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An Overview of Regular Dialysis Treatment in Japan (as of 31 December 2012)

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Abstract: A nationwide statistical survey of 4279 dialysis facilities was conducted at the end of 2012, among which 4238 responded (99.0%). The number of new dialysis patients was 38 055 in 2012. Since 2008, the number of new dialysis patients has remained almost the same without any marked increase or decrease. The number of dialysis patients who died in 2012 was 30 710; a slight decrease from 2011 (30 743). The dialysis patient population has been growing every year in Japan; it was 310 007 at the end of 2012, which exceeded 310 000 for the first time. The number of dialysis patients per million at the end of 2012 was 2431.2. The crude death rate of dialysis patients in 2012 was 10.0%, a slight decrease from that in 2011 (10.2%). The mean age of new dialysis patients was 68.5 years and the mean age of the entire dialysis patient population was 66.9 years. The most common primary cause of renal failure among new dialysis patients was diabetic nephropathy (44.2%). The actual number of new dialysis patients with diabetic nephropathy has been approximately 16 000 for the last few years. Diabetic nephropathy was also the most common primary disease among the entire dialysis patient population (37.1%), followed by chronic glomerulonephritis (33.6%). The percentage of dialysis patients with diabetic nephropathy has been continuously increasing, whereas not only the percentage but also the actual number of dialysis patients with chronic glomerulonephritis has decreased. The number of patients who underwent hemodiafiltration (HDF) at the end of 2012 was 21 725, a marked increase from that in 2011 (14 115). In particular, the number of patients who underwent on-line HDF increased threefold from 4890 in 2011 to 14 069 in 2012. From the results of the facility survey, the number of patients who underwent peritoneal dialysis (PD) was 9514 and that of patients who did not undergo PD despite having a PD catheter in the abdominal cavity was 347. From the results of the patient survey, among the PD patients, 1932 also underwent another dialysis method using extracorporeal circulation, such as hemodialysis (HD) and HDF. The number of patients who underwent HD at home in 2012 was 393, a marked increase from that in 2011 (327). **Key Words:** Chronic kidney disease—mineral and bone disorder, Dialysis patient population, Erythropoiesis-stimulating agent, On-line hemodiafiltration, 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 annually surveyed. Later, individual dialysis patients treated in facilities that participated in the surveys were also targeted and their data have been registered in an electronic database since 1983 (1).

In the 2012 survey, the following items were included in addition to the basic survey items.

First, items associated with hemodiafiltration (HDF) were surveyed for the first time. As background, in April 2012 on-line HDF was officially

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included in the targets for additional points in the medical insurance system in Japan (2).

Second, dialysate quality has been surveyed continuously since 2006. From 2010, facilities that maintain the required dialysate quality can obtain additional points in the medical insurance system in Japan (3). As mentioned above, facilities that offer on-line HDF can also obtain additional points. The findings in the previous surveys may have contributed to the approval of this revised point system by the health insurance administration of the government.

Third, items associated with chronic kidney disease–mineral and bone disorder (CKD-MBD) were surveyed. Over the last 10 years, such items were surveyed in 2004 and 2009. In the 2004 survey, the purpose was to obtain data that was used as the basis for preparing the Guideline for the Management of Secondary Hyperparathyroidism in Chronic Dialysis Patients (4). In the 2009 survey, the purpose was to evaluate the effect of the guideline on dialysis treatment in Japan. In 2012, JSDT revised the Clinical Practice Guideline for CKD-MBD (5). The purpose of examining items associated with CKD-MBD in the 2012 survey was to evaluate the effect of the revision of the Clinical Practice Guideline on dialysis treatment in Japan.

Fourth, renal anemia was also examined to obtain data that can be used as the basis for revising the 2008 JSDT Guideline for Renal Anemia in Chronic Kidney Disease (6). The 2008 Guideline is currently being revised by JSDT.

Fifth, blood pressure, smoking habits, and dyslipidemia were surveyed. These items are used as prognostic modulators in the analysis of association between the various survey items mentioned above and the prognosis of patients.

Sixth, the current status of patients who underwent peritoneal dialysis (PD) has been surveyed continuously since 2009 in cooperation with the Japanese Society for Peritoneal Dialysis. In the facility survey, the number of patients who underwent PD and another blood purification therapy such as hemodialysis (HD) (denoted as PD + HD patients) was determined. In the patient survey, PD dose, remaining renal function, peritoneal function, and other relevant items were examined in detail. The survey results are expected to be used as the basis for preparing new guidelines for PD.

In this report, the data obtained from the 2012 survey are summarized with regard to the following items.

A Basic demographics
B Items associated with HDF
C Current status of dialysate quality control
D Items associated with CKD-MBD
E Items associated with renal anemia
F Items associated with blood pressure, smoking habit, and dyslipidemia
G Items associated with PD

From the 2012 survey, the detailed results of the survey items associated with PD are reported separately from this report. Therefore, only a basic summary of the results is included in this report.

In order to widely distribute the survey result among JSDT members, all the figures and tables included in a CD-ROM that contains detailed data from each annual survey ("Overview of Regular Dialysis Treatment in Japan, the CD-ROM Report", hereafter referred to as the CD-ROM) have been available since 2012 on the members-only pages of the JSDT website. These pages contain all the findings from the first survey conducted in 1968 to the latest survey. Any JSDT member can access these pages. The pages have a simple search function. The summaries of survey results in "The Illustrated, Overview of Regular Dialysis Treatment in Japan" (hereafter, the Report) are available not only to JSDT members but also to the general public on the JSDT homepage (http://www.jsdt.or.jp/). Please refer to a review report for the survey items included in the previous surveys and the historical background (1).

In the annual surveys, JSDT has entrusted an information processing company to digitize the responses given on the collected survey sheets and maintain the survey database. This time, the entrustee was changed from Meitetsucom Co., Ltd. (headquarters located in Nagoya, Aichi, http://www.meitetsucom.co.jp/index.html), which was in charge until the 2011 survey, to imedia partners, Inc. (headquarters located in Minato-ku, Tokyo, http://www.imediapartners.jp/index.html).

PATIENTS AND METHODS

Method of survey

This survey is conducted annually by sending questionnaires to target dialysis facilities. A total of 4279 facilities surveyed were either member facilities of JSDT, non-member facilities offering regular maintenance hemodialysis (HD), or non-member facilities offering PD but not HD as of 31 December 2012. The number of facilities participating in this survey increased by 24 (0.56%) from the previous year (4255 facilities) (2).

The questionnaires were mainly sent and collected by postal mail; some were also faxed. Universal serial bus (USB) memory devices with stored electronic

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spreadsheets in Microsoft Excel were also sent with the printed questionnaires to the facilities. The facilities were requested to use these devices for the completion of the questionnaires as much as possible.

In this survey, two sets of questionnaires were used. One was for the facility survey, which included items related to dialysis facilities such as the number of patients, the number of staff members, and the number of dialyzers used at individual facilities. The other was for the patient survey, which included items on the epidemiological background, treatment conditions, and the outcome of the treatment of individual dialysis patients. Until the 2011 survey, new dialysis patients used Sheet II, registered dialysis patients used Sheet III, and nonregistered and transferred dialysis patients used Sheet IV. In the 2012 survey, however, these sheets were unified into one sheet for registered dialysis patients. New, transferred, and nonregistered dialysis patients were requested to be entered additionally on this sheet.

The deadline for the acceptance of responses was the end of January 2013. The acceptance of responses submitted after this deadline ended on 26 April 2013 for the preparation of the Report and on 12 September 2013 for the preparation of the CD-ROM Report (7,8).

For the CD-ROM Report, the number of facilities that responded to the facility survey was 4238 (99.0%), and the number of facilities that responded to both the facility and patient surveys was 4128 (96.4%). Moreover, the number of facilities that completed the questionnaires using the electronic medium (3654 facilities, 86.2%) increased from the 2011 survey (3594 facilities, 84.5%). This increase contributed to the accurate and simplified analysis of survey data. This annual report is based on the data tabulated for the CD-ROM Report (8).

Survey items

The 2012 survey includes the following items. The items in the previous surveys are provided on the members-only pages of the JSDT website (http://www.jsdt.or.jp/).

*Facility survey

The following items have been continuously surveyed since 2008 (9).

- Name and address of facilities
- Year and month when the facility started providing dialysis treatment
- Total number of patients who can concurrently receive dialysis
- Maximum capacity of patients
- Number of bedside consoles
- Number of workers engaged in dialysis treatment (e.g. doctors, nurses, clinical engineers, nutritionists, case workers)
- Number of patients who underwent dialysis at the end of 2012 (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 method by extracorporeal circulation such as HD or HDF (hereafter, denoted as PD + HD patients)
- Numbers of outpatients and inpatients who underwent daytime dialysis, nighttime dialysis, home HD, or PD in 2012
- Number of new patients who were started on dialysis in 2012
- Number of new patients who were started on PD in 2012 but introduced to HD or another blood purification method in 2012 (hereafter, denoted as PD dropout patients)
- Number of dialysis patients who died in 2012
- Number of bedside consoles equipped with an endotoxin retentive filter (ETRF)
- Use or nonuse of ETRFs for sampling dialysate
- Site from which dialysate was sampled for dialysate test
- Frequency of measurement of endotoxin level in dialysate
- Endotoxin level 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 surveyed since 1983.

- Pseudonym of patients
- Gender
- Date of birth
- Year and month of start of dialysis
- Year and month of transfer from another hospital
- Primary disease
- Prefecture where the patient lives
- Treatment method

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- Month of transfer (Code of facility to which the patient is transferred)
- Month and cause of death
- Year and month of change in dialysis method and code of new method

The following items were added to the basic survey items and were surveyed using both paper and electronic media. The new survey items are asterisked.

- Current status of combined use of PD and another method such as HD or HDF (hereafter, denoted as current status of combined use of PD and another method)
- History of undergoing PD
- Frequency of dialysis (e.g. HD) per week
- Duration of dialysis (e.g. HD) per session
- Blood flow rate: surveyed for the first time in four years since the 2008 survey
- Mode of dilution of dialysate for HDF*
- Volume of substitution fluid per HDF session*
- Height of patient
- 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 hemoglobin (Hb) level
- Measurement method for serum parathyroid hormone (PTH) level
- Intact and whole PTH levels
- Smoking habit
- History of myocardial infarction
- History of cerebral hemorrhage
- History of cerebral infarction
- History of amputation of upper and/or lower limbs
- History of femoral neck fracture
- History of encapsulating peritoneal sclerosis (EPS)
- Number of renal transplantations
- Use or nonuse of antihypertensive agent: surveyed for the first time in 12 years since the 2000 survey

The following items were added to the basic survey items and were only collected from the facilities that used the electronic medium. The new survey items are asterisked.

- Serum total cholesterol level
- Serum high-density lipoprotein cholesterol (HDL-C) level
- Serum iron level: surveyed for the first time in five years since the 2007 survey
- Total iron binding capacity (TIBC): surveyed for the first time in five years since the 2007 survey
- Serum ferritin level: surveyed for the first time in five years since the 2007 survey
- Type of erythropoiesis-stimulating agent (ESA) *: The type of ESA was surveyed for the first time in the 2012 survey. The use or nonuse and dose of erythropoietin were surveyed intermittently from 1994 to 2006.
- Predialysis blood pressure (systolic and diastolic phases) and pulse: surveyed for the first time in seven years since the 2005 survey
- Number of years on ongoing PD (PD vintage)*: This was surveyed using the unit of year and paper medium until the 2011 survey. In the 2012 survey, the unit and medium were changed to month and electronic medium, respectively.
- Use or nonuse of automated peritoneal dialysis (APD) machine*
- Method of changing PD solution*: The type of device used for changing the PD solution bag was surveyed.
- Performance or nonperformance of peritoneal equilibrium test (PET)
- Four-hour creatinine dialysate/plasma ratio in PET (PET Cr D/P ratio)
- Type of dialysate used for PD (Type of PD solution)
- Volume of PD solution per day
- PD duration per day*
- Daily urine output (Urine output)
- Mean amount of water removed per day (Amount of water removed)
- Kt/V for Residual kidney (Residual kidney Kt/V)
- Kt/V for PD (PD Kt/V)
- Number of episodes of peritonitis per year (Frequency of peritonitis)
- Annual frequency of exit-site infections*

Calculation of survival rate

The cumulative survival rate after the start of dialysis was actuarially calculated (10).

RESULTS AND DISCUSSION

A. Basic demographics

1. Number of patients

Table 1 shows a summary of the dynamics of the dialysis patient population in Japan at the end of 2012 obtained in this survey. The number of facilities that responded to the facility survey in 2012 was 4238, an increase of 25 (0.6%) from the previous year (4213). The number of such facilities continued to increase

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TABLE 1. *Current status of regular dialysis treatment in Japan (as of 31 December 2012)*

Number of facilities		4 238 facilities	(increase of 25 facilities, 0.6% increase)
Equipment	Number of bedside consoles	125 003 units	(increase of 3140 units, 2.6% increase)
Capacity	Total number of patients who can simultaneously receive dialysis	123 275 patients	(increase of 3348 patients, 2.8% increase)
	Maximum capacity	414 295 patients	(increase of 8714 patients, 2.1% increase)
Total number of patients regularly undergoing dialysis		310 007 patients	(increase of 5151 patients)
Number of patients per million		2 431.2 patients	(increase of 45.8 patients)
Number of patients for different dialysis methods	Daytime	258 131 patients	(83.3%)
	Nighttime	41 969 patients	(13.5%)
	Home HD	393 patients	(0.1%)
	PD	9 514 patients	(3.1%)
Number of PD + HD patients[1]		1 932 patients	
Number of non-PD + catheter patients[2]		347 patients	
Number of PD dropout patients[3]		175 patients	
Annual number of new dialysis patients		38 055 patients	(decrease of 558 patients, 1.4% decrease)
Annual number of deceased patients		30 710 patients	(decrease of 33 patients, 0.1% decrease)

*The above data were obtained from the facility survey.

Period on dialysis (years)	Male	Female	Unspecified	Total (%)
0 ≤ 5	95 268	48 092	0	143 360 (47.6)
5 ≤ 10	47 824	28 167	0	75 991 (25.2)
10 ≤ 15	23 057	15 490	0	38 547 (12.8)
15 ≤ 20	11 538	8 700	0	20 238 (6.7)
20 ≤ 25	5 948	5 067	0	11 015 (3.7)
≥25	6 620	5 687	0	12 307 (4.1)
Total	190 255	111 203	0	301 458 (100.0)
Longest period on dialysis		44 years and 9 months		

*The above data were obtained from the patient survey.

[1]Number of PD + HD patients: Number of patients who underwent both PD and HD, HDF, hemoadsorption, or hemofiltration (excluding those who underwent only peritoneal lavage). [2]Number of non-PD + catheter patients: Number of patients who did not undergo PD despite having a peritoneal catheter but underwent HD, HDF, hemoadsorption, or hemofiltration (including those who underwent only peritoneal lavage). [3]Number of PD dropout patients: Number of new patients who were started on PD in 2012 but introduced to another dialysis method within 2012.

by at least 100 every year before 2000. However, the increase in this number tended to decrease in the 2000s, and the increase in the number was only 50 or less in the 2010s. Table 1 shows data on the number of years on dialysis (dialysis vintage) and the longest dialysis vintage from the patient survey. All the other results were obtained from the facility survey.

As determined from the facility survey, the total number of dialysis patients in Japan at the end of 2012 was 310 007, which exceeded 310 000 (Table 1) and was approximately 5000 greater than that in the previous year (304 856). Table 2 shows changes in the number of dialysis patients over the last 21 years. The annual increase in dialysis patient population in the 1990s was 10 000–12 000. In the 2000s, however, the annual rate of increase in dialysis patient population decreased. This trend became remarkable after 2010. The annual rate of increase in dialysis patient population, defined as the ratio of the increase in dialysis patient population each year to the dialysis patient population at the end of the previous year, had been decreasing linearly every year. If this trend continues, the dialysis patient population in Japan is expected to reach maximum and start decreasing around 2021 (11).

The number of new patients who were started on dialysis (the annual number of new dialysis patients) was 38 055 in 2012. The annual number of new dialysis patients continued to increase from the start of the annual survey and reached 38 180 in 2008. Afterward, the annual number remained approximately 38 000 and did not tend to increase, as observed before 2008 (Table 2). Here, changes in the rate of increase in the number of new dialysis patients over the past 20 years corrected by the response collection rate were plotted (Fig. 1) similarly to the 2011 survey (12). The regression line for the rate of increase in the number of new dialysis patients intersects with the *X*-axis around 2011 and then falls below zero. This suggests that the annual number of new dialysis patients reached maximum around 2011, after which it started to decrease.

The total number of dialysis patients who died (the annual number of deaths) was 30 710 in 2012

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TABLE 2. *Changes in dialysis patient population in Japan (from the facility survey)*

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Dialysis patient population at the end of each year	134 298	143 709	154 413	167 192	175 988	185 322	197 213	206 134	219 183	229 538
Number of patients started on dialysis each year	23 874	24 296	26 398	28 409	28 870	29 641	31 483	32 018	33 243	33 710
Number of dialysis patients who died each year	12 143	13 187	14 406	15 174	16 102	16 687	18 524	18 938	19 850	20 614
Number of patients per million	1 076.4	1 149.4	1 229.7	1 328.4	1 394.9	1 465.2	1 556.7	1 624.1	1 721.9	1 801.2
Collection rate for facility survey† (%)	99.5	99.7	99.8	99.8	99.7	99.7	99.7	99.9	99.0	99.6
Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Dialysis patient population at the end of each year	237 710	248 166	257 765	264 473	275 242	283 421	290 661	298 252	304 856	310 007
Number of patients started on dialysis each year	33 966	35 084	36 063	36 373	36 934	38 180	37 566	37 512	38 613	38 055
Number of dialysis patients who died each year	21 672	22 715	23 983	24 034	25 253	27 266	27 646	28 882	30 743	30 710
Number of patients per million	1 862.7	1 943.5	2 017.6	2 069.9	2 154.2	2 219.6	2 279.5	2 329.1	2 385.4	2 431.2
Collection rate for facility survey† (%)	99.1	98.7	98.9	98.4	98.9	99.0	98.5	98.6	99.0	99.0

†Based on the number of facilities.

FIG. 1. Change in rate of increase in annual number of new dialysis patients corrected by response collection rate.

(Table 1). The annual number of deaths continued to increase and reached 30 743 in 2011, but it decreased slightly in 2012 (Table 2). Changes in the rate of increase in the annual number of deaths over the past 20 years corrected by the response collection rate were plotted (Fig. 2). Although the rate of increase in the annual number of deaths tended to decrease in the 1990s, this decrease has slowed since 2000. Similarly to the 2011 survey, the regression line for the rate of increase between 2002 and 2012 was calculated (• in Fig. 2). According to the 2011 survey, the slope of the regression line for the rate of increase between 2001 and 2011 was almost zero. In the 2012 survey, however, the slope clearly decreased but very

FIG. 2. Change in rate of increase in annual number of deaths corrected by response collection rate.

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gradually. The rate of increase in the annual number of deaths is not expected to fall below zero in the next 15 years or more. This means that the annual number of deaths will continue to increase for years. The background factors for this increase are considered to be the aging of the dialysis patient population and the increase in the number of patients with diabetic nephropathy.

If the annual number of new dialysis patients starts decreasing while the annual number of deaths continues to increase, the dialysis patient population in Japan is expected to start decreasing in the future.

In the 4238 facilities that responded to the facility survey questionnaire, the number of bedside consoles was 125 003, an increase of 3140 (2.6%) from the previous year. The total number of patients who can concurrently receive dialysis in all facilities was 123 275 and the maximum dialysis capacity was 414 295 patients in 2012, increases of 2.8 and 2.1% from the previous year, respectively. As mentioned above, the number of patients who undergo regular maintenance dialysis in Japan is expected to reach a maximum of approximately 350 000 in 2021 and then to gradually decrease, even when the number of patients treated in dialysis facilities that did not respond to this survey is considered (11). Therefore, the maximum dialysis capacity in 2012 was already greater than the expected maximum number of dialysis patients by at least 50 000 patients.

The percentage of patients who underwent daytime dialysis was 83.3% in 2012, which was the same as that in the previous year. In contrast, 13.5% of the patients underwent nighttime dialysis, an increase of 0.1% from the previous year (13.4%). The absolute number of patients who underwent nighttime dialysis remained approximately 41 000–42 000 over the last ten years (Table 3).

The number of patients who underwent HD at home was 393, an increase of 66 (20.2%) from the previous year (327). The number of patients who underwent HD at home has been increasing rapidly since 2006 (Table 3).

The number of PD + HD patients, which started to be surveyed at the end of 2009, was 1932 at the end of 2012. The number of non-PD + catheter patients was 347. The number of PD dropout patients in 2012 was 175. The number of PD + HD patients increased in 2010 but had remained almost unchanged at approximately 1900 since then. The entire PD patient population has tended to decrease slightly since 2010 (Table 3).

As shown in Table 3, the number of HDF patients had continued to decrease since 2008 but increased approximately 1.5-fold from 14 115 in 2011 to 21 725 in 2012. The demographics of HDF patients are described in detail in "B. Items associated with HDF".

According to the patient survey, the longest dialysis vintage was 44 years and 9 months (Table 1).

Table 4 shows the total number of dialysis patients in each prefecture of Japan determined from the facility survey.

2. Mean age

The dialysis patient population in Japan is aging yearly. Table 5 shows the changes in the mean age of patients obtained from the patient survey. The mean age of new patients who were started on dialysis in 2012 was 68.5 years (± 13.4, ± standard deviation [SD] here and hereafter) compared with a mean age of 66.9 years (± 12.5) for all dialysis patients in 2012. The dialysis patient population aged by 6.2 years from the end of 1992 to the end of 2002 and by 4.7 years from the end of 2002 to the end of 2012. Thus, the rate of aging of the dialysis patient population was decreasing. Similarly, the mean age of new patients who were started on dialysis increased by 5.2 years from the end of 1992 to the end of 2002, but by only 3.8 years from the end of 2002 to the end of 2012. These findings show that the rate of aging of new dialysis patients was also decreasing.

Tables 6 and 7 show the gender and age distributions of patients who started dialysis in 2012 and of all dialysis patients in 2012. In previous surveys, only the mean ages of patients with different primary diseases were summarized. In this survey, the age distributions of patients with different primary diseases were examined for patients who were started on dialysis in 2012 and for all dialysis patients in 2012, as shown in Tables 8 and 9. The data in Tables 6–9 were taken from the patient survey.

3. Primary diseases of dialysis patients

Table 8 shows the age distribution of patients with different primary diseases who were started on dialysis in 2012. Table 9 shows the age distribution of all dialysis patients with different primary diseases at the end of 2012. Figure 3 shows changes in the numbers of new dialysis patients and of all dialysis patients over the years for the three leading primary diseases.

Table 10 (upper) shows changes in the percentage of new patients who were started on dialysis each year for various primary causes of renal failure (primary diseases). The percentage of new patients with diabetic nephropathy as the primary disease was the highest (44.2%), followed by chronic glomerulonephritis (19.4%). The number and percentage of new patients who had diabetic nephropathy as the

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TABLE 3. *Changes in number of patients treated by different dialysis methods*

Year		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Facility survey[1]	Number of patients based on facility survey	229 538	237 710	248 166	257 765	264 473	275 242	283 421	290 661	298 252	304 856	310 007
	(%)[3]	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
	Number of daytime dialysis patients	180 810	187 533	196 337	206 340	213 454	223 953	231 517	238 848	246 146	253 916	258 131
	(%)[3]	(78.8)	(78.9)	(79.1)	(80.0)	(80.7)	(81.4)	(81.7)	(82.2)	(82.5)	(83.3)	(83.3)
	Number of nighttime dialysis patients	39 756	41 202	42 600	41 871	41 641	41 742	42 405	41 719	42 052	40 971	41 969
	(%)[3]	(17.3)	(17.3)	(17.2)	(16.2)	(15.7)	(15.2)	(15.0)	(14.4)	(14.1)	(13.4)	(13.5)
	Number of home HD patients	99	110	114	127	147	187	193	236	277	327	393
	(%)[3]	(0.0)	(0.0)	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
	Number of PD patients [5]	8 569	8 479	8 774	9 243	9 003	9 362	9 300	9 858	9 773	9 642	9 514
	(%)[3]	(3.7)	(3.6)	(3.5)	(3.6)	(3.4)	(3.4)	(3.3)	(3.4)	(3.3)	(3.2)	(3.1)
	Number of PD + HD patients [6]								1 720	1 983	1 902	1 932
	(%)[3]								(0.6)	(0.7)	(0.6)	(0.6)
	Number of non-PD + catheter patients [7]								437	406	369	347
	(%)[3]								(0.2)	(0.1)	(0.1)	(0.1)
Patient survey[2]	Number of patients based on patients survey	220 196	229 446	236 606	240 513	249 957	264 356	273 237	281 996	289 449	295 735	301 545
	(%)[4]	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
	HD	199 891	206 829	213 474	216 880	223 737	235 960	245 090	253 807	262 973	270 072	268 275
	(%)[4]	(90.8)	(90.1)	(90.2)	(90.2)	(89.5)	(89.3)	(89.7)	(90.0)	(90.9)	(91.3)	(89.0)
	HDF	11 509	13 732	14 183	14 083	16 163	17 759	17 380	16 853	14 867	14 115	21 725
	(%)[4]	(5.2)	(6.0)	(6.0)	(5.9)	(6.5)	(6.7)	(6.4)	(6.0)	(5.1)	(4.8)	(7.2)
	PD [5]	7 876	7 874	8 004	8 103	7 971	8 630	8 636	9 164	9 298	9 094	8 996
	(%)[4]	(3.6)	(3.4)	(3.4)	(3.4)	(3.2)	(3.3)	(3.2)	(3.2)	(3.2)	(3.1)	(3.0)

[1]Data obtained from the facility survey. [2]Data obtained from the patient survey. [3]The percentage to the total number of patients based on facility survey at each year. [4]The percentage to the total number of patients based on patient survey at each year. [5]The figures mean "number of CAPD patients" from 2002 to 2008. (CAPD: continuous ambulatory peritoneal dialysis). [6]Number of PD + HD patients: Number of patients who underwent both PD and HD, HDF, hemoadsorption, or hemofiltration (excluding those who underwent only peritoneal lavage). [7]Number of non-PD + catheter patients: Number of patients who did not undergo PD despite having a peritoneal catheter but underwent HD, HDF, hemoadsorption, or hemofiltration (including those who underwent only peritoneal lavage).

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TABLE 4. *Numbers of dialysis patients regularly undergoing dialysis in 47 prefectures*

Names of prefectures	Daytime	Nighttime	Home HD	PD	Total
Hokkaido	12 976	1 380	10	406	14 772
Aomori Prefecture	3 102	187	0	77	3 366
Iwate Prefecture	2 423	465	0	124	3 012
Miyagi Prefecture	4 160	831	0	76	5 067
Akita Prefecture	1 765	138	0	60	1 963
Yamagata Prefecture	2 131	282	6	90	2 509
Fukushima Prefecture	3 989	420	0	182	4 591
Ibaraki Prefecture	6 388	928	1	126	7 443
Tochigi Prefecture	4 947	665	2	61	5 675
Gunma Prefecture	4 495	895	3	86	5 479
Saitama Prefecture	13 736	1 965	70	331	16 102
Chiba Prefecture	11 529	1 614	4	300	13 447
Tokyo	23 382	5 248	38	1092	29 760
Kanagawa Prefecture	15 639	2 760	22	587	19 008
Niigata Prefecture	3 809	994	1	170	4 974
Toyama Prefecture	2 062	285	2	94	2 443
Ishikawa Prefecture	2 156	334	1	87	2 578
Fukui Prefecture	1 460	216	2	74	1 752
Yamanashi Prefecture	2 012	185	1	66	2 264
Nagano Prefecture	3 844	779	4	130	4 757
Gifu Prefecture	3 923	651	9	110	4 693
Shizuoka Prefecture	8 540	1 304	6	204	10 054
Aichi Prefecture	12 919	3 221	39	671	16 850
Mie Prefecture	3 444	547	6	96	4 093
Shiga Prefecture	2 278	416	25	133	2 852
Kyoto Prefecture	4 801	1 085	3	233	6 122
Osaka Prefecture	18 828	2 914	37	575	22 354
Hyogo Prefecture	11 061	1 666	55	247	13 029
Nara Prefecture	2 850	256	6	152	3 264
Wakayama Prefecture	2 597	251	4	33	2 885
Tottori Prefecture	1 248	137	0	90	1 475
Shimane Prefecture	1 278	147	0	73	1 498
Okayama Prefecture	3 913	545	4	212	4 674
Hiroshima Prefecture	6 226	635	13	403	7 277
Yamaguchi Prefecture	2 895	341	0	148	3 384
Tokushima Prefecture	2 200	284	2	170	2 656
Kagawa Prefecture	2 131	240	7	193	2 571
Ehime Prefecture	3 139	397	1	156	3 693
Kochi Prefecture	1 980	280	0	31	2 291
Fukuoka Prefecture	11 009	2 306	2	653	13 970
Saga Prefecture	1 909	288	1	23	2 221
Nagasaki Prefecture	3 266	477	2	153	3 898
Kumamoto Prefecture	5 073	968	1	139	6 181
Oita Prefecture	3 252	441	2	160	3 855
Miyazaki Prefecture	3 064	562	0	52	3 678
Kagoshima Prefecture	4 639	526	1	108	5 274
Okinawa Prefecture	3 663	513	0	77	4 253
Total	258 131	41 969	393	9514	310 007

The total number of patients regularly undergoing dialysis is the total in the column for the number of patients in Sheet I, and does not necessarily agree with the total number of patients counted in accordance with the method of dialysis.

primary disease and were started on dialysis continued to increase until the end of 2009 and reached 16 549 and 44.5%, respectively, in 2009. Since then, however, the number and percentage has remained more or less stable at approximately 16 000 and 44%, respectively, as shown in Figure 3 (left). Here, changes over the last 20 years in the rates of increases in the annual numbers of patients who had chronic glomerulonephritis as the primary disease and were started on dialysis and those who had diabetic

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TABLE 5. *Changes in mean ages of new patients started on dialysis and of all dialysis patients at the end of each year*

	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01
Mean age of all the dialysis patients at the end of each year ± SD	55.3 13.5	56.0 13.5	56.6 13.5	57.3 13.5	58.0 13.4	58.6 13.4	59.2 13.4	59.9 13.3	60.6 13.3	61.2 13.2	61.6 13.1
Mean age of new patients started on dialysis each year ± SD	58.1 14.6	59.5 14.5	59.8 14.4	60.4 14.3	61.0 14.2	61.5 14.2	62.2 14.0	62.7 13.9	63.4 13.9	63.8 13.9	64.2 13.7
	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12
Mean age of all the dialysis patients at the end of each year ± SD	62.2 13.0	62.8 12.9	63.3 12.9	63.9 12.8	64.4 12.8	64.9 12.7	65.3 12.7	65.8 12.6	66.2 12.6	66.6 12.6	66.9 12.5
Mean age of new patients started on dialysis each year ± SD	64.7 13.6	65.4 13.5	65.8 13.4	66.2 13.4	66.4 13.4	66.8 13.3	67.2 13.3	67.3 13.3	67.8 13.3	67.8 13.4	68.5 13.4

nephropathy (corrected by the response collection rate) were plotted (Fig. 4) similarly to the previous survey. The rates of increases in the annual numbers of new dialysis patients with chronic glomerulonephritis and diabetic nephropathy generally tended to decrease but repeatedly increasing and decreasing in short cycles. The rate of increase in the annual number of new dialysis patients with chronic glomerulonephritis had been negative since around 2000, indicating that the number of new dialysis patients with chronic glomerulonephritis had already tended to decrease. Similarly, the regression line for the rate of increase in the annual number of new dialysis patients with diabetic nephropathy fell below zero in 2012. That is, the number of new dialysis patients with diabetic nephropathy is expected to gradually decrease in the future.

Nephrosclerosis was the third most common primary disease (12.3%) after diabetic nephropathy and chronic glomerulonephritis. In relation to the aging of new dialysis patients, the percentage of patients who had nephrosclerosis and were started on

TABLE 6. *Number of new patients started on dialysis in 2012 by various age groups of both genders*

Age at introduction into dialysis	Male	Female	Subtotal	No information available	Total
<5	6 (0.0)	4 (0.0)	10 (0.0)		10 (0.0)
5–9	2 (0.0)	4 (0.0)	6 (0.0)		6 (0.0)
10–14	10 (0.0)	4 (0.0)	14 (0.0)		14 (0.0)
15–19	21 (0.1)	11 (0.1)	32 (0.1)		32 (0.1)
20–24	42 (0.2)	24 (0.2)	66 (0.2)		66 (0.2)
25–29	111 (0.4)	42 (0.4)	153 (0.4)		153 (0.4)
30–34	202 (0.8)	84 (0.7)	286 (0.8)		286 (0.8)
35–39	417 (1.7)	207 (1.7)	624 (1.7)		624 (1.7)
40–44	705 (2.9)	298 (2.5)	1 003 (2.7)		1 003 (2.7)
45–49	1 040 (4.2)	348 (2.9)	1 388 (3.8)		1 388 (3.8)
50–54	1 330 (5.4)	517 (4.3)	1 847 (5.0)		1 847 (5.0)
55–59	1 907 (7.7)	697 (5.9)	2 604 (7.1)		2 604 (7.1)
60–64	3 248 (13.2)	1 315 (11.1)	4 563 (12.5)		4 563 (12.5)
65–69	3 405 (13.8)	1 492 (12.5)	4 897 (13.4)		4 897 (13.4)
70–74	3 734 (15.1)	1 623 (13.6)	5 357 (14.6)		5 357 (14.6)
75–79	3 747 (15.2)	1 962 (16.5)	5 709 (15.6)		5 709 (15.6)
80–84	3 051 (12.4)	1 778 (14.9)	4 829 (13.2)		4 829 (13.2)
85–89	1 369 (5.5)	1 147 (9.6)	2 516 (6.9)		2 516 (6.9)
90–94	294 (1.2)	287 (2.4)	581 (1.6)		581 (1.6)
≥95	47 (0.2)	55 (0.5)	102 (0.3)		102 (0.3)
Subtotal	24 688 (100.0)	11 899 (100.0)	36 587 (100.0)		36 587 (100.0)
Unknown	1	2	3		3
No information available					
Total	24 689	11 901	36 590		36 590
Mean age	67.65	70.11	68.45		68.45
SD	13.18	13.62	13.37		13.37

Values in parentheses represent the percentage relative to the total in each column.

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TABLE 7. *Number of all dialysis patients by various age groups of both genders in 2012*

Age at introduction into dialysis	Male	Female	Subtotal	No information available	Total
<5	23 (0.0)	13 (0.0)	36 (0.0)		36 (0.0)
5–9	16 (0.0)	20 (0.0)	36 (0.0)		36 (0.0)
10–14	31 (0.0)	16 (0.0)	47 (0.0)		47 (0.0)
15–19	61 (0.0)	35 (0.0)	96 (0.0)		96 (0.0)
20–24	194 (0.1)	97 (0.1)	291 (0.1)		291 (0.1)
25–29	564 (0.3)	264 (0.2)	828 (0.3)		828 (0.3)
30–34	1 295 (0.7)	656 (0.6)	1 951 (0.6)		1 951 (0.6)
35–39	3 169 (1.7)	1 554 (1.4)	4 723 (1.6)		4 723 (1.6)
40–44	6 065 (3.2)	2 746 (2.5)	8 811 (2.9)		8 811 (2.9)
45–49	8 812 (4.6)	3 911 (3.5)	12 723 (4.2)		12 723 (4.2)
50–54	11 966 (6.3)	5 924 (5.3)	17 890 (5.9)		17 890 (5.9)
55–59	17 628 (9.3)	9 075 (8.2)	26 703 (8.9)		26 703 (8.9)
60–64	30 808 (16.2)	16 354 (14.7)	47 162 (15.6)		47 162 (15.6)
65–69	29 465 (15.5)	16 199 (14.6)	45 664 (15.1)		45 664 (15.1)
70–74	28 771 (15.1)	16 659 (15.0)	45 430 (15.1)		45 430 (15.1)
75–79	25 547 (13.4)	15 708 (14.1)	41 255 (13.7)		41 255 (13.7)
80–84	16 808 (8.8)	12 391 (11.1)	29 199 (9.7)		29 199 (9.7)
85–89	7 254 (3.8)	7 125 (6.4)	14 379 (4.8)		14 379 (4.8)
90–94	1 592 (0.8)	2 135 (1.9)	3 727 (1.2)		3 727 (1.2)
≥95	236 (0.1)	351 (0.3)	587 (0.2)		587 (0.2)
Subtotal	190 305 (100.0)	111 233 (100.0)	301 538 (100.0)		301 538 (100.0)
Unknown	3	4	7		7
No information available					
Total	190 308	111 237	301 545		301 545
Mean age	66.09	68.21	66.87		66.87
SD	12.39	12.68	12.54		12.54

Values in parentheses represent the percentage relative to the total in each column.

dialysis continued to increase steadily. The percentage of patients with "unspecified" primary diseases was the fourth highest (11.0%). 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 dialysis patients with these primary diseases among all new dialysis patients were 0.7–2.5%, which was much smaller than the percentages of patients with the abovementioned top three primary diseases and unspecified diseases, and showed no marked increase or decrease over the past 20 years.

Table 10 (lower) shows changes in the percentages of all dialysis patients with various primary diseases at the end of each year. Previously, chronic glomerulonephritis was the most common primary disease among all dialysis patients. However, the percentage of patients with this primary disease had continued to decrease, and the absolute number of such patients also started decreasing around 2005. In contrast, the number of patients with diabetic nephropathy continued to increase and exceeded that of patients with chronic glomerulonephritis in 2011 to become the most common primary disease in the dialysis patient population. In 2012, the percentage of patients with diabetic nephropathy further increased (37.1%), whereas that of patients with chronic glomerulonephritis decreased (33.6%).

The primary diseases accounting for the third highest percentage of patients among all dialysis patients in 2012 were unspecified (8.5%). The percentage of patients with nephrosclerosis among all dialysis patients was 8.3% and 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 past 20 years.

4. Causes of death

Table 11 shows the classification of causes of death of patients who were started on dialysis in 2012 and who died by the end of 2012. The leading cause of death of patients who were started on dialysis in 2012 was infectious diseases (25.7%). This was followed by cardiac failure (25.5%), other causes (11.2%), malignant tumors (10.6%), and unspecified causes (7.7%).

Table 12 shows the classification of the causes of death of all dialysis patients who died in 2012.

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TABLE 8. *Number of new patients started on dialysis in 2012 for different primary diseases and various age groups*

Primary disease	<5	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64
Chronic glomerulonephritis (%)			1 (0.0)	11 (0.2)	24 (0.3)	64 (0.9)	87 (1.2)	156 (2.2)	244 (3.4)	252 (3.5)	342 (4.8)	469 (6.6)	808 (11.4)
Chronic pyelonephritis (%)				1 (0.4)	3 (1.1)	4 (1.4)	2 (0.7)	12 (4.2)	11 (3.9)	17 (6.0)	15 (5.3)	22 (7.7)	34 (12.0)
Rapidly progressive glomerulonephritis (%)				2 (0.4)	3 (0.6)	3 (0.6)	5 (1.0)	6 (1.2)	4 (0.8)	5 (1.0)	18 (3.7)	32 (6.6)	46 (9.5)
Nephropathy of pregnancy/pregnancy toxemia (%)								3 (8.3)	2 (5.6)	1 (2.8)	2 (5.6)	4 (11.1)	7 (19.4)
Other nephritides that cannot be classified (%)		1 (0.7)		3 (2.1)	1 (0.7)	1 (0.7)	6 (4.2)	6 (4.2)	5 (3.5)	8 (5.6)	8 (5.6)	8 (5.6)	18 (12.7)
Polycystic kidney (%)	2 (0.2)				1 (0.1)	2 (0.2)	6 (0.6)	15 (1.6)	52 (5.6)	71 (7.6)	103 (11.1)	118 (12.7)	154 (16.6)
Nephrosclerosis (%)						6 (0.1)	9 (0.2)	34 (0.8)	52 (1.2)	69 (1.5)	94 (2.1)	171 (3.8)	304 (6.7)
Malignant hypertension (%)					2 (0.7)	4 (1.3)	12 (4.0)	17 (5.6)	19 (6.3)	23 (7.6)	20 (6.6)	14 (4.7)	22 (7.3)
Diabetic nephropathy (%)			2 (0.0)	2 (0.0)	1 (0.0)	16 (0.1)	93 (0.6)	248 (1.5)	455 (2.8)	727 (4.5)	1 011 (6.3)	1430 (8.8)	2495 (15.4)
SLE nephritis (%)			1 (0.4)	1 (0.4)	3 (1.1)	5 (1.9)	9 (3.3)	13 (4.8)	11 (4.1)	15 (5.6)	16 (5.9)	14 (5.2)	42 (15.6)
Amyloidal kidney (%)								1 (1.0)	4 (3.8)	2 (1.9)	1 (1.0)	7 (6.7)	13 (12.4)
Gouty kidney (%)							1 (1.2)	5 (5.8)	2 (2.3)	1 (1.2)	3 (3.5)	10 (11.6)	17 (19.8)
Renal failure due to congenital abnormality of metabolism (%)	1 (5.0)		1 (5.0)	1 (5.0)	2 (10.0)	2 (10.0)	1 (5.0)	5 (25.0)		1 (5.0)	1 (5.0)	1 (5.0)	3 (15.0)
Kidney and urinary tract tuberculosis (%)											1 (6.3)		3 (18.8)
Kidney and urinary tract stone (%)									1 (1.5)	2 (2.9)	2 (2.9)	2 (2.9)	15 (22.1)
Kidney and urinary tract tumor (%)				1 (0.5)			1 (0.5)	2 (1.1)	2 (1.1)	5 (2.7)	3 (1.6)	7 (3.7)	17 (9.0)
Obstructive urinary tract disease (%)				1 (1.0)			1 (1.0)	4 (3.8)	1 (1.0)	4 (3.8)	2 (1.9)	4 (3.8)	12 (11.4)
Myeloma (%)								1 (0.7)	1 (0.7)	1 (0.7)	4 (2.9)	8 (5.9)	16 (11.8)
Hypoplastic kidney (%)	5 (9.1)	4 (7.3)	6 (10.9)	3 (5.5)	5 (9.1)	3 (5.5)	3 (5.5)	3 (5.5)	1 (1.8)	1 (1.8)	2 (3.6)	1 (1.8)	3 (5.5)
Undetermined (%)			1 (0.0)	3 (0.1)	6 (0.1)	17 (0.4)	26 (0.6)	57 (1.4)	85 (2.1)	119 (2.9)	127 (3.1)	184 (4.6)	363 (9.0)
Reintroduction after transplantation (%)			1 (0.5)		2 (0.9)	4 (1.8)	9 (4.1)	12 (5.5)	19 (8.7)	23 (10.5)	29 (13.2)	27 (12.3)	30 (13.7)
Others (%)	2 (0.2)	1 (0.1)	1 (0.1)	3 (0.2)	13 (1.0)	22 (1.7)	15 (1.1)	24 (1.8)	32 (2.5)	41 (3.1)	43 (3.3)	71 (5.4)	140 (10.7)
Subtotal (%)	10 (0.0)	6 (0.0)	14 (0.0)	32 (0.1)	66 (0.2)	153 (0.4)	286 (0.8)	624 (1.7)	1003 (2.7)	1388 (3.8)	1 847 (5.0)	2604 (7.1)	4562 (12.5)
No information available (%)													1 (11.1)
Total (%)	10 (0.0)	6 (0.0)	14 (0.0)	32 (0.1)	66 (0.2)	153 (0.4)	286 (0.8)	624 (1.7)	1003 (2.7)	1388 (3.8)	1 847 (5.0)	2604 (7.1)	4563 (12.5)

Primary disease	65–69	70–74	75–79	80–84	85–89	90–94	≥95	Total	Unspecified	No information on birth date	Total	Mean age	SD
Chronic glomerulonephritis (%)	878 (12.4)	956 (13.4)	1135 (16.0)	996 (14.0)	529 (7.4)	131 (1.8)	25 (0.4)	7 108 (100.0)			7 108	68.21	14.39
Chronic pyelonephritis (%)	21 (7.4)	38 (13.4)	44 (15.5)	35 (12.3)	22 (7.7)	3 (1.1)		284 (100.0)			284	65.87	15.83
Rapidly progressive glomerulonephritis (%)	51 (10.5)	73 (15.0)	100 (20.6)	72 (14.8)	51 (10.5)	11 (2.3)	4 (0.8)	486 (100.0)			486	71.40	13.39
Nephropathy of pregnancy/pregnancy toxemia (%)	8 (22.2)	3 (8.3)	4 (11.1)	2 (5.6)				36 (100.0)			36	62.25	12.01
Other nephritides that cannot be classified (%)	15 (10.6)	16 (11.3)	19 (13.4)	15 (10.6)	9 (6.3)	3 (2.1)		142 (100.0)			142	63.40	18.07
Polycystic kidney (%)	121 (13.0)	101 (10.9)	98 (10.5)	52 (5.6)	26 (2.8)	6 (0.6)	2 (0.2)	930 (100.0)			930	62.49	12.94
Nephrosclerosis (%)	421 (9.3)	650 (14.4)	887 (19.7)	1000 (22.2)	622 (13.8)	166 (3.7)	26 (0.6)	4 511 (100.0)	1		4 512	74.85	11.30
Malignant hypertension (%)	33 (11.0)	29 (9.6)	39 (13.0)	38 (12.6)	21 (7.0)	7 (2.3)	1 (0.3)	301 (100.0)			301	63.82	17.46
Diabetic nephropathy (%)	2550 (15.8)	2523 (15.6)	2279 (14.1)	1602 (9.9)	615 (3.8)	111 (0.7)	11 (0.1)	16 171 (100.0)			16 171	66.70	11.99
SLE nephritis (%)	38 (14.1)	41 (15.2)	35 (13.0)	18 (6.7)	6 (2.2)	1 (0.4)		269 (100.0)			269	62.05	15.68
Amyloidal kidney (%)	19 (18.1)	29 (27.6)	16 (15.2)	9 (8.6)	3 (2.9)	1 (1.0)		105 (100.0)			105	69.12	10.24
Gouty kidney (%)	11 (12.8)	10 (11.6)	14 (16.3)	9 (10.5)	2 (2.3)	1 (1.2)		86 (100.0)			86	66.07	13.05
Renal failure due to congenital abnormality of metabolism (%)	1 (5.0)							20 (100.0)			20	38.20	18.16
Kidney and urinary tract tuberculosis (%)	2 (12.5)	2 (12.5)	3 (18.8)	1 (6.3)	2 (12.5)	2 (12.5)		16 (100.0)			16	73.88	11.92
Kidney and urinary tract stone (%)	11 (16.2)	9 (13.2)	14 (20.6)	7 (10.3)	4 (5.9)	1 (1.5)		68 (100.0)			68	70.21	10.20
Kidney and urinary tract tumor (%)	21 (11.2)	28 (14.9)	49 (26.1)	33 (17.6)	16 (8.5)	2 (1.1)	1 (0.5)	188 (100.0)			188	72.51	11.95
Obstructive urinary tract disease (%)	13 (12.4)	17 (16.2)	16 (15.2)	21 (20.0)	7 (6.7)	2 (1.9)		105 (100.0)	1		106	69.87	13.86
Myeloma (%)	24 (17.6)	24 (17.6)	28 (20.6)	15 (11.0)	10 (7.4)	3 (2.2)	1 (0.7)	136 (100.0)			136	71.56	10.28
Hypoplastic kidney (%)	1 (1.8)	5 (9.1)	4 (7.3)	4 (7.3)		1 (1.8)		55 (100.0)			55	39.11	27.97
Undetermined (%)	483 (12.0)	584 (14.5)	682 (16.9)	703 (17.4)	466 (11.5)	106 (2.6)	25 (0.6)	4 037 (100.0)			4 037	71.75	13.25
Reintroduction after transplantation (%)	14 (6.4)	18 (8.2)	12 (5.5)	12 (5.5)	7 (3.2)			219 (100.0)			219	56.72	15.20
Others (%)	161 (12.3)	201 (15.4)	228 (17.5)	180 (13.8)	98 (7.5)	23 (1.8)	6 (0.5)	1 305 (100.0)	1		1 306	68.44	15.23
Subtotal (%)	4897 (13.4)	5357 (14.6)	5706 (15.6)	4824 (13.2)	2516 (6.9)	581 (1.6)	102 (0.3)	36 578 (100.0)	3		36 581	68.45	13.37
No information available (%)			3 (33.3)	5 (55.6)				9 (100.0)			9	77.33	6.04
Total (%)	4897 (13.4)	5357 (14.6)	5709 (15.6)	4829 (13.2)	2516 (6.9)	581 (1.6)	102 (0.3)	36 587 (100.0)	3		36 590	68.45	13.37

Values in parentheses represent the percentage relative to the total in each row. The column "No information on birth date" shows the number of patients who provided no date of birth; thus, the calculation of age was impossible.

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TABLE 9. *Number of all dialysis patients for different primary diseases and various age groups in 2012*

Primary disease	<5	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64
Chronic glomerulonephritis (%)		3 (0.0)	7 (0.0)	31 (0.0)	91 (0.1)	330 (0.3)	797 (0.8)	1 895 (1.9)	3411 (3.4)	4 729 (4.7)	6 572 (6.5)	9 985 (9.9)	16 906 (16.7)
Chronic pyelonephritis (%)				1 (0.0)	6 (0.2)	29 (1.0)	42 (1.4)	104 (3.4)	137 (4.5)	190 (6.3)	179 (5.9)	253 (8.3)	488 (16.1)
Rapidly progressive glomerulonephritis (%)		2 (0.1)	1 (0.0)	2 (0.1)	6 (0.3)	13 (0.6)	21 (0.9)	52 (2.3)	73 (3.2)	61 (2.6)	114 (5.0)	158 (6.9)	307 (13.3)
Nephropathy of pregnancy/pregnancy toxemia (%)							8 (0.5)	17 (1.0)	52 (3.1)	85 (5.0)	145 (8.6)	213 (12.6)	414 (24.5)
Other nephritides that cannot be classified (%)		2 (0.1)	2 (0.1)	6 (0.4)	17 (1.3)	33 (2.4)	45 (3.3)	79 (5.8)	93 (6.9)	101 (7.5)	92 (6.8)	119 (8.8)	166 (12.3)
Polycystic kidney (%)	2 (0.0)		1 (0.0)	3 (0.0)	4 (0.0)	16 (0.2)	38 (0.4)	106 (1.0)	290 (2.8)	553 (5.3)	886 (8.5)	1 282 (12.4)	2 071 (20.0)
Nephrosclerosis (%)		1 (0.0)	1 (0.0)	2 (0.0)	9 (0.0)	25 (0.1)	59 (0.2)	172 (0.7)	346 (1.4)	469 (1.9)	660 (2.7)	1 138 (4.6)	2 182 (8.8)
Malignant hypertension (%)				1 (0.0)	3 (0.1)	12 (0.5)	41 (1.7)	87 (3.5)	147 (5.9)	187 (7.6)	205 (8.3)	226 (9.1)	309 (12.5)
Diabetic nephropathy (%)		1 (0.0)	3 (0.0)	6 (0.0)	3 (0.0)	42 (0.0)	347 (0.3)	1 176 (1.1)	2682 (2.4)	4 439 (4.0)	6 695 (6.0)	10 014 (8.9)	18 903 (16.9)
SLE nephritis (%)			1 (0.0)	1 (0.0)	10 (0.4)	18 (0.8)	48 (2.1)	97 (4.2)	154 (6.6)	198 (8.5)	241 (10.4)	286 (12.3)	372 (16.0)
Amyloidal kidney (%)								9 (1.9)	22 (4.7)	16 (3.4)	21 (4.5)	33 (7.1)	74 (15.8)
Gouty kidney (%)						1 (0.1)	4 (0.4)	24 (2.1)	30 (2.6)	40 (3.5)	47 (4.1)	100 (8.8)	169 (14.9)
Renal failure due to congenital abnormality of metabolism (%)	1 (0.4)		3 (1.1)	5 (1.8)	9 (3.3)	16 (5.9)	21 (7.7)	40 (14.7)	31 (11.4)	26 (9.5)	17 (6.2)	18 (6.6)	33 (12.1)
Kidney and urinary tract tuberculosis (%)									1 (0.4)	1 (0.4)	8 (3.2)	13 (5.2)	31 (12.4)
Kidney and urinary tract stone (%)							1 (0.2)	2 (0.3)	4 (0.7)	13 (2.3)	29 (5.0)	44 (7.6)	69 (12.0)
Kidney and urinary tract tumor (%)		1 (0.1)		1 (0.1)	1 (0.1)	2 (0.2)	4 (0.5)	7 (0.8)	10 (1.2)	13 (1.6)	12 (1.4)	37 (4.4)	96 (11.5)
Obstructive urinary tract disease (%)	3 (0.4)			1 (0.1)	8 (1.1)	18 (2.5)	22 (3.1)	43 (6.0)	45 (6.2)	45 (6.2)	42 (5.8)	38 (5.3)	71 (9.8)
Myeloma (%)							1 (0.4)	1 (0.4)	6 (2.6)	5 (2.1)	8 (3.4)	17 (7.2)	30 (12.8)
Hypoplastic kidney (%)	20 (3.3)	11 (1.8)	15 (2.5)	20 (3.3)	33 (5.4)	52 (8.6)	73 (12.0)	83 (13.7)	71 (11.7)	50 (8.2)	26 (4.3)	30 (4.9)	32 (5.3)
Undetermined (%)			1 (0.0)	5 (0.0)	25 (0.1)	80 (0.3)	185 (0.7)	405 (1.6)	693 (2.7)	883 (3.5)	1 203 (4.7)	1 811 (7.1)	3 266 (12.8)
Reintroduction after transplantation (%)			2 (0.1)	2 (0.1)	14 (0.6)	33 (1.5)	58 (2.7)	120 (5.5)	189 (8.6)	282 (12.9)	310 (14.2)	376 (17.2)	360 (16.5)
Others (%)	10 (0.1)	15 (0.2)	10 (0.1)	9 (0.1)	52 (0.8)	108 (1.6)	136 (2.0)	203 (3.0)	324 (4.7)	336 (4.9)	378 (5.5)	511 (7.4)	811 (11.8)
Subtotal (%)	36 (0.0)	36 (0.0)	47 (0.0)	96 (0.0)	291 (0.1)	828 (0.3)	1951 (0.6)	4 722 (1.6)	8811 (2.9)	12 722 (4.2)	17 890 (5.9)	26 702 (8.9)	47 160 (15.6)
No information available (%)								1 (4.8)		1 (4.8)		1 (4.8)	2 (9.5)
Total (%)	36 (0.0)	36 (0.0)	47 (0.0)	96 (0.0)	291 (0.1)	828 (0.3)	1 951 (0.6)	4 723 (1.6)	8811 (2.9)	12 723 (4.2)	17 890 (5.9)	26 703 (8.9)	47 162 (15.6)

Primary disease	65–69	70–74	75–79	80–84	85–89	90–94	≥95	Total	Unspecified	No information on birth date	Total	Mean age	SD
Chronic glomerulonephritis (%)	15 496 (15.3)	14 618 (14.4)	12 406 (12.2)	8 636 (8.5)	4 181 (4.1)	1081 (1.1)	167 (0.2)	101 342 (100.0)			101 342	65.78	12.59
Chronic pyelonephritis (%)	437 (14.4)	397 (13.1)	356 (11.7)	243 (8.0)	127 (4.2)	37 (1.2)	7 (0.2)	3 033 (100.0)			3 033	64.36	14.02
Rapidly progressive glomerulonephritis (%)	292 (12.7)	365 (15.9)	396 (17.2)	277 (12.0)	133 (5.8)	23 (1.0)	6 (0.3)	2 302 (100.0)			2 302	67.86	13.40
Nephropathy of pregnancy/pregnancy toxemia (%)	308 (18.2)	228 (13.5)	150 (8.9)	61 (3.6)	11 (0.7)			1 692 (100.0)			1 692	63.29	9.95
Other nephritides that cannot be classified (%)	135 (10.0)	165 (12.2)	139 (10.3)	95 (7.0)	51 (3.8)	13 (1.0)	2 (0.1)	1 355 (100.0)			1 355	60.15	16.77
Polycystic kidney (%)	1 679 (16.2)	1 459 (14.1)	1 086 (10.5)	592 (5.7)	250 (2.4)	48 (0.5)	3 (0.0)	10 369 (100.0)			10 369	64.38	11.20
Nephrosclerosis (%)	2 626 (10.5)	3 530 (14.2)	4 664 (18.7)	4 733 (19.0)	3 104 (12.5)	983 (3.9)	188 (0.8)	24 892 (100.0)	1		24 893	73.77	11.80
Malignant hypertension (%)	289 (11.7)	280 (11.3)	276 (11.2)	225 (9.1)	124 (5.0)	51 (2.1)	10 (0.4)	2 473 (100.0)			2 473	64.02	14.88
Diabetic nephropathy (%)	19 034 (17.0)	18 564 (16.6)	15 900 (14.2)	9 598 (8.6)	3 773 (3.4)	733 (0.7)	82 (0.1)	111 995 (100.0)	2		111 997	66.91	11.18
SLE nephritis (%)	283 (12.2)	258 (11.1)	203 (8.7)	110 (4.7)	35 (1.5)	8 (0.3)	4 (0.2)	2 327 (100.0)			2 327	60.08	13.58
Amyloidal kidney (%)	83 (17.8)	90 (19.3)	72 (15.4)	40 (8.6)	5 (1.1)	2 (0.4)		467 (100.0)			467	66.58	11.26
Gouty kidney (%)	195 (17.2)	224 (19.7)	162 (14.3)	98 (8.6)	31 (2.7)	8 (0.7)	2 (0.2)	1 135 (100.0)			1 135	67.08	11.32
Renal failure due to congenital abnormality of metabolism (%)	18 (6.6)	11 (4.0)	6 (2.2)	14 (5.1)	2 (0.7)	2 (0.7)		273 (100.0)			273	48.81	17.54
Kidney and urinary tract tuberculosis (%)	54 (21.7)	48 (19.3)	31 (12.4)	38 (15.3)	19 (7.6)	5 (2.0)		249 (100.0)			249	71.76	9.54
Kidney and urinary tract stone (%)	83 (14.4)	110 (19.1)	104 (18.1)	76 (13.2)	30 (5.2)	10 (1.7)	1 (0.2)	576 (100.0)			576	70.36	10.60
Kidney and urinary tract tumor (%)	121 (14.5)	127 (15.2)	195 (23.3)	144 (17.2)	51 (6.1)	10 (1.2)	5 (0.6)	837 (100.0)			837	71.79	11.38
Obstructive urinary tract disease (%)	79 (11.0)	80 (11.1)	96 (13.3)	88 (12.2)	30 (4.2)	11 (1.5)	1 (0.1)	721 (100.0)	1		722	62.55	17.52
Myeloma (%)	44 (18.7)	38 (16.2)	41 (17.4)	25 (10.6)	16 (6.8)	2 (0.9)	1 (0.4)	235 (100.0)			235	69.66	11.20
Hypoplastic kidney (%)	27 (4.4)	26 (4.3)	20 (3.3)	11 (1.8)	7 (1.2)	1 (0.2)		608 (100.0)			608	41.72	19.23
Undetermined (%)	3 325 (13.0)	3 758 (14.7)	3 944 (15.4)	3 321 (13.0)	1 989 (7.8)	592 (2.3)	96 (0.4)	25 582 (100.0)	2		25 584	69.14	13.15
Reintroduction after transplantation (%)	170 (7.8)	117 (5.3)	73 (3.3)	49 (2.2)	24 (1.1)	8 (0.4)		2 187 (100.0)			2 187	55.31	12.62
Others (%)	882 (12.8)	935 (13.6)	933 (13.6)	719 (10.5)	384 (5.6)	99 (1.4)	12 (0.2)	6 867 (100.0)	1		6 868	64.90	15.83
Subtotal (%)	45 660 (15.1)	45 428 (15.1)	41 253 (13.7)	29 193 (9.7)	14 377 (4.8)	3727 (1.2)	587 (0.2)	301 517 (100.0)	7		301 524	66.87	12.54
No information available (%)	4 (19.0)	2 (9.5)	2 (9.5)	6 (28.6)	2 (9.5)			21 (100.0)			21	71.19	12.18
Total (%)	45 664 (15.1)	45 430 (15.1)	41 255 (13.7)	29 199 (9.7)	14 379 (4.8)	3727 (1.2)	587 (0.2)	301 538 (100.0)	7		301 545	66.87	12.54

Values in parentheses represent the percentage relative to the total in each row. The column "No information on birth date" shows the number of patients who provided no date of birth; thus, the calculation of age was impossible.

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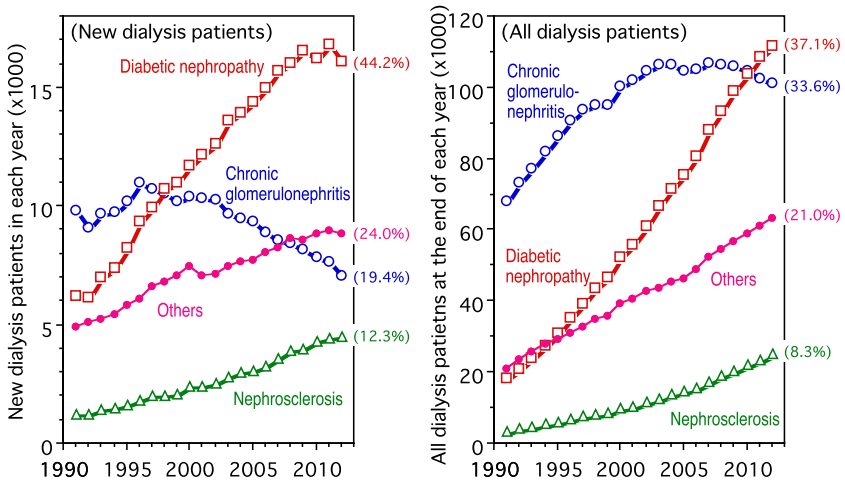

FIG. 3. Changes in numbers of new dialysis patients in each year (left) and all dialysis patients at the end of each year (right) for three leading primary diseases.

Table 13 shows changes in the percentages of the leading causes of death in all dialysis patients. Among all dialysis patients, the leading cause of death in 2012 was cardiac failure (27.2%). The percentage of patients who died of cardiac failure among all dialysis patients markedly decreased in the 1990s, after which it remained almost unchanged. The second leading cause of death among all dialysis patients was infectious diseases (20.3%), which had continued to increase until 2009 but has remained almost unchanged since then. The percentage of patients who died of malignant tumors was 9.1%. The percentage of patients who died of cerebrovascular disorder had continued to decrease since 1995 and reached 7.5% in 2012. The percentage of patients who died of myocardial infarction was 4.5%

Note that the classification codes for the causes of death were considerably revised in the 2003 and 2010 surveys. For details of these revisions, please refer to the 2010 survey report (13).

5. Annual crude death rate

The annual crude death rate was calculated from the facility survey data (Table 14). The annual crude death rate is defined as the percentage of patients who died each year with respect to the mean annual dialysis patient population. Table 14 shows the annual crude death rates between 1991 and 2012. The annual crude death rate had remained in the range of 9.0–9.9% since 1991 but tended to gradually increase after 2000. This is because the growth in dialysis patient population has slowed down since 2000, whereas the number of deaths was steady, as mentioned above. The annual crude death rate in 2011 was 10.2%, which exceeded 10% for the first time in the last 20 years. However, the annual crude death rate in 2012 was 10.0%, which was lower than that in 2011. This is attributed to the slight decrease in the number of deaths in 2012 from that in 2011. Basically, however, the annual crude death rate is expected to gradually increase because the annual number of deaths will continue to increase in the future, as described above.

6. Cumulative survival rate of new patients who were started on dialysis in and after 1983

The cumulative survival rates of new patients who were started on dialysis in and after 1983 are summarized by the year of starting dialysis (Table 15). The one- to 10-year survival rates were lowest for patients who were started on dialysis in 1992 and had been increasing for patients who were started on dialysis in 1993 or later. However, the 5-year survival rate for patients who were started on dialysis between 2003 and 2007 and the 10-year survival rates for patients who were started on dialysis between 1998 and 2002 have remained almost unchanged. The 15-year survival rate, which was calculated for the first time in the 2007 survey for patients who were started on dialysis in 1992, remained almost unchanged in the subsequent 5 years.

B. Items associated with HDF

A purified dialysate is used as a substitution fluid in on-line HDF. This method had not been included in the targets of the health insurance system in Japan until 2012. The public health insurance system is revised every 2 years in Japan. Owing to the latest revision made in April 2012, on-line HDF was included in the targets of the system, allowing medical institutions that provide on-line HDF to obtain additional points. Given this situation, items associated with HDF were examined in detail in this survey.

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TABLE 10. *Changes in percentages of new patients started on dialysis (upper) and for all dialysis patients (lower) with various primary diseases at the end of each year*

▼ New patients started on dialysis each year

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Diabetic nephropathy	28.1	28.4	29.9	30.7	31.9	33.1	33.9	35.7	36.2	36.6	38.1
Chronic glomerulonephritis	44.2	42.2	41.4	40.5	39.4	38.9	36.6	35.0	33.6	32.5	32.4
Nephrosclerosis	5.5	5.9	6.2	6.1	6.3	6.4	6.8	6.7	7.0	7.6	7.6
Polycystic kidney	3.0	2.7	2.6	2.5	2.4	2.5	2.4	2.4	2.2	2.4	2.3
Rapidly progressive glomerulonephritis	0.6	0.7	0.8	0.8	0.8	0.8	1.1	0.9	0.9	1.0	1.0
SLE nephritis	1.3	1.3	1.2	1.2	1.1	1.3	1.0	1.1	1.2	0.9	1.0
Chronic pyelonephritis	1.7	1.6	1.1	1.4	1.2	1.1	1.2	1.1	1.1	1.0	1.1
Undetermined	3.7	3.7	3.3	3.9	4.5	5.0	5.5	5.6	6.1	7.6	9.0
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Diabetic nephropathy	39.1	41.0	41.3	42.0	42.9	43.4	43.3	44.5	43.6	44.3	44.2
Chronic glomerulonephritis	31.9	29.1	28.1	27.4	25.6	23.8	22.8	21.9	21.0	20.2	19.4
Nephrosclerosis	7.8	8.5	8.8	9.0	9.4	10.0	10.6	10.7	11.7	11.8	12.3
Polycystic kidney	2.4	2.3	2.7	2.3	2.4	2.3	2.5	2.3	2.4	2.5	2.5
Rapidly progressive glomerulonephritis	1.1	1.2	1.1	1.1	1.2	1.3	1.2	1.2	1.2	1.3	1.3
SLE nephritis	0.9	0.7	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.7	0.7
Chronic pyelonephritis	0.9	1.0	0.9	1.0	0.8	0.8	0.7	0.7	0.8	0.7	0.8
Undetermined	8.4	8.8	9.3	9.5	9.9	10.2	10.6	10.7	10.7	10.9	11.0

▼ All dialysis patients at the end of each year

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Diabetic nephropathy	16.4	17.1	18.2	19.2	20.4	21.6	22.7	24.0	25.1	26.0	27.2
Chronic glomerulonephritis	61.7	60.4	58.8	57.7	56.6	55.4	54.1	52.5	51.1	49.7	49.6
Nephrosclerosis	2.9	3.1	3.4	3.6	3.8	4.0	4.2	4.4	4.5	4.8	5.0
Polycystic kidney	3.3	3.3	3.3	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.3
Chronic pyelonephritis	2.1	2.0	1.9	1.8	1.7	1.6	1.6	1.5	1.5	1.4	1.4
SLE nephritis	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0
Rapidly progressive glomerulonephritis	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6
Undetermined	2.9	2.9	2.9	3.1	3.2	3.6	3.9	4.2	4.4	5.0	5.6
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Diabetic nephropathy	28.1	29.2	30.2	31.4	32.3	33.4	34.2	35.1	35.9	36.7	37.1
Chronic glomerulonephritis	48.2	46.6	45.1	43.6	42.2	40.4	39.0	37.6	36.2	34.8	33.6
Nephrosclerosis	5.1	5.3	5.7	5.9	6.2	6.5	6.8	7.1	7.5	7.9	8.3
Polycystic kidney	3.3	3.3	3.4	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Chronic pyelonephritis	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0
SLE nephritis	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
Rapidly progressive glomerulonephritis	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.8
Undetermined	5.9	6.3	6.4	6.6	7.0	7.4	7.6	7.7	8.0	8.2	8.5

1. Changes in number of HDF patients

Table 16 shows changes in the number of HDF patients between 2009 and 2012. The number of HDF patients yearly decreased between 2009 and 2011. In 2012, however, it increased to 21 725, a marked increase of 7610 (53.9%) from 14 115 in the previous year.

The breakdown of HDF patients is examined as follows. The number of patients who underwent on-line HDF in 2011 was 4890, which accounted for only 34.6% of the entire HDF patient population. In 2012, it increased approximately threefold to 14 069, which accounted for 64.8% of the entire HDF patient population, almost double that in the previous year. The absolute numbers of patients who underwent off-line HDF, push/pull HDF, and acetate free biofiltration (AFBF) in 2012 were all smaller than those in 2011.

The above results suggest that not only HD patients but also many other patients who underwent HDF regimens excluding on-line HDF changed the dialysis method to on-line HDF in 2012.

2. Modes of dilution of substitution fluid

Table 17 shows the numbers of patients with different modes of dilution of substitution fluid who

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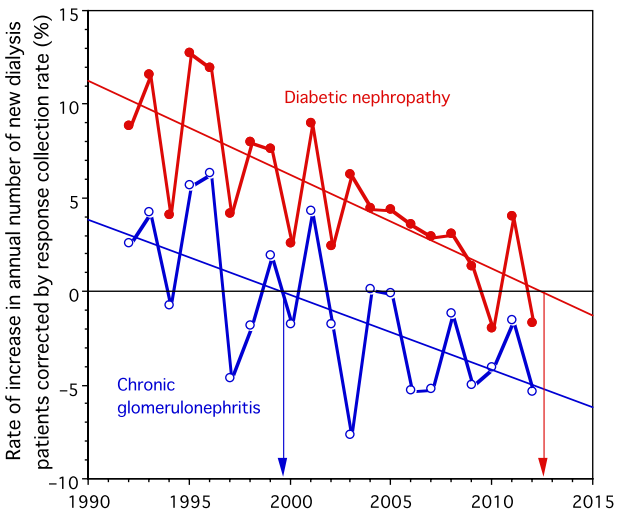

FIG. 4. Changes in rates of increases in annual numbers of new dialysis patients with chronic glomerulonephritis and diabetic nephropathy as primary diseases corrected by response collection rate.

underwent on-line or off-line HDF. The postdilution mode was adopted in 91.0% of the patients who underwent off-line HDF, whereas the predilution mode was adopted in 90.7% of the patients who underwent on-line HDF. The numbers of patients who adopted both the pre- and postdilution modes and those who adopted another dilution mode were very small for patients who underwent off-line or on-line HDF.

Among patients who underwent off-line or on-line HDF, the post- and predilution modes accounted for 33.4 and 65.4%, respectively. Thus, the majority of HDF patients adopted the predilution mode in Japan, although the postdilution mode is generally adopted among HDF patients overseas.

3. Volume of substitution fluid for off-line and on-line HDF

Table 18 shows the mean volumes of substitution fluid per session for off-line and on-line HDF using the post- or predilution mode. In the case of off-line HDF, the mean volumes were 7.8 and 9.2 L for the post- and predilution modes, respectively. In the case of on-line HDF, the mean volumes were 10.6 and 39.1 L for the post- and predilution modes, respectively. These results indicate that the volume of substitution fluid tended to be larger in on-line HDF than in off-line HDF regardless of the dilution mode.

4. Volume of substitution fluid for various body weight groups

The relationship between the postdialysis body weight of patients and the volume of substitution fluid was examined as follows. Table 19 shows the results for patients who underwent postdilution HDF. The percentage of patients with a substitution volume in the range of 5–10 L was highest among the patients weighing less than 70 kg, whereas the percentage of patients with a substitution volume in the range of 10–20 L was highest among the patients weighing 70 kg or greater.

Table 20 shows the results for patients who underwent predilution HDF. The percentage of patients

TABLE 11. *Classification of causes of death of new patients who were started on dialysis in 2012 and who died by the end of 2012*

Cause of death	Male (column %)	Female (column %)	Subtotal (column %)	No information available	Total (column %)
Cardiac failure	388 (23.5)	240 (29.5)	628 (25.5)		628 (25.5)
Cerebrovascular disorder	85 (5.1)	43 (5.3)	128 (5.2)		128 (5.2)
Infectious disease	452 (27.3)	181 (22.2)	633 (25.7)		633 (25.7)
Hemorrhage	30 (1.8)	16 (2.0)	46 (1.9)		46 (1.9)
Malignant tumor	198 (12.0)	63 (7.7)	261 (10.6)		261 (10.6)
Cachexia/Uremia	56 (3.4)	23 (2.8)	79 (3.2)		79 (3.2)
Cardiac infarction	47 (2.8)	22 (2.7)	69 (2.8)		69 (2.8)
Potassium poisoning/Sudden death	34 (2.1)	18 (2.2)	52 (2.1)		52 (2.1)
Chronic hepatitis/Cirrhosis	31 (1.9)	10 (1.2)	41 (1.7)		41 (1.7)
Suicide/Refusal of treatment (dialysis)	19 (1.1)	3 (0.4)	22 (0.9)		22 (0.9)
Intestinal obstruction	19 (1.1)	10 (1.2)	29 (1.2)		29 (1.2)
Pulmonary thrombus/Pulmonary embolus	4 (0.2)	5 (0.6)	9 (0.4)		9 (0.4)
Death due to disaster	5 (0.3)	(0.0)	5 (0.2)		5 (0.2)
Other causes	164 (9.9)	112 (13.8)	276 (11.2)		276 (11.2)
Unspecified	121 (7.3)	68 (8.4)	189 (7.7)		189 (7.7)
Subtotal	1653 (100.0)	814 (100.0)	2467 (100.0)		2467 (100.0)
No information available	2		2		2
Total	1655	814	2469		2469

Values in parentheses represent the percentage relative to the total in each column.

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TABLE 12. *Classification of causes of death of all dialysis patients who died in 2012*

Cause of death	Male (column %)	Female (column %)	Subtotal (column %)	No information available	Total (column %)
Cardiac failure	4 823 (25.7)	3 197 (30.0)	8 020 (27.2)		8 020 (27.2)
Cerebrovascular disorder	1 372 (7.3)	831 (7.8)	2 203 (7.5)		2 203 (7.5)
Infectious disease	3 978 (21.2)	2 018 (18.9)	5 996 (20.4)		5 996 (20.4)
Hemorrhage	325 (1.7)	196 (1.8)	521 (1.8)		521 (1.8)
Malignant tumor	1 950 (10.4)	727 (6.8)	2 677 (9.1)		2 677 (9.1)
Cachexia/Uremia	587 (3.1)	512 (4.8)	1 099 (3.7)		1 099 (3.7)
Cardiac infarction	894 (4.8)	435 (4.1)	1 329 (4.5)		1 329 (4.5)
Potassium poisoning/Sudden death	596 (3.2)	280 (2.6)	876 (3.0)		876 (3.0)
Chronic hepatitis/Cirrhosis	232 (1.2)	74 (0.7)	306 (1.0)		306 (1.0)
Suicide/Refusal of treatment (dialysis)	181 (1.0)	59 (0.6)	240 (0.8)		240 (0.8)
Intestinal obstruction	200 (1.1)	138 (1.3)	338 (1.1)		338 (1.1)
Pulmonary thrombus/Pulmonary embolus	38 (0.2)	42 (0.4)	80 (0.3)		80 (0.3)
Death due to disaster	137 (0.7)	34 (0.3)	171 (0.6)		171 (0.6)
Other causes	1 479 (7.9)	1 027 (9.6)	2 506 (8.5)		2 506 (8.5)
Unspecified	2 000 (10.6)	1 082 (10.2)	3 082 (10.5)		3 082 (10.5)
Subtotal	18 792 (100.0)	10 652 (100.0)	29 444 (100.0)		29 444 (100.0)
No information available	9	11	20		20
Total	18 801	10 663	29 464		29 464

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

TABLE 13. *Annual changes in major causes of death*

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Cardiac failure	30.5	31.1	29.9	28.2	25.4	24.1	23.9	24.1	24.3	23.2	25.5
Infectious disease	12.1	11.3	12.2	12.6	13.8	14.6	14.9	15.0	16.3	16.6	16.3
Malignant tumor	7.6	7.1	7.4	7.3	7.2	7.7	8.1	7.7	7.6	8.3	8.5
Cerebrovascular disease	13.7	13.6	13.5	14.1	13.5	12.9	12.6	12.1	11.3	11.3	11.6
Cardiac infarction	5.8	5.8	5.7	7.1	7.5	7.4	8.4	7.9	7.4	7.0	7.4
Others	4.4	4.5	4.1	4.5	5.8	6.3	6.7	7.0	7.7	7.9	9.1
Unspecified	1.8	2.5	2.6	2.8	3.2	2.5	3.5	3.9	3.6	8.1	5.7
Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Cardiac failure	25.1	25.0	25.1	25.8	24.9	24.0	23.7	23.6	27.0	26.6	27.2
Infectious disease	15.9	18.5	18.8	19.2	19.9	18.9	19.9	20.7	20.3	20.3	20.4
Malignant tumor	8.5	8.5	9.0	9.0	9.2	9.2	9.2	9.4	9.8	9.1	9.1
Cerebrovascular disease	11.2	10.7	10.6	9.8	9.4	8.9	8.6	8.4	8.1	7.7	7.5
Cardiac infarction	7.4	6.2	5.4	5.1	4.4	4.4	4.1	4.0	4.7	4.6	4.5
Others	9.0	9.7	10.3	9.1	9.5	9.7	9.7	10.0	6.6	8.4	8.5
Unspecified	6.6	5.6	6.5	7.3	8.3	10.3	10.9	10.6	10.9	10.8	10.5

with a substitution volume in the range of 20–50 L was highest for all the body weight groups.

For both the post- and predilution modes, the volume of substitution fluid tended to increase with increasing body weight. However, the rate of increase in the volume of substitution fluid with increasing body weight was lower than that in body weight.

5. Various parameters for different HDF methods

The mean values of various parameters were compared among the following five patient groups (Table 21): 1) patients who underwent HD at facilities (facility HD patients), 2) patients who

TABLE 14. *Change in annual crude death rate*

Year	Crude death rate (%)	Year	Crude death rate (%)
1991	8.9	2002	9.2
1992	9.7	2003	9.3
1993	9.4	2004	9.4
1994	9.5	2005	9.5
1995	9.7	2006	9.2
1996	9.4	2007	9.4
1997	9.4	2008	9.8
1998	9.2	2009	9.6
1999	9.7	2010	9.8
2000	9.2	2011	10.2
2001	9.3	2012	10.0

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TABLE 15. *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	9 856	0.818	0.747	0.680	0.630	0.585	0.552	0.519	0.480	0.450	0.419	0.389	0.365	0.342	0.322
1984	10 687	0.816	0.735	0.670	0.619	0.576	0.536	0.495	0.461	0.430	0.402	0.373	0.348	0.323	0.302
1985	11 582	0.794	0.720	0.659	0.607	0.561	0.517	0.481	0.440	0.409	0.380	0.355	0.330	0.307	0.284
1986	12 585	0.798	0.724	0.665	0.616	0.563	0.516	0.474	0.439	0.402	0.373	0.345	0.321	0.299	0.278
1987	13 510	0.814	0.737	0.669	0.605	0.552	0.502	0.457	0.418	0.385	0.357	0.331	0.306	0.286	0.264
1988	14 719	0.824	0.739	0.664	0.599	0.541	0.493	0.450	0.412	0.377	0.346	0.319	0.296	0.274	0.252
1989	14 505	0.848	0.760	0.684	0.613	0.555	0.506	0.460	0.421	0.384	0.352	0.326	0.300	0.279	0.258
1990	16 495	0.838	0.748	0.672	0.606	0.551	0.497	0.454	0.413	0.379	0.348	0.320	0.295	0.274	0.255
1991	18 151	0.827	0.734	0.660	0.595	0.535	0.484	0.440	0.402	0.370	0.340	0.313	0.289	0.268	0.249
1992	19 837	0.820	0.727	0.650	0.585	0.527	0.479	0.434	0.396	0.363	0.335	0.309	0.285	0.265	0.245
1993	20 814	0.832	0.742	0.666	0.596	0.540	0.489	0.444	0.406	0.373	0.342	0.316	0.291	0.268	0.249
1994	21 307	0.829	0.742	0.668	0.602	0.542	0.488	0.445	0.407	0.372	0.340	0.311	0.288	0.267	0.246
1995	22 796	0.840	0.753	0.678	0.608	0.549	0.500	0.456	0.416	0.381	0.349	0.319	0.295	0.272	0.249
1996	24 830	0.831	0.749	0.672	0.607	0.553	0.505	0.454	0.416	0.380	0.348	0.319	0.292	0.267	0.247
1997	25 391	0.837	0.751	0.680	0.619	0.562	0.511	0.465	0.422	0.385	0.352	0.323	0.294	0.271	0.249
1998	26 697	0.844	0.765	0.697	0.634	0.573	0.522	0.473	0.431	0.395	0.363	0.332	0.304	0.278	0.256
1999	27 631	0.850	0.773	0.705	0.639	0.579	0.527	0.480	0.439	0.399	0.362	0.330	0.300	0.272	
2000	29 125	0.855	0.777	0.711	0.647	0.588	0.533	0.487	0.443	0.404	0.367	0.333	0.306		
2001	30 660	0.854	0.777	0.707	0.641	0.585	0.532	0.484	0.441	0.401	0.364	0.331			
2002	31 333	0.857	0.780	0.712	0.649	0.589	0.533	0.484	0.439	0.398	0.360				
2003	32 358	0.859	0.785	0.716	0.653	0.594	0.538	0.490	0.441	0.400					
2004	33 458	0.865	0.790	0.723	0.660	0.600	0.545	0.492	0.445						
2005	34 534	0.861	0.789	0.721	0.656	0.597	0.539	0.485							
2006	35 960	0.870	0.798	0.729	0.666	0.605	0.546								
2007	36 711	0.866	0.795	0.726	0.659	0.596									
2008	37 787	0.866	0.796	0.727	0.661										
2009	38 313	0.872	0.797	0.728											
2010	38 213	0.877	0.804												
2011	37 946	0.873													

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TABLE 15. *Continued*

Year of introduction	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	28-year survival rate	29-year survival rate
1983	0.301	0.282	0.265	0.249	0.235	0.222	0.207	0.193	0.182	0.173	0.162	0.151	0.142	0.131	0.121
1984	0.282	0.264	0.247	0.233	0.221	0.207	0.194	0.183	0.174	0.162	0.153	0.144	0.135	0.125	
1985	0.266	0.248	0.231	0.216	0.202	0.187	0.174	0.163	0.151	0.142	0.133	0.124	0.116		
1986	0.261	0.244	0.228	0.215	0.203	0.191	0.178	0.168	0.157	0.148	0.139	0.130			
1987	0.245	0.230	0.213	0.197	0.184	0.175	0.164	0.154	0.143	0.134	0.125				
1988	0.234	0.218	0.203	0.190	0.180	0.168	0.157	0.147	0.138	0.129					
1989	0.241	0.225	0.210	0.195	0.184	0.171	0.159	0.149	0.140						
1990	0.238	0.222	0.207	0.193	0.181	0.169	0.157	0.145							
1991	0.231	0.217	0.202	0.189	0.177	0.165	0.154								
1992	0.228	0.212	0.198	0.184	0.171	0.158									
1993	0.232	0.215	0.199	0.185	0.172										
1994	0.227	0.211	0.197	0.184											
1995	0.228	0.210	0.194												
1996	0.228	0.210													
1997	0.228														
1998															
1999															
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TABLE 16. *Change in number of hemodiafiltration (HDF) patients*

Dialysis method		2009	2010	2011	2012
Facility HD		253 807	262 973	270 072	268 275
HDF	Off-line HDF	9 299	9 421	8 573	7 157
	On-line HDF	6 852	4 829	4 890	14 069
	P/p HDF	237	159	145	109
	AFBF	465	458	507	390
HDF subtotal		16 853	14 867	14 115	21 725
HD · HDF total		270 660	277 840	284 187	290 000

TABLE 17. *Modes of dilution for different types of hemodiafiltration (HDF)*

	Postdilution	Predilution	Pre- and postdilution	Other dilution mode	Subtotal	Unspecified	No information available	Total
Off-line HDF	5049	485	9	8	5 551	1	1605	7157
On-line HDF	953	11 275		198	12 426	2	1641	14 069
P/p HDF	28	19	8	10	65		44	109
AFBF	159	6			165		225	390
Total	6189	11 785	17	216	18 207	3	3515	21 725

underwent postdilution off-line HDF (postdilution off-line HDF patients), 3) patients who underwent predilution off-line HDF (predilution off-line HDF patients), 4) patients who underwent postdilution on-line HDF (postdilution on-line HDF patients), and 5) patients who underwent predilution on-line HDF (predilution on-line HDF patients). To unify the comparison conditions and remove the effect of the residual kidney function, only patients who had undergone one of the five dialysis methods three times per week for 2 years or more were targeted.

The mean age was highest for facility HD patients, followed by off-line HDF patients and on-line HDF patients. However, the mean dialysis vintage decreased in this order: off-line HDF patients, on-line HDF patients, and facility HD patients. The mean postdialysis body weight, which is considered to be almost equal to the basal body weight, was greatest for predilution on-line HDF patients of both genders.

The mean blood flow rate was lowest in facility HD patients (205.3 mL/min), followed by off-line HDF patients and on-line HDF patients. The mean blood flow rate for predilution on-line HDF patients was highest at 231.8 mL/min.

Next, single-pool Kt/V (Kt/Vsp) was examined as follows (14). The mean Kt/Vsp was lowest in facility HD patients, followed by off-line HDF patients and on-line HDF patients. However, there were no apparent differences in the mean Kt/Vsp between postdilution and predilution in both off-line and on-line HDF patients.

For patients with stable protein utilization, the normalized protein catabolic rate (nPCR) calculated using the urea kinetic model is considered to nearly agree with protein intake (14). The nPCRs were similar among the five patient groups regardless of the dialysis method or dilution mode.

The mean serum albumin level was highest in predilution on-line HDF patients (3.71 g/dL). In the other patient groups, the mean serum albumin levels were nearly the same (3.64–3.65 g/dL).

TABLE 18. *Volumes of substitution fluid for off-line and on-line hemodiafiltration (HDF)*

		Postdilution	Predillution
Off-line HDF	Number of patients	5049	485
	Mean volumes of substitution fluid per session (L)	7.8	9.2
	SD	2.3	3.8
On-line HDF	Number of patients	953	11 275
	Mean volumes of substitution fluid per session (L)	10.6	39.1
	SD	3.9	16.7

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TABLE 19. *Volumes of substitution fluid per hemodiafiltration (HDF) session for different body weights (kg) among patients who underwent postdilution off-line or on-line HDF*

Volume of substitution fluid	<40 kg	40 < 50 kg	50 < 60 kg	60 < 70 kg	70 < 80 kg	≥80 kg	Subtotal	No information available	Total	Mean	SD
<5 L	93	170	139	79	21	5	507	16	523	50.34	11.39
5 < 10 L	314	944	976	567	166	93	3060	74	3134	53.77	12
10 < 20 L	138	580	715	474	166	113	2186	23	2209	56.44	12.87
20 < 50 L	4	9	9	4	3	0	29	0	29	52.14	11.8
50 < 100 L	0	0	0	0	0	0	0	0	0		
≥100 L	0	0	0	0	0	0	0	0	0		
Subtotal	549	1703	1839	1124	356	211	5782	113	5895	54.47	12.41
No information available	12	35	36	13	5	3	104	3	107	52.69	12.02
Total	561	1738	1875	1137	361	214	5886	116	6002	54.44	12.41
Mean	7.39	7.98	8.36	8.5	8.86	8.92	8.24	7.33	8.22		
SD	2.85	2.66	2.78	2.76	2.87	2.56	2.78	2.5	2.77		

TABLE 20. *Volumes of substitution fluid per hemodiafiltration (HDF) session for patients of different body weights (kg) who underwent predilution off-line or on-line HDF*

Volume of substitution fluid	<40 kg	40 < 50 kg	50 < 60 kg	60 < 70 kg	70 < 80 kg	≥80 kg	Subtotal	No information available	Total	Mean	SD
<5 L	7	43	33	29	8	1	121	2	123	54.27	10.62
5 < 10 L	52	172	149	77	30	18	498	14	512	53.41	12.37
10 < 20 L	114	259	265	189	56	35	918	7	925	54.09	12.65
20 < 50 L	544	2007	2533	1467	576	300	7 427	117	7 544	55.71	12.44
50 < 100 L	80	485	765	635	263	169	2 397	91	2 488	59.56	13.28
≥100 L	4	7	5	0	1	0	17	0	17	48.31	9.25
Subtotal	801	2973	3750	2397	934	523	11 378	231	11 609	56.27	12.74
No information available	9	35	50	26	14	4	138	13	151	55.8	11.92
Total	810	3008	3800	2423	948	527	11 516	244	11 760	56.26	12.73
Mean	31.65	35.42	37.95	39.85	41.6	42.08	37.74	44.79	37.88		
SD	16.15	17.02	16.81	17.71	17.58	17.35	17.3	19.8	17.38		

TABLE 21. *Comparison between facility hemodialysis (HD) and various hemodiafiltration (HDF) methods*

			Off-line HDF		On-line HDF	
		Facility HD	Postdilution	Predillution	Postdilution	Predillution
Basic backgrond items	Number of patients	186 381	4632	453	836	9593
	Male	116 164	2695	247	492	5770
	Male(%)	62.3	58.2	54.5	58.9	60.1
	Percentage of diabetes	36.1	26.0	25.4	23.0	26.1
	Age†	66.9 ± 12.2	64.1 ± 12.1	65.8 ± 12.6	63.4 ± 12.0	63.2 ± 12.0
	Dialysis vintage (years)†	8.8 ± 6.8	14.0 ± 9.5	14.7 ± 9.2	13.6 ± 9.1	12.0 ± 8.9
	Postdialysis body weight (male)†	58.9 ± 11.7	59.6 ± 11.5	59.3 ± 12.7	59.6 ± 11.4	60.9 ± 11.7
	Postdialysis body weight (female)†	47.6 ± 10.1	47.2 ± 9.6	45.5 ± 8.5	46.8 ± 8.9	48.6 ± 9.7
Items related to urea kinetics	Dialysis time (minute)†	240.7 ± 29.4	248.2 ± 28.8	247.4 ± 31.1	246.7 ± 32.2	251.5 ± 31.6
	Blood flow rate (mL/min)†	205.3 ± 32.8	210.6 ± 34.7	206.5 ± 42.3	221.4 ± 38.5	231.8 ± 44.6
	Kt/V (male)†	1.38 ± 0.25	1.43 ± 0.25	1.43 ± 0.25	1.45 ± 0.27	1.46 ± 0.28
	Kt/V (female)†	1.60 ± 0.31	1.67 ± 0.30	1.68 ± 0.33	1.74 ± 0.33	1.72 ± 0.34
	Normalized protein catabolic rate (male)†	0.86 ± 0.17	0.88 ± 0.17	0.86 ± 0.16	0.89 ± 0.20	0.89 ± 0.17
	Normalized protein catabolic rate (female)†	0.89 ± 0.19	0.91 ± 0.19	0.90 ± 0.19	0.91 ± 0.18	0.92 ± 0.18
Items related to nutrition	Serum albumin (g/dL)†	3.65 ± 0.42	3.64 ± 0.41	3.65 ± 0.42	3.65 ± 0.39	3.71 ± 0.36
	Serum CRP level (mg/dL)†	0.64 ± 2.02	0.67 ± 1.70	0.57 ± 1.29	0.62 ± 1.98	0.50 ± 1.48
	Predialysis serum creatinin (male)†	11.21 ± 2.83	11.47 ± 2.87	11.42 ± 2.95	11.81 ± 2.80	11.78 ± 2.67
	Predialysis serum creatinin (female)†	9.32 ± 2.34	9.40 ± 2.22	9.13 ± 2.00	9.73 ± 2.16	9.78 ± 2.11
	Percent creatinin generation rate†	99.6 ± 26.1	100.5 ± 24.8	99.1 ± 25.3	104.3 ± 25.3	104.0 ± 23.1
Items related to CKD-MBD	Predialysis serum calcium (mg/dL)†	8.91 ± 0.75	8.95 ± 0.77	8.93 ± 0.82	8.96 ± 0.74	8.91 ± 0.74
	Predialysis serum phosphorus (mg/dL)†	5.22 ± 1.44	5.22 ± 1.43	5.22 ± 1.51	5.24 ± 1.42	5.39 ± 1.39
	Intact PTH level (pg/mL)†	163.4 ± 161.5	168.2 ± 163.9	174.4 ± 204.8	168.5 ± 151.8	171.8 ± 162.6
	Predialysis serum total cholesterol (mg/dL)†	155.4 ± 35.1	157.0 ± 36.5	154.6 ± 35.7	165.7 ± 37.9	160.8 ± 35.1
Items related to anemia	Predialysis hemoglobin (g/dL)†	10.61 ± 1.24	10.63 ± 1.26	10.61 ± 1.28	10.65 ± 1.19	10.79 ± 1.19
	Percentage of patients who had not used ESA	12.3	15.3	16.8	16.2	16.0

†Mean ± SD. Only patients who had undergone dialysis three times per week for 2 years or more were targeted. The objective patients' number is different between each item because the number of patients who had necessary data for tabulation is different between each items.

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The mean CRP level was lowest in predilution on-line HDF patients, followed by predilution off-line HDF patients. The mean CRP levels in both postdilution HDF patients and facility HD patients were slightly higher than those in predilution HDF patients.

The percent creatinine generation rate (%CGR) (15), an indicator of muscle mass, was highest in on-line HDF patients.

The indicators associated with CKD-MBD (serum calcium level, serum phosphorus level, and intact PTH level) were all similar among the five patient groups.

The indicators associated with anemia were as follows. The mean Hb level was highest in predilution on-line HDF patients, whereas the mean Hb levels in the other patient groups were similarly lower. The percentage of patients who had not used ESA was lowest among facility HD patients (12.3%), and those among the other patient groups were all approximately 16%.

The adequacy of the HDF method used for patients is determined by the clinicians at each facility. Therefore, the HDF conditions and background factors are considered to be quite biased among different HDF methods. The above results should not be directly correlated with the efficacy of the HDF methods.

C. Current status of dialysate quality control

Among 4238 facilities that responded to the facility survey, 4203 facilities that had at least one bedside console responded to questions regarding dialysate use. These 4203 facilities are denoted as "the facilities that responded to the questionnaire" below.

1. Frequency of measurement of endotoxin level in dialysate

Among the 4203 facilities that responded to the questionnaire, 4118 facilities (98.0%) responded to questions regarding the frequency of measurement of endotoxin level in the dialysate (Table 22). The endotoxin level in the dialysate was measured at least once a year in 96.2% of the 4118 facilities. The percentage of the facilities that measured the endotoxin level in the dialysate at least once a year has gradually increased every year. The percentage of facilities that measured the endotoxin level in the dialysate at least once a month, as recommended by the JSDT guidelines on dialysate quality control standards (16), was 76.3%. The percentage of the facilities that measured the endotoxin level in the dialysate at least once a month has also continued to increase yearly.

2. Endotoxin level in dialysate

There were 3941 facilities that responded to questions regarding the endotoxin level in the dialysate (93.8% of the 4203 facilities that responded to the questionnaire). According to the JSDT guidelines on dialysate quality control standards (16), the use of an ultrapure dialysate (endotoxin level, <0.001 EU/mL) is recommended for all dialysis methods, and the use of a standard dialysate (endotoxin level, <0.05 EU/mL) should be the minimum necessary measure to ensure the safety of dialysis. The percent-

TABLE 22. *Frequencies of measurement and measured endotoxin levels in dialysate (EU/mL) (for facilities with the number of bedside consoles ≥1)*

Endotoxin concentration in dialysate (EU/mL)	None	Every day	Every week	Every two week	Every month	Several times per year	Once a year	Subtotal	Unspecified	No information available	Total
<0.001		9	105	168	2017	256	229	2784	3		2787
0.001 < 0.01		6	19	33	430	94	57	639	1		640
0.01 < 0.05			11	12	183	58	32	296	2		298
0.05 < 0.1			1	4	50	22	14	91	1		92
0.1 < 0.25		1	1	3	36	9	11	61	1		62
0.25 < 0.5		1			22	6	5	34			34
≥0.5			1		19	3	5	28			28
Subtotal		17	138	220	2757	448	353	3933	8		3941
(%)		(0.4)	(3.5)	(5.6)	(70.1)	(11.4)	(9.0)	(100.0)			
Unspecified	100				9	8	11	128	69		197
No information available	57							57		8	65
Total	157	17	138	220	2766	456	364	4118	77	8	4203
(%)	(3.8)	(0.4)	(3.4)	(5.3)	(67.2)	(11.1)	(8.8)	(100.0)			

Values in parentheses represent the percentage relative to the total in each row.

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TABLE 23. *Frequencies of measurement and measured bacterial count in dialysate (cfu/mL) (for facilities with the number of bedside consoles ≥1)*

Bacterial counts in dialysate (cfu/mL)	None	Every day	Every week	Every two week	Every month	Several times per year	Once a year	Subtotal	Unspecified	No information available	Total
<0.1		13	78	146	1698	228	229	2392	5		2397
0.1~		2	17	33	424	59	50	585	1		586
1~		2	9	20	324	72	45	472			472
10~			9	13	167	30	28	247			247
100~					40	6	9	55			55
Subtotal		17	113	212	2653	395	361	3751	6		3757
(%)		(0.5)	(3.0)	(5.7)	(70.7)	(10.5)	(9.6)	(100.0)			
Unspecified	180	1	1		20	9	15	226	94		320
No information available	117				1			118		8	126
Total	297	18	114	212	2674	404	376	4095	100	8	4203
(%)	(7.3)	(0.4)	(2.8)	(5.2)	(65.3)	(9.9)	(9.2)	(100.0)			

Values in parentheses represent the percentage relative to the total in each row.

ages of the facilities that reported endotoxin levels <0.001 and <0.05 EU/mL were 70.7 and 94.5%, respectively (Table 22). These percentages were higher than those in the previous year (66.0 and 93.0%).

3. Frequency of measurement of bacterial count in dialysate

There were 4095 facilities that responded to questions regarding the frequency of measurement of the bacterial count in the dialysate (97.4% of the 4203 facilities that responded to the questionnaire). As shown in Table 23, the bacterial count was measured at least once a year at 3798 facilities (92.7% of the 4095 facilities). Measurement at least once a month is recommended by the JSDT guidelines on dialysate quality control standards (16). Among the 4095 facilities, 73.7% satisfied this recommendation.

4. Bacterial count in dialysate

Bacterial counts in the dialysate were reported by 3757 facilities (89.4% of the 4203 facilities that responded to the questionnaire). Among these 3757 facilities, 3702 facilities (98.5%) satisfied the bacterial count (<100 cfu/mL) recommended by the JSDT guidelines on dialysate quality control standards (16) (Table 24). A bacterial count <0.1 cfu/mL, which is the standard for an ultrapure dialysate, was satisfied by 2397 facilities (63.8%), an increase from the previous year (56.4%) (12).

5. Media used for cultivation of bacteria in dialysate

According to the JSDT guidelines on dialysate quality control standards (16), oligotrophic media, such as Reasoner's no. 2 agar (R2A) and tryptone glucose extract agar (TGEA), are recommended for the cultivation of bacteria in the dialysate. The survey results showed that these media were used by 3137 (85.6%) of the 3665 facilities that responded to questions regarding the media used for the cultivation of bacteria (Table 25).

6. Volume of sample for measurement of bacterial count in dialysate

At least 10 mL of a dialysate sample is required to measure a bacterial count of 0.1 cfu/mL, which is the maximum allowable count to maintain an ultrapure dialysate (16). The volume of the sample dialysate used for the measurement of bacterial count was 10 mL or higher in 2827 (74.9%) of the 3775 facilities that responded to questions regarding the volume of the sample (Table 25).

TABLE 24. *Numbers of facilities having bedside consoles equipped with endotoxin retentive filter (ETRF) (%) (for facilities with the number of bedside consoles ≥1)*

	With ETRF	Without ETRF	Subtotal	No information available	Total
Number of facilities	3963	232	4195	8	4203
(%)	(94.5)	(5.5)	(100.0)		

Values in parentheses represent the percentage relative to the total in the row.

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TABLE 25. *Types of medium used for cultivation of bacteria in dialysate and volumes of dialysate samples for measurement of bacterial count (for facilities with the number of bedside consoles ≥1)*

Volume of sample for measurement of bacterial count in dialysate (mL)	General agar medium	R2A medium[†]	TGEA medium[‡]	Blood agar medium	TSA medium[§]	Other media	Subtotal	Unspecified	No information available	Total
<1	52	170	23	4	4	10	263	26		289
1 < 10	66	469	39	12	2	27	615	44		659
10 < 50	67	698	298	3	7	85	1158	28		1186
50 < 100	36	565	461	1	16	83	1162	21	1	1184
100 < 500	18	265	114	1	2	21	421	3		424
500 < 1000	1	8	3				12			12
1 000 < 10 000	1	9	6		1	1	18	2		20
≥10 000		1					1			1
Subtotal	241	2185	944	21	32	227	3650	124	1	3775
(%)	(6.6)	(59.9)	(25.9)	(0.6)	(0.9)	(6.2)	(100.0)			
Unspecified	3	8				4	15	287	1	303
No information available									125	125
Total	244	2193	944	21	32	231	3665	411	127	4203
(%)	(6.7)	(59.8)	(25.8)	(0.6)	(0.9)	(6.3)	(100.0)			

[†]R2A medium: Reasoner's no. 2 agar medium. [‡]TGEA medium: Tryptone glucose extract agar medium. [§]TSA medium: Trypticase soy agar medium. Values in parentheses represent the percentage relative to the total in each row.

7. Installation of ETRFs

There were 4195 facilities that responded to questions regarding the installation of ETRFs (99.8% of the 4203 facilities that responded to the questionnaire). Among these 4195 facilities, 3963 (94.5%) had at least one bedside console equipped with an ETRF (Table 28).

The 4195 facilities that responded to the questions regarding the installation of ETRFs had a total of 124 894 bedside consoles, 83.4% of which were equipped with an ETRF (Table 26). The percentage of bedside consoles equipped with an ETRF increased by 5.5% from the previous year (77.9%).

8. Endotoxin level and bacterial count in dialysate for bedside consoles equipped with or without ETRF

The facilities that responded to questions regarding the endotoxin level 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 level in the dialysate was compared between the two groups.

According to the JSDT guidelines on dialysate quality control standards (16), an ultrapure dialysate is defined as having an endotoxin level <0.001 EU/mL and a bacterial count <0.1 cfu/mL. Among ETRF facilities, 26.4% reported an endotoxin level ≥0.001 EU/mL (Table 27) and 33.8% reported a bacterial count ≥0.1 cfu/mL (Table 28). These facilities may have problems, such as a high contamination level of raw water, a high risk of secondary contamination, contamination of ETRFs, or contamination during sampling. Such facilities need to optimize their method of controlling dialysate quality.

TABLE 26. *Numbers of bedside consoles equipped with and without endotoxin retentive filter (ETRF) in different facilities classified by status of ETRF installation (for facilities with the number of bedside consoles ≥1)*

	Facility status of ETRF installation				
Numbers of bedside consoles	More than one bedside console with ETRF in the facility (column %)	No bedside consoles with ETRF in the facility (column %)	Subtotal (column %)	No information available	Total (column %)
Number of bedside consoles with ETRF	104 142 (86.7)	0 (0.0)	104 142 (83.4)	0	104 142 (83.3)
Number of bedside consoles without ETRF	15 984 (13.3)	4768 (100.0)	20 752 (16.6)	109	20 861 (16.7)
Total	120 126 (100.0)	4768 (100.0)	124 894 (100.0)	109	125 003 (100.0)

Values in parentheses represent the percentage relative to the total in each column.

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TABLE 27. *Endotoxin levels in dialysate (EU/mL) in endotoxin retentive filter (ETRF) and non-ETRF facilities (for facilities with the number of bedside consoles ≥1)*

With or without ETRF when the dialysate sampled	<0.001	0.001 < 0.01	0.01 < 0.05	0.05 < 0.1	0.1 < 0.25	0.25 < 0.5	≥0.5	Subtotal	Unspecified	No information available	Total
Without ETRF	392	158	75	21	14	11	7	678	85	30	793
With ETRF	2375	472	219	70	47	23	21	3227	51	1	3279
Subtotal	2767	630	294	91	61	34	28	3905	136	31	4072
(%)	(70.9)	(16.1)	(7.5)	(2.3)	(1.6)	(0.9)	(0.7)	(100.0)			
Unspecified	20	10	4	1	1			36	60	6	102
No information available									1	28	29
Total	2787	640	298	92	62	34	28	3941	197	65	4203
(%)	(70.7)	(16.2)	(7.6)	(2.3)	(1.6)	(0.9)	(0.7)	(100.0)			

Values in parentheses represent the percentage relative to the total in each row.

TABLE 28. *Bacterial counts in dialysate (cfu/mL) in endotoxin retentive filter (ETRF) and non-ETRF facilities (for facilities with the number of bedside consoles ≥1)*

With or without ETRF when the dialysate sampled	<0.1	0.1–	1–	10–	100–	Subtotal	Unspecified	No information available	Total
Without ETRF	336	117	104	63	14	634	113	46	793
With ETRF	2047	460	360	182	41	3090	144	45	3279
Subtotal	2383	577	464	245	55	3724	257	91	4072
(%)	(64.0)	(15.5)	(12.5)	(6.6)	(1.5)	(100.0)			
Unspecified	14	9	8	2		33	62	7	102
No information available							1	28	29
Total	2397	586	472	247	55	3757	320	126	4203
(%)	(63.8)	(15.6)	(12.6)	(6.6)	(1.5)	(100.0)			

Values in parentheses represent the percentage relative to the total in each row.

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According to the above JSDT guidelines (16), a standard dialysate is defined as having an endotoxin level <0.05 EU/mL and a bacterial count <100 cfu/mL. Among ETRF facilities, 5.0% reported an endotoxin level ≥0.05 EU/mL (Table 27) and 1.3% reported a bacterial count ≥100 cfu/mL (Table 28).

In contrast, 57.8 and 53.0% of non-ETRF facilities reported an endotoxin level <0.001 EU/mL and a bacterial count <0.1 cfu/mL, respectively. These facilities may have ensured that the dialysate is purified upstream of the dialysate supply system.

9. Endotoxin level and bacterial count in dialysate

According to the JSDT guidelines on dialysate quality control standards (16), the use of an ultrapure dialysate is recommended for all dialysis methods. As mentioned above, an ultrapure dialysate is defined as having an endotoxin level <0.001 EU/mL (lower than the detection limit) and a bacterial count <0.1 cfu/mL.

Among the 4203 facilities that responded to the questionnaire, 3743 (89.1%) responded to questions regarding both the endotoxin level and bacterial count in the dialysate. Among the 3743 facilities, 2152 (57.5%) satisfied the above standards for an ultrapure dialysate, a marked increase from the previous year (48.7%), as shown in Table 29.

TABLE 29. *Endotoxin levels (EU/mL) and bacterial counts (cfu/mL) in dialysate in different facilities (for facilities with the number of bedside consoles ≥1)*

Bacterial counts in dialysate (cfu/mL)	<0.001	0.001 < 0.01	0.01 < 0.05	0.05 < 0.1	0.1 < 0.25	0.25 < 0.5	≥0.5	Subtotal	Unspecified	No information available	Total
<0.1	2152	163	48	18	5	1	3	2390	7		2397
0.1–	307	204	50	12	7	1	1	582	4		586
1–	159	171	89	23	20	5	4	471	1		472
10–	61	53	68	25	15	16	8	246	1		247
100–	10	6	14	7	7	3	7	54	1		55
Subtotal	2689	597	269	85	54	26	23	3743	14		3757
(%)	(71.8)	(15.9)	(7.2)	(2.3)	(1.4)	(0.7)	(0.6)	(100.0)			
Unspecified	65	29	23	6	6	5	5	139	180	1	320
No information available	33	14	6	1	2	3		59	3	64	126
Total	2787	640	298	92	62	34	28	3941	197	65	4203
(%)	(70.7)	(16.2)	(7.6)	(2.3)	(1.6)	(0.9)	(0.7)	(100.0)			

Values in parentheses represent the percentage relative to the total in each row.

D. Items associated with CKD-MBD

In this section, predialysis serum phosphorus level (hereafter, phosphorus level), predialysis serum calcium level corrected for the serum albumin level (hereafter, corrected calcium level), and serum intact PTH level (hereafter, intact PTH level) were examined to determine their relationships with various indicators.

The corrected calcium level was calculated from serum albumin level and serum calcium level using the following equation.

When the serum albumin level is <4.0 g/dL,

$$\text{Corrected calcium level (mg/dL)} = \text{Serum calcium level (mg/dL)} + \{4 - \text{Serum albumin level (g/dL)}\}.$$

Note that the effects of the background factors other than the indicator of interest were not considered in the following discussion on the patient distribution and comparison of mean levels. Therefore, care should be taken in the interpretation of the results.

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1. Gender

The phosphorus, corrected calcium, and intact PTH levels were examined in patients of both genders who underwent HD at facilities three times per week.

The phosphorus level was slightly higher among male patients than among female patients (Table 30). The corrected calcium (Table 31) and intact PTH levels (Table 32) were slightly higher among female patients than among male patients.

According to the Clinical Practice Guideline for the Management of CKD-MBD (hereafter, CKD-MBD Guideline) (5), the target phosphorus level is in the range of 3.5–6.0 mg/dL; the target corrected calcium level, in the range of 8.4–10.0 mg/dL; and the target intact PTH level, in the range of 60–240 pg/mL. The percentages of patients who achieved these target levels were compared between male and female patients. The target phosphorus level was achieved in 65.8% of the male patients and 67.6% of the female patients. The target corrected calcium level was achieved in 75.9% of the male patients and 75.6% of the female patients. The target intact PTH level was achieved in 60.3% of the male patients and 57.4% of the female patients. Thus, there were no marked differences in the three indicators between the male and female patients.

2. Age

Phosphorus, corrected calcium, and intact PTH levels were examined in patients in various age groups who underwent HD at facilities three times per week.

Phosphorus (Table 33) and intact PTH levels (Table 35) tended to gradually decrease with increasing age. In contrast, the corrected calcium level (Table 34) showed no clear relationship with age.

The percentages of patients who achieved the target phosphorus and intact PTH levels recommended in the CKD-MBD Guideline (5) tended to increase with age. However, the percentage of patients who achieved the target corrected calcium level showed no clear relationship with age.

3. Dialysis vintage

Phosphorus, corrected calcium, and intact PTH levels were examined in patients with different dialysis vintages and who underwent HD at facilities three times per week.

The phosphorus level (Table 36) slightly decreased with increasing dialysis vintage from 20 years or longer. In contrast, the intact PTH level (Table 38) was high among patients with a dialysis vintage of

TABLE 30. *Predialysis serum phosphorus levels for both genders (for all dialysis patients)*

Gender	Predialysis serum phosphorus level (mg/dL)												No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
	<3.0	3.0–	3.5–	4.0–	4.5–	5.0–	5.5–	6.0–	6.1–	6.5–	7.0–	7.5–	8.0–	8.5–	9.0–	Subtotal						
Male	7 008	8 628	15 092	21 118	25 056	25 514	21 974	3692	12 841	11 145	7 172	4434	2777	1671	2717	170 839	19 469	190 308	5.22	1.46	112 446	65.8
Female	4 517	5 111	9 040	12 796	15 247	15 329	12 808	2218	7 341	6 124	3 714	2243	1274	768	1271	99 801	11 436	111 237	5.14	1.42	67 438	67.6
Subtotal	11 525	13 739	24 132	33 914	40 303	40 843	34 782	5910	20 182	17 269	10 886	6677	4051	2439	3988	270 640	30 905	301 545	5.19	1.44	179 884	66.5
(row %)	(4.3)	(5.1)	(8.9)	(12.5)	(14.9)	(15.1)	(12.9)	(2.2)	(7.5)	(6.4)	(4.0)	(2.5)	(1.5)	(0.9)	(1.5)	(100.0)						
No information available																						
Total	11 525	13 739	24 132	33 914	40 303	40 843	34 782	5910	20 182	17 269	10 886	6677	4051	2439	3988	270 640	30 905	301 545	5.19	1.44	179 884	66.5
(row %)	(4.3)	(5.1)	(8.9)	(12.5)	(14.9)	(15.1)	(12.9)	(2.2)	(7.5)	(6.4)	(4.0)	(2.5)	(1.5)	(0.9)	(1.5)	(100.0)						

Target achieving number: the number of patients whose serum phosphorus level is in the range of 3.5–6.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

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TABLE 31. *Predialysis serum corrected calcium levels for both genders (for all dialysis patients)*

	Predialysis serum corrected calcium level (mg/dL)																			
Gender	<7.0	7.0–	7.5–	8.0–	8.4–	8.5–	9.0–	9.5–	10.0–	10.1–	10.5–	11.0–	11.5–	12.0–	Subtotal	No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
Male	609	1076	4140	13 278	3789	41 780	48 278	31 776	4042	10 378	5340	1769	954	3627	170 836	19 472	190 308	9.26	0.92	129 665	75.9
Female	314	489	1757	5 343	1581	19 839	28 962	22 059	2991	7 802	4212	1584	694	2186	99 813	11 424	111 237	9.40	0.92	75 432	75.6
Subtotal	923	1565	5897	18 621	5370	61 619	77 240	53 835	7033	18 180	9552	3353	1648	5813	270 649	30 896	301 545	9.31	0.92	205 097	75.8
(row %)	(0.3)	(0.6)	(2.2)	(6.9)	(2.0)	(22.8)	(28.5)	(19.9)	(2.6)	(6.7)	(3.5)	(1.2)	(0.6)	(2.1)	(100.0)						
No information available																					
Total	923	1565	5897	18 621	5370	61 619	77 240	53 835	7033	18 180	9552	3353	1648	5813	270 649	30 896	301 545	9.31	0.92	205 097	75.8
(row %)	(0.3)	(0.6)	(2.2)	(6.9)	(2.0)	(22.8)	(28.5)	(19.9)	(2.6)	(6.7)	(3.5)	(1.2)	(0.6)	(2.1)	(100.0)						

Target achieving number: the number of patients whose serum corrected calcium level is in the range of 8.4–10.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

TABLE 32. *Serum intact parathyroid hormone (PTH) levels for both genders (for all dialysis patients)*

	Serum intact PTH level (pg/mL)																								
Gender	<20	20–	40–	60–	80–	100–	120–	140–	160–	180–	240–	241–	300–	360–	420–	480–	500–	540–	600–	800–	Subtotal	No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
Male	8 065	11 043	11 555	12 219	12 534	11 991	11 257	10 262	9 182	20 149	255	11 150	6219	3438	1949	509	769	784	1305	1016	145 651	4351	150 002	161	150	87 849	60.3
Female	5 167	6 835	7 010	7 103	7 141	6 723	6 138	5 706	4 926	10 984	129	6 487	3677	2230	1419	312	582	623	1 010	873	85 075	2503	87 578	167	173	48 850	57.4
Subtotal	13 232	17 878	18 565	19 322	19 675	18 714	17 395	15 968	14 108	31 133	384	17 637	9896	5668	3368	821	1351	1407	2315	1889	230 726	6854	237 580	163	159	136 699	59.2
(row %)	(5.7)	(7.7)	(8.0)	(8.4)	(8.5)	(8.1)	(7.5)	(6.9)	(6.1)	(13.5)	(0.2)	(7.6)	(4.3)	(2.5)	(1.5)	(0.4)	(0.6)	(0.6)	(1.0)	(0.8)	(100.0)						
No information available																											
Total	13 232	17 878	18 565	19 322	19 675	18 714	17 395	15 968	14 108	31 133	384	17 637	9896	5668	3368	821	1351	1407	2315	1889	230 726	6854	237 580	163	159	136 699	59.2
(row %)	(5.7)	(7.7)	(8.0)	(8.4)	(8.5)	(8.1)	(7.5)	(6.9)	(6.1)	(13.5)	(0.2)	(7.6)	(4.3)	(2.5)	(1.5)	(0.4)	(0.6)	(0.6)	(1.0)	(0.8)	(100.0)						

Target achieving number: the number of patients whose serum intact PTH level is in the range of 60–240 pg/mL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

TABLE 33. *Predialysis serum phosphorus levels for various age groups (for all dialysis patients)*

Age (years old)	Predialysis serum phosphorus level (mg/dL)															Subtotal	No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
	<3.0	3.0–	3.5–	4.0–	4.5–	5.0–	5.5–	6.0–	6.1–	6.5–	7.0–	7.5–	8.0–	8.5–	9.0–							
<15	5	2	5	11	11	7	7		10	7	10	2	1	1	1	80	39	119	5.42	1.55	41	51.3
15–	27	23	59	77	115	140	135	29	95	96	90	55	43	37	58	1 079	136	1 215	5.99	1.76	555	51.4
30–	255	370	740	1 170	1 626	1 858	1 777	381	1 234	1 268	981	660	518	323	670	13 831	1 654	15 485	5.88	1.66	7 552	54.6
45–	1 035	1 580	3 158	5 047	6 859	7 922	7 344	1355	4 635	4 283	2 896	2040	1247	757	1277	51 435	5 881	57 316	5.59	1.48	31 685	61.6
60–	4 633	5 843	10 750	15 735	19 132	19 587	16 602	2767	9 585	8 068	4 865	2814	1627	970	1458	124 436	13 820	138 256	5.19	1.38	84 573	68.0
75–	5 159	5 551	8 926	11 268	11 967	10 864	8 565	1324	4 441	3 419	1 965	1063	598	337	495	75 942	8 891	84 833	4.81	1.35	52 914	69.7
90–	411	370	493	606	591	465	351	54	182	128	79	42	17	14	29	3 832	482	4 314	4.56	1.39	2 560	66.8
Subtotal	11 525	13 739	24 131	33 914	40 301	40 843	34 781	5910	20 182	17 269	10 886	6676	4051	2439	3988	270 635	30 903	301 538	5.19	1.44	179 880	66.5
(row %)	(4.3)	(5.1)	(8.9)	(12.5)	(14.9)	(15.1)	(12.9)	(2.2)	(7.5)	(6.4)	(4.0)	(2.5)	(1.5)	(0.9)	(1.5)	(100.0)						
Unspecified			1		2		1					1				5	2	7	5.28	1.45	4	80.0
No information available																						
Total	11 525	13 739	24 132	33 914	40 303	40 843	34 782	5910	20 182	17 269	10 886	6677	4051	2439	3988	270 640	30 905	301 545	5.19	1.44	179 884	66.5
(row %)	(4.3)	(5.1)	(8.9)	(12.5)	(14.9)	(15.1)	(12.9)	(2.2)	(7.5)	(6.4)	(4.0)	(2.5)	(1.5)	(0.9)	(1.5)	(100.0)						
Mean	72.5	71.1	70.0	68.9	67.8	66.7	65.9	65.0	64.8	63.8	62.7	61.5	60.4	59.8	58.4	66.9	66.9	66.9				
SD	11.6	11.7	11.8	11.8	12.0	12.0	12.2	12.4	12.4	12.6	13.0	12.9	13.4	13.5	14.0	12.5	12.9	12.5				

Target achieving number: the number of patients whose serum phosphorus level is in the range of 3.5–6.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

TABLE 34. *Predialysis serum corrected calcium levels for various age groups (for all dialysis patients)*

Age (years old)	Predialysis serum corrected calcium level (mg/dL)														Subtotal	No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
	<7.0	7.0–	7.5–	8.0–	8.4–	8.5–	9.0–	9.5–	10.0–	10.1–	10.5–	11.0–	11.5–	12.0–							
<15		1		2		2	10	21	4	13	17	3	2	6	81	38	119	10.20	1.16	37	45.7
15–	12	16	25	55	17	236	322	218	28	76	35	11	4	23	1 078	137	1 215	9.28	0.95	821	76.2
30–	109	132	379	1 030	292	3 006	4 010	2 786	347	879	394	121	60	283	13 828	1 657	15 485	9.25	0.94	10 441	75.5
45–	233	338	1275	3 548	1029	11 214	14 515	10 423	1409	3 659	1746	595	276	1173	51 433	5 883	57 316	9.32	0.95	38 590	75.0
60–	393	730	2820	8 633	2420	28 087	35 006	25 074	3308	8 461	4498	1552	755	2692	124 429	13 827	138 256	9.31	0.92	93 895	75.5
75–	169	338	1346	5 146	1533	18 210	22 209	14 540	1844	4 830	2724	1001	520	1549	75 959	8 874	84 833	9.31	0.89	58 336	76.8
90–	7	10	52	207	79	863	1 165	773	93	262	138	70	31	86	3 836	478	4 314	9.36	0.89	2 973	77.5
Subtotal	923	1565	5897	18 621	5370	61 618	77 237	53 835	7033	18 180	9552	3353	1648	5812	270 644	30 894	301 538	9.31	0.92	205 093	75.8
(row %)	(0.3)	(0.6)	(2.2)	(6.9)	(2.0)	(22.8)	(28.5)	(19.9)	(2.6)	(6.7)	(3.5)	(1.2)	(0.6)	(2.1)	(100.0)						
Unspecified						1	3							1	5	2	7	9.84	1.73	4	80.0
No information available																					
Total	923	1565	5897	18 621	5370	61 619	77 240	53 835	7033	18 180	9552	3353	1648	5813	270 649	30 896	301 545	9.31	0.92	205 097	75.8
(row %)	(0.3)	(0.6)	(2.2)	(6.9)	(2.0)	(22.8)	(28.5)	(19.9)	(2.6)	(6.7)	(3.5)	(1.2)	(0.6)	(2.1)	(100.0)						
Mean	61.9	64.1	65.2	66.7	66.8	67.3	67.0	66.6	66.5	66.5	67.2	67.8	68.3	66.5	66.9	66.9	66.9				
SD	13.9	13.0	12.4	12.4	12.5	12.4	12.6	12.5	12.4	12.5	12.4	12.2	12.4	12.5	12.5	12.9	12.5				

Target achieving number: the number of patients whose serum corrected calcium level is in the range of 8.4–10.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

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TABLE 35. *Serum intact parathyroid hormone (PTH) levels for various age groups (for all dialysis patients)*

Age (years old)	Serum intact PTH level (pg/mL) <20	20–	40–	60–	80–	100–	120–	140–	160–	180–	240–	241–	300–	360–	420–	480–	500–	540–	600–	800–	Subtotal	No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
<15	4	8	6	7	4	4	6	1	3	5		1	5	4	3	1	2	2	1	3	70		70	253	416	30	42.9
15–	30	49	47	62	64	70	63	63	58	106		77	50	43	27	6	19	18	27	29	908	21	929	235	255	486	53.5
30–	459	684	749	787	834	868	796	819	731	1 714	34	1 133	650	469	282	78	130	142	257	242	11 858	299	12 157	209	210	6 583	55.5
45–	2 227	2 872	3 014	3 346	3 380	3 377	3 298	3 081	2 750	6 373	68	3 764	2271	1313	868	188	338	379	586	546	44 039	1209	45 248	182	178	25 673	58.3
60–	6 190	8 073	8 510	8 892	9 113	8 636	8 129	7 288	6 612	14 460	172	8 254	4490	2629	1494	385	610	613	993	733	106 276	3045	109 321	162	153	63 302	59.6
75–	4 104	5 873	5 938	5 949	5 946	5 496	4 887	4 513	3 760	8 116	108	4 205	2327	1156	667	157	245	241	429	319	64 436	2155	66 591	145	138	38 775	60.2
90–	218	319	301	279	334	263	214	203	193	358	2	203	103	54	26	6	7	12	22	17	3 134	124	3 258	140	135	1 846	58.9
Subtotal	13 232	17 878	18 565	19 322	19 675	18 714	17 393	15 968	14 107	31 132	384	17 637	9896	5668	3367	821	1351	1407	2315	1889	230 721	6853	237 574	163	159	136 695	59.2
(row %)	(5.7)	(7.7)	(8.0)	(8.4)	(8.5)	(8.1)	(7.5)	(6.9)	(6.1)	(13.5)	(0.2)	(7.6)	(4.3)	(2.5)	(1.5)	(0.4)	(0.6)	(0.6)	(1.0)	(0.8)	(100.0)						
Unspecified							2		1	1					1						5	1	6	211	138	4	80.0
No information available																											
Total	13 232	17 878	18 565	19 322	19 675	18 714	17 395	15 968	14 108	31 133	384	17 637	9896	5668	3368	821	1351	1407	2315	1889	230 726	6854	237 580	163	159	136 699	59.2
(row %)	(5.7)	(7.7)	(8.0)	(8.4)	(8.5)	(8.1)	(7.5)	(6.9)	(6.1)	(13.5)	(0.2)	(7.6)	(4.3)	(2.5)	(1.5)	(0.4)	(0.6)	(0.6)	(1.0)	(0.8)	(100.0)						
Mean	68.2	68.6	68.3	67.9	67.9	67.4	67.0	66.8	66.6	66.2	65.7	65.4	65.0	63.9	63.2	63.2	62.5	62.2	62.2	60.5	66.8	68.0	66.8				
SD	11.9	12.2	12.2	12.1	12.2	12.3	12.3	12.5	12.4	12.4	12.7	12.6	12.7	13.1	13.1	13.2	13.7	13.5	13.8	14.3	12.5	12.4	12.5				

Target achieving number: the number of patients whose serum intact PTH level is in the range of 60–240 pg/mL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

TABLE 36. *Predialysis serum phosphorus levels for different dialysis vintages (for all dialysis patients)*

Dialysis vintage (years)	Predialysis serum phosphorus level (mg/dL) <3.0	3.0–	3.5–	4.0–	4.5–	5.0–	5.5–	6.0–	6.1–	6.5–	7.0–	7.5–	8.0–	8.5–	9.0–	Subtotal	No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
<2	2 912	3 453	6 220	8 149	8 992	8 506	7 055	1155	3 941	3 419	2 064	1319	868	482	795	59 330	8 361	67 691	5.07	1.44	40 077	67.5
2–	2 971	3 703	6 363	8 455	10 028	9 954	8 531	1457	4 995	4 296	2 708	1747	1015	650	1055	67 928	7 741	75 669	5.18	1.46	44 788	65.9
5–	2 916	3 279	5 620	8 171	9 928	10 338	8 927	1562	5 353	4 710	3 046	1856	1097	666	1187	68 656	7 335	75 991	5.26	1.48	44 546	64.9
10–	1 375	1 574	2 792	4 170	5 141	5 485	4 816	787	2 719	2 326	1 536	867	534	359	536	35 017	3 530	38 547	5.26	1.43	23 191	66.2
15–	645	755	1 399	2 257	2 872	2 959	2 530	426	1 517	1 165	724	450	295	155	233	18 382	1 856	20 238	5.25	1.38	12 443	67.7
20–	316	443	814	1 219	1 552	1 654	1 368	267	784	664	407	228	137	66	95	10 014	1 001	11 015	5.22	1.33	6 874	68.6
25–	202	258	450	797	932	1 041	848	122	480	358	211	114	67	26	45	5 951	551	6 502	5.16	1.28	4 190	70.4
30–	112	182	303	457	580	584	475	89	262	230	123	72	23	24	30	3 546	338	3 884	5.13	1.32	2 488	70.2
35–	56	75	143	214	249	283	208	40	115	90	62	23	13	10	8	1 589	145	1 734	5.09	1.29	1 137	71.6
40–	11	8	20	23	26	32	18	4	14	6	4	1	1	1	1	170	17	187	4.87	1.26	123	72.4
Subtotal	11 516	13 730	24 124	33 912	40 300	40 836	34 776	5909	20 180	17 264	10 885	6677	4050	2439	3985	270 583	30 875	301 458	5.19	1.44	179 857	66.5
(row %)	(4.3)	(5.1)	(8.9)	(12.5)	(14.9)	(15.1)	(12.9)	(2.2)	(7.5)	(6.4)	(4.0)	(2.5)	(1.5)	(0.9)	(1.5)	(100.0)						
Unspecified	9	8	8	2	3	5	6	1	2	5	1		1		3	54	30	84	4.70	1.96	25	46.3
No information available		1				2										3		3	4.50	1.04	2	66.7
Total	11 525	13 739	24 132	33 914	40 303	40 843	34 782	5910	20 182	17 269	10 886	6677	4051	2439	3988	270 640	30 905	301 545	5.19	1.44	179 884	66.5
(row %)	(4.3)	(5.1)	(8.9)	(12.5)	(14.9)	(15.1)	(12.9)	(2.2)	(7.5)	(6.4)	(4.0)	(2.5)	(1.5)	(0.9)	(1.5)	(100.0)						
Mean	6.49	6.61	6.65	7.12	7.35	7.62	7.59	7.68	7.59	7.41	7.38	7.09	6.88	6.80	6.57	7.26	6.51	7.18				
SD	6.93	7.22	7.28	7.51	7.54	7.64	7.49	7.55	7.43	7.25	7.11	6.88	6.66	6.55	6.20	7.39	7.13	7.37				

Target achieving number: the number of patients whose serum phosphorus level is in the range of 3.5–6.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

10–20 years. However, the corrected calcium level showed no clear relationship with dialysis vintage (Table 37).

The relationships between dialysis vintage and the target levels of the three indicators recommended in the CKD-MBD Guideline (5) were examined as follows. The percentage of patients who achieved the target phosphorus level was higher among those with a dialysis vintage of ≥20 years than among those with a shorter dialysis vintage. However, the percentages of patients who achieved the target intact PTH and corrected calcium levels were lower among those with a dialysis vintage of ≥15 or ≥20 years than among those with a shorter dialysis vintage.

4. Dialysis method

Phosphorus, corrected calcium, and intact PTH levels were examined for different dialysis methods (Tables 39–41). Predialysis levels were adopted for patients who underwent HD, HDF, hemofiltration (HF), or hemoadsorption. All dialysis patients, i.e. not limited to those who underwent dialysis three times per week, were included in this tabulation.

The phosphorus and intact PTH levels were slightly higher among patients who underwent HDF than among those who underwent HD at facilities. However, there was no marked difference in the corrected calcium level between the two patient groups.

The phosphorus level of PD patients was not markedly different from that of patients who underwent another type of dialysis method. The corrected calcium and intact PTH levels were markedly higher among PD patients than among those who underwent another type of dialysis method.

Patients who underwent HD at home showed clearly lower phosphorus and corrected calcium levels than those who underwent HD at facilities. In contrast, the intact PTH level was higher among patients who underwent HD at home than among those who underwent HD at facilities.

As mentioned at the beginning of this section, background factors of each patient were not considered in the above comparison. Therefore, the tendencies observed in the above examination should not be directly interpreted as indicators of the efficacy of each dialysis method.

5. Percentage of patients who achieved target levels recommended in CKD-MBD Guideline (5)

The percentage of patients who achieved the target levels recommended in the CKD-MBD Guideline was discussed for all dialysis patients examined in Section D. For reference, the target phosphorus, corrected calcium, and intact PTH levels are shown again below (5).

TABLE 37. *Predialysis serum corrected calcium levels for different dialysis vintages (for all dialysis patients)*

Dialysis vintage (years)	Predialysis serum corrected calcium level (mg/dL)													No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
	<7.0	7.0–	7.5–	8.0–	8.4–	8.5–	9.0–	9.5–	10.0–	10.1–	10.5–	11.0–	11.5–	12.0–	Subtotal							
<2	320	553	1962	6 186	1690	17 342	16 334	8 313	956	2 379	1244	501	385	1193	59 358	8 333	67 691	9.10	0.91	44 635	75.2
2–	182	347	1458	4 794	1519	16 895	20 708	12 721	1533	3 686	1799	579	317	1366	67 904	7 765	75 669	9.25	0.87	53 376	78.6
5–	177	267	1066	3 688	1064	14 159	20 400	15 231	2018	5 236	2590	916	401	1430	68 643	7 348	75 991	9.38	0.89	52 872	77.0
10–	80	155	511	1 711	517	6 205	9 632	8 308	1210	3 193	1839	628	244	772	35 005	3 542	38 547	9.47	0.92	25 872	73.9
15–	64	97	341	976	260	3 271	4 732	4 362	608	1 762	1008	336	136	449	18 402	1 836	20 238	9.47	0.97	13 233	71.9
20–	51	70	251	561	154	1 779	2 568	2 319	336	904	521	165	78	257	10 014	1 001	11 015	9.45	1.00	7 156	71.5
25–	29	34	176	334	91	1 012	1 510	1 405	206	528	291	117	47	177	5 957	545	6 502	9.46	1.04	4 224	70.9
30–	15	27	85	255	47	631	905	754	114	311	185	70	32	117	3 548	336	3 884	9.46	1.05	2 451	69.1
35–	4	13	43	102	26	280	403	363	49	160	64	34	7	43	1 591	143	1 734	9.44	1.02	1 121	70.5
40–		2	3	11	2	31	37	46	2	15	10	5		5	169	18	187	9.49	0.98	118	69.8
Subtotal	922	1565	5896	18 618	5370	61 605	77 229	53 822	7032	18 174	9551	3351	1647	5809	270 591	30 867	301 458	9.31	0.92	205 058	75.8
(row %)	(0.3)	(0.6)	(2.2)	(6.9)	(2.0)	(22.8)	(28.5)	(19.9)	(2.6)	(6.7)	(3.5)	(1.2)	(0.6)	(2.1)	(100.0)						
Unspecified	1		1	3		14	9	12	1	6	1	2	1	4	55	29	84	9.56	1.28	36	65.5
No information available							2	1							3		3	9.20	0.26	3	100.0
Total	923	1565	5897	18 621	5370	61 619	77 240	53 835	7033	18 180	9552	3353	1648	5813	270 649	30 896	301 545	9.31	0.92	205 097	75.8
(row %)	(0.3)	(0.6)	(2.2)	(6.9)	(2.0)	(22.8)	(28.5)	(19.9)	(2.6)	(6.7)	(3.5)	(1.2)	(0.6)	(2.1)	(100.0)						
Mean	6.86	6.58	6.52	5.95	5.77	6.10	6.98	8.24	8.77	9.10	9.42	9.46	8.07	8.02	7.26	6.51	7.18				
SD	8.17	8.16	8.03	7.32	6.88	6.92	7.10	7.51	7.61	7.77	7.81	8.14	7.92	8.03	7.39	7.11	7.37				

Target achieving number: the number of patients whose serum corrected calcium level is in the range of 8.4–10.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

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TABLE 38. *Serum intact parathyroid hormone (PTH) levels for different dialysis vintages (for all dialysis patients)*

Dialysis vintage (years)	Serum intact PTH level (pg/mL)																									Target achieving number	Target achieving rate (%)
	<20	20–	40–	60–	80–	100–	120–	140–	160–	180–	240–	241–	300–	360–	420–	480–	500–	540–	600–	800–	Subtotal	No information available	Total	Mean	SD		
<2	2 857	3 945	4 038	4 105	4 163	3 963	3 697	3 426	3 009	6 821	74	3 803	2186	1239	711	171	267	287	421	260	49 443	2 153	51 596	159	142	29 258	59.2
2–	3 503	5 382	5 462	5 430	5 392	5 002	4 590	4 072	3 436	7 303	84	3 929	1936	995	569	148	211	215	308	188	58 155	1 595	59 750	142	123	35 309	60.7
5–	2 822	4 505	4 747	5 076	5 013	4 792	4 513	4 140	3 686	8 073	118	4 607	2552	1448	905	198	345	347	617	523	59 027	1 577	60 604	166	159	35 411	60.0
10–	1 299	1 718	1 966	2 169	2 444	2 431	2 230	2 140	1 925	4 365	59	2 538	1662	1008	598	150	274	280	465	455	30 176	737	30 913	191	191	17 763	58.9
15–	955	915	1 033	1 172	1 262	1 229	1 140	1 090	1 019	2 201	25	1 316	790	505	301	72	136	142	249	227	15 779	329	16 108	186	192	9 138	57.9
20–	692	584	613	658	643	608	592	524	504	1 201	15	735	406	250	145	38	60	67	129	122	8 586	192	8 778	181	210	4 745	55.3
25–	551	405	360	379	374	388	336	318	287	661	2	394	193	123	78	21	31	43	58	66	5 068	121	5 189	164	183	2 745	54.2
30–	343	278	215	226	246	211	209	176	160	344	4	204	114	65	47	15	18	17	44	42	2 978	97	3 075	162	199	1 576	52.9
35–	182	127	116	88	122	85	80	74	69	145	3	99	50	31	8	7	9	8	22	5	1 330	33	1 363	146	159	666	50.1
40–	25	15	12	17	15	4	7	7	12	12		9	4	4	5	1		1	1	1	152	4	156	148	231	74	48.7
Subtotal	13 229	17 874	18 562	19 320	19 674	18 713	17 394	15 967	14 107	31 126	384	17 634	9893	5668	3367	821	1351	1407	2314	1889	230 694	6 838	237 532	163	159	136 685	59.2
(row %)	(5.7)	(7.7)	(8.0)	(8.4)	(8.5)	(8.1)	(7.5)	(6.9)	(6.1)	(13.5)	(0.2)	(7.6)	(4.3)	(2.5)	(1.5)	(0.4)	(0.6)	(0.6)	(1.0)	(0.8)	(100.0)						
Unspecified	3	4	3	2	1	1	1	1	1	7		3	3		1				1		32	16	48	172	144	14	43.8
No information available																											
Total	13 232	17 878	18 565	19 322	19 675	18 714	17 395	15 968	14 108	31 133	384	17 637	9896	5668	3368	821	1351	1407	2315	1889	230 726	6 854	237 580	163	159	136 699	59.2
(row %)	(5.7)	(7.7)	(8.0)	(8.4)	(8.5)	(8.1)	(7.5)	(6.9)	(6.1)	(13.5)	(0.2)	(7.6)	(4.3)	(2.5)	(1.5)	(0.4)	(0.6)	(0.6)	(1.0)	(0.8)	(100.0)						
Mean	8.34	6.76	6.72	6.86	7.03	7.03	7.04	7.09	7.27	7.32	7.34	7.56	7.72	8.08	8.14	8.51	8.60	8.74	9.34	10.33	7.29	6.14	7.26				
SD	8.96	7.43	7.12	7.08	7.21	7.07	7.11	7.10	7.23	7.22	6.96	7.39	7.30	7.49	7.45	7.93	7.52	7.76	7.93	7.71	7.37	7.21	7.37				

Target achieving number: the number of patients whose serum intact PTH level is in the range of 60–240 pg/mL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

TABLE 39. *Predialysis serum phosphorus levels for different dialysis methods (for all dialysis patients)*

Dialysis method	Predialysis serum phosphorus level (mg/dL)																No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
	<3.0	3.0–	3.5–	4.0–	4.5–	5.0–	5.5–	6.0–	6.1–	6.5–	7.0–	7.5–	8.0–	8.5–	9.0–	Subtotal						
Facility HD	10 603	12 469	21 748	30 384	35 982	36 334	30 981	5225	17 961	15 409	9 693	5957	3623	2189	3592	242 150	26 125	268 275	5.18	1.45	160 654	66.3
HDF	659	875	1 583	2 343	2 966	3 123	2 715	480	1 576	1 348	865	546	326	196	312	19 913	1 812	21 725	5.29	1.43	13 210	66.3
Hemofiltration	16	18	22	26	28	14	13	2	9	8	4		3			163	20	183	4.54	1.34	105	64.4
Hemoadsorption	57	75	148	252	293	324	270	51	139	101	57	32	12	9	13	1 833	143	1 976	5.13	1.23	1 338	73.0
Home HD	16	14	35	41	52	48	23		17	11	5	6	2		3	273	117	390	4.81	1.30	199	72.9
PD	174	288	596	868	982	1 000	780	152	480	392	262	136	85	45	68	6 308	2 688	8 996	5.18	1.34	4 378	69.4
Total	11 525	13 739	24 132	33 914	40 303	40 843	34 782	5910	20 182	17 269	10 886	6677	4051	2439	3988	270 640	30 905	301 545	5.19	1.44	179 884	66.5
(row %)	(4.3)	(5.1)	(8.9)	(12.5)	(14.9)	(15.1)	(12.9)	(2.2)	(7.5)	(6.4)	(4.0)	(2.5)	(1.5)	(0.9)	(1.5)	(100.0)						

Target achieving number: the number of patients whose serum phosphorus level is in the range of 3.5–6.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

TABLE 40. *Predialysis serum corrected calcium levels for different dialysis methods (for all dialysis patients)*

	Predialysis serum corrected calcium level (mg/dL)																		
Dialysis method	<7.0	7.0–	7.5–	8.0–	8.4–	8.5–	9.0–	9.5–	10.0–	10.1–	10.5–	11.0–	11.5–	12.0–	Subtotal	No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
Facility HD	823	1390	5302	16 873	4888	55 947	69 129	47 507	6148	15 916	8328	2945	1509	5478	242 183	26 092	268 275	9.31	0.93	183 619	75.8
HDF	66	127	442	1 318	368	4 317	5 807	4 200	557	1 402	752	249	83	208	19 896	1 829	21 725	9.29	0.82	15 249	76.6
Hemofiltration		3	2	9	3	42	39	38	4	8	9	3		3	163	20	183	9.31	0.90	126	77.3
Hemoadsorption	4	5	31	131	26	328	525	438	61	144	88	21	4	27	1 833	143	1 976	9.38	0.85	1 378	75.2
Home HD	5	3	13	21	5	53	74	53	7	23	10	1	1	4	273	117	390	9.18	0.97	192	70.3
PD	25	37	107	269	80	932	1 666	1 599	256	687	365	134	51	93	6 301	2 695	8 996	9.50	0.87	4 533	71.9
Total	923	1565	5897	18 621	5370	61 619	77 240	53 835	7033	18 180	9552	3353	1648	5813	270 649	30 896	301 545	9.31	0.92	205 097	75.8
(row %)	(0.3)	(0.6)	(2.2)	(6.9)	(2.0)	(22.8)	(28.5)	(19.9)	(2.6)	(6.7)	(3.5)	(1.2)	(0.6)	(2.1)	(100.0)						

Target achieving number: the number of patients whose serum corrected calcium level is in the range of 8.4–10.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

TABLE 41. *Serum intact parathyroid hormone (PTH) levels for different dialysis methods (for all dialysis patients)*

	Serum intact PTH level (pg/mL)																								
Dialysis method	<20	20–	40–	60–	80–	100–	120–	140–	160–	180–	240–	241–	300–	360–	420–	480–	500–	540–	600–	800–	Subtotal	No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
Facility HD	11 888	16 204	16 766	17 486	17 790	16 863	15 633	14 336	12 651	27 847	348	15 621	8760	4987	2947	712	1164	1211	2012	1616	206 842	6073	212 915	162	157	122 954	59.4
HDF	1 026	1 205	1 333	1 317	1 427	1 372	1 340	1 167	1 055	2 342	32	1 429	781	433	262	73	130	119	184	157	17 184	389	17 573	169	164	10 052	58.5
Hemofiltration	26	15	8	9	9	9	8	6	11	18		11	6	6	4	1	1	1		3	152	17	169	165	183	70	46.1
Hemoadsorption	140	145	123	140	146	133	103	115	96	193		100	62	38	23	5	7	10	9	12	1 600	26	1 626	149	146	926	57.9
Home HD	10	17	15	20	19	10	12	16	11	35	1	22	11	9	2	2			7	6	225	33	258	198	197	124	55.1
PD	142	292	320	350	284	327	299	328	284	698	3	454	276	195	130	28	49	66	103	95	4 723	316	5 039	212	210	2 573	54.5
Total	13 232	17 878	18 565	19 322	19 675	18 714	17 395	15 968	14 108	31 133	384	17 637	9896	5668	3368	821	1351	1407	2315	1889	230 726	6854	237 580	163	159	136 699	59.2
(row %)	(5.7)	(7.7)	(8.0)	(8.4)	(8.5)	(8.1)	(7.5)	(6.9)	(6.1)	(13.5)	(0.2)	(7.6)	(4.3)	(2.5)	(1.5)	(0.4)	(0.6)	(0.6)	(1.0)	(0.8)	(100.0)						

Target achieving number: the number of patients whose serum intact PTH level is in the range of 60–240 pg/mL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

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- Phosphorus levels, 3.5–6.0 mg/dL
- Corrected calcium levels, 8.4–10.0 mg/dL
- Intact PTH levels, 60–240 pg/mL

Table 42 shows the number of patients and their phosphorus and corrected calcium levels for all dialysis patients. As shown in the table, 51.4% of all dialysis patients achieved both the target phosphorus and corrected calcium levels.

Table 43 shows the percentages of patients who achieved the target levels among those who answered all the questions regarding the three indicators (phosphorus, corrected calcium, and intact PTH levels). As shown in the table, 32.3% of the above dialysis patients achieved the three target levels.

6. Nutrition-related indicators and phosphorus level

The relationships between phosphorus level and some indicators related to nutritional status are examined below.

Table 44 shows the number of patients and their phosphorus and serum albumin levels among all dialysis patients. The percentage of patients with a high phosphorus level increased with increasing serum albumin level. Among the patients with a serum albumin level ≥3.5 g/dL, only 6.4% had a phosphorus level <3.5 mg/dL (hypophosphatemia).

Table 45 shows the number of patients and their phosphorus levels and body mass indices (BMIs). The percentage of patients with a high phosphorus level tended to increase with increasing BMI, as observed in the relationship of phosphorus level with serum albumin level. Among patients with a BMI of 26 kg/m^2, 34.2% had a phosphorus level ≥6.1 mg/dL (hyperphosphatemia).

Table 46 shows the number of patients and their phosphorus levels and nPCR values for patients who underwent dialysis by extracorporeal circulation (facility HD, HDF, HF, hemoadsorption, or home HD) three times per week for two or more years. The percentage of patients with a high phosphorus level tended to increase with increasing nPCR. Among patients with a nPCR ≥0.8 g/kg/d, 4.8% had a phosphorus level <3.5 mg/dL (hypophosphatemia).

7. Single-pool Kt/V (spKt/V) and phosphorus level

Table 47 shows the number of patients and their phosphorus levels and spKt/V values for patients who underwent dialysis by extracorporeal circulation (facility HD, HDF, HF, hemoadsorption, or home HD) three times per week for two or more years. There was no clear relationship between phosphorus level and spKt/V. The mean phosphorus level of patients in various groups with different spKt/V values was as follows. The mean phosphorus level was highest (5.39 mg/dL) for patients with a spKt/V ≥1.0 but <1.2, and it decreased when spKt/V decreased below 1.0 and increased above 1.2. For patients with a spKt/V ≥1.0, the percentage of patients with a low phosphorus level increased as spKt/V increased, suggesting that the removal rate of phosphorus increased with increasing dialysis dose.

E. Items associated with renal anemia

1. Changes in Hb level

Table 48 shows the distributions of patients with different Hb levels at the end of 2006, 2008, 2010, and 2012. All dialysis patients at the end of each year are included in the tabulation. Since 2006, the percentage of patients with a Hb level <10 g/dL had gradually decreased, whereas the percentage of patients with a Hb level in the range of 11–13 g/dL had increased. Therefore, the mean Hb level of all dialysis patients at the end of each year had gradually increased.

2. Hb level and dialysis method

Table 49 shows the distribution of patients with different Hb levels for various dialysis methods. All dialysis patients are included in the tabulation. The mean Hb level for patients who underwent HD at home was higher than those for patients who underwent other types of dialysis, among whom the mean Hb levels were almost similar.

3. Hb level and primary diseases

Table 50 shows the distribution of patients with different Hb levels for various primary diseases. All dialysis patients are included in the tabulation. The Hb levels were compared among patients with the four common primary diseases, i.e. diabetic nephropathy, chronic glomerulonephritis, nephrosclerosis, and polycystic kidney disease. The percentage of patients with a Hb level ≥12 g/dL was higher among patients with polycystic kidney disease than among patients with the other major primary diseases.

4. Hb level, gender, and age

Tables 51 and 52 show the numbers of patients and their Hb levels in various age groups for males and females, respectively. For both males and females, the Hb level tended to decrease with increasing age. No marked difference in Hb level was observed between males and females.

5. Hb level, blood pressure, and pulse

The relationships of Hb level with blood pressure and pulse were examined for patients who underwent HD at facilities.

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TABLE 42. *Predialysis serum corrected calcium and phosphorus levels (for all dialysis patients)*

Predialysis serum phosphorus level (mg/dL)	Predialysis serum corrected calcium level (mg/dL)														Subtotal	No information available	Total	Mean	SD	Target achieving number	Target achieving rate (%)
	<7.0	7.0–	7.5–	8.0–	8.4–	8.5–	9.0–	9.5–	10.0–	10.1–	10.5–	11.0–	11.5–	12.0–							
<3.0	40	47	164	549	148	2 122	3 207	2 445	335	995	675	290	168	310	11 495	30	11 525	9.50	0.98	8 257	71.8
3.0–	20	43	221	784	224	3 101	3 983	2 785	382	1 013	532	223	114	294	13 719	20	13 739	9.37	0.90	10 475	76.4
3.5–	49	99	377	1 461	440	5 700	7 280	4 830	571	1 537	828	312	149	460	24 093	39	24 132	9.32	0.87	18 821	78.1
4.0–	72	144	611	2 145	617	8 111	10 169	6 746	889	2 093	1082	377	193	618	33 867	47	33 914	9.30	0.86	26 532	78.3
4.5–	86	176	751	2 592	796	9 356	11 906	8 219	1033	2 667	1322	396	196	753	40 249	54	40 303	9.30	0.87	31 310	77.8
5.0–	98	203	780	2 796	827	9 419	11 918	8 306	1042	2 676	1348	430	192	751	40 786	57	40 843	9.30	0.87	31 512	77.3
5.5–	98	188	753	2 503	750	7 944	9 800	7 015	934	2 380	1158	374	177	672	34 746	36	34 782	9.29	0.90	26 443	76.1
6.0–	23	34	143	462	143	1 282	1 601	1 201	163	423	203	65	32	127	5 902	8	5 910	9.31	0.94	4 390	74.4
6.1–	81	134	557	1 462	430	4 565	5 606	3 922	565	1 334	688	250	112	457	20 163	19	20 182	9.29	0.94	15 088	74.8
6.5–	85	124	463	1 376	375	3 901	4 650	3 312	435	1 187	605	213	106	423	17 255	14	17 269	9.29	0.97	12 673	73.4
7.0–	65	93	343	899	229	2 372	2 842	2 058	291	723	423	159	78	307	10 882	4	10 886	9.31	1.03	7 792	71.6
7.5–	32	85	241	620	147	1 481	1 687	1 149	166	445	278	96	43	197	6 667	10	6 677	9.28	1.05	4 630	69.4
8.0–	38	67	178	408	88	884	989	723	76	254	137	63	28	111	4 044	7	4 051	9.22	1.08	2 760	68.2
8.5–	40	42	117	193	63	513	603	412	66	157	97	33	21	79	2 436	3	2 439	9.25	1.13	1 657	68.0
9.0–	91	80	196	365	89	827	935	663	74	266	149	54	32	158	3 979	9	3 988	9.23	1.22	2 588	65.0
Subtotal	918	1559	5895	18 615	5366	61 578	77 176	53 786	7022	18 150	9525	3335	1641	5717	270 283	357	270 640	9.31	0.92	204 928	75.8
(row %)	(0.3)	(0.6)	(2.2)	(6.9)	(2.0)	(22.8)	(28.6)	(19.9)	(2.6)	(6.7)	(3.5)	(1.2)	(0.6)	(2.1)	(100.0)						
No information available	5	6	2	6	4	41	64	49	11	30	27	18	7	96	366	30 539	30 905	10.54	1.94	169	46.2
Total	923	1565	5897	18 621	5370	61 619	77 240	53 835	7033	18 180	9552	3353	1648	5813	270 649	30 896	301 545	9.31	0.92	205 097	75.8
(row %)	(0.3)	(0.6)	(2.2)	(6.9)	(2.0)	(22.8)	(28.5)	(19.9)	(2.6)	(6.7)	(3.5)	(1.2)	(0.6)	(2.1)	(100.0)						
Mean	6.15	5.85	5.63	5.39	5.33	5.18	5.13	5.14	5.15	5.16	5.13	5.08	5.03	5.34	5.19	4.96	5.19				
SD	2.09	1.80	1.64	1.47	1.41	1.40	1.39	1.41	1.42	1.48	1.55	1.64	1.70	1.66	1.44	1.63	1.44				
Target achieving number	426	844	3415	11 959	3573	41 812	52 674	36 317	4632	11 776	5941	1954	939	3381	179 643	241	179 884			139 008	
Target achieving rate (%)	46.4	54.1	57.9	64.2	66.6	67.9	68.3	67.5	66.0	64.9	62.4	58.6	57.2	59.1	66.5	67.5	66.5				51.4

Target achieving number: About calcium: the number of patients whose serum corrected calcium level is in the range of 8.4–10.0 mg/dL; About phosphorus: the number of patients whose serum phosphorus level is in the range of 3.5–6.0 mg/dL.
Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients. Values in parentheses represent the percentage relative to the total in each row.

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TABLE 43. *Percentage of patients who achieved target levels recommended in chronic kidney disease–mineral and bone disorder (CKD-MBD) Guideline (5) (for all dialysis patients)*

Patient's status	Number of patients	(%)†
1) Phosphorus levels, 3.5–6.0 mg/dL	179 884	(71.6)
2) Corrected calcium levels, 8.4–10.0 mg/dL	205 097	(81.7)
3) Intact PTH levels, 60–240 pg/mL	147 191	(58.6)
4) "Phosphorus levels, 3.5–6.0 mg/dL" and "Corrected calcium levels, 8.4–10.0 mg/dL"	139 008	(55.4)
5) "Phosphorus levels, 3.5–6.0 mg/dL", "Corrected calcium levels, 8.4–10.0 mg/dL" and "Intact PTH levels, 60–240 pg/mL"	81 060	(32.3)
Total number of objective patients for tabulation	251 128	

Total number of objective patients for tabulation: the total number of patients whose phosphorus level, corrected calcium level and intact PTH level are available simultaneously. †The percentage of patients' number to the total number of objective patients for tabulation.

Table 53 shows the mean systolic blood pressures of diabetic and nondiabetic patients with different Hb levels. Among the patients with a Hb level <9 g/dL, the mean systolic blood pressure tended to decrease with decreasing Hb level, regardless of the presence of diabetes. Among the patients with a Hb level ≥9 g/dL, the mean systolic blood pressures remained almost unchanged. Rather, the mean systolic blood pressure of nondiabetic patients with a Hb level ≥11 g/dL tended to decrease with increasing Hb level.

Table 54 shows the mean diastolic blood pressures of diabetic and nondiabetic patients with different Hb levels. Regardless of the presence of diabetes, the mean diastolic blood pressure tended to monotonically increase with increasing Hb level.

Table 55 shows the mean pulses of diabetic and nondiabetic patients with different Hb levels. The mean pulse of diabetic patients with Hb levels of 10–11 g/dL was lowest. The mean pulses of diabetic patients with Hb levels <10 and ≥11 g/dL increased with decreasing and increasing Hb level, respectively. In contrast, nondiabetic patients with Hb levels of 11–12 g/dL had the lowest mean pulse. Similarly to the case of diabetic patients, the mean pulses of nondiabetic patients with Hb levels <11 and ≥12 g/dL increased with decreasing and increasing Hb level, respectively. The increase in mean pulse with increasing Hb level was greater among nondiabetic patients than among diabetic patients.

6. Hb level and ESA dose

The relationship between Hb level and ESA dose was examined for various types of ESAs.

Table 56 shows the number of patients with different dialysis methods who did or did not use an ESA. Only a small number of patients used multiple ESAs. Among all dialysis patients, 11.9% did not use an ESA. The percentage of patients who did not use an ESA was highest among patients who underwent home HD (41.1%), followed by patients who underwent hemoadsorption (15.3%), HDF (15.1%), facility HD (11.6%), PD (9.8%), and HF (5.4%).

Among the patients who used an ESA, the most common ESA was darbepoetin (Aranesp), followed by epoetin alpha (Espo), epoetin beta (Epogin), epoetin beta pegol (Mircera), and epoetin kappa (Epoetin alpha biosimilar 1).

Next, the relationship between Hb level and ESA dose was examined as follows. Tables 57–60 show the numbers of patients with different Hb levels for different doses of epoetin alpha (or beta), epoetin kappa, darbepoetin, and epoetin beta pegol, respectively. In these tables, all dialysis patients are targeted. The mean ESA dose increased with decreasing Hb level regardless of the type of ESA.

7. Annual changes in anemia-related indicators

Annual changes in four anemia-related indicators (serum iron level, TIBC, transferrin saturation (TSAT) level, and serum ferritin level) were examined on the basis of the results of the 2006, 2007, and 2012 surveys. All dialysis patients were included (for the serum iron level in the 2007 survey, the targets were patients who underwent HD at facilities, HDF, and hemoadsorption).

Between 2006 and 2012, the mean serum iron level decreased (Table 61), the mean TIBC increased (Table 62), the mean TSAT level slightly decreased (Table 63), and the mean serum ferritin level decreased (Table 64). In particular, the mean serum ferritin level markedly decreased from 240 ng/mL in 2006 to 144 ng/mL in 2012. The patients with a serum ferritin level <200 ng/mL accounted for approximately 80% of all dialysis patients at the end of 2012.

8. ESA index (ESAI) and dialysis vintage

Here, ESAI is defined as "ESA dose/(Hb level × postdialysis body weight)". The relationship between ESAI and dialysis vintage was examined for

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TABLE 44. *Serum albumin and predialysis serum phosphorus levels (for all dialysis patients)*

Predialysis serum phosphorus level (mg/dL)	Serum albumin level (g/dL)									Subtotal	No information available	Total	Mean	SD
	<1.5	1.5–	2.0–	2.5–	3.0–	3.5–	4.0–	4.5–	5.0–					
<3.0	42	234	895	2 039	3 472	3 474	1 034	75	11	11 276	249	11 525	3.25	0.60
3.0–	12	122	456	1 470	3 904	5 641	1 731	105	14	13 455	284	13 739	3.45	0.51
3.5–	15	95	467	1 776	6 317	11 055	3 732	208	21	23 686	446	24 132	3.54	0.46
4.0–	25	83	413	1 912	8 086	16 322	6 106	352	26	33 325	589	33 914	3.60	0.44
4.5–	12	68	333	1 682	8 648	20 348	8 018	419	29	39 557	746	40 303	3.64	0.41
5.0–	14	54	283	1 421	7 974	21 041	8 763	496	36	40 082	761	40 843	3.67	0.40
5.5–	9	28	208	1 106	6 495	18 048	7 761	442	24	34 121	661	34 782	3.69	0.39
6.0–		4	34	150	1 060	3 043	1 414	79	2	5 786	124	5 910	3.71	0.38
6.1–	2	16	108	553	3 719	10 275	4 758	278	14	19 723	459	20 182	3.70	0.38
6.5–	4	17	96	450	2 906	8 908	4 167	295	10	16 853	416	17 269	3.72	0.38
7.0–	7	10	74	280	1 838	5 449	2 719	192	9	10 578	308	10 886	3.72	0.40
7.5–		4	37	175	1 075	3 371	1 700	102	3	6 467	210	6 677	3.73	0.39
8.0–	1	5	23	99	660	2 013	1 041	76	3	3 921	130	4 051	3.73	0.39
8.5–		6	15	72	368	1 177	676	42		2 356	83	2 439	3.74	0.40
9.0–	4	4	29	92	601	1 945	1 060	83	4	3 822	166	3 988	3.74	0.41
Subtotal	147	750	3471	13 277	57 123	132 110	54 680	3244	206	265 008	5 632	270 640	3.63	0.44
No information available	8	34	90	118	142	122	33	2	2	551	30 354	30 905	2.99	0.71
Total	155	784	3561	13 395	57 265	132 232	54 713	3246	208	265 559	35 986	301 545	3.63	0.44
Mean	4.04	3.76	4.03	4.42	4.95	5.28	5.47	5.55	5.03	5.18	5.42	5.19		
SD	1.91	1.61	1.66	1.51	1.42	1.38	1.41	1.49	1.39	1.44	1.63	1.44		
Target achieving number	75	332	1738	8 047	38 580	89 857	35 794	1996	138	176 557	3 327	179 884		
Target achieving rate (%)	51.0	44.3	50.1	60.6	67.5	68.0	65.5	61.5	67.0	66.6	59.1	66.5		

Target achieving number: the number of patients whose serum phosphorus level is in the range of 3.5–6.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients.

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TABLE 45. *Body mass index and predialysis serum phosphorus levels (for all dialysis patients)*

Predialysis serum phosphorus level (mg/dL)	Body Mass Index (kg/m^2)														
	<14	14–	16–	18–	20–	22–	24–	26–	28–	30–	Subtotal	No information available	Total	Mean	SD
<3.0	226	898	1 892	2 445	2 062	1 329	687	301	115	114	10 069	1 456	11 525	20.0	3.6
3.0–	150	690	1 866	2 877	2 793	1 915	1 062	456	218	178	12 205	1 534	13 739	20.7	3.6
3.5–	171	950	3 077	5 016	5 031	3 554	2 017	936	399	388	21 539	2 593	24 132	21.0	3.6
4.0–	207	1200	4 040	6 848	7 357	5 417	2 915	1 443	661	567	30 655	3 259	33 914	21.1	3.6
4.5–	224	1243	4 456	8 198	8 747	6 629	3 748	1 788	884	773	36 690	3 613	40 303	21.3	3.6
5.0–	197	1182	4 281	7 868	8 887	6 879	3 858	2 003	988	918	37 061	3 782	40 843	21.5	3.7
5.5–	128	946	3 403	6 667	7 475	5 903	3 463	1 838	883	920	31 626	3 156	34 782	21.7	3.8
6.0–	29	154	552	1 123	1 256	957	652	342	175	147	5 387	523	5 910	21.8	3.7
6.1–	77	512	1 887	3 775	4 207	3 438	2 130	1 168	584	586	18 364	1 818	20 182	21.9	3.9
6.5–	61	435	1 582	3 057	3 504	2 990	1 848	1 006	598	608	15 689	1 580	17 269	22.0	4.0
7.0–	48	265	964	1 810	2 221	1 773	1 235	711	403	463	9 893	993	10 886	22.2	4.1
7.5–	36	150	521	1 093	1 305	1 124	745	457	240	322	5 993	684	6 677	22.4	4.3
8.0–	18	80	323	603	791	680	449	281	186	235	3 646	405	4 051	22.7	4.5
8.5–	11	59	203	380	428	400	269	184	107	155	2 196	243	2 439	22.7	4.7
9.0–	27	64	335	601	723	640	430	295	180	298	3 593	395	3 988	23.0	4.9
Subtotal	1610	8828	29 382	52 361	56 787	43 628	25 508	13 209	6621	6672	244 606	26 034	270 640	21.5	3.8
No information available	20	91	221	354	376	288	169	83	40	49	1 691	29 214	30 905	21.2	3.9
Total	1630	8919	29 603	52 715	57 163	43 916	25 677	13 292	6661	6721	246 297	55 248	301 545	21.5	3.8
Mean	4.65	4.77	4.96	5.09	5.18	5.27	5.36	5.50	5.63	5.85	5.20	5.11	5.19		
SD	1.69	1.49	1.44	1.40	1.39	1.39	1.42	1.47	1.51	1.63	1.44	1.50	1.44		
Target achieving number	956	5675	19 809	35 720	38 753	29 339	16 653	8 350	3990	3713	162 958	16 926	179 884		
Target achieving rate (%)	59.4	64.3	67.4	68.2	68.2	67.2	65.3	63.2	60.3	55.7	66.6	65.0	66.5		

Target achieving number: the number of patients whose serum phosphorus level is in the range of 3.5–6.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients.

TABLE 46. *nPCR and predialysis serum phosphorus levels (for patients who underwent dialysis by extracorporeal circulation three times per week for two or more years)*

Predialysis serum phosphorus level (mg/dL)	Normalized protein catabolic rate (g/kg/day)										Subtotal	No information available	Total	Mean	SD
	<0.4	0.4–	0.6–	0.8–	1.0–	1.2–	1.4–	1.6–	1.8–	2.0–					
<3.0	136	1841	3 144	1 799	508	85	11	5	4	1	7 534	598	8 132	0.72	0.19
3.0–	39	1362	4 013	2 797	734	102	18	2	1	4	9 072	606	9 678	0.77	0.18
3.5–	43	1486	6 694	5 795	1 749	237	21	4	3	8	16 040	939	16 979	0.80	0.17
4.0–	40	1322	8 798	9 588	3 021	391	38	5	3	4	23 210	1 243	24 453	0.83	0.16
4.5–	41	972	9 307	12 817	4 425	633	57	6	4	8	28 270	1 493	29 763	0.86	0.16
5.0–	24	636	8 124	14 029	5 593	863	73	12	2	11	29 367	1 506	30 873	0.88	0.16
5.5–	24	379	5 846	12 495	5 476	904	74	11	1	4	25 214	1 266	26 480	0.90	0.16
6.0–	3	51	891	2 101	1 047	199	17			1	4 310	240	4 550	0.92	0.16
6.1–	11	143	2 903	7 074	3 776	720	69	6	4	2	14 708	775	15 483	0.93	0.16
6.5–	7	99	2 071	6 054	3 547	693	67	11	2	6	12 557	660	13 217	0.94	0.16
7.0–	10	55	1 096	3 597	2 540	622	67	6	2	3	7 998	441	8 439	0.96	0.17
7.5–	7	27	558	2 109	1 647	450	48	7	1	4	4 858	277	5 135	0.98	0.17
8.0–	3	18	265	1 182	1 038	310	55	8	2	2	2 883	147	3 030	1.00	0.18
8.5–	1	16	148	665	668	236	33	2	1		1 770	99	1 869	1.01	0.18
9.0–		33	269	936	1 058	450	103	11	3	4	2 867	186	3 053	1.03	0.21
Subtotal	389	8440	54 127	83 038	36 827	6895	751	96	33	62	190 658	10 476	201 134	0.88	0.18
No information available	2	19	87	110	38	6	1				263	4 851	5 114	0.84	0.17
Total	391	8459	54 214	83 148	36 865	6901	752	96	33	62	190 921	15 327	206 248	0.88	0.18
Mean	3.80	3.88	4.75	5.34	5.79	6.24	6.72	6.46	5.85	5.59	5.23	5.16	5.23		
SD	1.69	1.27	1.24	1.31	1.46	1.67	2.14	2.42	2.81	1.74	1.44	1.52	1.44		
Target achieving number	175	4846	39 660	56 825	21 311	3227	280	38	13	36	126 411	6 687	133 098		
Target achieving rate (%)	45.0	57.4	73.3	68.4	57.9	46.8	37.3	39.6	39.4	58.1	66.3	63.8	66.2		

Target achieving number: the number of patients whose serum phosphorus level is in the range of 3.5–6.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients.

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TABLE 47. *spKt/V and predialysis serum phosphorus levels (for patients who underwent dialysis by extracorporeal circulation three times per week for two or more years)*

Predialysis serum phosphorus level (mg/dL)	Single pool Kt/V										Subtotal	No information available	Total	Mean	SD
	<0.4	0.4–	0.6–	0.8–	1.0–	1.2–	1.4–	1.6–	1.8–	2.0–					
<3.0	14	25	85	322	1 023	1 782	1 885	1 330	614	431	7 511	621	8 132	1.46	0.33
3.0–	9	24	82	350	1 074	2 077	2 423	1 626	833	554	9 052	626	9 678	1.48	0.32
3.5–	15	25	109	512	1 695	3 738	4 457	2 974	1 502	977	16 004	975	16 979	1.50	0.31
4.0–	21	21	120	633	2 416	5 638	6 512	4 373	2 107	1320	23 161	1 292	24 453	1.50	0.30
4.5–	15	15	125	708	2 990	7 031	7 922	5 339	2 575	1498	28 218	1 545	29 763	1.50	0.30
5.0–	15	25	125	697	3 156	7 553	8 326	5 327	2 534	1541	29 299	1 574	30 873	1.49	0.29
5.5–	20	19	90	642	2 905	6 751	7 034	4 490	2 040	1192	25 183	1 297	26 480	1.48	0.29
6.0–	1	4	19	118	510	1 125	1 235	734	318	239	4 303	247	4 550	1.48	0.29
6.1–	10	14	60	415	1 886	4 071	4 077	2 393	1 122	642	14 690	793	15 483	1.46	0.29
6.5–	5	12	52	394	1 723	3 547	3 479	2 009	856	456	12 533	684	13 217	1.45	0.29
7.0–	4	12	45	297	1 186	2 340	2 096	1 210	521	271	7 982	457	8 439	1.43	0.29
7.5–	4	5	30	186	779	1 434	1 277	722	258	150	4 845	290	5 135	1.41	0.29
8.0–	4	6	27	138	486	867	710	390	165	84	2 877	153	3 030	1.40	0.29
8.5–			19	85	318	531	424	227	95	69	1 768	101	1 869	1.40	0.30
9.0–	4	6	29	173	497	839	677	354	159	120	2 858	195	3 053	1.39	0.31
Subtotal	141	213	1017	5670	22 644	49 324	52 534	33 498	15 699	9544	190 284	10 850	201 134	1.48	0.30
No information available	1		6	17	38	74	54	39	20	14	263	4 851	5 114	1.41	0.34
Total	142	213	1023	5687	22 682	49 398	52 588	33 537	15 719	9558	190 547	15 701	206 248	1.48	0.30
Mean	4.95	4.91	5.11	5.32	5.39	5.34	5.22	5.13	5.07	5.02	5.23	5.16	5.23		
SD	1.73	1.82	1.78	1.72	1.57	1.45	1.39	1.36	1.33	1.37	1.44	1.52	1.44		
Target achieving number	87	109	588	3310	13 672	31 836	35 486	23 237	11 076	6767	126 168	6 930	133 098		
Target achieving rate (%)	61.7	51.2	57.8	58.4	60.4	64.5	67.5	69.4	70.6	70.9	66.3	63.9	66.2		

Target achieving number: the number of patients whose serum phosphorus level is in the range of 3.5–6.0 mg/dL. Target achieving rate: the percentage of the number of patients who achieved the guideline's target level to the "subtotal" number of patients.

TABLE 48. *Annual changes in Hb level (for all dialysis patients)*

	Hb level (g/dL)											
	<8	8–	9–	10–	11–	12–	13–	Subtotal	No information available	Total	Mean	SD
Number of patients in 2012	7078	16 350	48 982	91 668	71 438	24 693	7708	267 917	33 628	301 545	10.60	1.28
Number of patients in 2010	8507	17 580	51 031	88 269	62 661	20 584	6707	255 339	34 110	289 449	10.49	1.31
Number of patients in 2008	8548	19 604	53 860	81 313	51 010	16 025	5363	235 723	37 514	273 237	10.36	1.29
Number of patients in 2006	9529	21 622	54 878	71 654	40 619	12 845	5031	216 178	33 779	249 957	10.23	1.33

TABLE 49. *Predialysis Hb levels for different dialysis methods (for all dialysis patients)*

	Hb level (g/dL)														
Dialysis method	<5	5–	6–	7–	8–	9–	10–	11–	12–	13–	14–	Subtotal	No information available	Total	Mean	SD
Facility HD	297	451	1189	4466	14 758	44 189	82 389	63 637	21 691	5123	1556	239 746	28 529	268 275	10.59	1.27
HDF	20	26	68	299	998	3 368	6 644	5 553	2 009	483	149	19 617	2 108	21 725	10.70	1.25
Hemofiltration			2	2	11	28	59	38	18	4		162	21	183	10.56	1.22
Hemoadsorption	2	1	5	28	121	352	680	439	152	31	14	1 825	151	1 976	10.54	1.22
Home HD	2		2	2	10	35	56	76	53	21	11	268	122	390	11.24	1.69
PD	3	13	42	158	452	1 010	1 840	1 695	770	242	74	6 299	2 697	8 996	10.72	1.43
Total	324	491	1308	4955	16 350	48 982	91 668	71 438	24 693	5904	1804	267 917	33 628	301 545	10.60	1.28
(row %)	(0.1)	(0.2)	(0.5)	(1.8)	(6.1)	(18.3)	(34.2)	(26.7)	(9.2)	(2.2)	(0.7)	(100.0)				

Values in parentheses represent the percentage relative to the total in each row.

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TABLE 50. *Predialysis Hb levels for different primary diseases (for all dialysis patients)*

Primary disease	Hb level (g/dL)											Subtotal	No information available	Total	Mean	SD
	<5	5–	6–	7–	8–	9–	10–	11–	12–	13–	14–					
Chronic glomerulonephritis	99	128	377	1555	5 090	15 873	31 162	24 681	8 437	1970	611	89 983	11 359	101 342	10.63	1.25
Chronic pyelonephritis	2	2	14	55	175	509	911	729	275	65	16	2 753	280	3 033	10.61	1.29
Rapidly progressive glomerulonephritis		3	10	49	109	393	658	541	204	48	22	2 037	265	2 302	10.63	1.31
Nephropathy of pregnancy/pregnancy toxemia	1	3	12	32	90	326	546	395	122	18	8	1 553	139	1 692	10.47	1.22
Other nephritides that cannot be classified	5	3	7	24	64	200	408	377	112	24	5	1 229	126	1 355	10.64	1.30
Polycystic kidney	6	7	22	115	476	1 537	3 072	2 631	1 003	326	104	9 299	1 070	10 369	10.78	1.28
Nephrosclerosis	26	46	122	420	1 457	4 199	7 804	5 847	1 870	412	116	22 319	2 574	24 893	10.54	1.26
Malignant hypertension	4	4	8	31	121	382	741	596	232	41	18	2 178	295	2 473	10.66	1.26
Diabetic nephropathy	117	221	510	1883	6 351	18 862	34 139	25 745	9 105	2190	687	99 810	12 187	111 997	10.58	1.29
SLE nephritis	2	1	10	47	141	386	656	567	190	41	15	2 056	271	2 327	10.57	1.30
Amyloidal kidney			5	15	31	87	118	78	43	12	1	390	77	467	10.43	1.41
Gouty kidney	1		3	17	63	173	377	277	95	23	7	1 036	99	1 135	10.66	1.22
Renal failure due to congenital abnormality of metabolism				5	18	25	85	70	26	5		234	39	273	10.71	1.21
Kidney and urinary tract tuberculosis			2	7	18	41	70	56	21	2	2	219	30	249	10.46	1.31
Kidney and urinary tract stone		1	1	9	34	102	180	138	47	7	4	523	53	576	10.56	1.24
Kidney and urinary tract tumor		1	8	20	62	141	236	198	59	7	3	735	102	837	10.43	1.28
Obstructive urinary tract disease		2	2	14	43	105	203	170	64	17	7	627	95	722	10.65	1.37
Myeloma	1		2	17	22	42	64	44	18	3		213	22	235	10.14	1.45
Hypoplastic kidney			4	3	25	79	193	153	67	20	3	547	61	608	10.84	1.24
Undetermined	51	48	128	467	1 453	4 076	7 401	5 958	1 966	465	116	22 129	3 455	25 584	10.55	1.30
Reintroduction after transplantation	2		13	30	85	355	641	555	195	62	20	1 958	229	2 187	10.72	1.28
Others	7	20	47	139	421	1 088	1 996	1 630	541	146	38	6 073	795	6 868	10.56	1.33
Subtotal	324	490	1307	4954	16 349	48 981	91 661	71 436	24 692	5904	1803	267 901	33 623	301 524	10.60	1.28
(%)	(0.1)	(0.2)	(0.5)	(1.8)	(6.1)	(18.3)	(34.2)	(26.7)	(9.2)	(2.2)	(0.7)	(100.0)				
No information available		1	1	1	1	1	7	2	1		1	16	5	21	10.04	2.47
Total	324	491	1308	4955	16 350	48 982	91 668	71 438	24 693	5904	1804	267 917	33 628	301 545	10.60	1.28
(%)	(0.1)	(0.2)	(0.5)	(1.8)	(6.1)	(18.3)	(34.2)	(26.7)	(9.2)	(2.2)	(0.7)	(100.0)				

Values in parentheses represent the percentage relative to the total in each row.

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TABLE 51. *Predialysis Hb levels for various age groups (for all male dialysis patients)*

Age (years old)	Hb level (g/dL) <8	8–	9–	10–	11–	12–	13–	Subtotal	No information available	Total	Mean	SD
<15		3	7	7	13	11	6	47	23	70	11.34	1.49
15–	16	38	89	217	234	99	35	728	91	819	10.90	1.33
30–	158	349	1 277	2 908	2 904	1 297	463	9 356	1 173	10 529	10.93	1.27
45–	646	1504	4 937	11 016	10 265	4 185	1579	34 132	4 274	38 406	10.86	1.29
60–	1844	4445	13 469	27 114	21 937	7 865	2674	79 348	9 696	89 044	10.67	1.27
75–	1416	3135	8 642	15 164	11 182	3 484	962	43 985	5 624	49 609	10.48	1.28
90–	58	126	397	565	331	105	23	1 605	223	1 828	10.31	1.26
Subtotal	4138	9600	28 818	56 991	46 866	17 046	5742	169 201	21 104	190 305	10.67	1.29
(row %)	(2.4)	(5.7)	(17.0)	(33.7)	(27.7)	(10.1)	(3.4)	(100.0)				
Unspecified			1	1				2	1	3	10.25	0.49
No information available												
Total	4138	9600	28 819	56 992	46 866	17 046	5742	169 203	21 105	190 308	10.67	1.29
(row %)	(2.4)	(5.7)	(17.0)	(33.7)	(27.7)	(10.1)	(3.4)	(100.0)				
Mean	68.74	68.41	67.62	66.48	65.18	63.76	62.57	66.07	66.22	66.09		
SD	12.10	12.02	12.11	12.17	12.40	12.65	12.47	12.36	12.61	12.39		

Values in parentheses represent the percentage relative to the total in each row.

TABLE 52. *Predialysis Hb levels (g/dL) for various age groups (for all female dialysis patients)*

Age (years old)	Hb level (g/dL) <8	8–	9–	10–	11–	12–	13–	Subtotal	No information available	Total	Mean	SD
<15		1	8	6	9	6	4	34	15	49	11.09	1.48
15–	7	26	53	107	99	40	10	342	54	396	10.72	1.35
30–	131	261	759	1 465	1 188	395	131	4 330	626	4 956	10.61	1.30
45–	412	959	3 127	5 940	4 520	1447	374	16 779	2 131	18 910	10.58	1.23
60–	1167	2869	8 848	15 627	11 197	3395	819	43 922	5 290	49 212	10.50	1.22
75–	1126	2458	6 864	10 756	7 131	2207	590	31 132	4 092	35 224	10.38	1.28
90–	97	176	504	774	427	156	38	2 172	314	2486	10.29	1.32
Subtotal	2940	6750	20 163	34 675	24 571	7646	1966	98 711	12 522	111 233	10.47	1.25
(row %)	(3.0)	(6.8)	(20.4)	(35.1)	(24.9)	(7.7)	(2.0)	(100.0)				
Unspecified				1	1	1		3	1	4	11.50	0.72
No information available												
Total	2940	6750	20 163	34 676	24 572	7647	1966	98 714	12 523	111 237	10.47	1.25
(row %)	(3.0)	(6.8)	(20.4)	(35.1)	(24.9)	(7.7)	(2.0)	(100.0)				
Mean	69.93	69.76	69.15	68.21	67.30	67.15	66.67	68.22	68.18	68.21		
SD	12.87	12.53	12.45	12.42	12.67	13.00	13.62	12.61	13.20	12.68		

Values in parentheses represent the percentage relative to the total in each row.

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TABLE 53. *Mean systolic blood pressures for different Hb levels (for diabetic and nondiabetic patients who underwent hemodialysis [HD] at facilities)*

Status of Diabetes	Systolic blood pressure (mm Hg)	Hb level (g/dL)							Subtotal	No information available	Total
		<8	8–	9–	10–	11–	12–	13–			
Diabetes	Number of patients	1967	4806	14 504	26 604	20 051	7 104	2138	77 174	807	77 981
	Mean of systolic blood pressure	152.0	155.1	156.9	157.5	157.6	157.7	157.0	157.1	155.2	157.1
	SD	25.4	25.4	24.4	24.3	24.3	24.6	25.4	24.5	25.4	24.5
Nondiabetes	Number of patients	3010	7174	22 051	42 752	33 832	11 218	3391	123 428	1563	124 991
	Mean of systolic blood pressure	144.4	147.4	149.0	149.1	148.6	148.4	146.1	148.6	147.3	148.5
	SD	26.2	24.5	23.7	22.8	22.7	23.3	24.4	23.2	24.1	23.2

TABLE 54. *Mean diastolic blood pressures for different Hb levels (for diabetic and nondiabetic patients who underwent hemodialysis [HD] at facilities)*

Status of Diabetes	Diastolic blood pressure (mm Hg)	Hb level (g/dL)							Subtotal	No information available	Total
		<8	8–	9–	10–	11–	12–	13–			
Diabetes	Number of patients	1964	4796	14 486	26 577	20 023	7095	2136	77 077	804	77 881
	Mean of diastolic blood pressure	73.2	74.7	76.0	77.2	78.2	79.7	81.3	77.3	75.9	77.3
	SD	14.5	14.4	14.4	14.3	14.5	14.7	14.9	14.5	14.4	14.5
Nondiabetes	Number of patients	3003	7157	22 008	42 683	33 785	11 199	3386	123 221	1562	124 783
	Mean of diastolic blood pressure	73.3	75.2	76.9	78.1	79.0	80.2	80.5	78.1	76.6	78.1
	SD	15.1	14.7	14.4	14.2	14.3	14.9	15.1	14.5	15.0	14.5

TABLE 55. *Mean pulses for different Hb levels (for diabetic and nondiabetic patients who underwent hemodialysis [HD] at facilities)*

Status of Diabetes	Pulses (beat/min.)	Hb level (g/dL) <8	8–	9–	10–	11–	12–	13–	Subtotal	No information available	Total
Diabetes	Number of patients	1862	4555	13 819	25 278	19 026	6 749	2011	73 300	749	74 049
	Mean of pulses	76.9	76.5	76.1	76.0	76.1	76.5	77.8	76.2	76.3	76.2
	SD	13.0	12.9	13.0	13.0	13.0	13.2	13.8	13.0	12.6	13.0
Nondiabetes	Number of patients	2841	6748	20 896	40 675	32 135	10 569	3198	117 062	1479	118 541
	Mean of pulses	76.5	74.9	74.6	74.2	74.1	74.8	75.9	74.4	75.7	74.5
	SD	13.4	12.9	12.8	12.6	12.6	13.0	13.6	12.7	12.5	12.7

TABLE 56. *Types of erythropoiesis-stimulating agents (ESAs) for different dialysis methods (for all dialysis patients)*

Dialysis method	Not used	Epoetin alpha, epoetin beta	Epoetin kappa	Darbepoetin	Epoetin beta pegol	Others (e.g. multiple ESAs)	Unspecified	Subtotal	No information available	Total
Facility HD	23 663	46 949	18 151	90 008	24 659	984	57	204 471	63 804	268 275
HDF	2 687	3 869	1 697	7 341	2 058	94	4	17 750	3 975	21 725
Hemofiltration	7	13	14	85	11			130	53	183
Hemoadsorption	224	274	87	618	250	10		1 463	513	1 976
Home HD	92	13	2	77	40			224	166	390
PD	535	252	37	2 701	1 904	18	38	5 485	3 511	8 996
Total	27 208	51 370	19 988	100 830	28 922	1106	99	229 523	72 022	301 545
(row %)	(11.9)	(22.4)	(8.7)	(43.9)	(12.6)	(0.5)	(0.0)	(100.0)		

Values in parentheses represent the percentage relative to the total in each row.

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TABLE 57. *Predialysis Hb levels (g/dL) for different doses of epoetin alpha (or beta) (U/week) (for all dialysis patients)*

Epoetin alpha, epoetin beta (U/week)	Hb level (g/dL)												No information available	Total	Mean	SD
	<5	5–	6–	7–	8–	9–	10–	11–	12–	13–	14–	Subtotal				
<750					1	3	18	29	10	4		65		65	11.29	1.01
750–	3	2	6	17	35	298	1 070	1 147	401	58	11	3 048	34	3 082	11.01	1.01
1500–	5	3	14	51	265	1468	4 487	3 545	1022	171	38	11 069	84	11 153	10.81	1.00
3000–	5	3	17	63	328	1529	3 624	2 627	666	88	17	8 967	105	9 072	10.65	1.02
4500–	5	6	16	116	500	2185	4 324	2 890	635	79	17	10 773	123	10 896	10.53	1.04
6000–	1	5	19	62	291	1155	2 171	1 349	285	39	6	5 383	57	5 440	10.46	1.05
7500–	1		4	11	57	298	444	315	62	5	2	1 199	24	1 223	10.45	1.03
9000–	10	29	121	465	1293	2728	3 005	1 446	285	45	12	9 439	119	9 558	9.90	1.25
Subtotal	30	48	197	785	2770	9664	19 143	13 348	3366	489	103	49 943	546	50 489	10.52	1.12
(row %)	(0.1)	(0.1)	(0.4)	(1.6)	(5.5)	(19.4)	(38.3)	(26.7)	(6.7)	(1.0)	(0.2)	(100.0)				
No information available		1	1	6	20	90	303	295	103	30	18	867	14	881	11.04	1.21
Total	30	49	198	791	2790	9754	19 446	13 643	3469	519	121	50 810	560	51 370	10.53	1.12
(row %)	(0.1)	(0.1)	(0.4)	(1.6)	(5.5)	(19.2)	(38.3)	(26.9)	(6.8)	(1.0)	(0.2)	(100.0)				
Mean	5150.00	6984.38	7149.75	7133.31	6478.80	5359.43	4 377.67	3 908.59	3522.87	3378.32	3487.86	4 546.79	4848.90	4 550.06		
SD	3118.77	2737.84	2997.62	3014.89	3007.30	2895.45	2 655.49	2 474.39	2410.59	2424.58	2556.80	2 791.84	2728.64	2 791.31		

Values in parentheses represent the percentage relative to the total in each row.

TABLE 58. *Predialysis Hb levels (g/dL) for different doses of epoetin kappa (U/week) (for all dialysis patients)*

Epoetin kappa (U/week)	Hb level (g/dL)												No information available	Total	Mean	SD
	<5	5–	6–	7–	8–	9–	10–	11–	12–	13–	14–	Subtotal				
<750						5	8	5	5	1		24		24	10.85	1.24
750–		1	1	1	15	95	359	378	137	26	1	1 014	14	1 028	11.03	0.98
1500–	1	1	3	9	85	628	1525	1086	296	52	5	3 691	34	3 725	10.72	0.97
3000–		2	7	29	133	602	1298	795	227	21	2	3 116	32	3 148	10.56	1.02
4500–	1		12	49	228	962	1715	916	197	24	2	4 106	38	4 144	10.40	1.00
6000–	2	1	5	35	171	549	1014	578	102	16	1	2 474	15	2 489	10.36	1.03
7500–			1	2	23	104	196	105	13	4	1	449	8	457	10.42	0.96
9000–	4	10	61	220	701	1467	1533	641	104	18	1	4 760	47	4 807	9.83	1.19
Subtotal	8	15	90	345	1356	4412	7648	4504	1081	162	13	19 634	188	19 822	10.38	1.10
(row %)	(0.0)	(0.1)	(0.5)	(1.8)	(6.9)	(22.5)	(39.0)	(22.9)	(5.5)	(0.8)	(0.1)	(100.0)				
No information available		2	1	3	5	25	50	53	16	4	1	160	6	166	10.77	1.45
Total	8	17	91	348	1361	4437	7698	4557	1097	166	14	19 794	194	19 988	10.38	1.11
(row %)	(0.0)	(0.1)	(0.5)	(1.8)	(6.9)	(22.4)	(38.9)	(23.0)	(5.5)	(0.8)	(0.1)	(100.0)				
Mean	6750.00	7000.00	7916.67	7713.04	6975.11	5698.96	4784.60	4200.79	3572.99	3539.35	3576.92	4 997.95	4918.88	4 997.20		
SD	2777.46	3126.79	3341.10	3034.73	3116.39	2959.69	2807.62	2648.79	2435.56	2712.85	2582.76	2 962.74	2896.11	2 962.06		

Values in parentheses represent the percentage relative to the total in each row.

TABLE 59. *Predialysis Hb levels (g/dL) for different doses of darbepoetin (μg/week) (for all dialysis patients)*

Darbepoetin (μg/week)	Hb level (g/dL)											Subtotal	No information available	Total	Mean	SD
	<5	5–	6–	7–	8–	9–	10–	11–	12–	13–	14–					
<10			1	1	27	146	612	800	318	54	19	1 978	18	1 996	11.19	0.99
10–	19	12	12	38	332	2 100	6 888	6 832	2237	398	66	18 934	125	19 059	10.96	1.01
15–	2	5	9	28	221	1 448	3 919	3 325	1000	172	34	10 163	92	10 255	10.84	0.99
20–	20	20	49	155	849	3 698	7 816	5 835	1804	339	71	20 656	177	20 833	10.67	1.11
30–	14	24	65	239	935	3 158	5 537	3 989	1169	239	44	15 413	178	15 591	10.52	1.19
40–	13	37	103	494	1547	3 929	5 054	3 132	889	178	33	15 409	206	15 615	10.21	1.26
60–	20	56	206	863	2180	3 683	3 697	1 977	525	97	39	13 343	209	13 552	9.82	1.37
120–	6	15	52	169	350	473	424	230	61	9	3	1 792	32	1 824	9.56	1.48
180–	1	5	20	58	86	116	90	40	14	3		433	5	438	9.29	1.51
Subtotal	95	174	517	2045	6527	18 751	34 037	26 160	8017	1489	309	98 121	1042	99 163	10.52	1.23
(row %)	(0.1)	(0.2)	(0.5)	(2.1)	(6.7)	(19.1)	(34.7)	(26.7)	(8.2)	(1.5)	(0.3)	(100.0)				
No information available	1	2	3	13	71	208	490	492	226	41	17	1 564	103	1 667	10.92	1.23
Total	96	176	520	2058	6598	18 959	34 527	26 652	8243	1530	326	99 685	1145	100 830	10.52	1.23
(row %)	(0.1)	(0.2)	(0.5)	(2.1)	(6.6)	(19.0)	(34.6)	(26.7)	(8.3)	(1.5)	(0.3)	(100.0)				
Mean	40.42	53.48	60.23	58.39	48.37	36.92	28.45	24.90	23.75	24.02	26.58	30.84	37.04	30.90		
SD	34.45	38.32	38.73	34.98	30.98	26.36	21.70	19.41	18.76	18.06	20.52	24.45	27.04	24.48		

Values in parentheses represent the percentage relative to the total in each row.

TABLE 60. *Predialysis Hb levels (g/dL) for different doses of epoetin beta pegol (μg/week) (for all dialysis patients)*

Darbepoetin (μg/week)	Hb level (g/dL)											Subtotal	No information available	Total	Mean	SD
	<5	5–	6–	7–	8–	9–	10–	11–	12–	13–	14–					
<25					4	13	16	25	3			61		61	10.57	1.00
25–	1	5	3	29	91	303	783	796	372	90	13	2 486	13	2 499	10.96	1.20
50–	6	1	17	33	181	732	1820	1554	541	106	13	5 004	86	5 090	10.79	1.12
75–	2	6	12	53	191	633	1312	1048	338	48	6	3 649	51	3 700	10.62	1.15
100–	6	7	29	100	448	1359	2547	1857	528	87	16	6 984	89	7 073	10.52	1.17
150–	8	16	47	143	518	1259	1842	1143	282	39	5	5 302	101	5 403	10.22	1.25
200–	4	10	37	117	356	662	767	452	88	25	2	2 520	54	2 574	9.96	1.32
250–		13	44	148	270	445	459	210	58	15	4	1 666	67	1 733	9.69	1.45
Subtotal	27	58	189	623	2059	5406	9546	7085	2210	410	59	27 672	461	28 133	10.46	1.25
(row %)	(0.1)	(0.2)	(0.7)	(2.3)	(7.4)	(19.5)	(34.5)	(25.6)	(8.0)	(1.5)	(0.2)	(100.0)				
No information available	1		8	18	62	160	273	181	52	13	5	773	16	789	10.42	1.33
Total	28	58	197	641	2121	5566	9819	7266	2262	423	64	28 445	477	28 922	10.46	1.26
(row %)	(0.1)	(0.2)	(0.7)	(2.3)	(7.5)	(19.6)	(34.5)	(25.5)	(8.0)	(1.5)	(0.2)	(100.0)				
Mean	113.89	176.72	174.50	173.39	146.43	126.21	107.77	96.87	86.85	86.15	89.83	111.51	135.30	111.90		
SD	54.30	114.22	95.34	100.64	81.82	73.61	63.91	58.42	56.87	64.98	67.13	69.73	81.87	70.01		

Values in parentheses represent the percentage relative to the total in each row.

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TABLE 61. *Annual changes in serum iron level*

	Serum iron level (μg/dL)														
	<20	20–	40–	60–	80–	100–	120–	140–	160–	180–	Subtotal	No information available	Total	Mean	SD
Number of patients in 2012	4527	43 012	70 959	53 231	26 997	11 080	4329	1856	948	1084	218 023	83 522	301 545	61.43	29.32
Number of patients in 2007	3929	33 753	65 383	52 133	25 488	10 382	4642	2395	1308	1098	200 511	54 751	255 262	63.42	29.54
Number of patients in 2006	2960	31 390	61 474	51 455	25 748	10 694	4624	2421	1290	1257	193 313	56 644	249 957	64.65	30.28

Dialysis methods of objective patients for tabulation in 2006 and 2012 are all dialysis methods. Dialysis methods of objective patients for tabulation in 2007 are limited to facility HD, HDF and hemoadsorption.

TABLE 62. *Annual changes in total iron binding capacity (TIBC) (for all dialysis patients)*

	TIBC (μg/dL)														
	<50	50–	100–	150–	200–	250–	300–	350–	400–	450–	Subtotal	No information available	Total	Mean	SD
Number of patients in 2012	322	815	5829	28 849	63 528	51 780	24 658	7280	1110	191	184 362	117 183	301 545	247.52	62.09
Number of patients in 2007	310	642	5272	32 849	59 428	35 744	14 818	4581	915	223	154 782	109 574	264 356	236.85	60.73
Number of patients in 2006	338	740	4845	29 889	53 715	32 750	13 513	4352	904	236	141 282	108 675	249 957	236.96	60.73

TABLE 63. *Annual changes in transferrin saturation (TSAT) level (for all dialysis patients)*

	TSAT level (%)											
	<10	10–	20–	30–	40–	50–	60–	Subtotal	No information available	Total	Mean	SD
Number of patients in 2012	12 168	54 280	61 273	33 509	12 809	4753	4537	183 329	118 216	301 545	25.94	13.42
Number of patients in 2007	7 230	37 735	53 534	31 890	12 718	5000	5566	153 673	110 683	264 356	28.09	14.42
Number of patients in 2006	5 958	34 372	48 686	29 555	12 047	9832		140 450	109 507	249 957	28.39	14.60

TABLE 64. *Annual changes in serum ferritin level (for all dialysis patients)*

	Serum ferritin level (ng/mL)													
	<25	25–	50–	100–	150–	200–	300–	500–	1000–	Subtotal	No information available	Total	Mean	SD
Number of patients in 2012	39 811	38 833	47 882	29 141	18 426	19 911	13 679	6 770	2560	217 013	84 532	301 545	144.49	261.83
Number of patients in 2007	23 838	23 379	33 853	27 552	20 556	27 401	24 365	14 927	5254	201 125	63 231	264 356	227.54	349.56
Number of patients in 2006	42 319		31 108	43 623		25 592	23 145	14 565	5439	185 791	64 166	249 957	239.59	383.29

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patients who used various types of ESA as follows. ESAI cannot be directly compared among ESAs because it depends on the type of ESA. Because of this, we focused on darbepoetin and epoetin beta pegol, for which ESAI can be calculated for at least 30 000 patients who underwent HD at facilities. The ESAIs of patients who used darbepoetin were calculated for the dose of darbepoetin per week, whereas those of patients who used epoetin beta pegol were calculated for the dose of epoetin beta pegol per month.

Tables 65 and 66 show the mean ESAIs of patients with different dialysis vintages who used darbepoetin and epoetin beta pegol, respectively. The patients were classified into diabetic and nondiabetic patients in the calculation of ESAI. Among diabetic patients who used darbepoetin or epoetin beta pegol, the mean ESAI tended to increase when the dialysis vintage increased to 15 or 20 years or more. This tendency was not observed among nondiabetic patients.

9. ESAI and dialysis dose

The relationship between ESAI and equilibrated Kt/V (eKt/V), an indicator of dialysis dose, was examined. The targets of tabulation were patients who underwent HD at facilities three times per week for two years or more whose eKt/V could be calculated and negligibly affected by their remaining kidney function. Tables 67 and 68 show the results for patients who used darbepoetin and epoetin beta pegol, respectively. Mean ESAI was calculated separately for diabetic and nondiabetic patients.

For both agents, the mean ESAI tended to increase with decreasing eKt/V below 1.0. However, this tendency was not clear among the diabetic patients who used epoetin beta pegol.

10. ESAI and serum intact PTH level

The relationship between serum intact PTH level and ESAI was examined (Tables 69, 70). The targets of tabulation were patients who underwent HD at facilities. For both darbepoetin and epoetin beta pegol, the ESAI was lowest among intact PTH levels of 180–300 pg/mL and tended to increase at PTH levels below and above this range. This tendency was observed similarly for both diabetic and nondiabetic patients.

11. ESAI, serum albumin level, and serum CRP level

The relationships of ESAI with serum albumin level and serum CRP level were examined for patients who underwent HD at facilities. Mean

TABLE 65. *Mean ESAIs for different dialysis vintages (for patients who used darbepoetin and underwent hemodialysis [HD] at facilities)*

Status of Diabetes	ESA index (ESAI) for darbepoetin	Dialysis vintage (years)								No information available	Total
		<2	2–	5–	10–	15–	20–	25–	Subtotal		
Diabetes	Number of patients	9937	10 208	9 570	3160	727	155	38	33 795	6	33 801
	Mean of ESAI	0.0553	0.0527	0.0571	0.0613	0.0663	0.0735	0.0705	0.0559	0.0925	0.0559
	SD	0.0510	0.0495	0.0581	0.0555	0.0593	0.0896	0.0595	0.0536	0.0414	0.0536
Nondiabetes	Number of patients	9394	9 606	11 160	6827	4151	2250	2280	45 668	3	45 671
	Mean of ESAI	0.0650	0.0581	0.0596	0.0602	0.0594	0.0624	0.0712	0.0612	0.1280	0.0612
	SD	0.0612	0.0588	0.0553	0.0578	0.0594	0.0623	0.0674	0.0591	0.0240	0.0591

ESA index (ESAI) = ESA dose per week/(Hb level × postdialysis body weight).

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TABLE 66. *Mean ESAIs for different dialysis vintages (for patients who used epoetin beta pegol and underwent hemodialysis [HD] at facilities)*

Status of Diabetes	ESA index (ESAI) for epoetin beta pegol	Dialysis vintage (years) <2	2–	5–	10–	15–	20–	25–	Subtotal	No information available	Total
Diabetes	Number of patients	2277	3001	2629	853	215	38	9	9 022	1	9 023
	Mean of ESAI	0.193	0.191	0.206	0.224	0.216	0.288	0.214	0.200	0.035	0.200
	SD	0.150	0.139	0.165	0.173	0.145	0.354	0.141	0.155	0.000	0.155
Nondiabetes	Number of patients	2298	2935	3094	2019	1209	645	573	12 773	5	12 778
	Mean of ESAI	0.216	0.218	0.227	0.215	0.214	0.223	0.240	0.220	0.273	0.220
	SD	0.158	0.168	0.178	0.165	0.161	0.181	0.183	0.169	0.395	0.169

ESA index (ESAI) = ESA dose per month/(Hb level × postdialysis body weight).

TABLE 67. *Mean ESAIs for different eKt/V values (for patients who used darbepoetin and underwent hemodialysis [HD] at facilities)*

Status of Diabetes	ESA index (ESAI) for darbepoetin	equilibrated Kt/V <0.4	0.4–	0.6–	0.8–	1.0–	1.2–	1.4–	1.6–	1.8–	2.0–	Subtotal	No information available	Total
Diabetes	Number of patients	19	72	619	3114	7028	6 760	3127	996	286	128	22 149	1117	23 266
	Mean of ESAI	0.0701	0.0850	0.0637	0.0573	0.0524	0.0547	0.0553	0.0611	0.0601	0.0648	0.0552	0.0722	0.0560
	SD	0.0494	0.0873	0.0537	0.0533	0.0475	0.0514	0.0504	0.0669	0.0528	0.0623	0.0516	0.0961	0.0547
Nondiabetes	Number of patients	31	84	476	2556	7859	10 812	7232	3140	1057	497	33 744	1549	35 293
	Mean of ESAI	0.1023	0.0951	0.0781	0.0639	0.0579	0.0572	0.0606	0.0620	0.0613	0.0643	0.0597	0.0681	0.0601
	SD	0.1097	0.0798	0.0749	0.0590	0.0547	0.0541	0.0587	0.0567	0.0610	0.0669	0.0569	0.0843	0.0584

ESA index (ESAI) = ESA dose per week/(Hb level × postdialysis body weight).

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TABLE 68. *Mean ESAIs for different eKt/V values (for patients who used epoetin beta pegol and underwent hemodialysis [HD] at facilities)*

Status of Diabetes	ESA index (ESAI) for epoetin beta pegol	Equilibrated Kt/V										Subtotal	No information available	Total
		<0.4	0.4–	0.6–	0.8–	1.0–	1.2–	1.4–	1.6–	1.8–	2.0–			
Diabetes	Number of patients	6	18	149	810	1 970	1 954	916	307	94	53	6 277	304	6 581
	Mean of ESAI	0.173	0.197	0.220	0.207	0.191	0.199	0.222	0.233	0.245	0.207	0.203	0.191	0.203
	SD	0.070	0.151	0.191	0.148	0.145	0.148	0.179	0.162	0.213	0.114	0.155	0.194	0.157
Nondiabetes	Number of patients	10	16	147	743	2 276	2 976	2 100	922	329	215	9 734	448	10 182
	Mean of ESAI	0.246	0.430	0.277	0.220	0.212	0.216	0.224	0.235	0.225	0.242	0.221	0.208	0.221
	SD	0.101	0.284	0.253	0.156	0.164	0.166	0.172	0.176	0.169	0.189	0.170	0.197	0.171

ESA index (ESAI) = ESA dose per month/(Hb level × postdialysis body weight).

TABLE 69. *Mean ESAIs for different serum intact parathyroid hormone (PTH) levels (for patients who used darbepoetin and underwent hemodialysis [HD] at facilities)*

Status of Diabetes	ESA index (ESAI) for darbepoetin	Serum intact PTH levels (pg/mL)								Subtotal	No information available	Total
		<60	60–	120–	180–	240–	300–	600–	1000–			
Diabetes	Number of patients	6677	7677	5984	3777	2045	2249	253	45	28 707	818	29 525
	Mean of ESAI	0.0580	0.0552	0.0534	0.0533	0.0527	0.0542	0.0613	0.0611	0.0550	0.0660	0.0553
	SD	0.0532	0.0526	0.0547	0.0480	0.0500	0.0562	0.0613	0.0437	0.0528	0.0634	0.0531
Nondiabetes	Number of patients	8085	9800	8050	5306	3043	4028	600	178	39 090	954	40 044
	Mean of ESAI	0.0649	0.0606	0.0580	0.0577	0.0582	0.0610	0.0610	0.0679	0.0604	0.0722	0.0607
	SD	0.0621	0.0576	0.0560	0.0553	0.0568	0.0626	0.0580	0.0605	0.0585	0.0654	0.0587

ESA index (ESAI) = ESA dose per week/(Hb level × postdialysis body weight).

TABLE 70. *Mean ESAIs for different serum intact parathyroid hormone (PTH) levels (for patients who used epoetin beta pegol and underwent hemodialysis [HD] at facilities)*

Status of Diabetes	ESA index (ESAI) for epoetin beta pegol	Serum intact PTH levels (pg/mL)							No information available	Total
		<60	60–	120–	180–	240–	300–	600–	1000–	Subtotal		
Diabetes	Number of patients	1867	1989	1683	983	548	546	62	15	7 693	235	7 928
	Mean of ESAI	0.215	0.202	0.191	0.180	0.182	0.190	0.199	0.215	0.198	0.241	0.199
	SD	0.177	0.160	0.142	0.127	0.133	0.131	0.166	0.096	0.154	0.187	0.155
Nondiabetes	Number of patients	2321	2731	2280	1498	853	1061	164	52	10 960	229	11 189
	Mean of ESAI	0.234	0.219	0.209	0.216	0.211	0.207	0.226	0.236	0.218	0.263	0.219
	SD	0.180	0.169	0.152	0.174	0.177	0.151	0.174	0.171	0.168	0.207	0.169

ESA index (ESAI) = ESA dose per month/(Hb level × postdialysis body weight).

ESAIs were compared among patients with different serum albumin and CRP levels. Tables 71 and 72 show the results for patients who used darbepoetin and epoetin beta pegol, respectively. For both agents, the mean ESAI increased as the serum albumin level decreased and as the serum CRP level increased.

12. ESAI, serum ferritin level, and TSAT level

The relationships of the ESAI with the serum ferritin level and the TSAT level were examined for patients who underwent HD at facilities. Mean ESAIs were compared among patients with different serum ferritin levels and TSAT levels. Tables 73 and 74 show the results for patients who used darbepoetin and epoetin beta pegol, respectively.

ESAI tended to be high for low TSAT levels (<20%). However, for patients with TSAT levels ≥20%, there was no clear relationship between TSAT level and ESAI. The ESAI also tended to be high for high serum ferritin levels (≥300 ng/mL). These tendencies were observed similarly for both patients who used darbepoetin and epoetin beta pegol.

F. Items associated with blood pressure, smoking habit, and dyslipidemia

The survey results for the items associated with blood pressure, smoking habit, and dyslipidemia are summarized below.

In the tabulation of the following items (the use of antihypertensive agents, smoking habit, histories of cardiovascular events, and classical risk factors for coronary artery diseases), the percentages of patients who answered "yes" and "no" in each patient group were calculated with respect to the total number of patients including those who answered "unclear" or provided no information. This was because (1) not a few patients answered "unclear" or provided no information (which were invalid answers) to each question and (2) each question has only two alternative answers, yes and no, which facilitated the understanding of the percentages of patients who answered yes or no.

1. Blood pressure and use of antihypertensive agents

Tables 75 and 76 show the numbers of patients who did or did not use an antihypertensive agent for different systolic and diastolic blood pressures, respectively. All dialysis patients are included in the tabulation.

Among the 227 304 patients who answered questions regarding systolic blood pressure, 61.5% used an antihypertensive agent, 29.7% did not use one, and 8.8% answered "unclear" or provided no

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TABLE 71. *Mean ESAIs for different serum albumin levels and serum C-reactive protein (CRP) levels (for patients who used darbepoetin and underwent hemodialysis [HD] at facilities)*

Serum CRP levels (mg/dL)	ESA index (ESAI) for darbepoetin	Serum albumin levels (g/dL)					Subtotal	No information available	Total
		<2.0	2.0–	3.0–	3.5–	4.0–			
<0.5	Number of patients	45	1897	10 386	28 414	13 035	53 777	186	53 963
	Mean of ESAI	0.1249	0.0925	0.0674	0.0508	0.0416	0.0533	0.0492	0.0533
	SD	0.1441	0.0743	0.0642	0.0458	0.0385	0.0511	0.0480	0.0511
0.5–	Number of patients	65	1807	4 383	5 704	1 377	13 336	79	13 415
	Mean of ESAI	0.1286	0.1114	0.0792	0.0597	0.0466	0.0721	0.0843	0.0722
	SD	0.1029	0.0782	0.0674	0.0538	0.0413	0.0645	0.0716	0.0646
2.0–	Number of patients	65	901	1 187	1 007	177	3 337	19	3 356
	Mean of ESAI	0.1353	0.1223	0.0897	0.0655	0.0518	0.0901	0.0870	0.0901
	SD	0.0774	0.0830	0.0834	0.0601	0.0418	0.0788	0.0714	0.0788
4.0–	Number of patients	60	440	416	293	51	1 260	10	1 270
	Mean of ESAI	0.1877	0.1274	0.0912	0.0691	0.0548	0.1018	0.1070	0.1018
	SD	0.1203	0.0997	0.0757	0.0600	0.0632	0.0893	0.0945	0.0893
6.0–	Number of patients	106	638	450	306	53	1 553	16	1 569
	Mean of ESAI	0.1704	0.1294	0.0891	0.0656	0.0617	0.1056	0.0956	0.1055
	SD	0.1197	0.0851	0.0659	0.0538	0.0447	0.0826	0.0595	0.0824
Subtotal	Number of patients	341	5683	16 822	35 724	14 693	73 263	310	73 573
	(row %)	(0.5)	(7.8)	(23.0)	(48.8)	(20.1)	(100.0)		
	Mean of ESAI	0.1528	0.1101	0.0732	0.0529	0.0423	–	0.0647	–
	SD	0.1155	0.0816	0.0674	0.0480	0.0390	–	0.0615	–
No information available	Number of patients	36	794	2 776	6 331	2 747	12 684	717	13 401
	Mean of ESAI	0.1258	0.0951	0.0661	0.0479	0.0408	0.0535	–	0.0539
	SD	0.0836	0.0787	0.0605	0.0412	0.0326	0.0499	–	0.0502
Total	Number of patients	377	6477	19 598	42 055	17 440	85 947	1027	86 974
	(row %)	(0.4)	(7.5)	(22.8)	(48.9)	(20.3)	(100.0)		
	Mean of ESAI	0.1502	0.1082	0.0722	0.0522	0.0421	–	0.0618	–
	SD	0.1130	0.0814	0.0665	0.0471	0.0381	–	0.0571	–

Values in parentheses represent the percentage relative to the total in each row. ESA index (ESAI) = ESA dose per week/(Hb level × postdialysis body weight).

TABLE 72. *Mean ESAIs for different serum albumin levels and serum C-reactive protein (CRP) levels (for patients who used epoetin beta pegol and underwent hemodialysis [HD] at facilities)*

Serum CRP levels (mg/dL)	ESA index (ESAI) for epoetin beta pegol	Serum albumin levels (g/dL)					Subtotal	No information available	Total
		<2.0	2.0–	3.0–	3.5–	4.0–			
<0.5	Number of patients	7	478	2775	7 724	3484	14 468	93	14 561
	Mean of ESAI	0.4912	0.3242	0.2387	0.1957	0.1732	0.2029	0.1863	0.2028
	SD	0.3393	0.2274	0.1759	0.1414	0.1212	0.1514	0.1375	0.1513
0.5–	Number of patients	16	397	1083	1 413	365	3 274	37	3 311
	Mean of ESAI	0.3923	0.3685	0.2650	0.2073	0.1883	0.2447	0.1999	0.2442
	SD	0.1885	0.2641	0.1815	0.1522	0.1461	0.1869	0.1987	0.1871
2.0–	Number of patients	9	173	281	296	52	811	2	813
	Mean of ESAI	0.4617	0.3872	0.3100	0.2192	0.2201	0.2893	0.3051	0.2893
	SD	0.2238	0.2776	0.2156	0.1419	0.1781	0.2165	0.1887	0.2164
4.0–	Number of patients	14	73	106	72	12	277	1	278
	Mean of ESAI	0.5171	0.3684	0.2771	0.2303	0.1621	0.2961	0.9330	0.2984
	SD	0.2864	0.2651	0.1779	0.1441	0.1252	0.2147	0.0000	0.2177
6.0–	Number of patients	23	100	113	77	22	335	6	341
	Mean of ESAI	0.5502	0.4243	0.2847	0.2418	0.2315	0.3312	0.2237	0.3293
	SD	0.4217	0.3271	0.1761	0.1840	0.1879	0.2700	0.0821	0.2681
Subtotal	Number of patients	69	1221	4358	9 582	3935	19 165	139	19 304
	(row %)	(0.4)	(6.4)	(22.7)	(50.0)	(20.5)	(100.0)		
	Mean of ESAI	0.4893	0.3584	0.2520	0.1987	0.1755	–	0.1986	–
	SD	0.3176	0.2599	0.1812	0.1436	0.1253	–	0.1661	–
No information available	Number of patients	11	207	822	1 966	954	3 960	240	4 200
	Mean of ESAI	0.4057	0.3154	0.2217	0.1815	0.1648	0.1934	–	0.1946
	SD	0.1447	0.2185	0.1640	0.1321	0.1189	0.1467	–	0.1524
Total	Number of patients	80	1428	5180	11 548	4889	23 125	379	23 504
	(row %)	(0.3)	(6.2)	(22.4)	(49.9)	(21.1)	(100.0)		
	Mean of ESAI	0.4778	0.3522	0.2472	0.1958	0.1734	–	0.2081	–
	SD	0.3005	0.2547	0.1789	0.1419	0.1241	–	0.2059	–

Values in parentheses represent the percentage relative to the total in each row. ESA index (ESAI) = ESA dose per month/(Hb level × postdialysis body weight).

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TABLE 73. *Mean ESAIs for different serum ferritin levels and transferrin saturation (TSAT) levels (for patients who used darbepoetin and underwent hemodialysis [HD] at facilities)*

TSAT levels (%)	ESA index (ESAI) for darbepoetin	Serum ferritin levels (ng/dL) <50	50–	100–	200–	300–	500–	1000–	Subtotal	No information available	Total
<10	Number of patients	3 498	590	297	93	77	26	5	4 586	198	4 784
	Mean of ESAI	0.0989	0.1081	0.0925	0.1024	0.0978	0.1618	0.0936	0.1000	0.0750	0.0990
	SD	0.0799	0.0868	0.0749	0.0829	0.0643	0.1651	0.0516	0.0812	0.0677	0.0808
10–	Number of patients	10 328	4 519	3 289	1098	673	298	55	20 260	883	21 143
	Mean of ESAI	0.0650	0.0672	0.0644	0.0660	0.0746	0.0900	0.1214	0.0663	0.0575	0.0659
	SD	0.0541	0.0633	0.0565	0.0548	0.0599	0.0866	0.0881	0.0577	0.0498	0.0574
20–	Number of patients	6 824	5 643	5 403	2086	1225	565	126	21 872	930	22 802
	Mean of ESAI	0.0492	0.0498	0.0517	0.0542	0.0621	0.0711	0.0827	0.0519	0.0446	0.0516
	SD	0.0411	0.0481	0.0518	0.0527	0.0737	0.0646	0.0806	0.0503	0.0363	0.0498
30–	Number of patients	2 692	2 685	3 278	1421	926	414	130	11 546	460	12 006
	Mean of ESAI	0.0447	0.0450	0.0468	0.0509	0.0565	0.0639	0.0873	0.0482	0.0441	0.0481
	SD	0.0398	0.0431	0.0442	0.0551	0.0574	0.0643	0.0934	0.0477	0.0415	0.0475
40–	Number of patients	828	893	1 112	569	465	234	111	4 212	170	4 382
	Mean of ESAI	0.0436	0.0461	0.0469	0.0506	0.0574	0.0668	0.0736	0.0496	0.0466	0.0494
	SD	0.0400	0.0427	0.0459	0.0684	0.0594	0.0699	0.0702	0.0522	0.0489	0.0521
50–	Number of patients	504	482	619	437	424	315	259	3 040	119	3 159
	Mean of ESAI	0.0549	0.0513	0.0542	0.0604	0.0658	0.1044	0.1032	0.0657	0.0512	0.0652
	SD	0.0651	0.0492	0.0580	0.0698	0.0735	0.1185	0.1329	0.0808	0.0485	0.0799
Subtotal	Number of patients	24 674	14 812	13 998	5704	3790	1852	686	65 516	2760	68 276
	(row %)	(37.7)	(22.6)	(21.4)	(8.7)	(5.8)	(2.8)	(1.0)	(100.0)		
	Mean of ESAI	0.0623	0.0564	0.0541	0.0565	0.0635	0.0789	0.0930	–	0.0512	–
	SD	0.0565	0.0558	0.0525	0.0580	0.0662	0.0842	0.1053	–	0.0466	–
No information available	Number of patients	5 073	3 019	2 919	1240	837	408	168	13 664	5034	18 698
	Mean of ESAI	0.0591	0.0547	0.0521	0.0563	0.0636	0.0662	0.0799	0.0571	–	0.0599
	SD	0.0511	0.0567	0.0461	0.0498	0.0564	0.0560	0.0823	0.0524	–	0.0552
Total	Number of patients	29 747	17 831	16 917	6944	4627	2260	854	79 180	7794	86 974
	(row %)	(37.6)	(22.5)	(21.4)	(8.8)	(5.8)	(2.9)	(1.1)	(100.0)		
	Mean of ESAI	0.0618	0.0561	0.0538	0.0565	0.0635	0.0766	0.0904	–	0.0618	–
	SD	0.0556	0.0560	0.0514	0.0566	0.0645	0.0800	0.1013	–	0.0572	–

Values in parentheses represent the percentage relative to the total in each row. ESA index (ESAI) = ESA dose per week/(Hb level × postdialysis body weight).

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TABLE 74. *Mean ESAIs for different serum ferritin levels and transferrin saturation (TSAT) levels (for patients who used epoetin beta pegol and underwent hemodialysis [HD] at facilities)*

TSAT levels (%)	ESA index (ESAI) for epoetin beta pegol	Serum ferritin levels (ng/dL) <50	50–	100–	200–	300–	500–	1000–	Subtotal	No information available	Total
<10	Number of patients	868	144	71	24	14	4	0	1 125	39	1 164
	Mean of ESAI	0.3152	0.3308	0.3070	0.3268	0.4159	0.3796	0.0000	0.3184	0.3620	0.3199
	SD	0.2269	0.2440	0.2392	0.2130	0.2511	0.1519	0.0000	0.2297	0.2015	0.2288
10–	Number of patients	1875	1096	751	261	129	60	14	4 186	148	4 334
	Mean of ESAI	0.2282	0.2309	0.2366	0.2388	0.2737	0.2968	0.2179	0.2334	0.2330	0.2334
	SD	0.1756	0.1750	0.1660	0.1557	0.2031	0.2013	0.1492	0.1741	0.1741	0.1740
20–	Number of patients	1399	1487	1483	476	288	138	33	5 304	189	5 493
	Mean of ESAI	0.2044	0.2000	0.1972	0.2015	0.2245	0.2322	0.2956	0.2033	0.1761	0.2023
	SD	0.1338	0.1430	0.1475	0.1596	0.1675	0.2013	0.3451	0.1490	0.1194	0.1482
30–	Number of patients	731	979	1158	438	264	129	41	3 740	164	3 904
	Mean of ESAI	0.1957	0.1782	0.1825	0.1927	0.2167	0.2413	0.2236	0.1901	0.1897	0.1900
	SD	0.1259	0.1238	0.1402	0.1490	0.1907	0.1894	0.1496	0.1415	0.1370	0.1413
40–	Number of patients	280	377	558	246	202	90	30	1 783	77	1 860
	Mean of ESAI	0.2006	0.1753	0.1794	0.1819	0.2141	0.2282	0.3030	0.1907	0.1983	0.1910
	SD	0.1597	0.1187	0.1300	0.1465	0.1936	0.1644	0.2638	0.1496	0.1370	0.1491
50–	Number of patients	170	203	366	200	205	185	131	1 460	79	1 539
	Mean of ESAI	0.2125	0.1891	0.1812	0.1908	0.2058	0.2694	0.2938	0.2120	0.1808	0.2104
	SD	0.1316	0.1839	0.1319	0.1354	0.1351	0.2416	0.2685	0.1768	0.1565	0.1759
Subtotal	Number of patients	5323	4286	4387	1645	1102	606	249	17 598	696	18 294
	(row %)	(30.2)	(24.4)	(24.9)	(9.3)	(6.3)	(3.4)	(1.4)	(100.0)		
	Mean of ESAI	0.2297	0.2046	0.1982	0.2027	0.2254	0.2523	0.2793	–	0.2048	–
	SD	0.1720	0.1556	0.1494	0.1539	0.1806	0.2078	0.2589	–	0.1536	–
No information available	Number of patients	1096	857	975	493	299	144	60	3 924	1286	5 210
	Mean of ESAI	0.2329	0.1945	0.1929	0.1985	0.2034	0.2713	0.2823	0.2102	–	0.2098
	SD	0.1720	0.1503	0.1473	0.1466	0.1857	0.1955	0.3056	0.1649	–	0.1647
Total	Number of patients	6419	5143	5362	2138	1401	750	309	21 522	1982	23 504
	(row %)	(29.8)	(23.9)	(24.9)	(9.9)	(6.5)	(3.5)	(1.4)	(100.0)		
	Mean of ESAI	0.2303	0.2029	0.1973	0.2017	0.2207	0.2559	0.2799	–	0.2072	–
	SD	0.1720	0.1547	0.1491	0.1522	0.1819	0.2055	0.2680	–	0.1606	–

Values in parentheses represent the percentage relative to the total in each row. ESA index (ESAI) = ESA dose per month/(Hb level × postdialysis body weight).

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TABLE 75. *Use of antihypertensive agents for different predialysis systolic blood pressures (for all dialysis patients)*

Predialysis systolic blood pressure (mm Hg)	Use of antihypertensive agents				Total
	Not used	Used	Unspecified	No information available	
<60	31	32		5	68
60–	276	91	3	30	400
80–	1 839	836	13	269	2 957
100–	7 966	6 793	80	1 425	16 264
120–	17 702	27 161	205	4 083	49 151
140–	21 038	48 016	279	6 280	75 613
160–	12 909	37 366	187	4 688	55 150
180–	4 493	14 969	77	1 834	21 373
200–	1 007	3 728	17	467	5 219
220–	198	796	4	111	1 109
Subtotal	67 459	139 788	865	19 192	227 304
(row %)	(29.7)	(61.5)	(0.4)	(8.4)	(100.0)
No information available	12 670	24 849	145	36 577	74 241
Total	80 129	164 637	1010	55 769	301 545
(row %)	(26.6)	(54.6)	(0.3)	(18.5)	(100.0)
Mean	144.7	154.5	148.5	151.6	151.3
SD	25.0	23.1	25.0	24.6	24.2

Values in parentheses represent the percentage relative to the total in each row.

information. For both systolic and diastolic blood pressures, the percentage of patients who used an antihypertensive agent increased with increasing blood pressure, whereas the percentage of patients who did not use an antihypertensive agent increased with decreasing blood pressure.

Among the above 227 304 patients, 58.8% had a predialysis systolic blood pressure ≥140 mm Hg but did not take an antihypertensive agent. In contrast, 5.5% of the patients had a predialysis systolic blood pressure <120 mm Hg but took an antihypertensive agent. These results indicate that the decision on the use of an antihypertensive agent is not necessarily based on predialysis systolic blood pressure. The patients who answered "unclear" or provided no available information to questions regarding the use of an antihypertensive agent accounted for 18.8% of the 301 545 target patients.

TABLE 76. *Use of antihypertensive agents for different predialysis diastolic blood pressures (for all dialysis patients)*

Predialysis diastolic blood pressure (mm Hg)	Use of antihypertensive agents				Total
	Not used	Used	Unspecified	No information available	
<20	33	69		5	107
20–	367	286	3	71	727
40–	7 140	9 930	87	1 608	18 765
60–	31 968	62 780	403	8 699	103 850
80–	23 752	55 661	311	7 387	87 111
100–	3 803	10 144	58	1 316	15 321
120–	207	653	1	81	942
140–	13	70	1	11	95
Subtotal	67 283	139 593	864	19 178	226 918
(row %)	(29.7)	(61.5)	(0.4)	(8.5)	(100.0)
No information available	12 846	25 044	146	36 591	74 627
Total	80 129	164 637	1010	55 769	301 545
(row %)	(26.6)	(54.6)	(0.3)	(18.5)	(100.0)
Mean	76.2	78.6	76.3	78.0	77.8
SD	14.7	14.4	15.1	14.7	14.5

Values in parentheses represent the percentage relative to the total in each row.

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2. Presence or absence of hypertension for both genders and different age groups, primary diseases, and dialysis vintages

In this section, patients who meet at least one of the following three conditions are defined as patients with hypertension.

1 Systolic blood pressure ≥140 mm Hg
2 Diastolic blood pressure ≥90 mm Hg
3 Taking an antihypertensive agent

The numbers of patients with and without hypertension, as defined above, were examined for both genders and different age groups, primary diseases, and dialysis vintages. All dialysis patients were included.

Tables 77 and 78 show the numbers of patients with and without hypertension for different age groups among males and females, respectively. The percentage of male patients with hypertension was lower among patients aged <15 or ≥90 years than among patients aged 15–90 years. On the other hand, the percentage of female patients with hypertension was generally lower than that of male patients in each corresponding age group; the percentage of female patients with hypertension was lower among patients aged <30 or ≥90 years than among patients aged 30–90 years. Note that the presence or absence of hypertension was unclear in 18.0% of the male patients and 19.1% of the female patients because of insufficient data.

Table 79 shows the numbers of patients with and without hypertension for different primary diseases. In this tabulation, the patients are classified into four groups, i.e. patients with nephrosclerosis, diabetic nephropathy, chronic glomerulonephritis, and others. The percentages of patients with hypertension were 73.7% of the patients with nephrosclerosis, 77.5% of the patients with diabetic nephropathy, and 69.9% of the patients with chronic glomerulonephritis. Thus, the percentage of patients with hypertension was highest for the patients with diabetic nephropathy, suggesting that hypertension is strongly associated with diabetic nephropathy.

Table 80 shows the numbers of patients with and without hypertension for different dialysis vintages. The percentages of patients with hypertension were in the range of 72.8–74.9% for patients with a dialysis vintage <15 years. However, as dialysis vintage increased above 15 years, the percentage of patients with hypertension decreased and that of patients without hypertension increased. This is because (1) the blood pressure of patients with a long dialysis vintage tends to decrease with increasing dialysis vintage, (2) patients with hypertension tend to die

TABLE 77. *Numbers of patients with and without hypertension in different age groups (for all male dialysis patients)*

	Age (years/old)											
With and without hypertension	<15	15–	30–	45–	60–	75–	90–	Subtotal	Unspecified	No information available	Total	Mean	SD
With hypertension†	25	604	7 892	29 212	66 576	35 209	1183	140 701	2	0	140 703	65.79	12.27
(%)	(35.7)	(73.7)	(75.0)	(76.1)	(74.8)	(71.0)	(64.7)	(73.9)	(66.7)		(73.9)		
Without hypertension	15	61	761	2 523	6 810	4 945	240	15 355	0	0	15 355	67.94	12.73
(%)	(21.4)	(7.4)	(7.2)	(6.6)	(7.6)	(10.0)	(13.1)	(8.1)	(0.0)		(8.1)		
Unspecified/no information available	30	154	1 876	6 671	15 658	9 455	405	34 249	1	0	34 250	66.50	12.62
(%)	(42.9)	(18.8)	(17.8)	(17.4)	(17.6)	(19.1)	(22.2)	(18.0)	(33.3)		(18.0)		
Total	70	819	10 529	38 406	89 044	49 609	1828	190 305	3	0	190 308	66.09	12.39

Values in parentheses represent the percentage relative to the total in each row. †Patients who meet at least one of the following three conditions are defined as patients with hypertension. (1) Systolic blood pressure ≥140 mm Hg (2) Diastolic blood pressure ≥90 mm Hg (3) Taking an antihypertensive agent.

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TABLE 78. *Numbers of patients with and without hypertension in different age groups (for all female dialysis patients)*

With and without hypertension	Age (years/old)							Subtotal	Unspecified	No information available	Total	Mean	SD
	<15	15–	30–	45–	60–	75–	90–						
With hypertension†	19	248	3316	13 391	35 411	24 442	1600	78 427	3	0	78 430	68.15	12.42
(%)	(38.8)	(62.6)	(66.9)	(70.8)	(72.0)	(69.4)	(64.4)	(70.5)	(75.0)		(70.5)		
Without hypertension	11	66	635	1 970	4 722	3 845	362	11 611	0	0	11 611	68.32	13.70
(%)	(22.4)	(16.7)	(12.8)	(10.4)	(9.6)	(10.9)	(14.6)	(10.4)	(0.0)		(10.4)		
Unspecified/no information available	19	82	1005	3 549	9 079	6 937	524	21 195	1	0	21 196	68.39	13.04
(%)	(38.8)	(20.7)	(20.3)	(18.8)	(18.4)	(19.7)	(21.1)	(19.1)	(25.0)		(19.1)		
Total	49	396	4956	18 910	49 212	35 224	2486	111 233	4	0	111 237	68.21	12.68

Values in parentheses represent the percentage relative to the total in each row. †Patients who meet at least one of the following three conditions are defined as patients with hypertension. (1) Systolic blood pressure ≥140 mm Hg (2) Diastolic blood pressure ≥90 mm Hg (3) Taking an antihypertensive agent.

TABLE 79. *Numbers of patients with and without hypertension for different primary diseases (for all dialysis patients)*

With and without hypertension	Primary disease				Subtotal	No information available	Total
	Nephrosclerosis	Diabetic nephropathy	Chronic glomerulonephritis	Other diseases			
With hypertension†	18 357	86 813	70 827	25 957	201 954	17 179	219 133
(%)	(73.7)	(77.5)	(69.9)	(68.8)	(73.2)	(67.1)	(72.7)
Without hypertension	2 328	6 144	11 217	4 594	24 283	2 683	26 966
(%)	(9.4)	(5.5)	(11.1)	(12.2)	(8.8)	(10.5)	(8.9)
Unspecified/no information available	4 208	19 040	19 298	7 178	49 724	5 722	55 446
(%)	(16.9)	(17.0)	(19.0)	(19.0)	(18.0)	(22.4)	(18.4)
Total	24 893	111 997	101 342	37 729	275 961	25 584	301 545

Values in parentheses represent the percentage relative to the total in each row. †Patients who meet at least one of the following three conditions are defined as patients with hypertension. (1) Systolic blood pressure ≥140 mm Hg (2) Diastolic blood pressure ≥90 mm Hg (3) Taking an antihypertensive agent.

TABLE 80. *Numbers of patients with and without hypertension for different dialysis vintages (for all dialysis patients)*

With and without hypertension	Dialysis vintage (years)						Subtotal	Unspecified	No information available	Total	Mean	SD
	<2	2–	5–	10–	15–	20–	25–						
With hypertension†	49 296	56 165	56 923	28 272	14 117	7 218	7 096	219 087	43	3	219 133	6.87	6.94
(%)	(72.8)	(74.2)	(74.9)	(73.3)	(69.8)	(65.5)	(57.7)	(72.7)		(100.0)	(72.7)		
Without hypertension	5 257	5 793	5 783	3 549	2 361	1 669	2 544	26 956	10	0	26 966	9.45	9.33
(%)	(7.8)	(7.7)	(7.6)	(9.2)	(11.7)	(15.2)	(20.7)	(8.9)		(0.0)	(8.9)		
Unspecified/no information available	13 138	13 711	13 285	6 726	3 760	2 128	2 667	55 415	31	0	55 446	7.73	7.73
(%)	(19.4)	(18.1)	(17.5)	(17.4)	(18.6)	(19.3)	(21.7)	(18.4)		(0.0)	(18.4)		
Total	67 691	75 669	75 991	38 547	20 238	11 015	12 307	301 458	84	3	301 545	7.18	7.37

Values in parentheses represent the percentage relative to the total in each row. †Patients who meet at least one of the following three conditions are defined as patients with hypertension. (1) Systolic blood pressure ≥140 mm Hg (2) Diastolic blood pressure ≥90 mm Hg (3) Taking an antihypertensive agent.

early and those with low blood pressure tend to survive, and (3) many patients with a short dialysis vintage have diabetes or nephrosclerosis, both of which easily induce hypertension.

3. Smoking habit for both genders and different age groups

In this section, the relationship between smoking habit (as of the survey date) and age is examined for all dialysis patients. Tables 81 and 82 show the results for males and females, respectively. For males, 12.9% had smoking habit. The percentage of male patients with smoking habit was highest among patients aged 30–45 years (20.8%). That is, the percentage of male patients with smoking habit who were aged <30 or ≥45 years was lower than that of the above patients. In contrast, 4.0% of all female patients had smoking habit, which was lower than the percentage of male patients. As in male patients, the percentage of female patients with smoking habit was also highest among patients aged 30–45 years (9.8%). That is, the percentage of female patients with smoking habit who were aged <30 or ≥45 years was lower than that of the above patients.

Among the male and female patients, smoking habit was unclear in 25.8% and 24.9%, respectively, because of the unavailability of relevant information. When the patients with unclear smoking habit were excluded from the tabulation, the percentage of patients with smoking habit among all dialysis patients (including both male and female patients) was 12.9%, lower than that in the 2001 survey (20.1%).

4. Percentage of patients with classical risk factors for coronary artery diseases

Table 83 shows the numbers of patients with and without the classical risk factors for coronary artery diseases for different histories of cardiovascular events. The risk factors are defined as follows. Patients with diabetes are those with diabetic nephropathy as the primary disease. Patients with hypertension are defined in Section 2. Patients with a smoking habit are those who answered "current smoker" to the question regarding smoking habits. Patients with dyslipidemia are those who satisfy at least one of the following: (1) serum HDL-C level <40 mg/dL and (2) serum non-HDL-C level ≥150 mg/dL. Non-HDL-C is the difference between the total cholesterol level and the HDL-C level and indicates the total level of lipoprotein cholesterol, which promotes atherosclerosis. Patients whose risk factors were unspecified because of invalid responses were classified as patients without available relevant information.

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TABLE 81. *Numbers of patients with and without smoking habit in different age groups (for all male dialysis patients)*

With and without smoking habit	Age (years old)							Subtotal	Unspecified	No information available	Total	Mean	SD
	<15	15–	30–	45–	60–	75–	90–						
With smoking habit	0	99	2 195	7 552	11 619	2 984	67	24 516	0	0	24 516	61.10	11.66
(%)	(0.0)	(12.1)	(20.8)	(19.7)	(13.0)	(6.0)	(3.7)	(12.9)	(0.0)		(12.9)		
Without smoking habit	44	505	5 634	20 903	54 499	33 924	1270	116 779	2	0	116 781	67.15	12.27
(%)	(62.9)	(61.7)	(53.5)	(54.4)	(61.2)	(68.4)	(69.5)	(61.4)	(66.7)		(61.4)		
Unspecified/no information available	26	215	2 700	9 951	22 926	12 701	491	49 010	1	0	49 011	66.07	12.41
(%)	(37.1)	(26.3)	(25.6)	(25.9)	(25.7)	(25.6)	(26.9)	(25.8)	(33.3)		(25.8)		
Total	70	819	10 529	38 406	89 044	49 609	1828	190 305	3	0	190 308	66.09	12.39

Values in parentheses represent the percentage relative to the total in each row.

TABLE 82. *Numbers of patients with and without smoking habit in different age groups (for all female dialysis patients)*

With and without smoking habit	Age (years old)							Subtotal	Unspecified	No information available	Total	Mean	SD
	<15	15–	30–	45–	60–	75–	90–						
With smoking habit	0	19	486	1 286	1 954	619	37	4 401	0	0	4 401	61.25	12.62
(%)	(0.0)	(4.8)	(9.8)	(6.8)	(4.0)	(1.8)	(1.5)	(4.0)	(0.0)		(4.0)		
Without smoking habit	35	276	3188	12 898	34 972	25 897	1843	79 109	2	0	79 111	68.64	12.55
(%)	(71.4)	(69.7)	(64.3)	(68.2)	(71.1)	(73.5)	(74.1)	(71.1)	(50.0)		(71.1)		
Unspecified/no information available	14	101	1 282	4 726	12 286	8 708	606	27 723	2	0	27 725	68.10	12.75
(%)	(28.6)	(25.5)	(25.9)	(25.0)	(25.0)	(24.7)	(24.4)	(24.9)	(50.0)		(24.9)		
Total	49	396	4956	18 910	49 212	35 224	2486	111 233	4	0	111 237	68.21	12.68

Values in parentheses represent the percentage relative to the total in each row.

TABLE 83. *Numbers of patients with and without histories of cardiovascular events and percentages of patients with classical risk factors for coronary artery diseases (for all dialysis patients)*

▼Patients who had no histories of cardiovascular events (myocardial infarction, cerebral infarction, cerebral hemorrhage, and amputation of upper and/or lower limbs)

With and without diabetes	Number of patients	With and without hypertension	Number of patients	With and without smoking habit	Number of patients	With and without dyslipidemia	Number of patients
Diabetes	56 020	With hypertension	139 467	With smoking habit	19 804	With dyslipidemia	37 004
Nondiabetes	98 698	Without hypertension	18 415	Without smoking habit	133 602	Without dyslipidemia	62 254
Unspecified / No information available	14 382	Unspecified / No information available	11 218	Unspecified / No information available	15 694	Unspecified / No information available	69 842
Total	169 100	Total	169 100	Total	169 100	Total	169 100

▼Patients with a history of myocardial infarction

With and without diabetes	Number of patients	With and without hypertension	Number of patients	With and without smoking habit	Number of patients	With and without dyslipidemia	Number of patients
Diabetes	11 696	With hypertension	18 045	With smoking habit	2 694	With dyslipidemia	6 256
Nondiabetes	9 405	Without hypertension	2 537	Without smoking habit	16 629	Without dyslipidemia	6 959
Unspecified / No information available	1 504	Unspecified / No information available	2 023	Unspecified / No information available	3 282	Unspecified / No information available	9 390
Total	22 605	Total	22 605	Total	22 605	Total	22 605

▼Patients with a history of cerebral infarction

With and without diabetes	Number of patients	With and without hypertension	Number of patients	With and without smoking habit	Number of patients	With and without dyslipidemia	Number of patients
Diabetes	20 310	With hypertension	34 798	With smoking habit	4 351	With dyslipidemia	10 742
Nondiabetes	19 281	Without hypertension	4 216	Without smoking habit	32 360	Without dyslipidemia	14 011
Unspecified / No information available	3 306	Unspecified / No information available	3 883	Unspecified / No information available	6 186	Unspecified / No information available	18 144
Total	42 897	Total	42 897	Total	42 897	Total	42 897

▼Patients with a history of cerebral hemorrhage

With and without diabetes	Number of patients	With and without hypertension	Number of patients	With and without smoking habit	Number of patients	With and without dyslipidemia	Number of patients
Diabetes	4 550	With hypertension	11 069	With smoking habit	1 323	With dyslipidemia	3 236
Nondiabetes	8 046	Without hypertension	1 452	Without smoking habit	10 477	Without dyslipidemia	4 635
Unspecified / No information available	1 212	Unspecified / No information available	1 287	Unspecified / No information available	2 008	Unspecified / No information available	5 937
Total	13 808	Total	13 808	Total	13 808	Total	13 808

▼Patients with a history of amputation of upper and/or lower limbs

With and without diabetes	Number of patients	With and without hypertension	Number of patients	With and without smoking habit	Number of patients	With and without dyslipidemia	Number of patients
Diabetes	6 181	With hypertension	6 596	With smoking habit	1 147	With dyslipidemia	2 344
Nondiabetes	1 718	Without hypertension	828	Without smoking habit	5 954	Without dyslipidemia	2 260
Unspecified / No information available	375	Unspecified / No information available	850	Unspecified / No information available	1 173	Unspecified / No information available	3 670
Total	8 274	Total	8 274	Total	8 274	Total	8 274

Values in parentheses represent the percentage relative to the total in each column.

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Among patients who had no histories of cardiovascular events (myocardial infarction, cerebral infarction, cerebral hemorrhage, and amputation of upper and/or lower limbs), 33.1% had diabetes, 82.5% had hypertension, 11.7% had smoking habit, and 21.9% had dyslipidemia.

Among patients with a history of myocardial infarction, the percentages of patients with diabetes and dyslipidemia were higher than among patients without histories of cardiovascular events. However, there was only a small difference in the percentage of patients with smoking habit between the two patient groups. The percentage of patients with hypertension was lower among the patients with a history of myocardial infarction than among patients without histories of cardiovascular events.

Among patients with a history of cerebral infarction, the percentages of patients with diabetes and dyslipidemia were higher than among patients without histories of cardiovascular events. The differences in the percentages of patients with hypertension and smoking habit were small. Patients with a history of cerebral hemorrhage showed no marked difference in any risk factor from the patients without histories of cardiovascular events.

Among patients with a history of amputation of upper and/or lower limbs, the percentages of patients with diabetes, smoking habit, and dyslipidemia were higher than among patients without histories of cardiovascular events. In particular, the percentage of patients with diabetes among the patients with a history of amputation of upper and/or lower limbs was 74.7%, which was much higher than that of patients without histories of cardiovascular events (33.1%).

Note that many patients underwent therapeutic intervention upon the onset of the cardiovascular events, which might have improved risk factors to some extent. Therefore, care should be taken in the interpretation of the above results.

G. Items associated with PD

The facility survey showed that the number of PD patients was 9514 at the end of 2012. Moreover, the number of patients who had a peritoneal catheter for PD (most of whom are considered to undergo only peritoneal lavage) but underwent a non-PD method was 347 and that of new patients who were started on PD in 2012 but introduced to other methods in the same year was 175. Taken together with the abovementioned PD patients, the total number of PD-related patients was 10 036 in 2012 (Table 1).

As mentioned above, from the 2012 survey, the detailed results of the survey items associated with PD are reported separately from this report. Therefore, only a basic summary of the results is included in this report.

*1. Current status of combined use of PD and another method (*e.g. *HD, HDF) for different main dialysis methods*

Table 84 shows the current status of combined use of PD and another method for patients and their main dialysis method, examined in the patient survey of all the target facilities. The main dialysis methods are categorized on the basis of the classification codes for dialysis methods that have conventionally been used in the patient survey.

Among the 301 440 patients who provided valid responses to questions regarding the current status of combined use of PD and another method in the patient survey (excluding patients who answered "unspecified" and provided no information), 292 329 (97.0%) underwent a non-PD method alone such as HD (i.e. non-PD patients) and 9111 (3.0%) underwent PD alone or with another method such as HD.

Among the 292 329 patients who answered "non-PD method only" to questions regarding the current status of combined use of PD and another method, 322 patients had a peritoneal catheter for PD (i.e. non-PD + catheter patients). Most of these patients were introduced to HD from PD but did not have their PD catheter removed. There were also two non-PD + catheter patients among the 384 patients who underwent HD at home. These two non-PD + catheter patients have been introduced to home HD from PD most recently.

In this survey report, non-PD + catheter patients were tentatively classified and counted as patients who did not undergo PD in the analysis of the survey data. Note that the JSDT Statistical Survey Committee does not intend to standardize the above definition.

The number of patients who answered "PD only" to questions regarding the current status of combined use of PD and another method was 7323, which was 2.4% of the 301 440 patients who provided valid responses to the above questions and 80.4% of the 9111 patients who underwent PD alone or with another method. Moreover, the number of patients who answered "combined use of PD and another method" was 1788, which was 0.6% of the above 301 440 patients and 19.6% of the abovementioned 9111 patients.

Among the 1788 patients who answered "combined use of PD and another method", 1428 (79.9%) underwent a non-PD method such as HD once a week; 219 (12.2%) underwent a non-PD method

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TABLE 84. *Current status of combined use of peritoneal dialysis (PD) and another method for different main dialysis methods (for all dialysis patients)*

				Main dialysis method†							(Percentage relative to subtotal in column)	(Percentage relative to total in column)
				Facility HD	HDF	Hemo-filtration	Hemo-adsorption	Home HD	PD	Total		
Combined use of PD and another method	Patients who did not undergo PD (Non-PD patients)	Non-PD + non-catheter patients		267 777	21 695	183	1970	382	0	292 007	(99.9)	(96.9)
		Non-PD + catheter patients‡	299	19	0	2	2	0	322	(0.1)	(0.1)	
		Total number of non-PD patients	268 076	21 714	183	1972	384	0	292 329	(100.0)	(97.0)	
	Patients who underwent PD (PD patients)§	PD only		0	0	0	0	0	7 323	7 323	(80.4)	(2.4)
		Patients who underwent PD and another method (PD + HD patients)	PD + HD once a week	1	0	0	0	0	1 427	1 428	(15.7)	(0.5)
			PD + HD twice a week	51	3	0	0	0	165	219	(2.4)	(0.1)
			PD + HD three times a week	48	5	0	0	0	2	55	(0.6)	(0.0)
			PD + HD four times a week	0	0	0	0	0	0	0	(0.0)	(0.0)
			PD + HD at other frequencies	9	1	0	3	0	73	86	(0.9)	(0.0)
			Total number of PD + HD patients	109	9	0	3	0	1 667	1 788	(19.6)	(0.6)
		Total number of PD patients		109	9	0	3	0	8 990	9 111	(100.0)	(3.0)
	Total number of non-PD and PD patients			268 185	21 723	183	1975	384	8 990	301 440		(100.0)
	Unspecified			14	1	0	1	6	0	22		
	No information available			76	1	0	0	0	6	83		
Total				268 275	21 725	183	1976	390	8 996	301 545		
(Percentage relative to total in row)				(89.0)	(7.2)	(0.1)	(0.7)	(0.1)	(3.0)	(100.0)		

†Main dialysis methods are classified on the basis of the classification codes for dialysis methods that have conventionally been used in the annual survey. ‡In this survey, patients who did not undergo PD despite having a peritoneal catheter for PD (including those who underwent only peritoneal lavage) were tentatively classified as patients who did not undergo PD (i.e. non-PD patients) to analyze the survey data. It is not intended to standardize the above definition. §In this survey, both patients who underwent PD only and those who underwent PD and another method were tentatively classified as patients who underwent PD (i.e. PD patients) to analyze the survey data. It is not intended to standardize the above definition. The selection of the classification code for the dialysis method of the patients classified in the shaded area in the table, i.e. PD + HD patients, was left to the subjective decision of the respondents.

TABLE 85. *Current status of combined use of peritoneal dialysis (PD) and another method for different PD vintages (for patients who underwent PD in some form)*

	PD vintage (years)									
Combined use of PD and another method	<1	1–	2–	4–	8–	Subtotal	No information available	Total	Mean	SD
Non-PD + non-catheter patients										
PD only	1235	937	1179	839	256	4446	2877	7323	2.83	2.84
Non-PD + catheter patients										
PD + HD once a week	44	78	186	315	172	795	632	1427	5.49	3.63
PD + HD twice a week	2	7	22	45	32	108	57	165	6.80	3.96
PD + HD three times a week			1			1	1	2	2.42	
PD + HD four times a week										
PD + HD at other frequencies	5	5	10	22	13	55	18	73	6.10	4.92
Unspecified										
Subtotal	1286	1027	1398	1221	473	5405	3585	8990	3.33	3.21
(row %)	(23.8)	(19.0)	(25.9)	(22.6)	(8.8)	(100.0)				
No information available							6	6		
Total	1286	1027	1398	1221	473	5405	3591	8996	3.33	3.21
(row %)	(23.8)	(19.0)	(25.9)	(22.6)	(8.8)	(100.0)				

Values in parentheses represent the percentage relative to the total in each row.

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twice a week; 55 (3.1%) underwent a non-PD method three times a week; and none of the patients underwent a non-PD method four times a week. There were also 86 patients (4.8%) who answered "combined use of PD and another method" in forms other than those mentioned above.

The main dialysis methods of the 1788 patients who answered "combined use of PD and another method" varied from facility HD to PD (shaded area in Table 84). In this survey, the selection of the classification code for the main dialysis method for these patients was left to the subjective decision of the respondents. Therefore, the patient distribution of the main dialysis methods among the 1788 patients who underwent PD and another method, as determined in this survey (shaded area in the table), strongly depended on the subjective decision of the respondents.

In this survey report on the combined use of PD and another method, patients who underwent PD in some form were tentatively classified and counted as patients who underwent PD to analyze the survey data. Note that the JSDT Statistical Survey Committee does not intend to standardize the above definition.

Incidentally, the main dialysis methods (surveyed on the basis of the conventional classification codes) and the combined use of PD and another method were separately surveyed. Therefore, there would be contradicting responses in these two survey items. For example, some patients would answer "PD" as the main dialysis method but answer "non-PD method only" to questions regarding the combined use of PD and another method. For facilities that responded to the questionnaires using the electronic medium, such contradicting responses were avoided because a macro that raised a warning to potentially contradictory responses was incorporated into the Excel spreadsheet. However, this method was not applicable to facilities that used the paper medium only. Therefore, the staff of the JSDT Statistical Survey Committee Office manually checked each of the responses on the collected survey sheets and corrected any contradictory responses by directly asking the target facilities.

2. Current status of combined use of PD and another method (e.g. HD, HDF) for different PD vintages

In this survey, the types of dialysis method (e.g. HD, PD) for the target patients were determined annually by surveying the dialysis methods of the patients as of the survey date (i.e. 31 December each year). That is, the time when the patients started on one dialysis method were introduced to another dialysis method (for example, from HD to PD) was not surveyed. Therefore, the PD vintage of patients, i.e. the period from the start of PD, was determined only by monitoring the type of dialysis method as of the survey date (the end of each year) determined in each survey report. However, the PD vintage of PD patients started to be surveyed at the end of 2009. The target patients were only those who underwent PD as of the survey date.

Table 85 shows the current status of the combined use of PD and another method for different PD vintages among the 5405 patients who responded to questions regarding both combined use and PD vintage. The percentage of patients who underwent PD and another method such as HD increased with PD vintage: <1 year, 4.0%; 1–2 years, 8.8%; 2–4 years, 15.7%; 4–8 years, 31.3%; and 8 years or longer, 45.9%.

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Peritoneal Dialysis Registry With 2012 Survey Report

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Abstract: Since 2009, the peritoneal dialysis (PD) registry survey has been carried out as part of the annual nationwide survey conducted by the Statistical Survey Committee of the Japanese Society for Dialysis Therapy with the cooperation of the Japanese Society for Peritoneal Dialysis. In this report, the current status of PD patients is presented on the basis of the results of the survey conducted at the end of 2012. The subjects were PD patients who lived in Japan and participated in the 2012 survey. Descriptive analysis of various items was performed, which included the current status of the combined use of PD and another dialysis method such as hemodialysis (HD) or hemodiafiltration (HDF), the method of exchanging dialysate, the use of an automated peritoneal dialysis (APD) machine, and the rates of peritonitis and catheter exit-site infection. From the results of the facility survey in 2012, the number of PD patients was 9514, a decrease of 128 from 2011. Among the entire dialysis patient population, 3.1% were PD patients, a decrease of 0.1%. Among the studied patients, 347 had a peritoneal catheter and underwent peritoneal lavage, 175 were started on PD in 2012 but introduced to other blood purification methods in the same year, and 1932 underwent both PD and another dialysis method such as HD or HDF. The percentage of patients who underwent PD and another dialysis method increased with PD vintage: <1 year, 4.8%; 1 to <2 years, 9.2%; 2 to <4 years, 16.3%; 4 to <8 years, 32.0%; and ≥8 years, 47.5%. The percentage of PD patients who completely manually exchanged the dialysate was 29.8%. The percentages of PD patients who used a double-bag exchange system with ultraviolet-light irradiation and those who used the same system but with a sterile connecting device were 54.7 and 13.9%, respectively. The percentage of patients on PD for <1 year using an APD machine was 43.4%, and it decreased with a PD vintage of ≥2 years. The mean rate of peritonitis was 0.22 per patient per year. The mean rate of catheter exit-site infections was 0.36 per patient per year. **Key Words:** Peritoneal dialysis, Catheter exit-site infection, Dialysate exchange method, Peritonitis, Registry.

The Japanese Society for Dialysis Therapy (JSDT) has been conducting an annual statistical survey on the current status of regular dialysis treatment in Japan at the end of each year since 1968. Initially, only the numbers of dialysis patients and beds in dialysis facilities were surveyed. Later, survey items related to all dialysis patients treated in dialysis facilities that participated in the surveys were included and the obtained data have been registered in an electronic database since 1983 (1).

In the annual survey in 2009, JSDT started the peritoneal dialysis (PD) registry survey for patients who underwent PD in cooperation with the Japanese Society for Peritoneal Dialysis (2). The subjects of the PD registry survey include facilities that offer PD alone,

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which were not targeted in the conventional annual statistical surveys. The results of the PD registry survey have been reported annually in the sections "Current status of PD treatment" and "Items associated with PD" of the "Overview of Regular Dialysis Treatment in Japan" compiled by the Subcommittee of Statistical Analysis, the Statistical Survey Committee, JSDT. In the 2012 survey, the results of the PD registry survey are separated from the above Overview and independently summarized in this report.

Here, data obtained from the 2012 PD registry survey are summarized according to the following six items:

1. Current status of PD patients
2. Urine output, volume of water removed by PD, and total volume of fluid removed
3. Dialysate/plasma creatinine (D/P Cr) ratio in peritoneal equilibration test (PET)
4. Kt/V for residual renal function (residual renal Kt/V), Kt/V for PD (PD Kt/V), and total Kt/V
5. Peritonitis and catheter exit-site infections
6. Encapsulating peritoneal sclerosis (EPS)

PATIENTS AND METHODS

Methods

This survey was conducted by sending questionnaires to individual dialysis facilities. A total of 4279 facilities surveyed were either member facilities of JSDT, nonmember facilities offering regular hemodialysis (HD), or nonmember facilities offering PD but not HD as of 31 December 2012. The number of facilities participating in this survey increased by 24 (0.56%) from the previous year (4255 facilities) (3). Among the 4279 facilities, 1052 treated PD patients. Universal serial bus (USB) memory devices that stored electronic spreadsheets in Microsoft Excel or paper questionnaires were sent to and collected from the individual dialysis facilities mainly by postal mail; for some facilities, the questionnaires were sent and collected by fax. In the 2012 survey, two sets of questionnaires were used. One was for the facility survey, which included items on individual dialysis facilities, such as the number of patients and the number of staff members (previously "Sheet I"). The other was for the patient survey, which included items on individual dialysis patients, such as their epidemiological background, treatment conditions, and outcome of treatment (previously "Sheets II–IV"). For details of these surveys, refer to "Overview of Regular Dialysis Treatment in Japan (as of 31 December 2012)" written by Shigeru Nakai et al. (*Journal of Japanese Society for Dialysis Therapy*).

The deadline for acceptance of responses was the end of January 2013. The acceptance of responses after this deadline ended on 26 April 2013 for the preparation of "The Illustrated, Overview of Regular Dialysis Treatment in Japan" and on 12 September 2013 for the preparation of "Overview of Regular Dialysis Treatment in Japan: Report on CD-ROM" (4,5). For the Report on CD-ROM, the number of facilities that responded to the facility survey was 4238 (99.0%), and the number of those that responded to both the facility and patient surveys was 4128 (96.4%). Moreover, the number of facilities that completed the questionnaires using the electronic medium was 3654 (86.2%), which was higher than that in the 2011 survey (3594 facilities, 84.5%). This increase contributed to the accurate and simplified analysis of survey data. Note that this report is based on the data tabulated for the Report on CD-ROM (5).

Survey items

The 2012 survey included the following survey items. For the items in the previous surveys, refer to the members-only pages of the JSDT website (http://www.jsdt.or.jp/).

1. **Questionnaire for facility survey (previously Sheet I)**

   - Name of facility, contact numbers (Tel, Fax), name of representative (doctor), and name of respondent
   - Year and month when the facility started offering dialysis treatment
   - Number of bedside consoles, total number of patients who can simultaneously receive dialysis, and maximum capacity (number of patients)
   - Number of workers exclusively or inclusively engaged in dialysis treatment (e.g., doctors, nurses, clinical engineers, nutritionists, and case workers)
   - Number of outpatients and inpatients who underwent dialysis (daytime dialysis, nighttime dialysis, home HD, and PD)
   - Total number of patients who underwent dialysis at the end of 2012
   - Number of new patients who were started on dialysis in 2012 and number of dialysis patients who died in 2012
   - Number of patients who underwent HD or hemodiafiltration (HDF) and did not undergo PD despite having a catheter for PD (underwent only peritoneal lavage), number of patients who underwent both PD and

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HD or HDF, and number of new patients who were started on PD in 2012 but introduced to other blood purification methods in the same year
- Current status of dialysate quality control (details not shown)

2. **Questionnaire for patient survey (previously Sheets II–IV)**
   - Pseudonym of patients
   - Gender and date of birth
   - Year and month of start of dialysis and year and month of transfer from another hospital
   - Primary disease
   - Prefecture where the patient lives
   - Outcome data (year and month of transfer, death, change in dialysis method, and transplantation)
   - History of comorbidity (e.g., myocardial infarction, cerebral hemorrhage, cerebral infarction, quadruple amputation, femoral neck fracture, and EPS)
   - Use or nonuse of antihypertensive drugs and smoking habit
   - Dialysis method, current status of combined use of PD and HD or HDF, history of PD, and number of times of renal transplantation
   - Frequency of dialysis per week, duration of one session of dialysis (min/session), blood flow rate (mL/min) (for patients who underwent a blood purification method by extracorporeal circulation)
   - Method of diluting HDF solution, volume of HDF solution replaced per session (L) (for patients who underwent HDF)
   - Height and predialysis and postdialysis weights
   - Predialysis and postdialysis serum blood urea nitrogen (BUN) (mg/dL) and creatinine (mg/dL) levels
   - Predialysis albumin (g/dL), C-reactive protein (CRP) (mg/dL), calcium (mg/dL), phosphorus (mg/dL), and blood hemoglobin (g/dL) levels, parathyroid hormone (PTH) level (pg/mL), and its measurement method

3. **USB-only survey items**

Details of PD are surveyed as USB-only survey items, separately from the above-mentioned questionnaires for the facility and patient surveys. The following are the USB-only survey items associated with PD. New 2012 survey items associated with PD are asterisked.

- PD vintage (months)
- Number of months when PD was performed in 2012*
- Performance or nonperformance of PET
- PET-derived 4-h dialysate/plasma creatinine ratio (PET D/P Cr ratio)
- Type of PD solution
- Volume of PD solution used per day
- Remaining renal function (daily urine output)
- Mean volume of water removed per day
- Residual renal Kt/V and PD Kt/V
- Use or nonuse of APD machine*
- Number of hours of PD per day*
- Method of changing PD solution*
- Frequency of peritonitis in 2012
- Frequency of catheter exit-site infections in 2012*

RESULTS AND DISCUSSION

Current status of PD patients

Number of patients (obtained from facility survey)

Table 1 shows a summary of the numbers of PD patients at the end of 2012 obtained from the facility survey. According to the facility survey, the number of PD patients was 9514 at the end of 2012, a decrease of 128 from the previous year. The percentage of PD patients among the entire dialysis patient population was 3.1%, a decrease of 0.1% from the previous year. The number of patients who underwent a non-PD method although they had a catheter for PD (most of whom are considered to have undergone only peritoneal lavage) was 347 (a decrease of 22 from the previous year) and the number of new patients who were started on PD in 2012 but introduced to other methods in the same year was 175 (the same as in the previous year). The number of patients who underwent both PD and another dialysis method such as HD or HDF was 1,932 (an increase of 30 from the previous year).

TABLE 1. *Number of PD patients at the end of 2012*

	Number of patients
PD patients	9514
Patients with a catheter for PD such as those who underwent only peritoneal lavage	347
New patients who were started on PD in 2012 but introduced to other methods in the same year	175
Patients who underwent PD+HD(F)	1932

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Current status of combined use of PD and another method such as HD or HDF [hereafter, PD+HD(F)] for different main dialysis methods (obtained from patient survey)

Table 2 shows the current status of PD+HD(F) for patients and their main dialysis method, examined on the basis of the patient survey of all the target facilities. This table is the same as Table 84 shown in "Overview of Regular Dialysis Treatment in Japan (as of 31 December 2012)".

The classification of main dialysis methods is based on the classification codes for dialysis methods that have conventionally been used in the patient survey. Among the 301 440 patients who provided valid responses to questions regarding the current status of PD+HD(F) in the patient survey (excluding patients who answered "unspecified" and provided no information), 292 329 (97.0%) underwent a non-PD method alone such as HD (hereafter, non-PD patients) and 9111 (3.0%) underwent PD alone or with another method such as HD. Among the 292 329 non-PD patients, 322 patients had a catheter for PD in the peritoneal cavity (hereafter, non-PD + catheter patients).

In this survey report, non-PD + catheter patients were classified and counted as patients who did not undergo PD. Regarding PD+HD(F), patients who underwent PD in some form (including patients who underwent PD alone or with another method) were classified and counted as patients who underwent PD.

The number of patients who answered "PD only" to questions regarding the current status of PD+HD (F) was 7323, which was 2.4% of the 301 440 patients who provided valid responses to the above questions and 80.4% of the 9111 patients who underwent PD. Moreover, the number of patients who answered "PD+HD(F)" was 1788, which was 19.6% of the abovementioned 9111 patients.

Among the 1788 patients who answered "PD+ HD(F)", 1428 (79.9%) underwent a non-PD method such as HD once a week; 219 (12.2%) twice a week; and 55 (3.1%) three times a week. None of the patients underwent a non-PD method four times a week. There were also 86 patients (4.8%) who answered "PD+ HD(F)" in forms other than those mentioned above.

Note that the above classification of dialysis methods is tentatively used to analyze the survey data and that the JSDT Statistical Survey Committee does not intend to standardize the definition of "patients who undergo PD"

Current status of PD+HD(F) for different PD vintages (obtained from patient survey)

To the questions regarding PD vintage and PD+ HD(F), 5459 patients responded. The percentage of patients who underwent PD+HD(F) increased with the PD vintage: <1 year, 4.8%; 1 to <2 years, 9.2%; 2 to <4 years, 16.3%; 4 to <8 years, 32.0%; and ≥8 years, 47.5% (Table 3). Focusing on the frequency of HD(F), PD patients who underwent HD(F) once a week were the majority (nearly 80%). The percentage of PD patients who underwent HD(F) twice or three times a week tended to increase with the PD vintage (Table 3).

Method of exchanging PD solution (obtained from patient survey)

To the questions regarding the method of exchanging PD solution, 4557 of the PD-only patients responded. The number of PD patients who performed completely manual dialysate exchanges was 1359 (29.8%), whereas the numbers of PD patients who used a double-bag exchange system with ultraviolet-light irradiation and those who used the same system but with a sterile connecting device were 2491 (54.7%) and 633 (13.9%), respectively (Table 4).

Use or nonuse of APD machine for different PD vintages (obtained from patient survey)

Among the PD-only patients, 4331 responded to the questions regarding their PD vintage and use or nonuse of an APD machine. The percentages of PD-only patients who used an APD machine were 43.4% for those with a PD vintage of <1 year and 46.3% for those with a PD vintage of 1 to <2 years. However, the percentage of PD-only patients with a PD vintage of ≥2 years who used an APD machine decreased with the PD vintage (2 to <4 years, 41.6%; 4 to <8 years, 39.4%; and ≥8 years, 27.4%: Table 5).

Hours of PD session per day for different PD vintages (obtained from patient survey)

Among the PD-only patients, 4084 responded to the questions regarding their PD vintage and hours of PD session per day. The percentage of patients who underwent PD the whole day (24 h) increased with the PD vintage (<1 year, 44.9%; 1 to <2 years, 52.7%; 2 to <4 years, 57.8%; 4 to <8 years, 63.7%; and ≥8 years, 77.0%: Table 6).

Urine output, volume of water removed by PD, and total volume of fluid removed (obtained from patient survey)

Urine output for different PD vintages

To the questions regarding urine output, 3549 of the PD-only patients responded. The mean urine

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TABLE 2. *Combined use of PD and one of main dialysis methods [HD(F)] in entire dialysis patient population*

			Main dialysis method*							(% relative to total in column)	(% relative to total in column)
			Facility HD	HDF	HD	Hemo-adsorption	Home HD	PD	Total		
Combined use of PD + HD(F)	Non-PD patients	Non-PD (without PD catheter) (% relative to total in row)	267 777 (91.7)	21 695 (7.4)	183 (0.1)	1970 (0.7)	382 (0.1)	0 (0.0)	292 007 (100.0)	(99.9)	(96.9)
		Non-PD (with PD catheter)** (% relative to total in row)	299 (92.9)	19 (5.9)	0 (0.0)	2 (0.6)	2 (0.6)	0 (0.0)	322 (100.0)	(0.1)	(0.1)
		Subtotal of non-PD patients (% relative to total in row)	268 076 (91.7)	21 714 (7.4)	183 (0.1)	1972 (0.7)	384 (0.1)	0 (0.0)	292 329 (100.0) (100.0)	(100.0)	(97.0)
	PD patients***	PD-only (% relative to total in row)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	7323 (100.0)	7323 (100.0)	(80.4)	(2.4)
		PD+HD(F) patients HD(F) once a week (% relative to total in row)	1 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1427 (99.9)	1428 (100.0)	(15.7)	(0.5)
		HD(F) twice a week (% relative to total in row)	51 (23.3)	3 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	165 (75.3)	219 (100.0)	(2.4)	(0.1)
		HD(F) three times a week (% relative to total in row)	48 (87.3)	5 (9.1)	0 (0.0)	0 (0.0)	0 (0.0)	2 (3.6)	55 (100.0)	(0.6)	(0.0)
		HD(F) four times a week (% relative to total in row)	0	0	0	0	0	0	0	(0.0)	(0.0)
		Other (% relative to total in row)	9 (10.5)	1 (1.2)	0 (0.0)	3 (3.5)	0 (0.0)	73 (84.9)	86 (100.0)	(0.9)	(0.0)
		Subtotal of PD+HD(F) patients (% relative to total in row)	109 (6.1)	9(0.5)	0 (0.0)	3 (0.2)	0 (0.0)	1667 (93.2)	1788 (100.0)	(19.6)	(0.6)
		Subtotal of PD patients (% relative to total in row)	109 (1.2)	9 (0.1)	0 (0.0)	3 (0.0)	0 (0.0)	8990 (98.7)	9111 (100.0) (100.0)	(100.0)	(3.0)
	Subtotal (% relative to total in row)		268 185 (89.0)	21 723 (7.2)	183 (0.1)	1975 (0.7)	384 (0.1)	8990 (3.0)	301 440 (100.0)		(100.0)
	Unspecified (% relative to total in row)		14 (63.6)	1 (4.5)	0 (0.0)	1 (4.5)	6 (27.3)	0 (0.0)	22 (100.0)		
	No information available (% relative to total in row)		76 (91.6)	1 (1.2)	0 (0.0)	0 (0.0)	0 (0.0)	6 (7.2)	83 (100.0)		
Total (% relative to total in row)			268 275 (89.0)	21 725 (7.2)	183 (0.1)	1976 (0.7)	390 (0.1)	8996 (3.0)	301 545 (100.0)		

*The classification of main dialysis methods is based on the classification codes for dialysis methods that have conventionally been used in the annual survey. **Patients who had a catheter for PD in the peritoneal cavity but did not undergo PD (including those who underwent only peritoneal lavage) were classified as "non-PD patients". Note that this classification is tentatively used to analyze the survey data and that it is not intended as a standard definition of "patients who do not undergo PD". ***Patients who underwent PD in some form (including patients who underwent PD alone or with HD or HDF) were classified as "PD patients". Note that this classification is tentatively used to analyze the survey data and that it is not intended as a standard definition of "patients who undergo PD". Note: The classification codes for the main dialysis methods of patients classified in the shaded (gray) cells of the table depend on the subjective decision by each respondent.

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TABLE 3. *Current status of combined use PD+HD(F) in patients of different PD vintages [including PD patients and PD+HD(F) patients]*

PD vintage	<1 year	1 year–	2 years–	4 years–	8 years–	Subtotal	No information available	Total	Mean	SD
PD only (%)	1235 (95.2)	937 (90.8)	1179 (83.7)	839 (68.0)	256 (52.5)	4446 (81.4)	2877 (78.8)	7323 (80.4)	2.83	2.84
PD+HD(F) once a week (%)	44 (3.4)	78 (7.6)	186 (13.2)	315 (25.5)	172 (35.2)	795 (14.6)	633 (17.3)	1428 (15.7)	5.49	3.63
PD+HD(F) twice a week (%)	8 (0.6)	7 (0.7)	26 (1.8)	52 (4.2)	42 (8.6)	135 (2.5)	84 (2.3)	219 (2.4)	6.77	4.27
PD+HD(F) three times a week (%)	2 (0.2)	3 (0.3)	7 (0.5)	4 (0.3)	4 (0.8)	20 (0.4)	35 (1.0)	55 (0.6)	4.18	3.62
PD+HD(F) at other frequencies (%)	8 (0.6)	7 (0.7)	11 (0.8)	23 (1.9)	14 (2.9)	63 (1.2)	23 (0.6)	86 (0.9)	5.74	4.94
Total (%)	1297 (100.0)	1032 (100.0)	1409 (100.0)	1233 (100.0)	488 (100.0)	5459 (100.0)	3652 (100.0)	9111 (100.0)	3.35	3.24

TABLE 4. *Method of exchanging PD solution in PD-only patients*

Method of exchanging PD solution	Completely manual exchange	Double-bag exchange system with ultraviolet-light irradiation	Double-bag exchange system with sterile connecting device	Double-bag exchange system (other than methods on the left columns, including semi-manual methods)	Subtotal	Unspecified	No information available	Total
Number of patients (%)	1359 (29.8)	2491 (54.7)	633 (13.9)	74 (1.6)	4557 (100.0)	15	2751	7323

TABLE 5. *Use or nonuse of APD machine in PD-only patients of different PD vintages*

Use or nonuse of APD machine	<1 year	1 year–	2 years–	4 years–	8 years–	Subtotal	No information available	Total	Mean	SD
Nonuse (%)	672 (56.6)	497 (53.7)	676 (58.4)	490 (60.6)	183 (72.6)	2518 (58.1)	159	2677	3.01	3.04
Use (%)	515 (43.4)	429 (46.3)	482 (41.6)	318 (39.4)	69 (27.4)	1813 (41.9)	126	1939	2.59	2.50
Subtotal (%)	1187 (100.0)	926 (100.0)	1158 (100.0)	808 (100.0)	252 (100.0)	4331 (100.0)	285	4616	2.83	2.83
Unspecified	3	0	1	1	0	5	0	5	1.53	2.39
No information available	45	11	20	30	4	110	2592	2702	2.69	2.98
Total	1235	937	1179	839	256	4446	2877	7323	2.83	2.84

TABLE 6. *Duration of PD session (h) per day in PD-only patients of different PD vintages*

Duration of PD session (h) per day Duration of PD session (h) per day	<1 year	1 year–	2 years–	4 years–	8 years–	Subtotal	No information available	Total	Mean	SD
1 h- (%)	25 (2.2)	19 (2.2)	26 (2.4)	26 (3.4)	9 (4.0)	105 (2.6)	1	106	3.30	3.51
5 h- (%)	282 (24.9)	165 (18.9)	173 (15.9)	70 (9.2)	13 (5.8)	703 (17.2)	20	723	1.93	1.89
9 h- (%)	199 (17.6)	131 (15.0)	134 (12.3)	83 (10.9)	14 (6.2)	561 (13.7)	21	582	2.20	2.21
13 h-(%)	90 (8.0)	67 (7.7)	76 (7.0)	51 (6.7)	10 (4.4)	294 (7.2)	5	299	2.56	2.73
18 h- (%)	28 (2.5)	31 (3.6)	51 (4.7)	47 (6.2)	6 (2.7)	163 (4.0)	2	165	3.28	2.70
24 h (%)	508 (44.9)	460 (52.7)	629 7(57.8)	487 (63.7)	174 (77.0)	2258 (55.3)	97	2355	3.20	3.02
Subtotal (%)	1132 (100.0)	873 (100.0)	1089 (100.0)	764 (100.0)	226 (100.0)	4084 (100.0)	146	4230	2.80	2.78
No information available	103	64	90	75	30	362	2731	3093	3.12	3.35
Total	1235	937	1179	839	256	4446	2877	7323	2.83	2.84
Mean	16.27	17.54	18.42	19.43	20.90	17.96	19.23	18.01	–	–
SD	7.49	7.34	7.13	6.81	6.20	7.29	6.93	7.28	–	–

output of the PD patients was 723.0 mL/day. The urine output decreased with increasing PD vintage for the 3445 patients who responded to the questions regarding both urine output and the PD vintage (<1 year, 926.5 mL/day; 1 to <2 years, 838.6 mL/day; 2 to <4 years, 692.0 mL/day; 4 to <8 years, 506.0 mL/day; and ≥8 years, 247.6 mL/day: Table 7).

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TABLE 7. *Urine output in PD-only patients of different PD vintages*

Urine output (mL/day)	<1 year	1 year–	2 years–	4 years–	8 years–	Subtotal	No information available	Total
Number of patients	939	740	938	638	190	3445	104	3549
Mean	926.52	838.62	691.99	506.02	247.57	728.46	540.39	722.95
SD	549.72	533.54	524.77	543.70	408.93	563.70	625.40	566.39

Volume of water removed by PD for different PD vintages

To the questions regarding the volume of water removed by PD, 3877 of the PD-only patients responded. The mean volume of water removed by PD was 623.0 mL/day. The volume of water removed by PD increased with the PD vintage in the 3826 patients who responded to the questions regarding the volume of water removed by PD and the PD vintage (<1 year, 425.0 mL/day; 1 to <2 years, 586.1 mL/day; 2 to <4 years, 678.0 mL/day; 4 to <8 years, 776.1 mL/day; and ≥8 years, 891.3 mL/day: Table 8).

Total volume of fluid removed for different PD vintages

Among the PD-only patients, 3350 responded to all questions regarding urine output, the volume of water removed by PD, and the PD vintage. The total volume of fluid removed (urine output + volume of water removed by PD) decreased with increasing PD vintage for the patients who had undergone PD for 2 years or longer (<1 year, 1361.0 mL/day; 1 to <2 years, 1415.0 mL/day; 2 to <4 years, 1373.2 mL/day; 4 to <8 years, 1290.0 mL/day; and ≥8 years, 1124.9 mL/day: Table 9).

PET (obtained from patient survey)

Performance or nonperformance of PET

To the questions regarding the performance or nonperformance of PET, 4403 of the PD-only patients responded. Among these patients, 2143 (48.7%) underwent a standard PET and 802 (18.2%) underwent a fast PET; that is, a total of 2945 (66.9%) underwent a PET (Table 10).

PET D/P Cr ratio and type of PD solution used

To the questions regarding the type of PD solution used, 4546 of the PD-only patients responded. Among these patients, 2729 (60.0%) used 1.5 or 2.5% dextrose and only 16 (0.35%) used 4.25% dextrose. The total number of patients who used icodextrin was 1808 (39.8%). Table 11 shows a summary of PET D/P Cr ratios for different PD solutions used. The percentage of patients who used icodextrin increased with PET D/P Cr ratio (<0.5, 22.7%; 0.5 to <0.65, 32.6%; 0.65 to <0.81, 50.1%; and ≥0.81, 59.6%: Table 11).

Residual renal Kt/V, PD Kt/V, and total Kt/V (obtained from patient survey)

Residual renal Kt/V for different PD vintages

To the questions regarding residual renal Kt/V, 1757 of the PD-only patients responded. The mean residual renal Kt/V was 0.74. The residual renal Kt/V decreased with increasing PD vintage for the patients who had undergone PD for 2 years or longer (<1 year, 1.00; 1 to <2 years, 0.74; 2 to <4 years, 0.75; 4 to <8 years, 0.54; and ≥8 years, 0.42: Table 12).

TABLE 8. *Volume of water removed by PD in PD-only patients of different PD vintages*

Volume of water removed by PD (mL/day)	<1 year	1 year–	2 years–	4 years–	8 years–	Subtotal	No information available	Total
Number of patients	1026	807	1039	735	219	3826	51	3877
Mean	425.04	586.10	678.00	776.05	891.32	621.83	707.49	622.96
SD	455.82	534.41	505.59	470.60	422.99	508.10	826.76	513.50

TABLE 9. *Total volume of fluid removed for different PD vintages in PD-only patients who responded to all questions regarding PD vintage, urine output, and volume of water removed by PD*

		<1 year	1 year–	2 years–	4 years–	8 years–	Subtotal	No information available	Total
Number of patients		919	716	912	617	186	3350	37	3387
Urine output (mL/day)	Mean	928.22	844.49	696.73	507.38	240.53	731.61	748.62	731.8
	SD	549.65	536.39	523.68	545.20	406.70	564.77	650.73	565.67
Volume of water removed by PD (mL/day)	Mean	432.74	570.52	676.48	782.64	884.34	618.06	679.11	618.73
	SD	460.02	517.88	494.27	468.22	425.68	501.81	538.27	502.18

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TABLE 10. *Performance or nonperformance of PET in PD-only patients*

Performance or nonperformance of PET	Not performed	PET performed	Fast PET only	Subtotal	Unspecified	No information available	Total
Number of patients (%)	1458 (33.1)	2143 (48.7)	802 (18.2)	4403 (100.0)	59	2861	7323

TABLE 11. *PET D/P Cr ratio and type of PD solution used in PD-only patients*

PET D/P Cr ratio	<0.5	0.5–	0.65–	0.81–	Subtotal	No information available	Total	Mean	SD
1.5% dextrose only (%)	169 (15.8)	454 (42.5)	348 (32.6)	96 (9.0)	1067 (100.0)	948	2015	0.61	0.16
1.5 and 2.5% dextrose (%)	47 (15.3)	119 (38.8)	110 (35.8)	31 (10.1)	307 (100.0)	284	591	0.61	0.18
2.5% dextrose only (%)	16 (28.6)	12 (21.4)	24 (42.9)	4 (7.1)	56 (100.0)	67	123	0.55	0.24
4.25% dextrose only (without icodextrin) (%)	0 (0.0)	1 (20.0)	3 (60.0)	1 (20.0)	5 (100.0)	4	9	0.73	0.07
Icodextrin only (without dextrose) (%)	1 (4.2)	2 (8.3)	13 (54.2)	8 (33.3)	24 (100.0)	27	51	0.74	0.11
1.5% dextrose + icodextrin (%)	34 (5.6)	165 (27.0)	282 (46.2)	129 (21.1)	610 (100.0)	418	1028	0.70	0.14
1.5 and 2.5% dextrose + icodextrin (%)	16 (6.1)	79 (29.9)	128 (48.5)	41 (15.5)	264 (100.0)	169	433	0.68	0.14
2.5% dextrose + icodextrin (%)	17 (12.7)	37 (27.6)	63 (47.0)	17 (12.7)	134 (100.0)	155	289	0.65	0.18
4.25% dextrose + icodextrin (%)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	6	7	0.55	–
Subtotal (%)	300 (12.2)	870 (35.3)	971 (39.3)	327 (13.2)	2468 (100.0)	2078	4546	0.64	0.17
Unspecified	0	4	0	1	5	7	12	0.65	0.14
No information available	3	14	8	3	28	2737	2765	0.64	0.13
Total	303	888	979	331	2501	4822	7323	0.64	0.17

TABLE 12. *Residual renal Kt/V in PD-only patients of different PD vintages*

Residual renal Kt/V	<1 year	1 year–	2 years–	4 years–	8 years–	Subtotal	No information available	Total
Number of patients	400	395	506	314	62	1677	80	1757
Mean	1.00	0.74	0.75	0.54	0.42	0.75	0.35	0.74
SD	1.00	0.72	1.09	0.92	1.01	0.97	0.53	0.96

PD Kt/V for different PD vintages

To the questions regarding PD Kt/V, 2111 of the PD-only patients responded. The mean PD Kt/V was 1.44. The PD Kt/V increased with the PD vintage (<1 year, 1.23; 1 to <2 years, 1.34; 2 to <4 years, 1.45; 4 to <8 years, 1.70; and ≥8 years, 1.81: Table 13).

Total Kt/V for different PD vintages

Among the PD-only patients, 1658 responded to all questions regarding residual renal Kt/V, PD Kt/V, and the PD vintage. For these patients, the mean residual renal Kt/V was 0.75 and the mean PD Kt/V was 1.34. The mean total Kt/V (residual renal Kt/V + PD Kt/V) was 2.09. The total Kt/V was generally in the range of 2.0–2.2 for any PD vintage (<1 year, 2.12; 1 to <2 years, 2.00; 2 to <4 years, 2.12; 4 to <8 years, 2.11; and ≥8 years, 2.21: Table 14).

Peritonitis and catheter exit-site infections (obtained from patient survey)

Peritonitis is defined as a white blood cell count in a waste PD solution of ≥100/μL (neutrophils, ≥50%). A catheter exit-site infection is defined by the presence of purulent drainage from the exit site.

Peritonitis rate in entire PD patient population in Japan and individual patients

The peritonitis rate in the entire PD patient population in Japan was calculated using the following formula."Peritonitis rate in entire PD patient population (number of peritonitis episodes per year per patient)" = "Total number of peritonitis episodes in 2012 for all patients" ÷ "Total number of months when PD was performed in 2012 in all patients" × 12

TABLE 13. *PD Kt/V of PD-only patients of different PD vintages*

PD Kt/V	<1 year	1 year–	2 years–	4 years–	8 years–	Subtotal	No information available	Total
Number of patients	479	451	602	397	88	2017	94	2111
Mean	1.23	1.34	1.45	1.70	1.81	1.44	1.51	1.44
SD	0.61	0.71	0.66	0.78	0.80	0.72	0.44	0.71

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TABLE 14. *Total Kt/V of PD-only patients of different PD vintages*

		<1 year	1 year–	2 years–	4 years–	8 years–	Subtotal	No information available	Total
Number of patients		394	393	501	310	60	1658	80	1738
Residual renal Kt/V	Mean	0.99	0.74	0.76	0.52	0.43	0.75	0.35	0.73
	SD	1.00	0.72	1.09	0.85	1.02	0.96	0.53	0.95
PD Kt/V	Mean	1.13	1.26	1.36	1.59	1.78	1.34	1.49	1.35
	SD	0.54	0.67	0.58	0.66	0.60	0.64	0.44	0.63

According to the International Society for Peritoneal Dialysis (ISPD) guidelines (Peritoneal Dialysis-Related Infections Recommendations: 2010 Update) (6), "the center's peritonitis rate should be no more than one episode every 18 months (0.67/year at risk)".

The peritonitis rate in individual patients was calculated using the following formula.

> "Peritonitis rate in individual patients (number of peritonitis episodes per year)" = "Total number of peritonitis episodes in 2012 in individual patients" ÷ "Total number of months when PD was performed in 2012 in individual patients" × 12

To the questions regarding peritonitis, 4195 of the PD-only patients responded. The mean peritonitis rate in the entire dialysis patient population was 0.22 per patient per year (once per 54.5 patients per month). This was much lower than the value specified in the ISPD guidelines.

The number of patients who did not develop peritonitis in 2012 was 3626 (86.4%). The number of patients with a peritonitis rate of 1.0 to <2.0 was 430 (10.3%) and that with a peritonitis rate of ≥2.0 was 139 (3.3%) (Table 15).

Peritonitis rate in facilities

The peritonitis rate in a facility was calculated using the following formula.

> "Peritonitis rate in a facility (number of peritonitis episodes per year per patient)" = "Total number of peritonitis episodes in 2012 in all patients in the facility" ÷ "Total number of months when PD was performed in 2012 in all patients in the facility" × 12

On the basis of the valid responses obtained from 234 facilities, the mean peritonitis rate in a facility was calculated to be 0.24 per patient per year (once per 50.0 patients per month) (Table 16).

Catheter exit-site infection rate in entire PD patient population and individual patients

The catheter exit-site infection rate in the entire PD patient population was calculated using the following formula.

> "Catheter exit-site infection rate in entire PD patient population (number of infections per year per patient)" = "Total number of infections in 2012 in all patients" ÷ "Total number of months when PD was performed in 2012 in all patients" × 12

TABLE 15. *Peritonitis rate in individual PD-only patients*

Peritonitis rate (episodes per year per patient)	0	1.0–	2.0–	3.0–	4.0–	5.0–	Subtotal	Unspecified	No information available	Total	Mean
Number of patients (%)	3626 (86.4)	430 (10.3)	75 (1.8)	30 (0.7)	19 (0.5)	15 (0.4)	4195 (100.0)	4	3124	7323	0.22

TABLE 16. *Peritonitis rate in PD-only patients in facilities*

Peritonitis rate (episodes per year per patient)	0	1.0–	2.0–	3.0–	4.0–	5.0–	Subtotal	No information available	Total	Mean
Number of facilities (%)	199 (85.0)	28 (12.0)	3 (1.3)	0 (0.0)	2 (0.9)	2 (0.9)	234 (100.0)	285	519	0.24

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The catheter exit-site infection rate in individual patients was calculated using the following formula.

> "Catheter exit-site infection rate in individual patients (number of infections per year per patient)" = "Total number of infections in 2012 in individual patients" ÷ "Total number of months when PD was performed in 2012 in individual patients" × 12

To the questions regarding catheter exit-site infections, 4168 of the PD-only patients responded. The mean catheter exit-site infection rate in the entire dialysis patient population was 0.36 per patient per year (once per 33.3 patients per month).

The number of patients who did not develop catheter exit-site infections in 2012 was 3369 (80.8%). The number of patients with a catheter exit-site infection rate of 1.0 to <2.0 was 520 (12.5%) and that with a catheter exit-site infection rate of ≥2.0 was 279 (6.7%) (Table 17).

Catheter exit-site infection rate in facilities

The catheter exit-site infection rate in a facility was calculated using the following formula.

> "Catheter exit-site infection rate in a facility (number of infections per year per patient)" = "Total number of infections in 2012 in all patients in the facility" ÷ "Total number of months when PD was performed in 2012 in all patients in the facility" × 12

On the basis of the valid responses obtained from 270 facilities, the mean catheter exit-site infection rate in a facility was calculated to be 0.38 per patient per year (once per 31.6 patients per month: Table 18).

EPS (obtained from patient survey)

Percentage of patients with histories of PD and EPS

Items associated with EPS were surveyed in all dialysis patients including HD patients. Among the 12 923 patients who had undergone PD and responded to the questions regarding their history of EPS, 682 (5.3%) had a history of EPS. Among these 682 patients, 545 (79.9%) had undergone detachment surgery (Table 19).

History of EPS for different PD vintages

Responses to the questions regarding the PD vintage and history of EPS were obtained from 4770 patients. The percentages of patients with a history of EPS who had undergone PD for <8 years were low (<1 year, 0.8%; 1 to <2 years, 0.3%; 2 to <4 years, 0.5%; and 4 to <8 years, 0.2%). However, the

TABLE 17. *Catheter exit-site infection rate in individual PD-only patients*

Catheter exit-site infection rate (infections per year per patient)	0	1.0–	2.0–	3.0–	4.0–	5.0–	Subtotal	Unspecified	No information available	Total	Mean
Number of patients (%)	3369 (80.8)	520 (12.5)	144 (3.5)	58 (1.4)	37 (0.9)	40 (1.0)	4168 (100.0)	31	3124	7323	0.36

TABLE 18. *Catheter exit-site infection rate in PD-only patients in facilities*

Catheter exit-site infection rate (infections per year per patient)	0	1.0–	2.0–	3.0–	4.0–	5.0–	Subtotal	No information available	Total	Mean
Number of facilities (%)	210 (77.8)	40 (14.8)	12 (4.4)	2 (0.7)	2 (0.7)	4 (1.5)	270 (100.0)	250	520	0.38

TABLE 19. *Percentage of PD patients with history of EPS*

History of EPS	A: No	B: Yes (with detachment surgery and use of steroids)	C: Yes (with detachment surgery and without use of steroids)	D: Yes (without detachment surgery and with use of steroids)	E: Yes (without detachment surgery or use of steroids)	Subtotal	Z: Unspecified	No information available	Total
Number of patients (%)	12 241 (94.7)	521 (4.0)	24 (0.2)	95 (0.7)	42 (0.3)	12 923 (100.0)	263	3583	16 769

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TABLE 20. *History of EPS in patients of different PD vintages*

History of EPS	<1 year	1 year–	2 years–	4 years–	8 years–	Subtotal	No information available	Total
No (%)	1125 (99.2)	887 (99.7)	1240 (99.5)	1083 (99.8)	403 (97.1)	4738 (99.3)	7503	12 241
Yes (with detachment surgery and use of steroids) (%)	9 (0.8)	3 (0.3)	3 (0.2)	1 (0.1)	6 (1.4)	22 (0.5)	499	521
Yes (with detachment surgery and without use of steroids) (%)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	24	24
Yes (without detachment surgery and with use of steroids) (%)	0 (0.0)	0 (0.0)	1 (0.1)	1 (0.1)	3 (0.7)	5 (0.1)	90	95
Yes (without detachment surgery or use of steroids) (%)	0 (0.0)	0 (0.0)	2 (0.2)	0 (0.0)	3 (0.7)	5 (0.1)	37	42
Subtotal (%)	1134 (100.0)	890 (100.0)	1246 (100.0)	1085 (100.0)	415 (100.0)	4770 (100.0)	8153	12 923
Unspecified	10	15	13	10	13	61	202	263
No information available	153	127	149	139	62	630	2953	3583
Total	1297	1032	1408	1234	490	5461	11 308	16 769

percentage of such patients who had undergone PD for ≥8 years was much higher (2.9%) (Table 20). According to the tabulation on the causes of death, the number of patients who died of EPS was 16 (newly calculated on the basis of the tabulation on the causes of death for patients who died in 2012).

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