (11.5)	9 (14.8)	4 (6.6)	9 (14.8)	61 (100.0)	1		62			
Subtotal (%)	2164 (63.6)	676 (19.9)	316 (9.3)	107 (3.1)	74 (2.2)	38 (1.1)	29 (0.9)	3404 (100.0)	10	9	3423			
Unspecified (%)	52 (45.6)	30 (26.3)	9 (7.9)	8 (7.0)	8 (7.0)	3 (2.6)	4 (3.5)	114 (100.0)	81	21	216			
No information available (%)	127 (50.0)	56 (22.0)	28 (11.0)	19 (7.5)	12 (4.7)	7 (2.8)	5 (2.0)	254 (100.0)	14	217	485			
Total (%)	2343 (62.1)	762 (20.2)	353 (9.4)	134 (3.6)	94 (2.5)	48 (1.3)	38 (1.0)	3772 (100.0)	105	247	4124			

Values in parentheses under each figure represent the percentages relative to the total in each row.

**TABLE 29.** History of undergoing carpal tunnel release surgery (CTx) for different dialysis methods (for all target patients)

Dialysis method	Without undergoing CTx	With undergoing CTx	Subtotal	Unspecified	No information available	Total
Facility HD (%)	204 374 (96.7)	6984 (3.3)	211 358 (100.0)	2068	49 547	262 973
HDF (%)	10 893 (88.0)	1482 (12.0)	12 375 (100.0)	57	2435	14 867
HF (%)	82 (97.6)	2 (2.4)	84 (100.0)		68	152
Hemoadsorption (%)	284 (17.3)	1360 (82.7)	1 644 (100.0)	4	235	1 883
Home HD (%)	147 (96.7)	5 (3.3)	152 (100.0)	1	123	276
PD (%)	6 012 (98.8)	71 (1.2)	6 083 (100.0)	128	3087	9 298
Total (%)	221 792 (95.7)	9904 (4.3)	231 696 (100.0)	2258	55 495	289 449

Values in parentheses under each figure represent the percentages relative to the total in each row. HD, hemodialysis, HDF, hemodiafiltration, HF, hemofiltration, PD, peritoneal dialysis.

**TABLE 30.** History of undergoing carpal tunnel release surgery (CTx) for each gender (for all target patients)

Gender	Without undergoing CTx	With undergoing CTx	Subtotal	Unspecified	No information available	Total
Male (%)	139 320 (96.5)	4999 (3.5)	144 319 (100.0)	1400	34 401	180 120
Female (%)	82 472 (94.4)	4905 (5.6)	87 377 (100.0)	858	21 094	109 329
Subtotal (%)	221 792 (95.7)	9904 (4.3)	231 696 (100.0)	2258	55 495	289 449
No information available (%)						
Total (%)	221 792 (95.7)	9904 (4.3)	231 696 (100.0)	2258	55 495	289 449

Values in parentheses under each figure represent the percentages relative to the total in each row.

#### History of undergoing CTx for different dialysis durations (Table 32)

Table 32 shows the number of patients who had undergone CTx for different dialysis durations. The percentage of patients who had undergone CTx increased with dialysis duration; the percentages were 23.2% for a dialysis duration of 20–25 years and 51.5% for a dialysis duration of 25 years or longer. In the 1999 survey, the percentages of such patients were 48.0% for a dialysis duration of 20–25 years and 70.8% for a dialysis duration of 25 years or longer (3). Thus, the percentage of patients who had been

treated by dialysis for a long period and had undergone CTx greatly decreased over the last 11 years.

#### History of undergoing CTx for different primary diseases (Table 33)

Table 33 shows the number of patients who had undergone CTx for different primary diseases. As mentioned above, there is a strong association between the history of undergoing CTx and dialysis duration. Therefore, the association between primary diseases and the history of undergoing CTx shown in the table is considered to be strongly affected by the

**TABLE 31.** History of undergoing carpal tunnel release surgery (CTx) for various age groups (for all target patients)

Age (years old)	Without undergoing CTx	With undergoing CTx	Subtotal	Unspecified	No information available	Total
<15 (%)	55 (100.0)		55 (100.0)		26	81
15~ (%)	1 069 (99.6)	4 (0.4)	1 073 (100.0)	10	275	1 358
30~ (%)	12 436 (98.9)	136 (1.1)	12 572 (100.0)	116	3 001	15 689
45~ (%)	45 937 (95.4)	2201 (4.6)	48 138 (100.0)	447	11 298	59 883
60~ (%)	100 240 (94.3)	6086 (5.7)	106 326 (100.0)	1043	25 323	132 692
75~ (%)	59 115 (97.6)	1446 (2.4)	60 561 (100.0)	615	14 803	75 979
90~ (%)	2 936 (99.0)	31 (1.0)	2 967 (100.0)	27	768	3 762
Subtotal (%)	221 788 (95.7)	9904 (4.3)	231 692 (100.0)	2258	55 494	289 444
No information available (%)	4 (100.0)		4 (100.0)		1	5
Total (%)	221 792 (95.7)	9904 (4.3)	231 696 (100.0)	2258	55 495	289 449
Mean	66.21	65.35	66.17	66.63	66.36	66.21
SD	12.69	8.92	12.56	12.58	12.66	12.57

Values in parentheses under each figure represent the percentages relative to the total in each row.



**TABLE 32.** History of undergoing carpal tunnel release surgery (CTx) for different dialysis durations (for all target patients)

dialysis duration (year)	Without undergoing CTx	With undergoing CTx	Subtotal	Unspecified	No information available	Total
<2 (%)	51 721 (99.6)	218 (0.4)	51 939 (100.0)	523	12 759	65 221
2~ (%)	58 972 (99.4)	366 (0.6)	59 338 (100.0)	577	14 235	74 150
5~ (%)	58 113 (99.0)	564 (1.0)	58 677 (100.0)	514	14 129	73 320
10~ (%)	28 307 (97.4)	753 (2.6)	29 060 (100.0)	292	6 986	36 338
15~ (%)	13 816 (91.2)	1334 (8.8)	15 150 (100.0)	182	3 520	18 852
20~ (%)	6 391 (76.8)	1929 (23.2)	8 320 (100.0)	89	1 926	10 335
25~ (%)	4 472 (48.5)	4740 (51.5)	9 212 (100.0)	81	1 940	11 233
Total (%)	221 792 (95.7)	9904 (4.3)	231 696 (100.0)	2258	55 495	289 449
Mean	6.39	22.54	7.08	7.15	6.9	7.05
SD	6.32	9.26	7.25	7.23	7.05	7.21

Values in parentheses under each figure represent the percentages relative to the total in each row.

dialysis duration of individual patients with each primary disease. To evaluate the effect of each primary disease on the history of undergoing CTx, it is necessary to correct for the dialysis duration of individual patients for each primary disease by some means.

#### History of undergoing CTx for different predialysis $\beta_2m$ levels (Table 34)

The predialysis  $\beta_2m$  level in patients who had undergone CTx (25.4 mg/L) was lower than that for patients who had not (26.8 mg/L). As a reason for this, differences in dialysis duration, residual renal function, and dialysis conditions between the two patient groups are considered. It is necessary to correct for the effects attributable to these factors by some means for accurate comparison of predialysis  $\beta_2m$  level between patients who had and had not undergone CTx. The percentages of patients who showed a predialysis  $\beta_2m$  level below 30 mg/L were 70.7% and 80.0% of the patients who had not and had undergone CTx, respectively.

#### History of undergoing CTx for different $\beta_2m$ removal rates (Table 35)

Table 35 shows the number of patients who had and had not undergone CTx for different  $\beta_2m$  removal rates. The  $\beta_2m$  removal rate was calculated using the following equation.

$$\beta_2m \text{ removal rate (\%)} = \left[ \frac{\{(\text{Predialysis } \beta_2m \text{ level}) - (\text{Postdialysis } \beta_2m \text{ level})\}}{(\text{Predialysis } \beta_2m \text{ level})} \right] \times 100$$

The mean  $\beta_2m$  removal rates were 59.6% and 65.0% for the patients who had not and had undergone CTx, respectively. This indicated that the

patients who had undergone CTx were treated by dialysis with a high  $\beta_2m$  removal rate.

#### Items associated with dementia

In the 2010 survey, the onset or non-onset of dementia was investigated as in the 2009 survey (5). The survey items were the same in both years. These items were asked with the following four alternative responses, and the respondents answered accordingly.

- A: Without dementia
- B: With dementia (requiring no care)
- C: With dementia (requiring care)
- Z: Unspecified

#### Dialysis method and dementia (Table 36)

Patients determined to have dementia (patients with dementia) accounted for 10.0% of all dialysis patients, almost the same as the percentage in the 2009 survey (9.9%) (5). The percentage of patients with dementia among the patients who underwent HD at facilities was 10.3%, the highest percentage among different dialysis methods. The percentage of patients with dementia among the patients who underwent hemofiltration (HF) was only 4.8% although it was higher in the 2009 survey (20.5%). However, the number of patients who underwent HF and responded to questions regarding dementia was very small; 44 (nine of which were confirmed to have dementia) in the 2009 survey and 83 (four of which were confirmed to have dementia) in the 2010 survey. Therefore, careful consideration is required to determine the significance of the change in percentage.

The percentage of patients with dementia who underwent PD was 5.9%, much lower than for patients who underwent HD at facilities (10.3%). This low percentage may be due to the fact that

**TABLE 33.** History of undergoing carpal tunnel release surgery (CTx) for different primary diseases (for all target patients)

Primary disease	Without undergoing CTx	With undergoing CTx	Subtotal	Unspecified	No information available	Total
Chronic glomerulonephritis (%)	77 490 (92.0)	6758 (8.0)	84 248 (100.0)	736	19 779	104 763
Chronic pyelonephritis (%)	2 360 (93.2)	173 (6.8)	2 533 (100.0)	19	539	3 091
Rapidly progressive glomerulonephritis (%)	1 588 (97.6)	39 (2.4)	1 627 (100.0)	17	406	2 050
Nephropathy of pregnancy/pregnancy toxemia (%)	1 160 (81.9)	257 (18.1)	1 417 (100.0)	16	312	1 745
Other nephritides that cannot be classified (%)	1 011 (94.5)	59 (5.5)	1 070 (100.0)	17	237	1 324
Polycystic kidney (%)	7 621 (95.9)	328 (4.1)	7 949 (100.0)	90	1 726	9 765
Nephrosclerosis (%)	17 395 (98.9)	194 (1.1)	17 589 (100.0)	215	4 012	21 816
Malignant hypertension (%)	1 835 (96.2)	73 (3.8)	1 908 (100.0)	8	413	2 329
Diabetic nephropathy (%)	82 402 (98.8)	1014 (1.2)	83 416 (100.0)	750	19 656	103 822
SLE nephritis (%)	1 804 (95.3)	89 (4.7)	1 893 (100.0)	16	494	2 403
Amyloid kidney (%)	366 (97.3)	10 (2.7)	376 (100.0)	5	113	494
Gouty kidney (%)	945 (95.2)	48 (4.8)	993 (100.0)	8	205	1 206
Renal failure due to congenital abnormality of metabolism (%)	210 (93.3)	15 (6.7)	225 (100.0)	5	50	280
Kidney and urinary tract tuberculosis (%)	217 (88.9)	27 (11.1)	244 (100.0)	1	54	299
Kidney and urinary tract stone (%)	444 (94.1)	28 (5.9)	472 (100.0)	5	99	576
Kidney and urinary tract tumor (%)	601 (98.5)	9 (1.5)	610 (100.0)	5	147	762
Obstructive urinary tract disease (%)	528 (95.7)	24 (4.3)	552 (100.0)	4	130	686
Myeloma (%)	161 (97.6)	4 (2.4)	165 (100.0)	1	49	215
Hypoplastic kidney (%)	455 (97.0)	14 (3.0)	469 (100.0)	5	108	582
Undetermined (%)	17 160 (97.2)	487 (2.8)	17 647 (100.0)	214	5 211	23 072
Reintroduction after transplantation (%)	1 518 (92.0)	132 (8.0)	1 650 (100.0)	56	413	2 119
Others (%)	4 521 (97.4)	122 (2.6)	4 643 (100.0)	65	1 334	6 042
Total (%)	221 792 (95.7)	9904 (4.3)	231 696 (100.0)	2258	55 487	289 441
No information available (%)					8	8
Total (%)	221 792 (95.7)	9904 (4.3)	231 696 (100.0)	2258	55 495	289 449

Values in parentheses under each figure represent the percentages relative to the total in each row.

**TABLE 34.** History of undergoing carpal tunnel release surgery (CTx) for different  $\beta_2m$  levels (mg/L) (for all target patients)

History of undergoing CTx	<10	10~	20~	30~	40~	50~	60~	Subtotal	No information available	Total	Mean	SD
Without undergoing CTx (%)	1814 (98.9)	26 422 (94.5)	101 710 (95.1)	46 454 (96.9)	6430 (97.1)	797 (97.0)	201 (97.1)	183 828 (95.6)	37 964 (96.4)	221 792 (95.7)	26.79	7.28
With undergoing CTx (%)	21 (1.1)	1 524 (5.5)	5 236 (4.9)	1 469 (3.1)	194 (2.9)	25 (3.0)	6 (2.9)	8 475 (4.4)	1 429 (3.6)	9 904 (4.3)	25.42	6.45
Subtotal (%)	1835 (100.0)	27 946 (100.0)	106 946 (100.0)	47 923 (100.0)	6624 (100.0)	822 (100.0)	207 (100.0)	192 303 (100.0)	39 393 (100.0)	231 696 (100.0)	26.73	7.26
Unspecified	9	157	707	436	78	9	6	1 402	856	2 258	28.38	7.72
No information available	101	2 419	10 570	4 920	629	82	20	18 741	36 754	55 495	27.08	6.96
Total	1945	30 522	118 223	53 279	7331	913	233	212 446	77 003	289 449	26.77	7.24

Values in parentheses under each figure represent the percentages relative to the total in each row.

patients who undergo PD at home are required to have a certain level of cognitive ability. This is similarly considered for the low percentage of patients with dementia who underwent HD at home.

*Gender, age, and dementia* (Tables 37 and 38)

The numbers of patients with and without dementia who underwent HD at facilities were analyzed for both genders and different age groups. Similar to the 2009 survey, the percentage of patients with dementia was high for patients aged 60 years or older (5). Moreover, the percentage of patients with dementia was higher among females than among males for any age group.

*Age, ADL, and dementia* (Tables 39 and 40)

In the 2010 survey, ADL of patients was also investigated similarly to the 2009 survey (5). Table 41 shows the alternatives used in the questionnaires and headings in the subsequent tables.

Tables 39 and 40 respectively show the numbers of patients without and with dementia who underwent HD at facilities for different age groups and levels of ADL. Patients with dementia requiring no care and those with dementia requiring care were classified as dementia in these tables. The percentage of patients who showed a low level of ADL tended to increase with age among patients without dementia. In contrast, patients who showed a low level of ADL were observed at a high percentage among patients with dementia for any age group, showing little association between increasing age and decreasing level of ADL.

*Age, place of residence, and dementia* (Tables 42 and 43)

In this survey, the place of residence of individual patients was investigated using the following four alternatives similar to those in the 2009 survey (5).

- A: Patients' own home (outpatient dialysis, home PD, home HD);
- B: Care facilities (e.g. homes with care services, nursing homes such as private-pay nursing homes without national aids and nursing homes for families with financial difficulties, group homes, vocational centers, relief facilities);
- C: Hospitals (e.g. health service facilities for elderly, beds for general patients, patients in chronic stage, patients requiring rehabilitation, and patients with mental illness and infectious diseases such as tuberculosis);
- Z: Unspecified or uncategorized.

The numbers of patients without and with dementia who underwent HD at facilities for different age

**TABLE 35.** History of undergoing carpal tunnel release surgery (CTx) for different  $\beta_2m$  removal rates (%) (for patients treated by blood purification therapies using extracorporeal circulation)

$\beta_2m$ removal rates (%)	Without undergoing CTx	With undergoing CTx	Subtotal	Unspecified	No information available	Total
<40 (%)	4 510 (97.8)	101 (2.2)	4 611 (100.0)	18	229	4 858
40~ (%)	2 366 (97.9)	51 (2.1)	2 417 (100.0)	14	137	2 568
45~ (%)	3 391 (97.5)	86 (2.5)	3 477 (100.0)	17	243	3 737
50~ (%)	5 163 (97.0)	161 (3.0)	5 324 (100.0)	27	436	5 787
55~ (%)	7 656 (96.8)	257 (3.2)	7 913 (100.0)	33	738	8 684
60~ (%)	9 836 (95.7)	440 (4.3)	10 276 (100.0)	42	1 114	11 432
65~ (%)	10 063 (94.6)	574 (5.4)	10 637 (100.0)	58	1 140	11 835
70~ (%)	6 756 (92.6)	542 (7.4)	7 298 (100.0)	44	805	8 147
75~ (%)	2 858 (90.6)	296 (9.4)	3 154 (100.0)	50	317	3 521
80~ (%)	751 (89.3)	90 (10.7)	841 (100.0)	9	79	929
85~ (%)	124 (90.5)	13 (9.5)	137 (100.0)	2	8	147
90~ (%)	400 (98.0)	8 (2.0)	408 (100.0)		86	494
Sub-total (%)	53 874 (95.4)	2619 (4.6)	56 493 (100.0)	314	5 332	62 139
No information available (%)	167 918 (95.8)	7285 (4.2)	175 203 (100.0)	1944	50 163	227 310
Total (%)	221 792 (95.7)	9904 (4.3)	231 696 (100.0)	2258	55 495	289 449
Mean	59.63	64.97	59.88	62.94	62.68	60.13
SD	13.82	11.59	13.78	12.79	12.02	13.65

Values in parentheses under each figure represent the percentages relative to the total in each row.

groups and places of residence are shown in Tables 42 and 43, respectively. As with the tables showing the level of ADL, patients with dementia requiring no care and those with dementia requiring care were classified as patients with dementia.

The percentage of patients who stayed at care facilities and hospitals increased with age among patients without dementia. In contrast, the percentage of such patients was high for all age groups among patients with dementia. Moreover, the percentages of such patients were similar among patients aged 45 years or older.

### Current status of PD therapy

Among the survey items associated with PD in the patient survey, two items were investigated in all the target facilities: current status of combined use of PD

and another therapy and PD duration. The items associated with PD other than the above two items were investigated only in the 3545 facilities that responded to the questionnaires using electronic media.

### Current status of combined use of PD and another therapy for different daily amounts of PD solution (Table 44)

According to the facility survey, the number of PD patients at the end of 2010 was 9773, among which 1983 (20.3%) were PD + another therapy patients. Here, patients who were determined to mainly undergo HD or other therapies more frequently than PD were excluded as PD patients in the table based on the patient survey. Conversely, 8743 patients who responded to questions regarding the current status of the combined use of PD and another therapy with

**TABLE 36.** Numbers of patients with and without dementia for different dialysis methods (for all dialysis patients)

Dialysis method	Dementia			Subtotal	Unspecified	No information available	Total
	Without dementia	With dementia (requiring no care)	With dementia (requiring care)				
Facility HD (%)	193 507 (89.7)	9 922 (4.6)	12 362 (5.7)	215 791 (100.0)	2589	44 593	262 973
HDF (%)	11 728 (93.4)	394 (3.1)	440 (3.5)	12 562 (100.0)	78	2 227	14 867
HF (%)	79 (95.2)		4 (4.8)	83 (100.0)	1	68	152
Hemoadsorption (%)	1 568 (97.6)	23 (1.4)	15 (0.9)	1 606 (100.0)	8	269	1 883
Home HD (%)	186 (99.5)		1 (0.5)	187 (100.0)		89	276
PD (%)	5 790 (94.1)	158 (2.6)	206 (3.3)	6 154 (100.0)	149	2 995	9 298
Total (%)	212 858 (90.0)	10 497 (4.4)	13 028 (5.5)	236 383 (100.0)	2825	50 241	289 449

The values in parentheses under each figure represent the percentage relative to the total in each row. HD, hemodialysis, HDF, hemodiafiltration, HF, hemofiltration, PD, peritoneal dialysis.

**TABLE 37.** Numbers of male patients with and without dementia and their ages (for patients who underwent HD at facilities three times per week)

Age (years old)	Dementia			Subtotal	Unspecified	No information available	Total
	Without dementia	With dementia (requiring no care)	With dementia (requiring care)				
<15 (%)	2 (100.0)			2 (100.0)			2
15~ (%)	591 (99.3)	3 (0.5)	1 (0.2)	595 (100.0)	5	61	661
30~ (%)	7 376 (99.6)	16 (0.2)	15 (0.2)	7 407 (100.0)	45	786	8 238
45~ (%)	27 204 (98.6)	206 (0.7)	181 (0.7)	27 591 (100.0)	218	3 000	30 809
60~ (%)	57 015 (94.0)	1848 (3.0)	1816 (3.0)	60 679 (100.0)	626	6 740	68 045
75~ (%)	25 094 (79.8)	2993 (9.5)	3340 (10.6)	31 427 (100.0)	472	3 560	35 459
90~ (%)	652 (59.7)	177 (16.2)	264 (24.2)	1 093 (100.0)	24	137	1 254
Subtotal (%)	117 934 (91.6)	5243 (4.1)	5617 (4.4)	128 794 (100.0)	1390	14 284	144 468
No information available (%)	3 (100.0)			3 (100.0)			3
Total (%)	117 937 (91.6)	5243 (4.1)	5617 (4.4)	128 797 (100.0)	1390	14 284	144 471
Mean	64.58	75.69	76.72	65.56	68.87	65.86	65.62
SD	12.12	8.67	8.68	12.31	11.95	12.25	12.30

The values in parentheses under each figure represent the percentage relative to the total in each row.

either of the following five answers were classified as patients who underwent mainly PD although they also underwent another therapy, (i.e. PD patients) and were the target group in the tabulation:

- PD only;
- PD + another therapy once a week;
- PD + another therapy twice a week;
- PD + another therapy three times a week;
- PD + another therapy (other frequencies).

From Table 44, the number of patients who underwent PD and another therapy such as HD was 1688 (19.3% of PD patients).

The daily amount of PD solution was investigated in the facilities that responded to the questionnaires using electronic media and was reported for 4815

patients. Among these patients, the percentage of patients who used 6–8 L of PD solution per day was the highest (33.6%), followed by the patients who used 8–10 L of PD solution per day (28.6%).

However, among 3979 PD-only patients, the percentage of patients who used 6–8 L of PD solution per day was the highest (35.3%). The percentage of PD-only patients who used 10 L of PD solution or higher per day was 11.2%. Among PD + another therapy once a week patients, the percentage of patients who used 8–10 L of PD solution per day was the highest (38.5%) and the percentage of patients who used 10 L of PD solution or higher per day was 23.7%. The daily amount of PD solution tended to be higher among PD + another therapy once a week patients than among PD-only patients.

**TABLE 38.** Numbers of female patients with and without dementia and their ages (for patients who underwent HD at facilities three times per week)

Age (years old)	Dementia			Subtotal	Unspecified	No information available	Total
	Without dementia	With dementia (requiring no care)	With dementia (requiring care)				
<15 (%)	1 (100.0)			1 (100.0)			1
15~ (%)	292 (99.7)		1 (0.3)	293 (100.0)	6	32	331
30~ (%)	3 496 (99.3)	11 (0.3)	12 (0.3)	3 519 (100.0)	37	393	3 949
45~ (%)	14 060 (98.3)	109 (0.8)	131 (0.9)	14 300 (100.0)	125	1553	15 978
60~ (%)	31 467 (92.8)	1128 (3.3)	1317 (3.9)	33 912 (100.0)	439	3921	38 272
75~ (%)	16 807 (72.2)	2587 (11.1)	3900 (16.7)	23 294 (100.0)	405	2643	26 342
90~ (%)	735 (50.1)	215 (14.7)	516 (35.2)	1 466 (100.0)	39	186	1 691
Subtotal (%)	66 858 (87.1)	4050 (5.3)	5877 (7.7)	76 785 (100.0)	1051	8728	86 564
No information available (%)							
Total (%)	66 858 (87.1)	4050 (5.3)	5877 (7.7)	76 785 (100.0)	1051	8728	86 564
Mean	66.05	77.74	79.25	67.67	70.72	67.95	67.74
SD	12.3	8.51	8.49	12.61	12.61	12.58	12.61

The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 39.** Activities of daily living (ADL) for different patients' age (for patients without dementia who underwent HD at facilities three times per week)

Age (years old)	Activities of daily living (ADL)						Total
	No symptoms	Moderate symptoms	≥50% sitting up	≥50% in bed	Whole day in bed	Subtotal	
<15 (%)	1 (33.3)		1 (33.3)		1 (33.3)	3 (100.0)	3
15~ (%)	677 (78.6)	150 (17.4)	20 (2.3)	8 (0.9)	6 (0.7)	861 (100.0)	883
30~ (%)	7 806 (73.3)	2 228 (20.9)	380 (3.6)	146 (1.4)	93 (0.9)	10 653 (100.0)	10 872
45~ (%)	25 896 (64.0)	10 798 (26.7)	2 223 (5.5)	1 004 (2.5)	514 (1.3)	40 435 (100.0)	41 264
60~ (%)	43 950 (50.7)	27 571 (31.8)	8 999 (10.4)	4 017 (4.6)	2 232 (2.6)	86 769 (100.0)	88 482
75~ (%)	14 025 (34.1)	12 998 (31.6)	8 415 (20.5)	3 885 (9.5)	1 767 (4.3)	41 090 (100.0)	41 901
90~ (%)	265 (19.6)	278 (20.5)	430 (31.8)	267 (19.7)	114 (8.4)	1 354 (100.0)	1 387
Subtotal (%)	92 620 (51.1)	54 023 (29.8)	20 468 (11.3)	9 327 (5.1)	4 727 (2.6)	181 165 (100.0)	184 792
No information available (%)	1 (50.0)		1 (50.0)			2 (100.0)	3
Total (%)	92 621 (51.1)	54 023 (29.8)	20 469 (11.3)	9 327 (5.1)	4 727 (2.6)	181 167 (100.0)	184 795
Mean	62.11	66.22	71.41	71.88	70.97	65.12	65.11
SD	12.14	11.31	10.92	10.99	10.85	12.20	12.21

The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 40.** Activities of daily living (ADL) for different patients' age (for patients with dementia who underwent HD at facilities three times per week)

Age (years old)	Activities of daily living (ADL)						Total
	No symptoms	Moderate symptoms	≥50% sitting up	≥50% in bed	Whole day in bed	Subtotal	
<15 (%)							5
15~ (%)	1 (20.0)	1 (20.0)	1 (20.0)		2 (40.0)	5 (100.0)	54
30~ (%)	13 (24.5)	14 (26.4)	9 (17.0)	10 (18.9)	7 (13.2)	53 (100.0)	627
45~ (%)	74 (12.0)	104 (16.9)	133 (21.6)	132 (21.4)	174 (28.2)	617 (100.0)	6 109
60~ (%)	424 (7.1)	959 (16.0)	1 512 (25.3)	1 276 (21.3)	1 808 (30.2)	5 979 (100.0)	12 820
75~ (%)	670 (5.3)	1 644 (13.1)	3 452 (27.5)	3 120 (24.8)	3 671 (29.2)	12 557 (100.0)	1 172
90~ (%)	47 (4.1)	67 (5.8)	239 (20.7)	358 (31.0)	445 (38.5)	1 156 (100.0)	293
Subtotal (%)	1 229 (6.0)	2 789 (13.7)	5 346 (26.2)	4 896 (24.0)	6 107 (30.0)	20 367 (100.0)	20 787
No information available (%)							293
Total (%)	1 229 (6.0)	2 789 (13.7)	5 346 (26.2)	4 896 (24.0)	6 107 (30.0)	20 367 (100.0)	20 787
Mean	74.7	75.63	77.65	78.37	77.67	77.37	77.37
SD	9.80	8.50	8.18	8.63	8.85	8.70	8.70

The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 41.** Alternatives used in questionnaire on activities of daily living (ADL) and headings in table

	Alternatives used in questionnaire		Headings in table
A:	The patient can perform social activities without symptoms and behave as he/she was before the onset of dementia without restrictions.	→	No symptoms
B:	The patient has moderate symptoms and has trouble with physical work, but can walk and do light and sedentary work, such as light domestic and clerical work.	→	Moderate symptoms
C:	The patient can walk and take care of him/herself, but sometimes requires care. The patient can sit up at least half of the day although he/she cannot do light work.	→	≥50% sitting up
D:	The patient can take care of him/herself to some extent, but often requires care and is in bed at least half of the day.	→	≥50% in bed
E:	The patient cannot take care of him/herself and has to be in bed the whole day, requiring constant care.	→	Whole day in bed
Z:	Unspecified or uncategorized	→	Unspecified

*Combined use of PD and another therapy for various types of PD solution (Table 45)*

Responses to questions regarding the type of PD solution were obtained from 5045 patients. From

Table 45, the percentage of patients who used only 1.5% glucose solution was 34.3% of the 5045 patients. The percentage of patients who used icodextrin in some form was 42.7%. Although most of these patients also used 1.5% or 2.5% glucose solution as well as icodextrin, 54 patients used only icodextrin (1.1%).

The percentages of patients who used only 1.5% glucose solution were 38.2% for the PD-only patients and only 15.8% for the PD + another therapy patients. In contrast, the percentages of patients who used icodextrin were 40.9% for the PD-only patients and 51.8% for the PD + another therapy patients.

*Combined use of PD and another therapy for different PET Cr D/P ratios (Table 46)*

Responses to questions regarding PET Cr D/P ratio were obtained from 2795 patients. Among these patients, the PET Cr D/P ratio was lower than 0.5 (low transporter) in 10.7%, 0.5–0.65 (low-average transporter) in 36.8%, 0.65–0.81 (high-average transporter) in 38.7%, and 0.81–1.0 (high transporter) in 13.7%. The mean PET Cr D/P ratio was 0.65 (±0.14, SD).

The mean PET CR D/P ratio of the PD-only patients was 0.66 (±0.13) whereas that of the PD + another therapy patients tended to be lower as follows: 0.63 (±0.14), 0.59 (±0.13), and 0.55 (±0.33) for the patients who underwent another therapy once, twice, and three times a week, respectively.

**TABLE 42.** Places of residence for different patients' age (for patients without dementia who underwent HD at facilities three times per week)

Age (years old)	Places of residence			Subtotal	Unspecified	No information available	Total
	Homes <sup>†</sup>	Care facilities <sup>‡</sup>	Hospitals <sup>§</sup>				
<15 (%)	2 (66.7)		1 (33.3)	3 (100.0)			3
15~ (%)	851 (98.3)	4 (0.5)	11 (1.3)	866 (100.0)		17	883
30~ (%)	10 494 (97.7)	63 (0.6)	185 (1.7)	10 742 (100.0)	6	124	10 872
45~ (%)	39 305 (96.3)	274 (0.7)	1215 (3.0)	40 794 (100.0)	15	455	41 264
60~ (%)	82 615 (94.4)	802 (0.9)	4122 (4.7)	87 539 (100.0)	21	922	88 482
75~ (%)	36 844 (88.9)	965 (2.3)	3635 (8.8)	41 444 (100.0)	10	447	41 901
90~ (%)	1 072 (78.2)	73 (5.3)	225 (16.4)	1 370 (100.0)		17	1 387
Subtotal (%)	171 183 (93.7)	2181 (1.2)	9394 (5.1)	182 758 (100.0)	52	1982	184 792
No information available (%)	3 (100.0)			3 (100.0)			3
Total (%)	171 186 (93.7)	2181 (1.2)	9394 (5.1)	182 761 (100.0)	52	1982	184 795
Mean	64.72	71.73	70.78	65.12	61.87	64.72	65.11
SD	12.15	12.41	11.28	12.20	14.36	12.71	12.21

The values in parentheses under each figure represent the percentage relative to the total in each row. <sup>†</sup>Patients' own home (outpatient dialysis, home PD, home HD). <sup>‡</sup>Care facilities (e.g. homes with care services, nursing homes such as private-pay nursing homes without national aid and nursing homes for families with financial difficulties, group homes, vocational centers, relief facilities). <sup>§</sup>Hospitals (e.g. health service facilities for the elderly; beds for general patients, patients of chronic stage, patients requiring rehabilitation, and patients with mental illness and infectious diseases, such as tuberculosis).

**TABLE 43.** Places of residence for different patients' age (for patients with dementia who underwent hemodialysis (HD) at facilities three times per week)

Age (years old)	Places of residence			Subtotal	Unspecified	No information available	Total
	Homes <sup>†</sup>	Care facilities <sup>‡</sup>	Hospitals <sup>§</sup>				
<15 (%)							
15~ (%)	4 (80.0)		1 (20.0)	5 (100.0)			5
30~ (%)	37 (68.5)	8 (14.8)	9 (16.7)	54 (100.0)			54
45~ (%)	316 (51.0)	51 (8.2)	253 (40.8)	620 (100.0)	1	6	627
60~ (%)	3 514 (58.2)	474 (7.8)	2051 (34.0)	6 039 (100.0)	2	68	6 109
75~ (%)	7 396 (58.3)	1213 (9.6)	4071 (32.1)	12 680 (100.0)	6	134	12 820
90~ (%)	562 (48.3)	147 (12.6)	455 (39.1)	1 164 (100.0)		8	1 172
Subtotal (%)	11 829 (57.5)	1893 (9.2)	6840 (33.3)	20 562 (100.0)	9	216	20 787
No information available (%)							
Total (%)	11 829 (57.5)	1893 (9.2)	6840 (33.3)	20 562 (100.0)	9	216	20 787
Mean	77.2	78.63	77.34	77.38	76	76.95	77.37
SD	8.44	9.00	9.02	8.70	10.61	8.36	8.70

The values in parentheses under each figure represent the percentage relative to the total in each row. <sup>†</sup>Patients' own home (outpatient dialysis, home PD, home HD). <sup>‡</sup>Care facilities (e.g. homes with care services, nursing homes such as private-pay nursing homes without national aid and nursing homes for families with financial difficulties, group homes, vocational centers, relief facilities). <sup>§</sup>Hospitals (e.g. health service facilities for the elderly; beds for general patients, patients of chronic stage, patients requiring rehabilitation, and patients with mental illness and infectious diseases, such as tuberculosis).

#### Combined use of PD and another therapy for different PD Kt/V-values (Table 47)

Responses to questions regarding PD Kt/V were obtained from 2406 patients. The percentages of patients with the following PD Kt/V-values were as follows: lower than 0.8, 15.3%; 0.8–1.2, 21.2%; 1.2–1.7, 35.4%; 1.7–2.0, 15.7%; and 2.0 or higher, 12.5%. The mean PD Kt/V was 1.35 ( $\pm 0.65$ ). The percentage of the patients with a PD Kt/V of 1.7 or higher, which is recommended in the JSDT guidelines for PD (10), was 28.2%.

Patients who showed PD Kt/V-values of 1.2–1.7 accounted for the highest percentages of the PD-only patients (mean  $\pm$  SD,  $1.36 \pm 0.63$ ) and PD + another therapy once a week patients ( $1.34 \pm 0.71$ ). However, the PD Kt/V was low for the PD + another therapy twice a week patients ( $0.87 \pm 0.57$ ) and the PD + another therapy three times a week patients ( $0.70 \pm 0.48$ ). This may be because the patients who underwent another therapy twice or more per week were less frequently treated by PD.

#### Combined use of PD and another therapy for different daily urine outputs (Table 48)

Responses to questions regarding daily urine output were obtained from 3754 PD patients. The percentages of patients with the following urine outputs per day were as follows: less than 100 mL, 24.7%; 100–400 mL, 16.0%; 400–800 mL, 21.3%; 800–1200 mL, 20.6%; 1200–1600 mL, 11.1%; and 1600 mL or more, 6.3%. The percentages of patients with a urine output of 400 mL or higher per day, which is an index for patients with effective residual renal func-

tion, were 59.3% for the patients who responded to the questions regarding daily urine output, 67.8% for the PD-only patients, and only 19.0% for the PD + another therapy once a week patients.

#### Combined use of PD and another therapy for different residual-kidney Kt/V-values (Table 49)

Responses to questions regarding residual-kidney Kt/V were obtained from 2043 PD patients. The mean residual-kidney Kt/V was 0.56 ( $\pm 0.70$ ) among these patients. It was 0.63 ( $\pm 0.72$ ) for the PD-only patients whereas it was 0.16 ( $\pm 0.33$ ) for the PD + another therapy once a week patients, which was much lower than that for the PD-only patients.

#### PD duration for different PET Cr D/P ratios (Table 50)

There were 2236 patients who responded to both questions regarding PD duration and PET Cr D/P ratio. The percentage of patients who showed a PET Cr D/P ratio of 0.65 or higher (high or high-average transporter) gradually decreased with increasing PD duration as follows: less than 1 year, 51.7%; 1–2 years, 56.9%; 2–4 years, 55.2%; 4–8 years, 48.8%; and 8 years or longer, 40.2%. These values were in disagreement with the previous report that peritoneal permeability increased with PD duration, requiring a detailed examination in the future.

#### PD duration for different PD Kt/V-values (Table 51)

There were 1931 patients who responded to both questions regarding PD duration and PD Kt/V. The percentage of patients who showed a PD Kt/V of 1.7



**TABLE 44.** Current status of combined use of peritoneal dialysis (PD) and another therapy for different daily amounts of PD solution (L/day) (for all PD patients)

Daily amount of PD solution	Non-PD	PD only	Non-PD + catheter	PD + another therapy once a week	PD + another therapy twice a week	PD + another therapy three times a week	PD + another therapy four times a week	PD + another therapy (other frequencies)	Subtotal	Unspecified	No information available	Total
<2- (%)		76 (75.2)		17 (16.8)	1 (1.0)	5 (5.0)		2 (2.0)	101 (100.0)			101
2- (%)		260 (92.2)		14 (5.0)	6 (2.1)	1 (0.4)		1 (0.4)	282 (100.0)			282
4- (%)		737 (91.2)		54 (6.7)	15 (1.9)			2 (0.2)	808 (100.0)			808
6- (%)		1403 (86.7)		175 (10.8)	29 (1.8)	1 (0.1)		10 (0.6)	1618 (100.0)			1618
8- (%)		1057 (76.8)		265 (19.3)	24 (1.7)	2 (0.1)		28 (2.0)	1376 (100.0)			1376
10- (%)		303 (72.5)		102 (24.4)	3 (0.7)	2 (0.5)		8 (1.9)	418 (100.0)			418
12- (%)		143 (67.5)		61 (28.8)	4 (1.9)			4 (1.9)	212 (100.0)			212
Subtotal (%)		3979 (82.6)		688 (14.3)	82 (1.7)	11 (0.2)		55 (1.1)	4815 (100.0)			4815
No information available (%)		3076 (78.3)		608 (15.5)	135 (3.4)	39 (1.0)	8 (0.2)	62 (1.6)	3928 (100.0)			3928
Total (%)		7055 (80.7)		1296 (14.8)	217 (2.5)	50 (0.6)	8 (0.1)	117 (1.3)	8743 (100.0)			8743
Mean		6.79		8.05	6.76	4.75		7.99	6.98			6.98
SD		2.56		2.77	2.57	3.93		2.55	2.64			2.64

The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 45.** Current status of combined use of peritoneal dialysis (PD) and another therapy for different types of PD solution (for all PD patients)

Type of PD solution used	Non-PD	PD only	Non-PD + catheter	PD + another therapy once a week	PD + another therapy twice a week	PD + another therapy three times a week	PD + another therapy four times a week	PD + another therapy (other frequencies)	Subtotal	Unspecified	No information available	Total
1.5% glucose only (%)		1594 (92.1)		111 (6.4)	14 (0.8)	4 (0.2)		8 (0.5)	1731 (100.0)			1731
Combined use of 1.5 and 2.5% glucose (%)		637 (74.8)		181 (21.2)	24 (2.8)	2 (0.2)		8 (0.9)	852 (100.0)			852
2.5% glucose only (%)		118 (80.8)		18 (12.3)	9 (6.2)			1 (0.7)	146 (100.0)			146
1.5% glucose + icodextrin (%)		933 (86.7)		117 (10.9)	13 (1.2)	1 (0.1)		12 (1.1)	1076 (100.0)			1076
1.5% + 2.5% glucose + icodextrin (%)		460 (71.1)		159 (24.6)	11 (1.7)	1 (0.2)		16 (2.5)	647 (100.0)			647
2.5% glucose + icodextrin (%)		275 (72.6)		81 (21.4)	11 (2.9)	1 (0.3)		11 (2.9)	379 (100.0)			379
Icodextrin only (%)		39 (72.2)		7 (13.0)	4 (7.4)	4 (7.4)			54 (100.0)			54
4.25% glucose (%)		3 (37.5)		5 (62.5)					8 (100.0)			8
Other solutions (%)		119 (78.3)		25 (16.4)	4 (2.6)			4 (2.6)	152 (100.0)			152
Subtotal (%)		4178 (82.8)		704 (14.0)	90 (1.8)	13 (0.3)		60 (1.2)	5045 (100.0)			5045
Unspecified (%)		7 (87.5)		1 (12.5)					8 (100.0)			8
No information available (%)		2870 (77.8)		591 (16.0)	127 (3.4)	37 (1.0)	8 (0.2)	57 (1.5)	3690 (100.0)			3690
Total (%)		7055 (80.7)		1296 (14.8)	217 (2.5)	50 (0.6)	8 (0.1)	117 (1.3)	8743 (100.0)			8743

The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 46.** Current status of combined use of peritoneal dialysis (PD) and another therapy for different PET Cr D/P ratios (for all PD patients)

PET Cr/D/P ratios	Non-PD	PD only	Non-PD + catheter	PD + another therapy once a week	PD + another therapy twice a week	PD + another therapy three times a week	PD + another therapy four times a week	PD + another therapy (other frequencies)	Subtotal	Unspecified	No information available	Total
<0.5 (%)		226 (75.3)		56 (18.7)	14 (4.7)	1 (0.3)		3 (1.0)	300 (100.0)			300
0.5- (%)		833 (81.0)		164 (15.9)	23 (2.2)	2 (0.2)		7 (0.7)	1029 (100.0)			1029
0.65- (%)		902 (83.4)		153 (14.1)	15 (1.4)	1 (0.1)		11 (1.0)	1082 (100.0)			1082
0.81- (%)		335 (87.2)		44 (11.5)	2 (0.5)	1 (0.3)		2 (0.5)	384 (100.0)			384
Subtotal (%)		2296 (82.1)		417 (14.9)	54 (1.9)	5 (0.2)		23 (0.8)	2795 (100.0)			2795
No information available (%)		4759 (80.0)		879 (14.8)	163 (2.7)	45 (0.8)		94 (1.6)	5948 (100.0)			5948
Total (%)		7055 (80.7)		1296 (14.8)	217 (2.5)	50 (0.6)		117 (1.3)	8743 (100.0)			8743
Mean		0.66		0.63	0.59	0.55		0.64	0.65			0.65
SD		0.13		0.14	0.13	0.33		0.13	0.14			0.14

PET Cr D/P ratio: four-hour creatinine dialysate/plasma ratio in peritoneal equilibrium test. The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 47.** Current status of combined use of peritoneal dialysis (PD) and another therapy for different PD Kt/V values (for all PD patients)

PD Kt/V	Non-PD	PD only	Non-PD + catheter	PD + another therapy once a week	PD + another therapy twice a week	PD + another therapy three times a week	PD + another therapy four times a week	PD + another therapy (other frequencies)	Subtotal	Unspecified	No information available	Total
<0.1 (%)		3 (15.8)		14 (73.7)		1 (5.3)		1 (5.3)	19 (100.0)			19
0.1- (%)		79 (75.2)		21 (20.0)	5 (4.8)				105 (100.0)			105
0.4- (%)		199 (81.9)		30 (12.3)	14 (5.8)				243 (100.0)			243
0.8- (%)		446 (87.6)		52 (10.2)	7 (1.4)	3 (0.6)		1 (0.2)	509 (100.0)			509
1.2- (%)		712 (83.6)		127 (14.9)	7 (0.8)			6 (0.7)	852 (100.0)			852
1.7- (%)		312 (82.5)		62 (16.4)	2 (0.5)			2 (0.5)	378 (100.0)			378
2.0- (%)		146 (78.9)		34 (18.4)	3 (1.6)			2 (1.1)	185 (100.0)			185
2.4- (%)		99 (86.1)		16 (13.9)					115 (100.0)			115
Subtotal (%)		1996 (83.0)		356 (14.8)	38 (1.6)	4 (0.2)		12 (0.5)	2406 (100.0)			2406
No information available (%)		5059 (79.8)		940 (14.8)	179 (2.8)	46 (0.7)		105 (1.7)	6337 (100.0)			6337
Total (%)		7055 (80.7)		1296 (14.8)	217 (2.5)	50 (0.6)		117 (1.3)	8743 (100.0)			8743
Mean		1.36		1.34	0.87	0.7		1.46	1.35			1.35
SD		0.63		0.71	0.57	0.48		0.55	0.65			0.65

PD peritoneal dialysis. The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 48.** Current status of combined use of PD and another therapy for different daily urine outputs (for all PD patients)

Daily urine outputs (ml/day)	Non-PD	PD only	Non-PD + catheter	PD + another therapy once a week	PD + another therapy twice a week	PD + another therapy three times a week	PD + another therapy four times a week	PD + another therapy (other frequencies)	Subtotal	Unspecified	No information available	Total
<100 (%)		548 (59.1)		316 (34.1)	36 (3.9)	6 (0.6)		22 (2.4)	928 (100.0)			928
100- (%)		454 (75.8)		124 (20.7)	13 (2.2)			8 (1.3)	599 (100.0)			599
400- (%)		729 (91.1)		64 (8.0)	3 (0.4)	1 (0.1)		3 (0.4)	800 (100.0)			800
800- (%)		741 (95.6)		29 (3.7)	2 (0.3)			3 (0.4)	775 (100.0)			775
1200- (%)		404 (97.3)		7 (1.7)	4 (1.0)				415 (100.0)			415
1600- (%)		233 (98.3)		3 (1.3)		1 (0.4)			237 (100.0)			237
Subtotal (%)		3109 (82.8)		543 (14.5)	58 (1.5)	8 (0.2)		36 (1.0)	3754 (100.0)			3754
No information available (%)		3946 (79.1)		753 (15.1)	159 (3.2)	42 (0.8)		81 (1.6)	4989 (100.0)			4989
Total (%)		7055 (80.7)		1296 (14.8)	217 (2.5)	50 (0.6)		117 (1.3)	8743 (100.0)			8743
Mean		717.56		185.85	205.52	287.5		158.81	626.46			626.46
SD		580.72		312.32	381.09	635.69		291.39	580.66			580.66

The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 49.** Current status of combined use of peritoneal dialysis (PD) and another therapy for different residual-kidney Kt/V values (for all PD patients)

Residual-kidney Kt/V	Non-PD	PD only	Non-PD + catheter	PD + another therapy once a week	PD + another therapy twice a week	PD + another therapy three times a week	PD + another therapy four times a week	PD + another therapy (other frequencies)	Subtotal	Unspecified	No information available	Total
<0.1 (%)		328 (59.4)		197 (35.7)	19 (3.4)	2 (0.4)		6 (1.1)	552 (100.0)			552
0.1- (%)		321 (82.7)		64 (16.5)	1 (0.3)			2 (0.5)	388 (100.0)			388
0.4- (%)		494 (95.6)		20 (3.9)	3 (0.6)				517 (100.0)			517
0.8- (%)		305 (94.1)		16 (4.9)	3 (0.9)				324 (100.0)			324
1.2- (%)		143 (94.7)		5 (3.3)	1 (0.7)				151 (100.0)			151
1.7- (%)		52 (98.1)		1 (1.9)					53 (100.0)			53
2.0- (%)		24 (96.0)		1 (4.0)					25 (100.0)			25
2.4- (%)		33 (100.0)							33 (100.0)			33
Subtotal (%)		1700 (83.2)		304 (14.9)	27 (1.3)	4 (0.2)		8 (0.4)	2043 (100.0)			2043
No information available (%)		5355 (79.9)		992 (14.8)	190 (2.8)	46 (0.7)		109 (1.6)	6700 (100.0)			6700
Total (%)		7055 (80.7)		1296 (14.8)	217 (2.5)	50 (0.6)		117 (1.3)	8743 (100.0)			8743
Mean		0.63		0.16	0.23	0.6		0.03	0.56			0.56
SD		0.72		0.33	0.41	0.69		0.05	0.70			0.70

The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 50.** Peritoneal dialysis (PD) duration (year) for different PET Cr D/P ratios (for all PD patients)

PET Cr D/P ratio	PD duration (year)					Subtotal	No information available	Total	Mean	SD
	<1	1~	2~	4~	8~					
<0.5 (%)	56 (21.8)	44 (17.1)	52 (20.2)	65 (25.3)	40 (15.6)	257 (100.0)	43	300	3.67	3.76
0.5~ (%)	134 (16.4)	138 (16.9)	247 (30.2)	219 (26.8)	79 (9.7)	817 (100.0)	212	1029	3.27	3.04
0.65~ (%)	134 (15.6)	167 (19.5)	279 (32.5)	213 (24.8)	65 (7.6)	858 (100.0)	224	1082	3.07	2.98
0.81~ (%)	69 (22.7)	73 (24.0)	89 (29.3)	58 (19.1)	15 (4.9)	304 (100.0)	80	384	2.56	3.16
Subtotal (%)	393 (17.6)	422 (18.9)	667 (29.8)	555 (24.8)	199 (8.9)	2236 (100.0)	559	2795	3.14	3.14
No information available (%)	784 (24.8)	523 (16.5)	768 (24.3)	755 (23.9)	334 (10.6)	3164 (100.0)	2784	5948	3.18	3.56
Total (%)	1177 (21.8)	945 (17.5)	1435 (26.6)	1310 (24.3)	533 (9.9)	5400 (100.0)	3343	8743	3.17	3.39
Mean	0.66	0.67	0.66	0.64	0.61	0.65	0.66	0.65		
SD	0.15	0.14	0.13	0.14	0.14	0.14	0.13	0.14		

PET Cr D/P ratio: four-hour creatinine dialysate/plasma ratio in peritoneal equilibrium test. The values in parentheses under each figure represent the percentage relative to the total in each row.

or higher gradually increased with PD duration: less than 1 year, 16.1%; 1–2 years, 24.3%; 2–4 years, 25.9%; 4–8 years, 36.3%; and 8 years or longer, 40.0%.

#### PD duration for different daily urine outputs (Table 52)

There were 3008 patients who responded to both questions regarding PD duration and daily urine output. The percentage of patients with a urine output of 400 mL or higher per day, which is an index for patients with effective residual renal function, decreased with increasing PD duration: less than 1 year, 86.8%; 1–2 years, 75.7%; 2–4 years, 58.6%; 4–8 years, 39.5%; and 8 years or longer, 15.0%.

#### PD duration for different residual-kidney Kt/V-values (Table 53)

There were 1633 patients who responded to both questions regarding PD duration and residual-kidney

Kt/V. Similar to the trend of daily urine output, the mean residual-kidney Kt/V decreased with increasing PD duration: less than 1 year, 0.85; 1–2 years, 0.68; 2–4 years, 0.48; 4–8 years, 0.36; and 8 years or longer, 0.14.

#### PD duration for different total dialysis doses (Table 54)

The sum of PD Kt/V and residual-kidney Kt/V was defined as the total PD dose and its association with PD duration was examined. Moreover, for PD + another therapy patients, Kt/V attributable to the therapies other than PD was excluded and Kt/V calculated using the above-described equation was used as the total PD dose. There were 1578 patients who responded to all of questions regarding PD duration, PD Kt/V, and residual-kidney Kt/V. The percentages of patients who satisfied a total PD dose of 1.7 or more, which is recommended in the JSDT

**TABLE 51.** Peritoneal dialysis (PD) duration (year) for different PD Kt/V values (for all PD patients)

PD Kt/V	PD duration (year)					Subtotal	No information available	Total	Mean	SD
	<1	1~	2~	4~	8~					
<0.1 (%)	3 (17.6)	1 (5.9)	3 (17.6)	6 (35.3)	4 (23.5)	17 (100.0)	2	19	5.00	4.64
0.1~ (%)	18 (20.7)	8 (9.2)	30 (34.5)	26 (29.9)	5 (5.7)	87 (100.0)	18	105	3.08	2.81
0.4~ (%)	71 (31.6)	32 (14.2)	51 (22.7)	48 (21.3)	23 (10.2)	225 (100.0)	18	243	2.88	3.23
0.8~ (%)	123 (28.8)	117 (27.4)	116 (27.2)	60 (14.1)	11 (2.6)	427 (100.0)	82	509	1.86	2.11
1.2~ (%)	113 (17.4)	120 (18.4)	223 (34.3)	148 (22.7)	47 (7.2)	651 (100.0)	201	852	2.94	2.96
1.7~ (%)	30 (10.5)	47 (16.5)	84 (29.5)	93 (32.6)	31 (10.9)	285 (100.0)	93	378	3.67	3.05
2.0~ (%)	17 (11.7)	23 (15.9)	40 (27.6)	46 (31.7)	19 (13.1)	145 (100.0)	40	185	3.98	3.50
2.4~ (%)	16 (17.0)	19 (20.2)	24 (25.5)	25 (26.6)	10 (10.6)	94 (100.0)	21	115	3.31	3.32
Subtotal (%)	391 (20.2)	367 (19.0)	571 (29.6)	452 (23.4)	150 (7.8)	1931 (100.0)	475	2406	2.92	2.99
No information available (%)	786 (22.7)	578 (16.7)	864 (24.9)	858 (24.7)	383 (11.0)	3469 (100.0)	2868	6337	3.30	3.58
Total (%)	1177 (21.8)	945 (17.5)	1435 (26.6)	1310 (24.3)	533 (9.9)	5400 (100.0)	3343	8743	3.17	3.39
Mean	1.15	1.33	1.34	1.42	1.41	1.32	1.44	1.35		
SD	0.63	0.60	0.65	0.74	0.68	0.67	0.55	0.65		

The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 52.** Peritoneal dialysis (PD) duration (year) for different daily urine outputs (mL/day) (for all PD patients)

Daily urine output (mL/day)	PD duration (year)					Subtotal	No information available	Total	Mean	SD
	<1	1~	2~	4~	8~					
<100 (%)	33 (4.5)	32 (4.4)	169 (23.1)	292 (39.8)	207 (28.2)	733 (100.0)	195	928	5.91	4.05
100~ (%)	52 (10.7)	101 (20.7)	185 (37.9)	125 (25.6)	25 (5.1)	488 (100.0)	111	599	2.90	2.38
400~ (%)	158 (25.1)	142 (22.5)	186 (29.5)	124 (19.7)	20 (3.2)	630 (100.0)	170	800	2.25	2.39
800~ (%)	207 (32.3)	145 (22.7)	181 (28.3)	92 (14.4)	15 (2.3)	640 (100.0)	135	775	1.87	2.28
1200~ (%)	120 (37.3)	70 (21.7)	96 (29.8)	33 (10.2)	3 (0.9)	322 (100.0)	93	415	1.53	1.76
1600~ (%)	73 (37.4)	58 (29.7)	38 (19.5)	23 (11.8)	3 (1.5)	195 (100.0)	42	237	1.56	2.12
Subtotal (%)	643 (21.4)	548 (18.2)	855 (28.4)	689 (22.9)	273 (9.1)	3008 (100.0)	746	3754	3.05	3.27
No information available (%)	534 (22.3)	397 (16.6)	580 (24.2)	621 (26.0)	260 (10.9)	2392 (100.0)	2597	4989	3.32	3.53
Total (%)	1177 (21.8)	945 (17.5)	1435 (26.6)	1310 (24.3)	533 (9.9)	5400 (100.0)	3343	8743	3.17	3.39
Mean	947.95	820.67	612.15	392.14	156.50	630.17	611.51	626.46		
SD	551.67	569.87	544.15	494.48	384.71	582.35	573.93	580.66		

The values in parentheses under each figure represent the percentage relative to the total in each row.

guidelines for PD (10), decreased with increasing PD duration: less than 1 year, 63.7%; 1–2 years, 63.0%; 2–4 years, 56.0%; 4–8 years, 57.3%; and 8 years or longer, 57.8%. As shown in Table 52, PD Kt/V increased but residual-kidney Kt/V decreased with increasing PD duration. Therefore, the decrease in the total PD dose associated with increasing PD duration is strongly affected by the decrease in residual-kidney Kt/V associated with increasing PD duration.

#### PET Cr D/P ratio for different methods of exchanging PD solution (Table 55)

There were 2785 patients who responded to both questions regarding the detailed methods of PD and PET Cr D/P ratio. No significant differences were observed in the trend of PET Cr D/P ratio between the patients who used an automated peritoneal dialysis (APD) machine and those who did not.

#### PET Cr D/P ratio for different types of PD solution (Table 56)

There were 2752 patients who responded to both questions regarding the type of PD solution and PET Cr D/P ratio. Patients who showed a high PET Cr D/P ratio tended to use icodextrin: 34.0% for low transporters, 35.7% for low-average transporters, 52.1% for high-average transporters, and 60.0% for high transporters.

#### PD duration and rate of peritonitis per year (Table 57)

There were 3634 patients who responded to both questions regarding PD duration and the frequencies of developing peritonitis per year. Among these patients, 17.3% developed peritonitis at least once a year. The percentage of patients who developed peritonitis at least once a year was slightly smaller for the patients with a PD duration of less than 1 year than for the patients with a PD duration of 1 year or

**TABLE 53.** Peritoneal dialysis (PD) duration (year) for different residual-kidney Kt/V values (for all PD patients)

Residual-kidney Kt/V	PD duration (year)					Subtotal	No information available	Total	Mean	SD
	<1	1~	2~	4~	8~					
<0.1 (%)	16 (3.7)	29 (6.7)	116 (27.0)	181 (42.1)	88 (20.5)	430 (100.0)	122	552	5.13	3.58
0.1~ (%)	51 (16.2)	63 (20.0)	114 (36.2)	74 (23.5)	13 (4.1)	315 (100.0)	73	388	2.65	2.33
0.4~ (%)	107 (25.1)	100 (23.5)	145 (34.0)	66 (15.5)	8 (1.9)	426 (100.0)	91	517	2.03	2.18
0.8~ (%)	87 (32.5)	66 (24.6)	72 (26.9)	39 (14.6)	4 (1.5)	268 (100.0)	56	324	1.77	2.03
1.2~ (%)	46 (40.7)	29 (25.7)	25 (22.1)	11 (9.7)	2 (1.8)	113 (100.0)	38	151	1.47	1.91
1.7~ (%)	18 (46.2)	11 (28.2)	5 (12.8)	5 (12.8)		39 (100.0)	14	53	1.15	1.57
2.0~ (%)	12 (54.5)	5 (22.7)	1 (4.5)	3 (13.6)	1 (4.5)	22 (100.0)	3	25	1.59	2.87
2.4~ (%)	6 (30.0)	3 (15.0)	7 (35.0)	4 (20.0)		20 (100.0)	13	33	2.15	2.03
Subtotal (%)	343 (21.0)	306 (18.7)	485 (29.7)	383 (23.5)	116 (7.1)	1633 (100.0)	410	2043	2.86	2.96
No information available (%)	834 (22.1)	639 (17.0)	950 (25.2)	927 (24.6)	417 (11.1)	3767 (100.0)	2933	6700	3.30	3.55
Total (%)	1177 (21.8)	945 (17.5)	1435 (26.6)	1310 (24.3)	533 (9.9)	5400 (100.0)	3343	8743	3.17	3.39
Mean	0.85	0.68	0.48	0.36	0.14	0.54	0.62	0.56		
SD	0.58	0.55	0.54	0.74	0.34	0.63	0.92	0.70		

The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 54.** Peritoneal dialysis (PD) duration (year) for different total PD doses (for all PD patients)

Total PD dose	PD duration (year)					Subtotal	No information available	Total	Mean	SD
	<1	1~	2~	4~	8~					
<0.1 (%)	2 (14.3)	1 (7.1)	3 (21.4)	5 (35.7)	3 (21.4)	14 (100.0)		14	4.43	3.61
0.1~ (%)			3 (21.4)	9 (64.3)	2 (14.3)	14 (100.0)	9	23	5.36	2.76
0.4~ (%)	7 (24.1)	3 (10.3)	8 (27.6)	8 (27.6)	3 (10.3)	29 (100.0)	1	30	3.28	3.36
0.8~ (%)	25 (23.6)	13 (12.3)	28 (26.4)	36 (34.0)	4 (3.8)	106 (100.0)	13	119	2.87	2.53
1.2~ (%)	89 (18.6)	93 (19.5)	168 (35.1)	97 (20.3)	31 (6.5)	478 (100.0)	112	590	2.76	2.84
1.7~ (%)	75 (18.4)	79 (19.4)	132 (32.4)	99 (24.3)	22 (5.4)	407 (100.0)	104	511	2.76	2.65
2.0~ (%)	80 (24.8)	61 (18.9)	86 (26.6)	68 (21.1)	28 (8.7)	323 (100.0)	72	395	2.85	3.21
2.4~ (%)	31 (26.3)	25 (21.2)	29 (24.6)	27 (22.9)	6 (5.1)	118 (100.0)	34	152	2.47	2.58
2.8~ (%)	30 (33.7)	22 (24.7)	20 (22.5)	14 (15.7)	3 (3.4)	89 (100.0)	48	137	1.90	2.23
Subtotal (%)	339 (21.5)	297 (18.8)	477 (30.2)	363 (23.0)	102 (6.5)	1578 (100.0)	393	1971	2.76	2.84
No information available (%)	838 (21.9)	648 (17.0)	958 (25.1)	947 (24.8)	431 (11.3)	3822 (100.0)	2950	6772	3.33	3.58
Total (%)	1177 (21.8)	945 (17.5)	1435 (26.6)	1310 (24.3)	533 (9.9)	5400 (100.0)	3343	8743	3.17	3.39
Mean	1.88	1.88	1.77	1.75	1.70	1.81	2.02	1.85		
SD	0.75	0.62	0.70	0.89	0.61	0.74	1.03	0.81		

The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 55.** PET Cr D/P ratio for different methods of exchanging peritoneal dialysis (PD) solution

Dialysis method	Detailed method	PET Cr D/P ratio				Subtotal	No information available	Total	Mean	SD
		<0.5	0.5~	0.65~	0.81~					
PD	Manual only (%) <sup>†</sup>	178 (10.9)	598 (36.5)	650 (39.7)	211 (12.9)	1637 (100.0)	3503	5140	0.65	0.13
PD	APD only (%) <sup>†</sup>	79 (10.2)	278 (36.0)	280 (36.2)	136 (17.6)	773 (100.0)	1535	2308	0.66	0.15
PD	Manual + APD (%) <sup>†</sup>	41 (10.9)	149 (39.7)	149 (39.7)	36 (9.6)	375 (100.0)	770	1145	0.64	0.14
	Total (%) <sup>†</sup>	298 (10.7)	1025 (36.8)	1079 (38.7)	383 (13.8)	2785 (100.0)	5808	8593	–	–

PET Cr D/P ratio: four-hour creatinine dialysate/plasma ratio in peritoneal equilibrium test. <sup>†</sup>Percentage relative to total in row.

**TABLE 56.** PET Cr D/P ratio for different types of peritoneal dialysis (PD) solution (for all PD patients)

Type of PD solution used	PET Cr D/P ratio				Subtotal	No information available	Total	Mean	SD
	<0.5	0.5~	0.65~	0.81~					
1.5% glucose only (%)	124 (13.1)	428 (45.1)	310 (32.6)	88 (9.3)	950 (100.0)	781	1731	0.62	0.13
Combined use of 1.5 and 2.5% glucose (%)	49 (11.3)	177 (40.8)	158 (36.4)	50 (11.5)	434 (100.0)	418	852	0.64	0.13
2.5% glucose only (%)	12 (19.7)	19 (31.1)	24 (39.3)	6 (9.8)	61 (100.0)	85	146	0.62	0.15
1.5% glucose + icodextrin (%)	49 (7.5)	175 (26.6)	307 (46.7)	126 (19.2)	657 (100.0)	419	1076	0.69	0.13
1.5% + 2.5% glucose + icodextrin (%)	34 (9.3)	127 (34.8)	150 (41.1)	54 (14.8)	365 (100.0)	282	647	0.67	0.13
2.5% glucose + icodextrin (%)	15 (7.6)	53 (26.9)	90 (45.7)	39 (19.8)	197 (100.0)	182	379	0.69	0.14
Icodextrin only (%)	2 (7.7)	6 (23.1)	9 (34.6)	9 (34.6)	26 (100.0)	28	54	0.72	0.15
4.25% glucose (%)	1 (25.0)	2 (50.0)	1 (25.0)		4 (100.0)	4	8	0.57	0.11
Other solutions (%)	8 (13.8)	24 (41.4)	18 (31.0)	8 (13.8)	58 (100.0)	94	152	0.64	0.14
Subtotal (%)	294 (10.7)	1011 (36.7)	1067 (38.8)	380 (13.8)	2752 (100.0)	2293	5045	0.65	0.14
Unspecified (%)			1 (100.0)		1 (100.0)	7	8	0.73	
No information available (%)	6 (14.3)	18 (42.9)	14 (33.3)	4 (9.5)	42 (100.0)	3648	3690	0.63	0.16
Total (%)	300 (10.7)	1029 (36.8)	1082 (38.7)	384 (13.7)	2795 (100.0)	5948	8743	0.65	0.14

PET Cr D/P ratio: four-hour creatinine dialysate/plasma ratio in peritoneal equilibrium test. The values in parentheses under each figure represent the percentage relative to the total in each row.

**TABLE 57.** Peritoneal dialysis (PD) duration for different frequencies of developing peritonitis per year (times/year) (for all PD patients)

Frequencies of developing peritonitis (times/year)	PD duration (year)					Subtotal	No information available	Total	Mean	SD
	<1	1~	2~	4~	8~					
None (%)	707 (23.5)	531 (17.7)	804 (26.7)	682 (22.7)	282 (9.4)	3006 (100.0)	842	3848	3.02	3.33
Once (%)	86 (18.4)	90 (19.3)	136 (29.1)	111 (23.8)	44 (9.4)	467 (100.0)	136	603	3.15	3.33
Twice (%)	16 (15.0)	23 (21.5)	41 (38.3)	20 (18.7)	7 (6.5)	107 (100.0)	27	134	2.81	2.61
Three times (%)	4 (12.1)	5 (15.2)	10 (30.3)	10 (30.3)	4 (12.1)	33 (100.0)	5	38	4.03	4.05
Four times (%)	1 (9.1)	2 (18.2)	2 (18.2)	4 (36.4)	2 (18.2)	11 (100.0)	2	13	4.64	3.47
Five times or more (%)		2 (20.0)	1 (10.0)	4 (40.0)	3 (30.0)	10 (100.0)	2	12	6.40	5.58
Subtotal (%)	814 (22.4)	653 (18.0)	994 (27.4)	831 (22.9)	342 (9.4)	3634 (100.0)	1014	4648	3.06	3.33
No information available (%)	363 (20.6)	292 (16.5)	441 (25.0)	479 (27.1)	191 (10.8)	1766 (100.0)	2329	4095	3.39	3.49
Total (%)	1177 (21.8)	945 (17.5)	1435 (26.6)	1310 (24.3)	533 (9.9)	5400 (100.0)	3343	8743	3.17	3.39

The values in parentheses under each figure represent the percentage relative to the total in each row.

longer and there was no significant difference in percentage among different PD durations: less than 1 year, 13.1%; 1–2 years, 18.7%; 2–4 years, 19.1%; 4–8 years, 17.9%; and 8 years or longer, 17.3%.

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