



우리나라 신대체요법의 현황

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대한신장학회 등록위원회

Current Renal Replacement Therapy in Korea

- Insan Memorial Dialysis Registry, 2017 -
ESRD Registry Committee, Korean Society of Nephrology*

=Abstracts=

The registry committee of Korean Society of Nephrology has collected data about dialysis in Korea through on-line registry program in KSN internet web site. The status of renal replacement therapy in Korea at the end of 2017 was as follows:

1) The total number of patients with renal replacement therapy (RRT) was 98,7464 (hemodialysis: HD 73,059 peritoneal dialysis: PD 6,475, functioning kidney transplant: KT 19,212). Prevalence of RRT was 1,907 patients per million population (pmp). The proportion of RRT was HD 74%, PD 7%, and renal transplant 19%. New RRT patients in 2017 were 16,659 (HD 13,754, PD 742, KT 2,163). Incidence rate was 322 pmp in 2017.

2) The most common primary cause of end stage renal diseases was diabetic nephropathy (48.9%), hypertensive nephrosclerosis (21.4%) and chronic glomerulonephritis (7.5%), in order.

3) The number of RRT centers was 941 and total number of HD machines was 25,895. Dialysis patients' individual data were collected from 51.9% of overall RRT centers.

4) Mean age of HD patient was 62.7 years old, of PD was 53.9 years old. Proportion of patients on HD more than 5 years' maintenance was 46%. Mean blood pressure was 98.9mmHg in HD and 97.7mmHg in PD patients. Pulse pressure was 67.2 mmHg in HD and 53.9 mmHg in PD patients. Mean hemoglobin of HD patient was 10.4 g/dL (hematocrit 31.6%), PD was 10.3 g/dL. Mean urea reduction ratio was 69.8% in male HD patients and 75.8% in female HD patients. Mean single pool Kt/V was 1.45 in male patient, 1.73 in female patients.

5) Common causes of death were unknown cause or not uremia associated cardiac arrest (14.5%), uremia associated cardiac arrest (12.7%), sepsis (12.2%), pulmonary infection (7.7%) and malignant disease (6.6%) in 2017. Overall patient survival of male dialysis patient in 5 years was 67.2%, female patients was 71.7%. HD patient's 5 year survival was 70.2% and PD was 62.4%. Five year survival of diabetic dialysis patients was 62.3%, chronic glomerulonephritis patients 84.6%, hypertensive nephrosclerosis patients 7.8%, respectively.

6) Survey on rehabilitation status of dialysis patients showed that 23% of HD patients have full time job and 10% have part time job. 34% of PD patients have full time job, and 15% have part time job.

7) The number of kidney transplantation was 2,163 (deceased donor 903) in 2017.

8) Analysis of factors on mortality by Cox proportional hazard model, the hazard ratio is sharply increased according to low body mass index, low hemoglobin, low albumin, low phosphorus and low single pool Kt/V.

Key words: renal replacement therapy, hemodialysis, peritoneal dialysis, prevalence, incidence, survival, dialysis adequacy

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Part 1. Prevalence and Incidence of ESRD (1)



Table 1-1. Prevalence of renal replacement therapy.

	HD		PD		Transplant		Total	
1980	198	(4.9)	30	(0.7)	-	-	228	(6.0)
1986	1,335	(32.6)	573	(13.9)	621	(15.1)	2,534	(61.7)
1988	3,012	(74.0)	1,058	(25.2)	982	(23.4)	5,142	(122.7)
1990	4,311	(101.8)	1,130	(26.7)	1,866	(44.1)	7,307	(172.6)
1992	5,890	(135.3)	1,599	(36.7)	2,862	(65.8)	10,351	(237.8)
1994	7,387	(162.7)	2,284	(50.3)	4,116	(90.6)	13,787	(303.6)
1996	9,635	(207.5)	2,976	(64.1)	5,461	(117.6)	18,072	(389.2)
1998	13,473	(285.6)	3,912	(82.9)	6,515	(138.1)	23,900	(506.7)
2000	15,853	(330.4)	4,671	(97.4)	7,522	(156.8)	28,046	(584.5)
2002	20,010	(412.4)	5,712	(117.7)	8,271	(170.5)	33,993	(700.6)
2004	25,335	(516.5)	7,569	(154.3)	8,987	(183.2)	41,891	(854.0)
2006	29,031	(585.0)	7,990	(161.0)	9,709	(195.7)	46,730	(941.7)
2008	33,427	(663.3)	7,840	(155.6)	10,722	(212.8)	51,989	(1031.6)
2010	39,509	(768.1)	7,309	(142.1)	12,042	(234.1)	58,860	(1144.4)
2011	42,596	(823.6)	7,694	(148.8)	13,051	(252.4)	63,341	(1224.8)
2012	48,531	(935.4)	7,552	(145.6)	14,128	(272.3)	70,211	(1353.3)
2013	52,378	(1006.1)	7,540	(144.8)	15,124	(290.5)	75,042	(1441.5)
2014	57,256	(1115.3)	7,423	(144.6)	15,995	(311.6)	80,674	(1571.5)
2015	62,634	(1215.5)	7,352	(142.7)	17,028	(330.5)	87,014	(1688.6)
2016	68,853	(1331.9)	6,842	(132.4)	18,189	(351.8)	93,884	(1816.1)
2017	73,059	(1411.0)	6,475	(125.1)	19,212	(371.0)	98,746	(1907.1)

(): Number of patients per million population. Rep. of Korea's population at the end of 2017: 51,778,544.

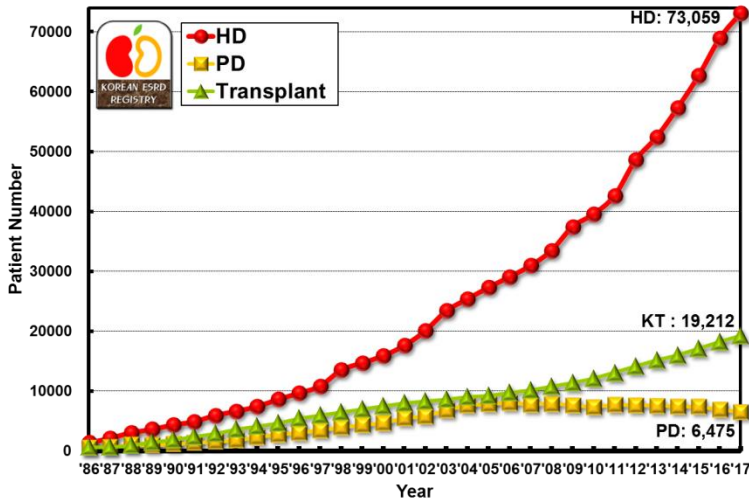


Fig.1-1. Patient numbers of renal replacement therapy at the end of each year.

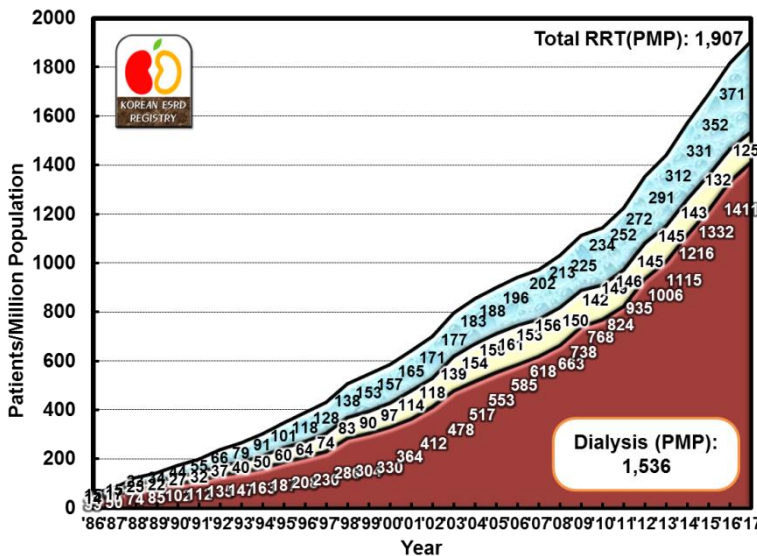


Fig.1-2. Point prevalence of renal replacement therapy (Patients numbers per million population, HD; hemodialysis, PD; peritoneal dialysis, KT; kidney transplantation).

Part 1. Prevalence and Incidence of ESRD (2)



Table 1-2. Number of new renal replacement therapy patients.

	HD	PD	Transplant	Total
1986	670 (16.3)	287 (7.0)	221 (5.4)	1,173 (28.7)
1988	1,516 (36.2)	375 (8.9)	428 (10.2)	2,319 (55.3)
1990	2,418 (57.1)	530 (12.5)	624 (14.7)	3,572 (84.3)
1992	3,083 (70.8)	705 (16.2)	765 (17.6)	4,553 (104.6)
1994	2,999 (66.0)	907 (19.9)	685 (15.1)	4,591 (101.1)
1996	3,670 (79.0)	1,388 (29.9)	919 (19.8)	5,977 (128.7)
1998	2,463 (52.2)	753 (15.9)	994 (21.1)	4,210 (89.3)
2000	2,736 (57.0)	1,021 (21.3)	683 (14.2)	4,440 (92.5)
2002	3,878 (79.9)	1,666 (34.3)	739 (15.2)	6,283 (129.5)
2004	5,279 (107.6)	2,246 (45.8)	853 (17.4)	8,378 (170.8)
2006	5,694 (114.7)	2,568 (51.7)	935 (18.8)	9,197 (185.3)
2008	6,415 (127.3)	1,619 (32.1)	1,145 (22.7)	9,179 (182.1)
2010	7,204 (140.1)	867 (16.9)	1,264 (24.6)	9,335 (181.5)
2011	8,057 (155.8)	920 (17.8)	1,639 (31.7)	10,616 (205.3)
2012	8,811 (169.8)	923 (17.8)	1,738 (33.5)	11,472 (221.1)
2013	9,543 (183.3)	884 (17.0)	1,756 (33.7)	12,183 (234.0)
2014	10,594 (206.4)	867 (16.9)	1,680 (32.7)	13,141 (256.0)
2015	12,011 (233.1)	854 (16.6)	1,891 (36.7)	14,756 (286.4)
2016	13,049 (252.4)	786 (15.2)	2,233 (43.2)	16,068 (310.8)
2017	13,754 (265.6)	742 (14.3)	2,163 (41.8)	16,659 (321.7)

(): Number of patients per million population. Rep. of Korea's population at the end of 2017: 51,778,544.

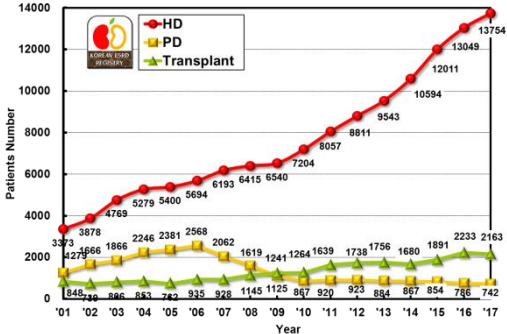


Fig. 1-3. New renal replacement therapy patients number in each year.



Table 1-3. Causes of end stage renal disease in new patients.

Causes	Percent (%)														
	1992	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2015	2016	2017
Chronic Glomerulonephritis	25.3	25.5	21.6	17.9	14	13.9	12.5	13.0	12.1	11.3	8.1	8.2	8.5	8.4	7.5
Not Histologically confirmed	19.7	20.4	16.7	13.6	10.6	10.0	8.6	9.0	8.2	7.7	4.5	4.4	4.2	3.8	3.7
Histologically confirmed	5.6	5.0	4.9	4.3	3.4	3.9	3.9	3.9	3.8	3.6	3.6	3.8	4.3	4.5	3.8
Diabetic nephropathy	19.5	26.1	30.8	38.9	40.7	40.7	43.4	42.3	41.9	45.2	50.6	48.0	48.4	50.2	48.9
Hypertensive nephrosclerosis	15.4	20.8	18.3	17.8	16.6	16	16.2	16.9	18.7	19.2	18.5	21.2	20.2	20.3	21.4
Cystic kidney disease	2.1	2.2	1.8	1.7	2.2	1.6	1.4	1.7	1.7	1.7	1.8	1.8	1.9	1.5	1.7
Renal tuberculosis	1.1	1.5	1.2	0.5	0.4	0.5	0.3	0.3	0.2	0.2	0.0	0.1	0.1	0.1	0.0
Pyelo/interstitial nephritis	1.3	1.1	0.7	1.0	0.8	0.6	0.6	0.6	0.5	0.4	0.5	0.8	0.3	0.4	0.5
Drugs or nephrotoxic agents	1.3	0.1	0.6	0.3	0.3	0.4	0.2	0.3	0.3	0.3	0.4	0.2	0.6	0.3	0.3
Lupus nephritis	0.8	0.7	1.0	0.5	0.9	0.8	0.6	0.6	0.6	0.5	0.6	0.5	0.3	0.5	0.5
Gouty nephropathy	0.7	0.7	0.6	0.5	0.7	0.4	0.5	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.2
Hereditary nephropathy	0.3	0.7	0.4	0.2	0.1	0.2	0.3	0.3	0.3	0.2	0.5	0.5	0.4	0.5	0.4
Kidney tumor	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.5
Other	4.1	2.7	2.8	3.9	3.0	5.6	5.9	6.0	5.8	5.1	6.8	6.1	6.3	5.5	5.9
Uncertain	28.6	17.8	15.9	16.6	20.2	19	17.8	17.5	17.6	15.3	11.4	12.1	12.3	11.7	12.1

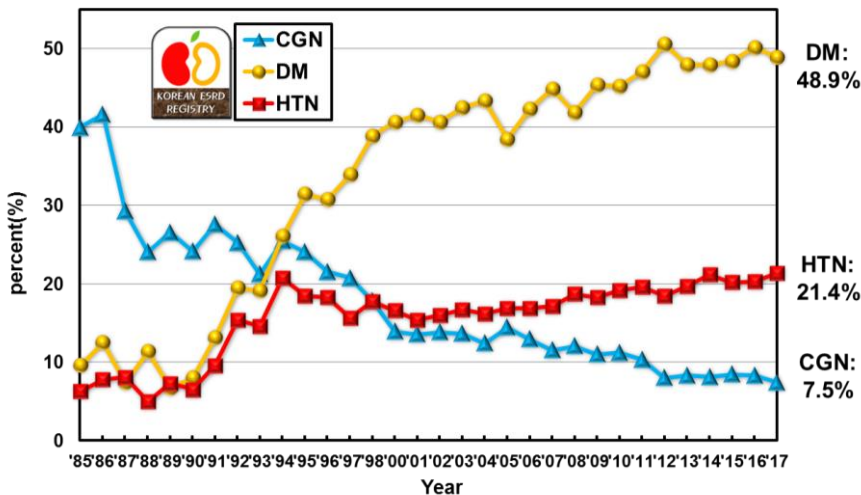


Fig. 1-4. Three major causes of end stage renal disease patients who were initiated renal replacement therapy in each year. (DM: diabetic nephropathy, CGN: chronic glomerulonephritis, HTN: hypertensive nephrosclerosis). Note increase of DM and decrease of CGN.

Part 2. Renal Replacement Therapy Modalities

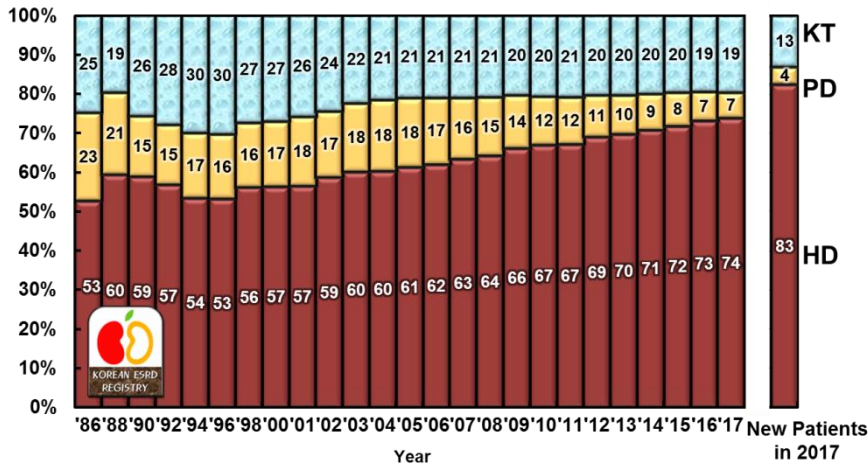


Fig. 2-1. Proportion of renal replacement modalities, annual prevalence and incidence. HD: hemodialysis, PD: peritoneal dialysis, KT: kidney transplantation.

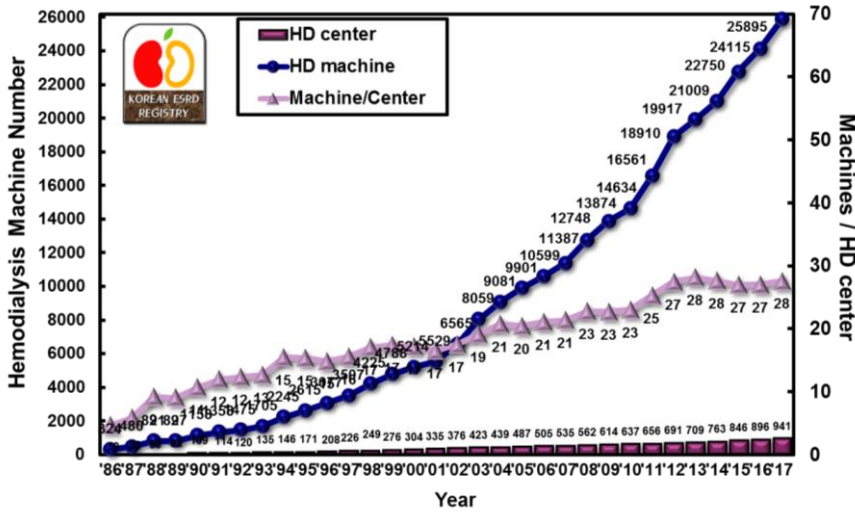


Fig. 2-2. Numbers of dialysis centers, hemodialysis (HD) machines and machine per each dialysis center in Korea.

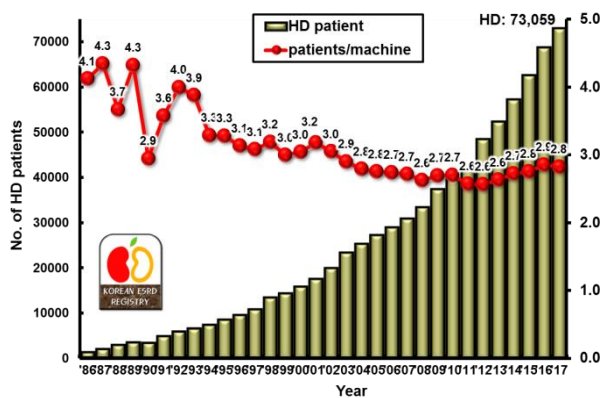


Fig. 2-3. Number of hemodialysis (HD) patients and hemodialysis patients per hemodialysis machine.

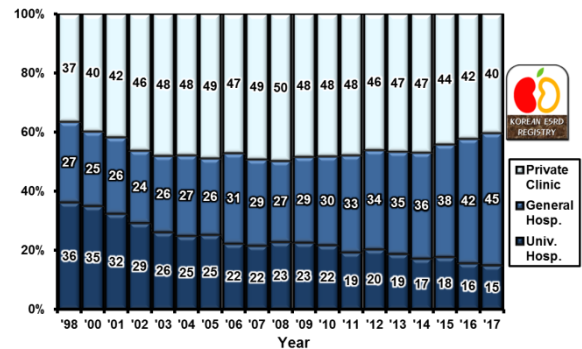


Fig. 2-4. Percentage of hemodialysis patients number according to dialysis center.

Part 3. Regional Distribution of Patients & Facilities



Table 3-1. Regional distribution of dialysis patients & hemodialysis machines.

	HD pts	PD pts	Total Dialysis pts	Dialysis pts. / Million pop.	Dialysis Centers	HD machines	HD pts. / HD machine
서울 Seoul	17,570	1,875	19,445	1,973	197	5,302	3.3
부산 Busan	5,454	814	6,268	1,806	65	1,885	2.9
대구 Daegu	3,997	548	4,545	1,836	44	1,257	3.2
인천 Incheon	3,770	290	4,060	1,377	44	1,356	2.8
광주 Gwangju	2,376	209	2,585	1,766	39	963	2.5
대전 Daejeon	1,893	263	2,156	1,435	22	729	2.6
울산 Ulsan	1,564	77	1,641	1,408	21	540	2.9
경기 Gyeonggi	14,965	1,257	16,222	1,260	195	5,538	2.7
강원 Gangwon	2,188	334	2,522	1,627	30	775	2.8
충북 Chungbuk	2,452	80	2,532	1,588	35	944	2.6
충남 Chungnam	2,762	121	2,883	1,203	47	1,174	2.4
전북 Jeonbuk	2,320	92	2,412	1,301	31	1,073	2.2
전남 Jeonnam	2,477	133	2,610	1,376	42	1,061	2.3
경북 Gyeongbuk	3,584	100	3,684	1,369	52	1,231	2.9
경남 Gyeongnam	4,574	185	4,759	1,408	62	1,690	2.7
제주 Jeju	1,113	97	1,210	1,841	15	377	3.0
Total	73,059	6,475	79,534	1,536	941	25,895	2.8

Table 3-2. Dialysis patients and machines according to life zone*.

	Population (%)	HD patients	PD patients	Total Dialysis patients	Dialysis pts /Million pop.	Dialysis centers	Dialysis machine	HD pts / HD machine
수도권 Capital Area (Seoul, Incheon, Gyeonggi)	25,679,863 (49.6%)	36,305 (49.7%)	3,422 (52.8%)	39,727 (49.9%)	1,547	436 (46.3%)	12,196 (47.1%)	3.0
충청권 Chungcheung (Daejeon, Chungnam, Chungbuk)	5,493,529 (10.6%)	7,107 (9.7%)	464 (7.2%)	7,571 (9.5%)	1,378	104 (11.1%)	2,847 (11.0%)	2.5
호남권 Honam (Gwangju, Jeonnam, Jeonbuk)	5,214,801 (10.1%)	7,173 (9.8%)	434 (6.7%)	7,607 (9.6%)	1,459	112 (11.9%)	3,097 (12.0%)	2.3
영남권 Youngnam (Busan, Daegu, Gyeongnam, Gyeongbuk, Ulsan)	13,183,126 (25.5%)	19,173 (26.2%)	1,724 (26.6%)	20,897 (26.3%)	1,585	244 (25.9%)	6,603 (25.5%)	2.9
강원권 Gangwon	1,550,142 (3.0%)	2,188 (3.0%)	334 (5.2%)	2,522 (3.2%)	1,627	30 (3.2%)	775 (3.0%)	2.8
Total	51,778,544	73,059	6,475	79,534	1,536	941	25,895	2.8

* 제주 표시 제외. Data of Jeju-do is not shown.

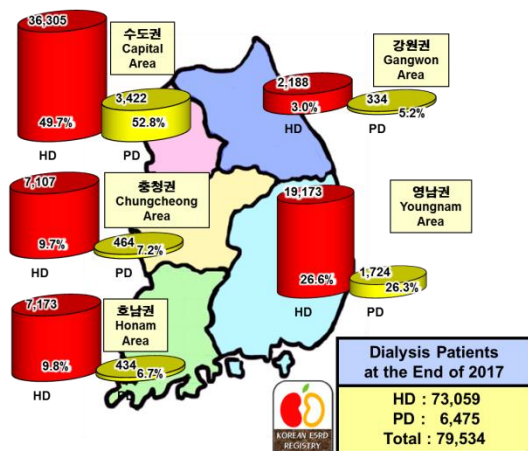


Fig. 3-1. Distribution of dialysis patients and machines according to life zone.

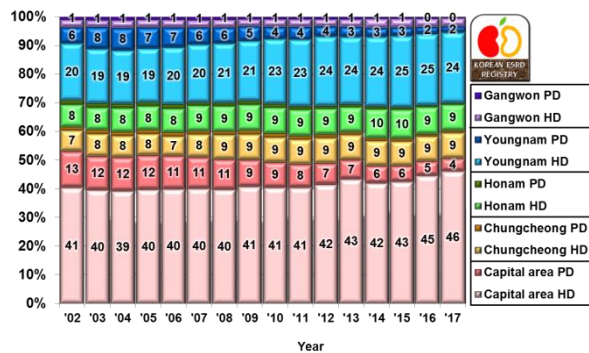


Fig. 3-2. Regional proportion of dialysis patient number in each year.

Part 4. Dialysis Patients Demographics (1)

Table 4-1. Dialysis centers contributing individual patient data.

	Dialysis Centers*	Internet Input	Paper Data	Total Contributed Centers	Contributing Rate (%)
서울 Seoul	172	97	6	103	59.9
부산 Busan	57	27	1	28	49.1
대구 Daegu	38	20	1	21	55.3
인천 Incheon	38	20	0	20	52.6
광주 Gwangju	34	15	1	16	47.1
대전 Daejeon	19	9	0	9	47.4
울산 Ulsan	18	11	0	11	61.1
경기 Gyeonggi	173	82	4	86	49.7
강원 Gangwon	26	12	0	12	46.2
충북 Chungbuk	31	12	1	13	41.9
충남 Chungnam	41	20	0	20	48.8
전북 Jeonbuk	27	10	0	10	37.0
전남 Jeonnam	37	17	1	18	48.6
경북 Gyeongbuk	44	19	1	20	45.5
경남 Gyeongnam	55	33	1	34	61.8
제주 Jeju	13	6	0	6	46.2
Total	823	410	17	427	51.9

* 투석의료기관 수에서 비윤리 의료기관 및 소수 환자 수 의료기관은 제외함.

Fig.4-1. Individual patients data contributing rate of dialysis centers according to hospital classification in each year.

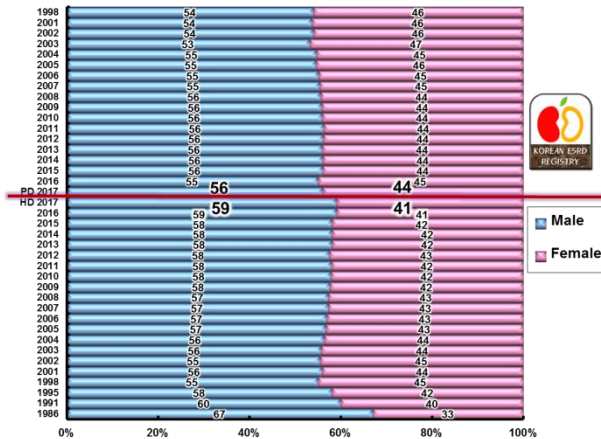
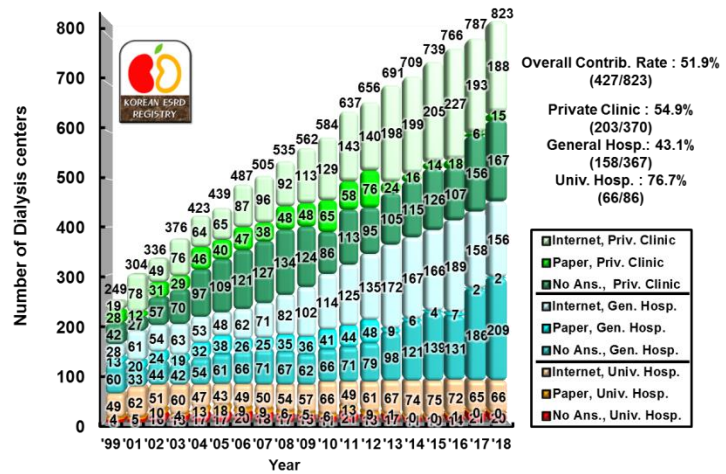


Fig.4-2. Gender ratio of HD & PD patients according to years.

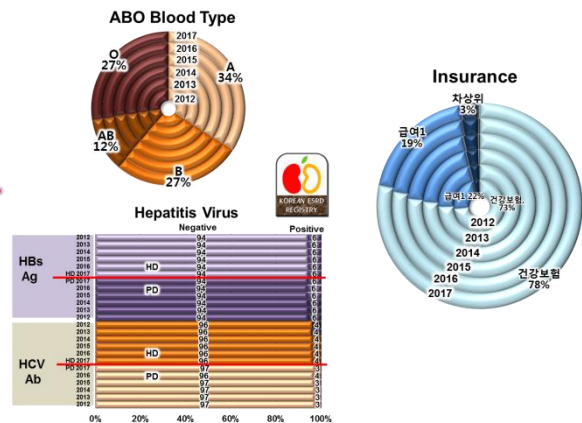
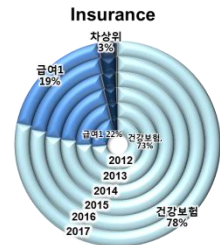


Fig.4-3. ABO blood type and hepatitis virus, medical insurance of HD & PD patients.



Part 4. Dialysis Patients Demographics (2) - Age

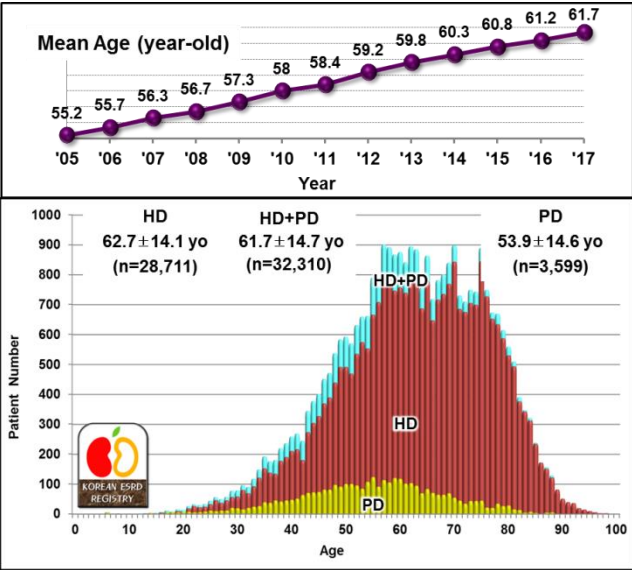


Fig.4-4. Age distribution of dialysis patients according to dialysis modalities.

Fig.4-5. Elderly dialysis patient (over 65 year-old) proportion according to year.

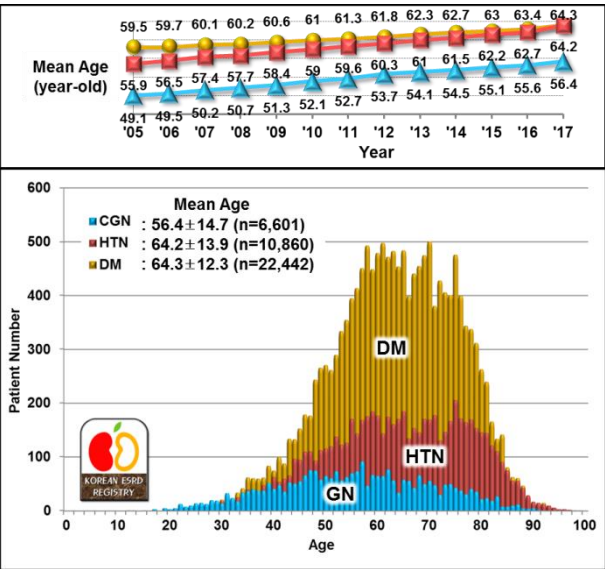
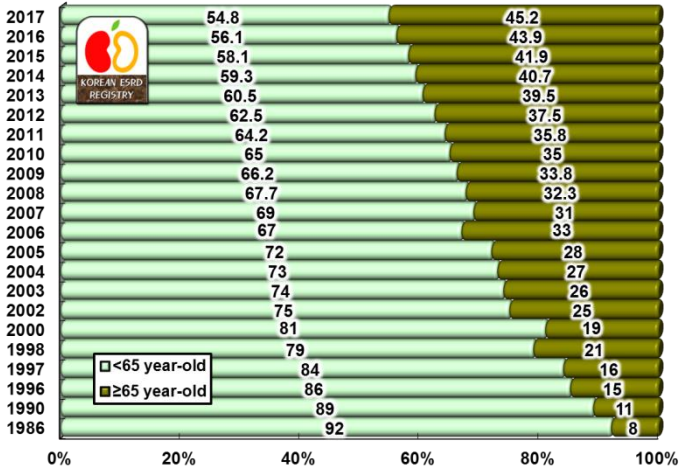


Fig.4-6. Age distribution of dialysis patients according to underlying diseases, diabetic patients (DM), hypertensive nephrosclerosis (HTN) and glomerulonephritis (GN). Note the difference of peak age between GN and DM.

Part 4. Dialysis Patients Demographics (3) – Dialysis Duration & BMI

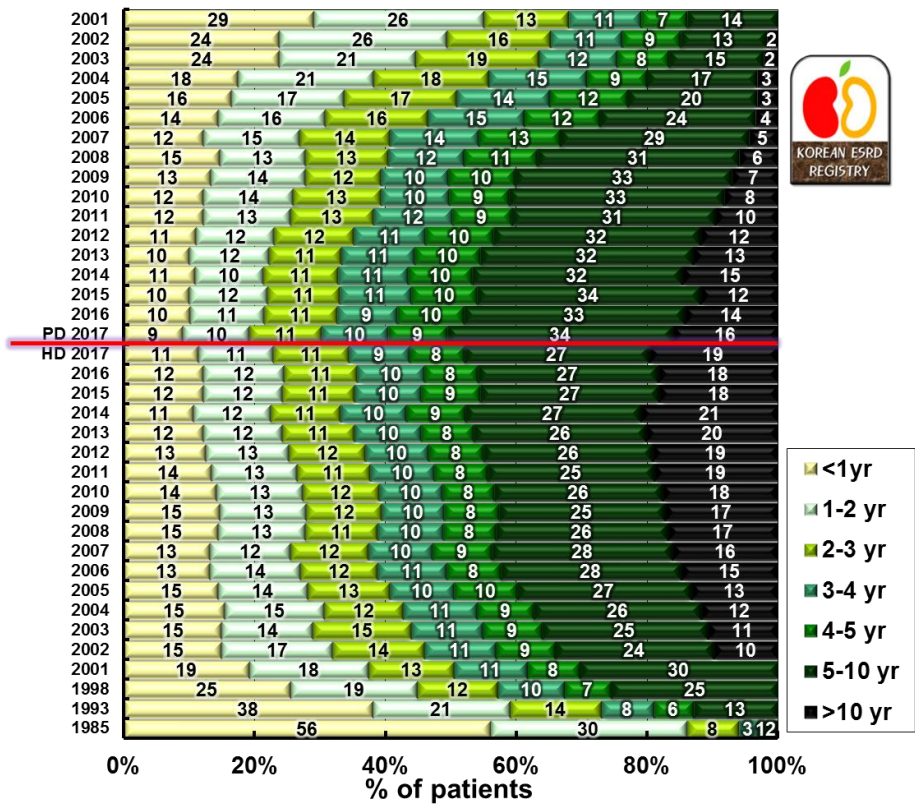


Fig.4-7. Duration of maintenance hemodialysis and peritoneal dialysis. Percent of estimated patient number according to year.

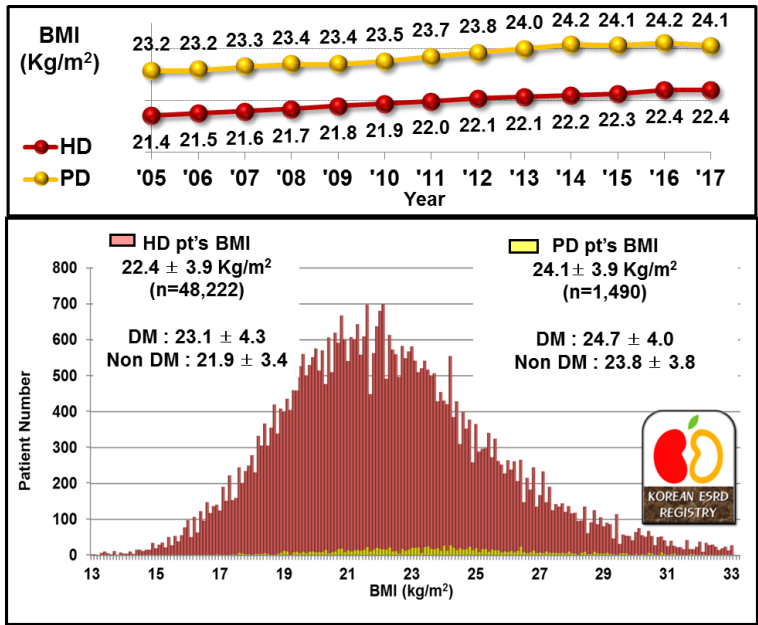


Fig.4-8. Distribution of body mass index (BMI) in hemodialysis (HD) and peritoneal dialysis (PD) patients.

Part 4. Dialysis Patients Demographics (4) – BP

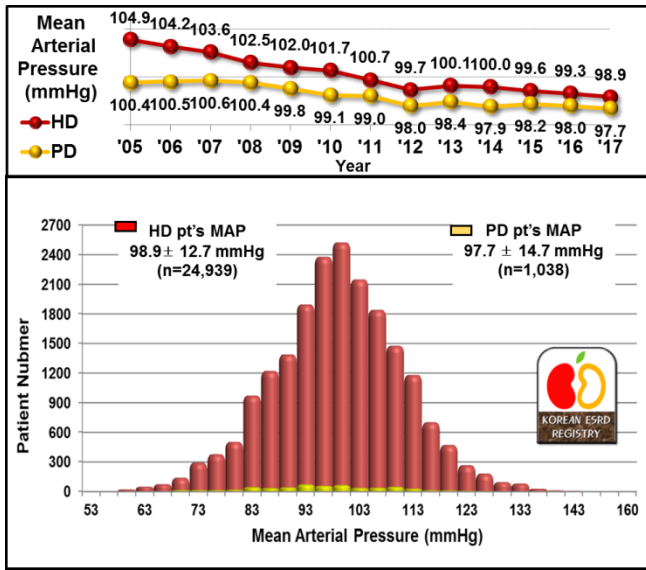


Fig.4-9. Distribution of mean arterial pressure in HD and PD patients. Blood pressure was higher in HD patients than in PD patients.

Fig.4-10. Systolic and diastolic blood pressure with pulse pressure in HD and PD patients. Note the difference of pulse pressure between HD and PD patients.

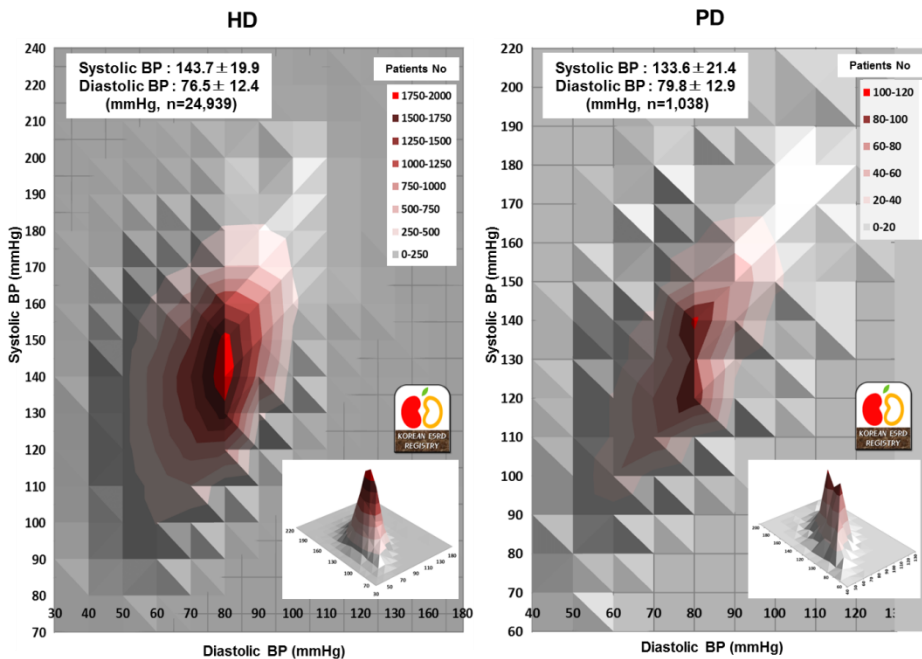
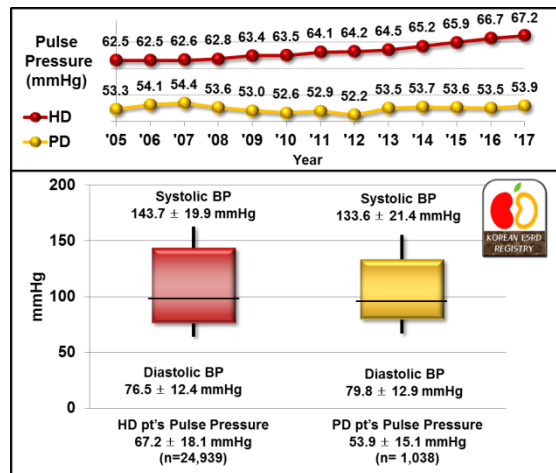


Fig.4-11. HD and PD patients' number distribution according to systolic and diastolic blood pressure.

Part 5. Dialysis Therapy (1) – HD & Vascular Access

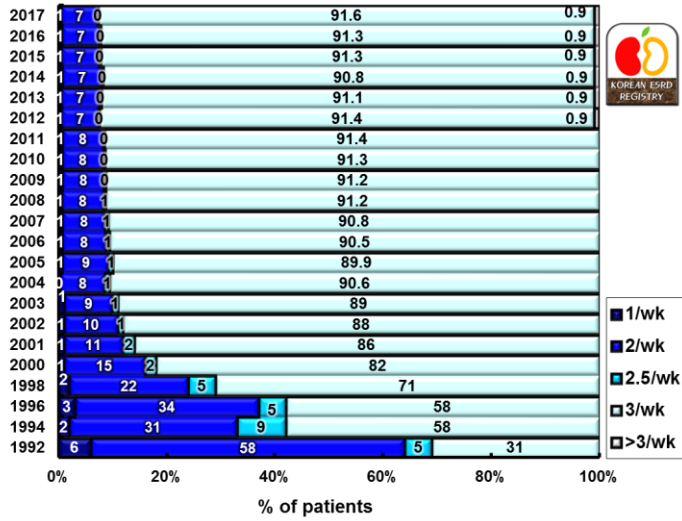


Fig.5-1. Frequency of HD per week.

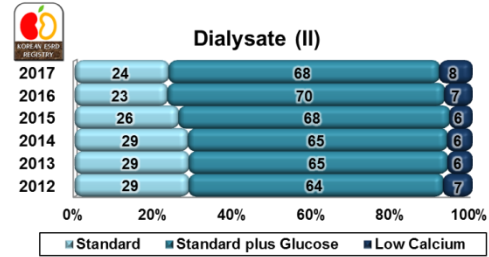
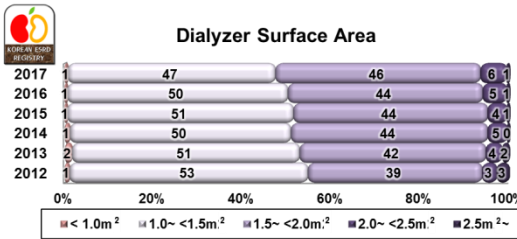
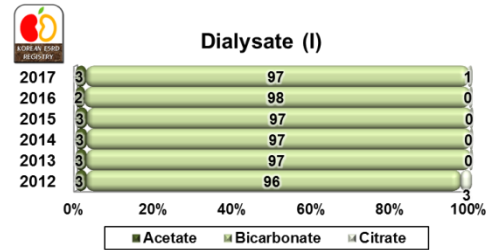
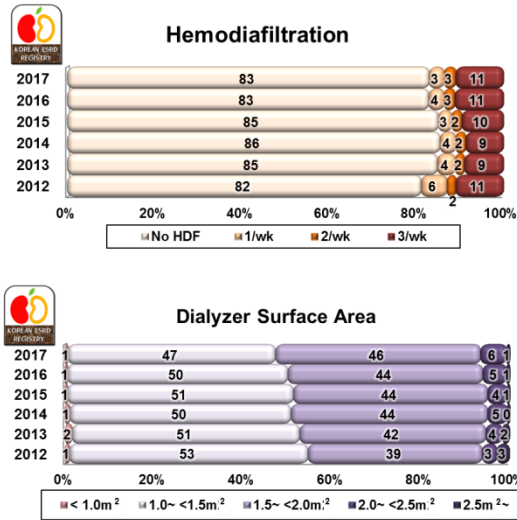


Fig. 5-2. Percent of hemodiafiltration (HDF) applied patients and dialyzer membrane surface area.

Fig.5-3. HD dialysate.

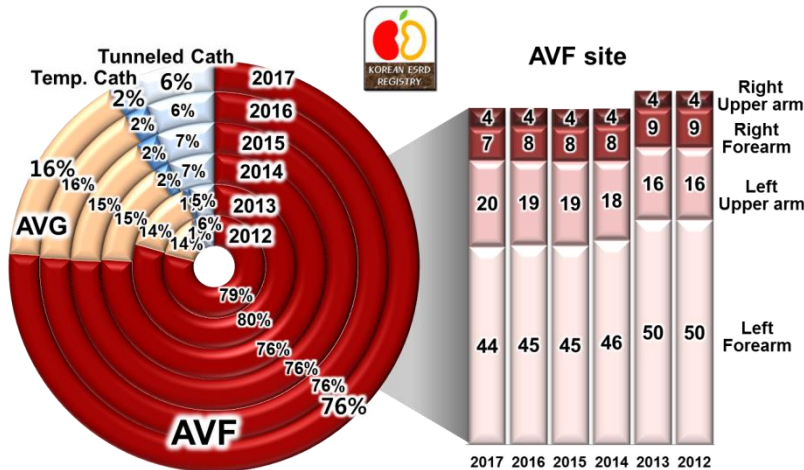


Fig.5-4. Vascular access for HD.

Part 5. Dialysis Therapy (2) – Peritoneal Dialysis

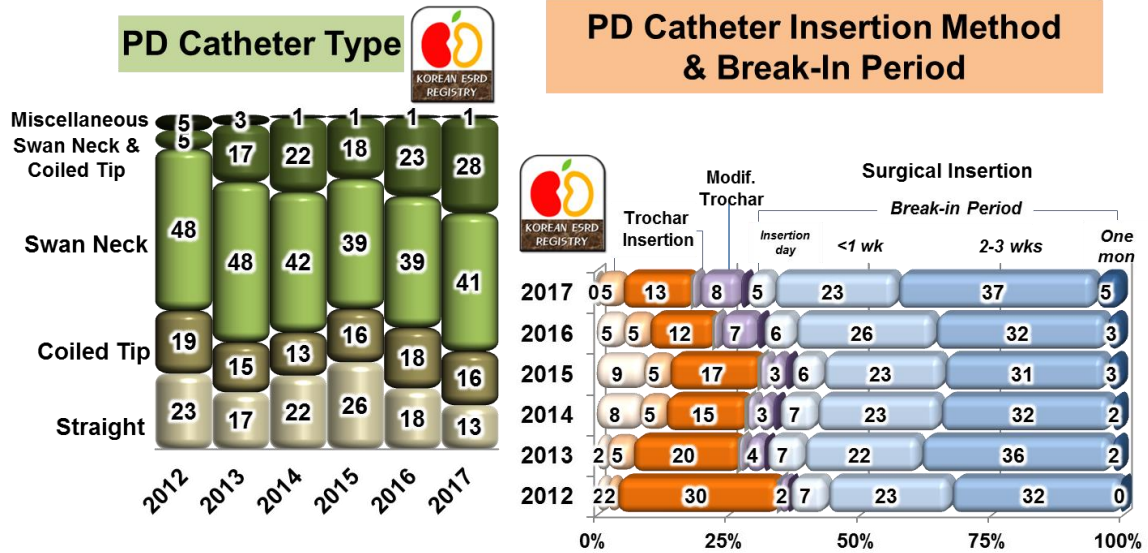


Fig.5-5. PD catheter type and PD catheter insertion methods.

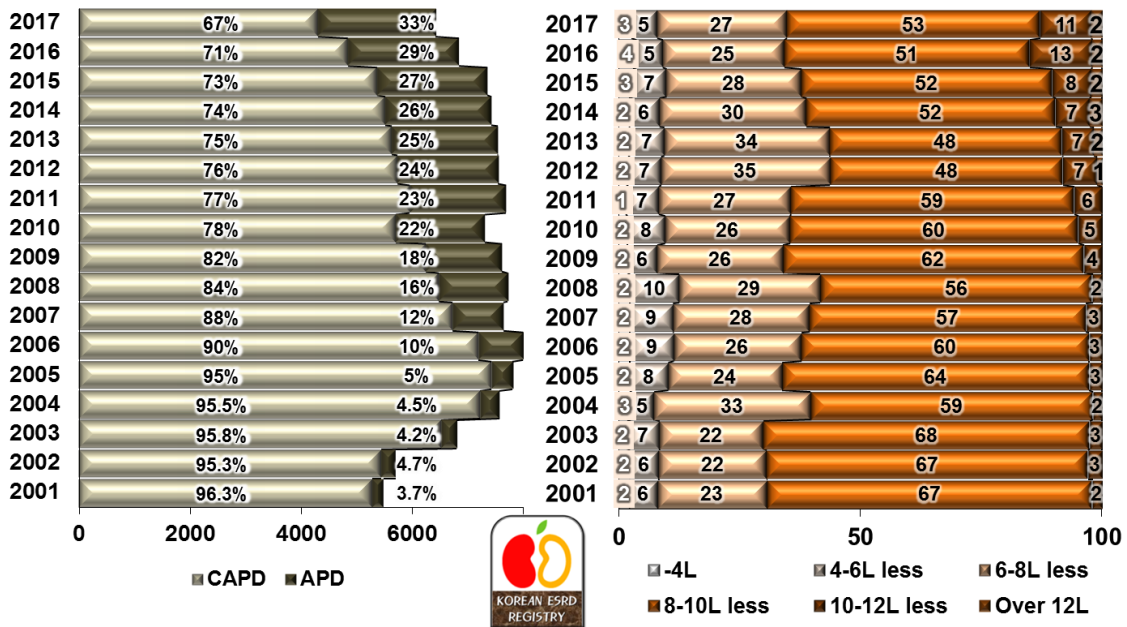


Fig.5-6. Percent distribution of PD type and dialysate doses according to year.

Part 6. Laboratory Data & Drugs (1) – Anemia & Erythropoietin

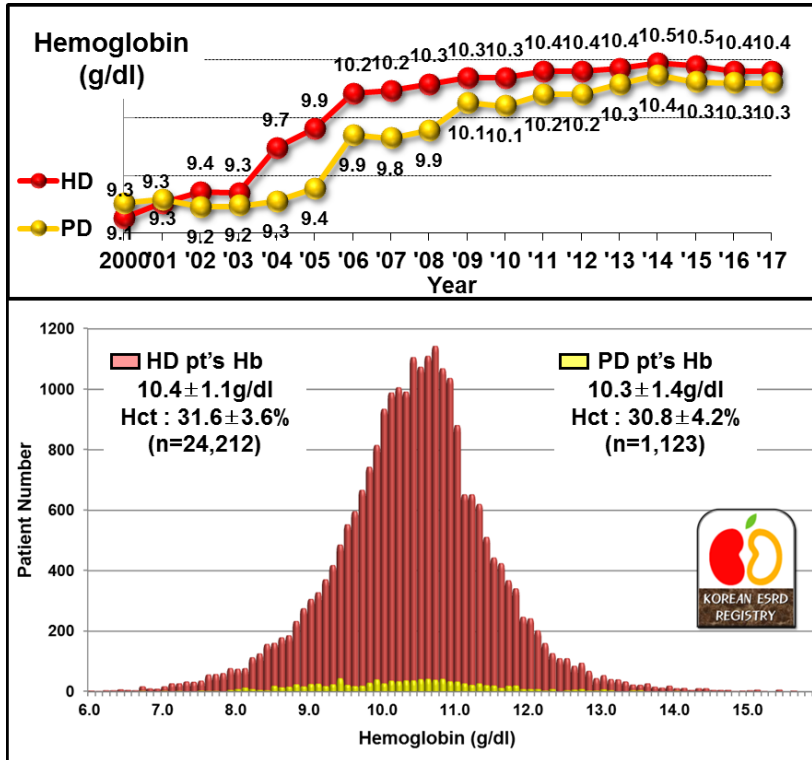


Fig.6-1. Distribution of hemoglobin levels in HD and PD patients.

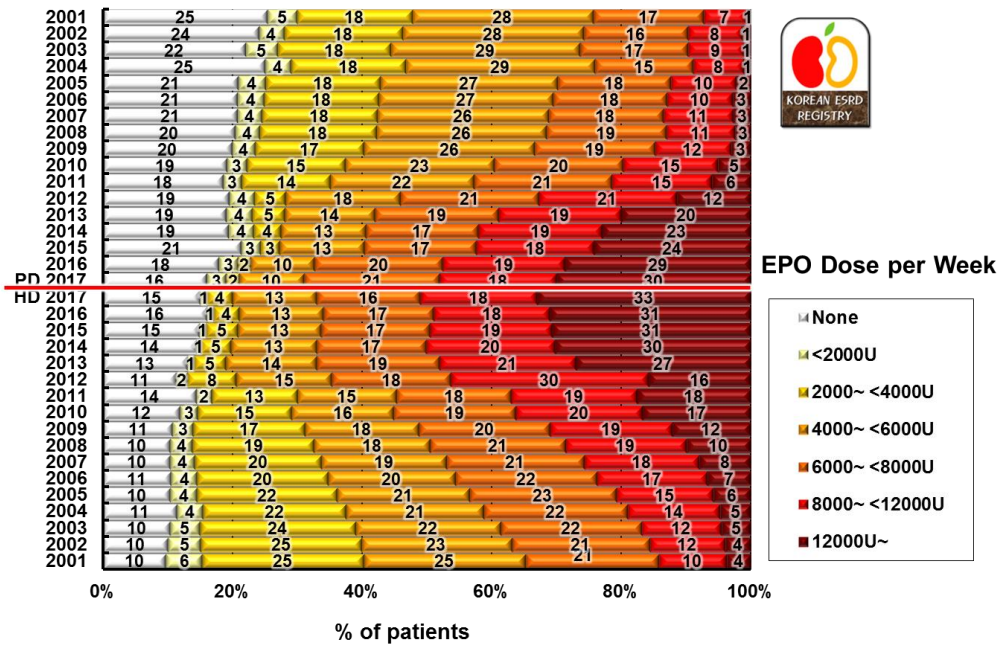


Fig.6-2. Percent distribution of erythropoietin doses prescribed for hemodialysis and peritoneal dialysis patients.

Part 6. Laboratory Data & Drugs (2) – Calcium & Phosphorus

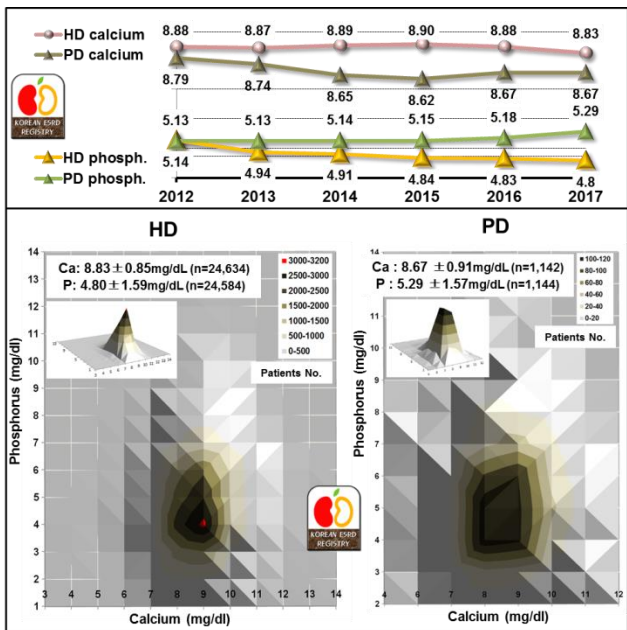


Fig.6-3. Distribution of patients numbers according to calcium and phosphorus level.

Fig.6-4. PTH level of HD and PD patients. (x-axis is on logarithmic scale.)

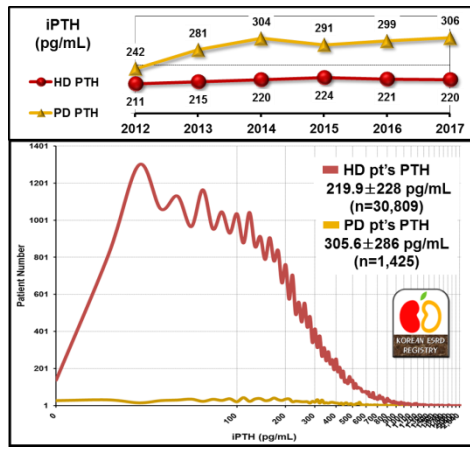


Fig.6-5. Phosphate binders.

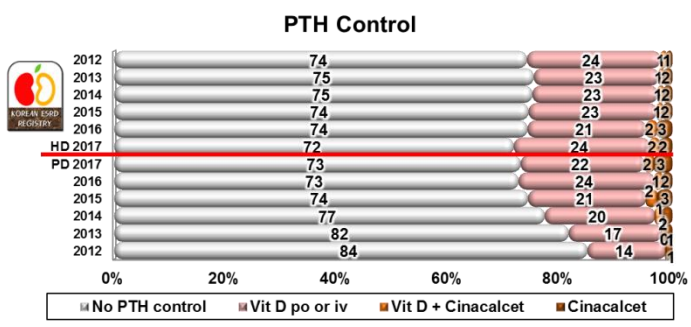
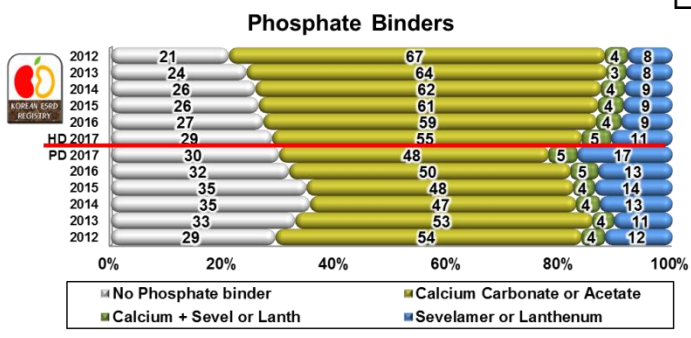


Fig.6-6. Medications for PTH control.

Part 6. Laboratory Data & Drugs (3) – Miscellaneous Lab. Data

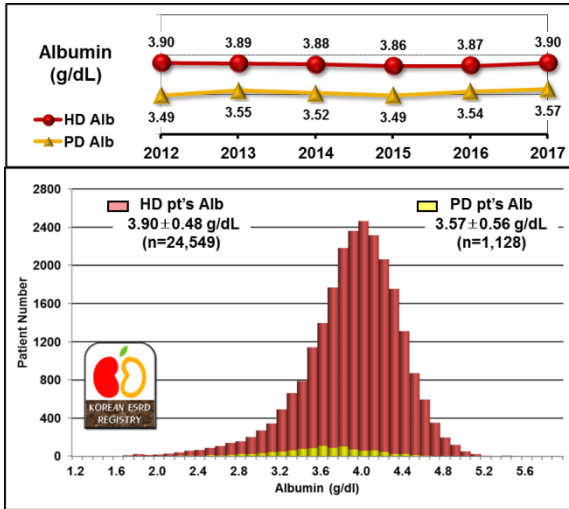


Fig. 6-7. Albumin(Alb) level of HD and PD patients.

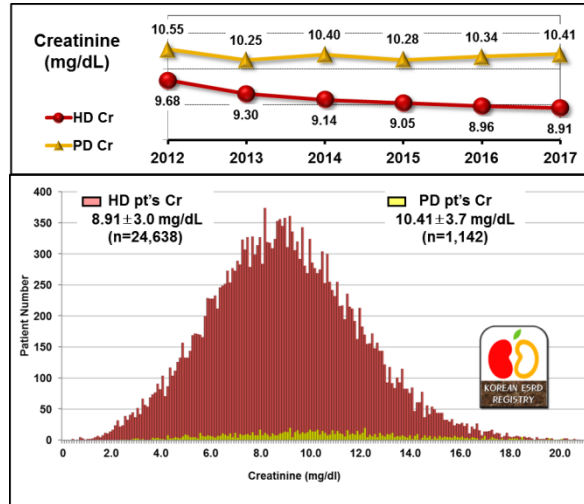


Fig. 6-8. Creatinine(Cr) level of HD and PD patients.

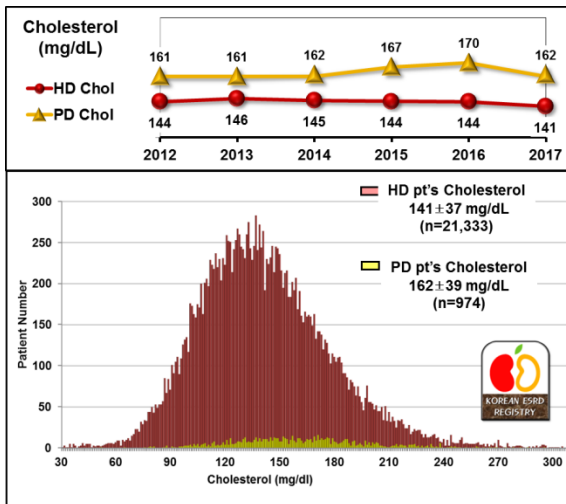


Fig. 6-9. Total cholesterol level of HD and PD patients.

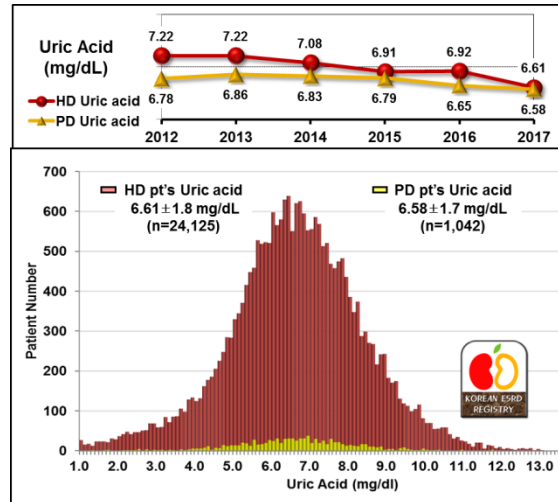


Fig. 6-10. Uric acid level of HD and PD patients.

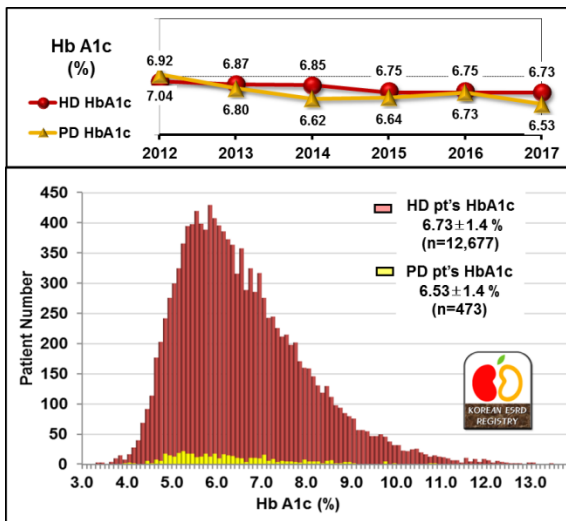


Fig. 6-11. HbA1c level of diabetic HD and PD patients.

Part 7. Dialysis Adequacy

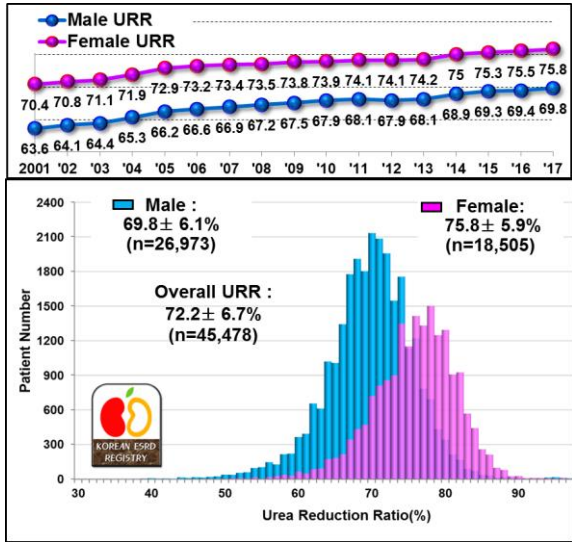


Fig.7-1. Distribution of urea reduction ratio (URR) of hemodialysis patients. Note the difference between male and female.

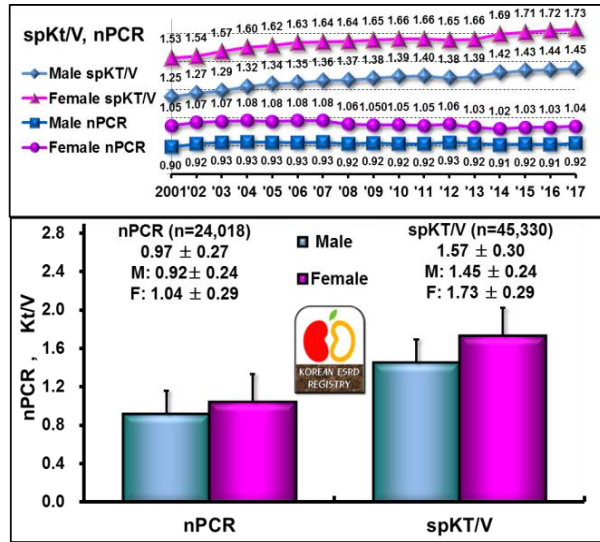


Fig.7-2. Dialysis adequacy parameters (nPCR & Kt/V) of hemodialysis patients.

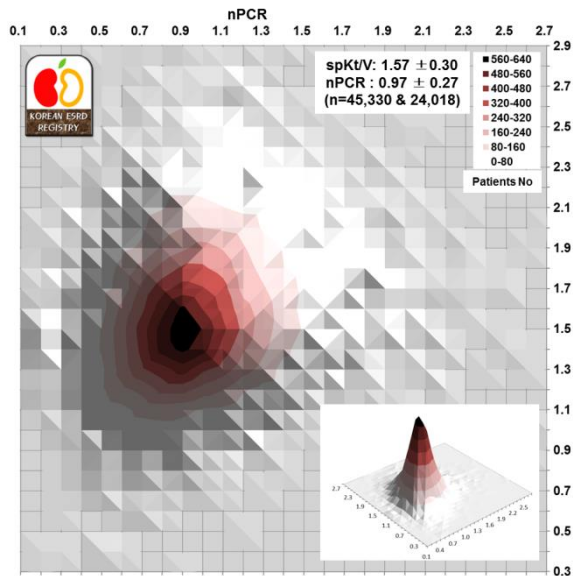


Fig.7-3. Distribution of patients number according to nPCR and single pool Kt/V in hemodialysis patients.

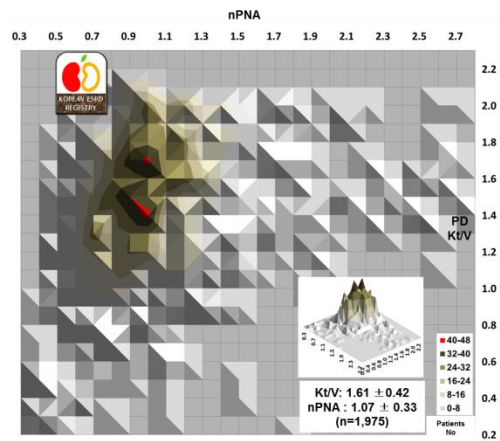


Fig.7-4. Distribution of patients number according to nPNA and PD Kt/V in peritoneal dialysis

Part 8. Rehabilitation Status of Dialysis Patients

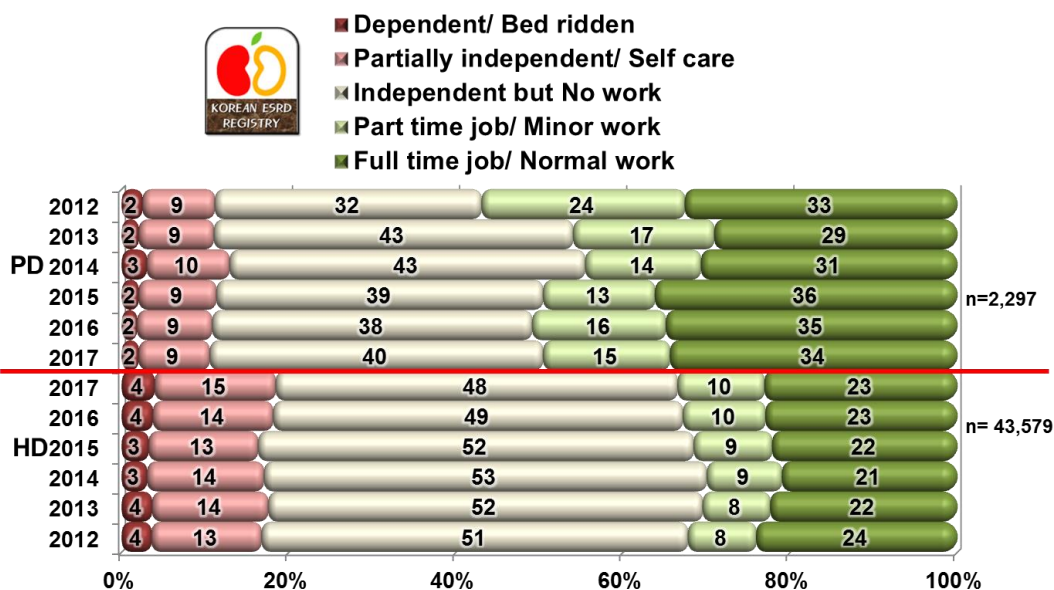


Fig.8-1. Rehabilitation status of HD and PD patients.

Part 9. Co-morbidity of Dialysis Patients

Table 9-1. Co-morbidity of dialysis patients in 2017. Relative percent of reported comorbidity.

	HD (% , n=40,929)	PD (% , n=1,484)
Cardiac	16.8	14.9
Coronary Artery Disease	8.7	7.3
Congestive Heart Failure	4.0	5.5
Pericardial Effusion	0.3	0.3
Arrythmia	3.7	1.7
Vascular	49.7	53.3
Cerebrovascular accident	3.5	3.4
Hypertension	44.2	48.7
Other vascular disease	2.0	1.3
Infection	5.4	14.5
Pneumonia	1.6	2.3
Tuberculosis	0.4	0.7
Peritonitis	0.2	8.4
Herpes zoster	0.3	0.3
Access/ exit site infection	0.7	1.1
Other Infection	2.2	1.7
Liver disease	5.3	4.6
Hepatitis B	3.1	3.3
Hepatitis C	1.8	0.8
Congestive Liver	0.1	0.1
Hemochromatosis	0.0	0.0
Other liver diseases	0.3	0.4
Gastrointestinal	15.1	7.5
Gastric Ulcer	2.0	0.7
Duodenal Ulcer	0.3	0.0
Constipation	5.4	3.8
Other Gastrointestinal Diseases	7.3	2.9
Miscellaneous	7.8	5.3
Malnutrition (Alb<2.5g/dl)	0.2	0.7
Malignancy	1.1	0.8
Hypertensive Retinopathy	0.5	0.0
Uremic Dermatitis	1.9	0.8
Uremic Neuritis	0.7	0.1
Uremic Dementia	0.2	0.0
Uremic Ascites / Pleural Effusion	0.3	0.1
Osteodystrophy	0.5	0.5
COPD & other pulm disease	0.6	0.3
Decubitus ulcer/ DM foot	1.9	2.0

Part 10. Causes of Death in Dialysis Patients



Table 10-1. Causes of death (%) in dialysis patients, 1994-2017*

	1994-96	1998	2001	2003	2005	2007	2009	2011	2013	2014	2015	2016	2017
Cardiac	27.4	27.4	26.9	31.7	30.7	31.7	29.5	32.7	35.8	32.5	36.1	38.1	33.7
Myocardial infarction	6.4	6.4	7.7	7.4	8	7.5	8.0	6.6	7.5	5.7	8.0	5.5	6.5
Cardiac arrest, uremia associated	13.7	13.7	11.2	11.7	10.4	10.8	8.5	11.0	14.2	14.1	13.1	13.3	12.7
Cardiac arrest, other cause	7.2	7.2	8.1	12.5	12.4	13.3	13	15.0	14.2	12.6	15.0	19.3	14.5
Vascular	17.2	17.2	22.7	19.5	17	17.8	15.9	14.1	13.3	13.2	11.8	10.8	11.4
Cerebrovascular accident	14.3	14.3	15.1	14.5	12.3	13	11	8.7	8.7	8.5	6.5	6.2	6.2
Pulmonary embolus	0.2	0.2	0.5	0.1	0.6	0.5	0.2	0.2	0.2	0.2	0.9	0.4	0.3
Gastrointestinal hemorrhage	1.7	1.7	2.7	3.2	1.7	2.7	2.3	2.2	1.2	1.7	1.4	2.0	0.8
Gastrointestinal embolism	0.1	0.1	0.1	0	0.5	0.1	0.5	0.1	0.2	0.2	0.7	0.3	0.3
Other vascular disease	0.9	0.9	4.3	1.6	1.9	1.6	1.9	3.0	3.0	2.6	2.4	1.9	3.7
Infection	13.5	13.5	17.8	20.5	20.1	20.2	21.9	23.1	23.5	26.8	24.6	24.5	25.2
Pulmonary infection	2.5	2.5	4.5	3.6	4.5	4.4	5.9	8.4	8.4	9.0	8.9	9.3	7.7
Septicemia	6.6	6.6	6.9	9.7	9.6	11.7	10.4	9.7	11.9	13.6	11.0	10.2	12.2
Tuberculosis	0.3	0.3	0.8	0.2	0.3	0.2	0.3	0.1	0.1	0.1	1.1	0.1	0.2
Peritonitis	2.1	2.1	1.1	2	1.4	1.1	0.8	1.0	0.5	0.7	1.1	1.2	0.7
Other infection	2	2	4.5	4.9	4.3	2.9	4.5	4.0	2.7	3.4	2.4	3.6	4.5
Liver disease	3.4	3.4	2.6	2.8	2.7	2.2	3.1	2.1	2.4	2.2	2.6	2.3	2.0
Liver failure due to hepatitis B	1.8	1.8	1.6	1.8	1.5	1.3	2.2	1.0	1.3	1.0	1.1	0.9	1.1
Liver failure due to other cause	1.6	1.6	1	1	1.2	0.8	0.9	1.1	1.1	1.2	1.5	1.5	1.0
Social	6.2	6.2	6.3	4.4	5.4	3.3	2.5	3.3	2.8	2.5	2.0	2.5	1.5
Patient refused further treatment	2.9	2.9	2.1	1	1.1	1.1	0.5	0.4	0.3	0.3	0.3	0.5	0.1
Suicide	2.5	2.5	3.3	2.3	3.3	1.5	1.3	1.4	1.3	1.6	1.0	1.5	0.8
Therapy ceased for other reason	0.8	0.8	0.9	1	1	0.7	0.8	1.5	1.2	0.7	0.8	0.5	0.6
Miscellaneous	32	32	23.7	21.3	24	24.8	27.1	24.7	22.2	22.9	23.0	21.8	26.2
Cachexia	2.9	2.9	8.1	6.6	4	4.4	3.3	2.7	1.6	1.5	1.4	0.9	1.0
Malignant disease	2.1	2.1	4.4	3.5	6.4	5.7	5.7	6.0	5.7	6.0	5.8	6.5	6.6
Accident	1.2	1.2	0.9	1.1	1.4	1.2	1.3	1.6	1.4	2.0	1.0	1.0	1.1
Uncertain	25.8	25.8	10.3	10.1	12.3	13.4	16.8	14.5	13.4	13.4	14.8	13.4	17.6

*Number of patients :1994-1996=981, 1998=911, 2001=761, 2003=894, 2005=1,256, 2007=1,531, 2009=1,727, 2011=1,828, 2013=1,604, 2014=1,534, 2015=891, 2016=1,849, 2017=1,771.

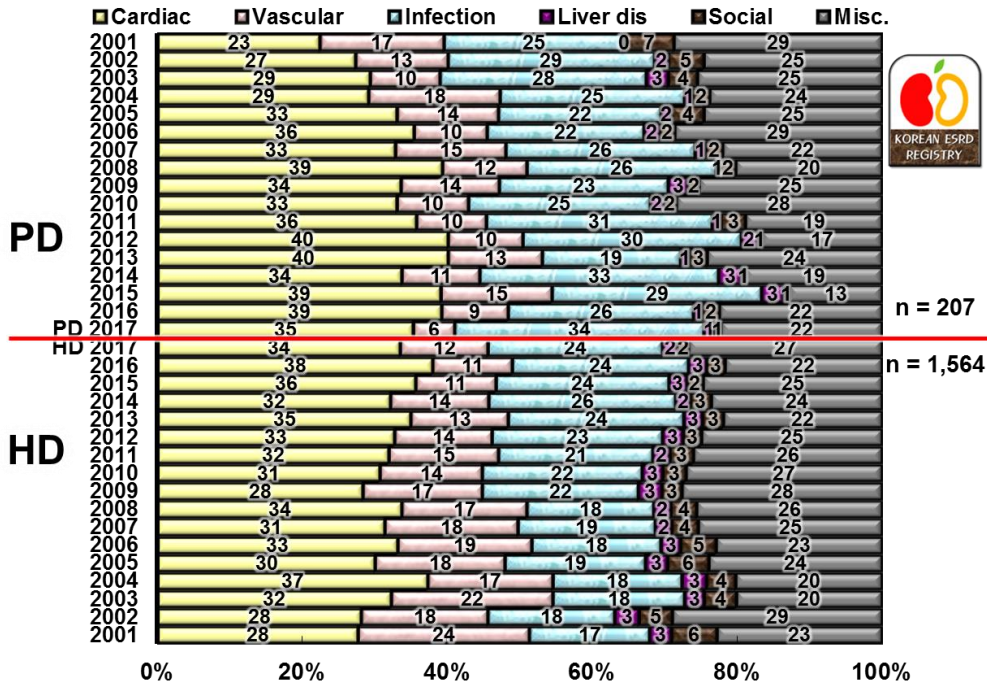


Fig.10-1. Comparison of death causes, hemodialysis versus peritoneal dialysis patients

Part 11. Survival Rate of Dialysis Patients

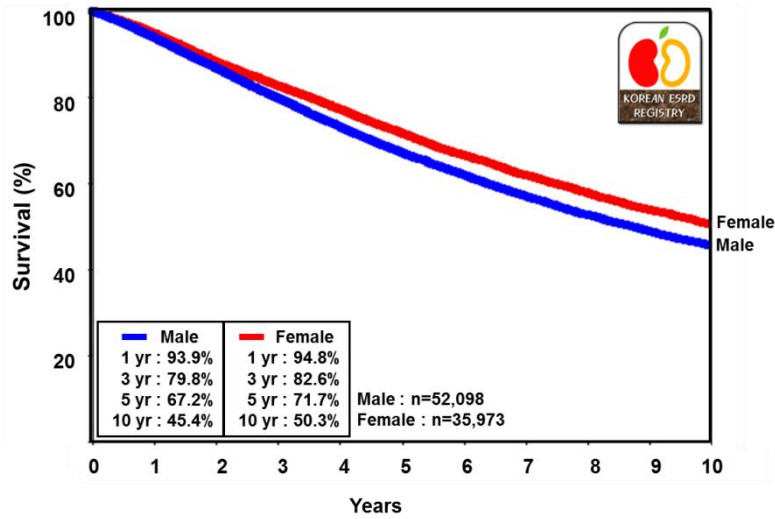


Fig.11-1. Survival rates of male and female dialysis patients. (Registered dialysis patients to Korean Society of Nephrology registry since 2007.).

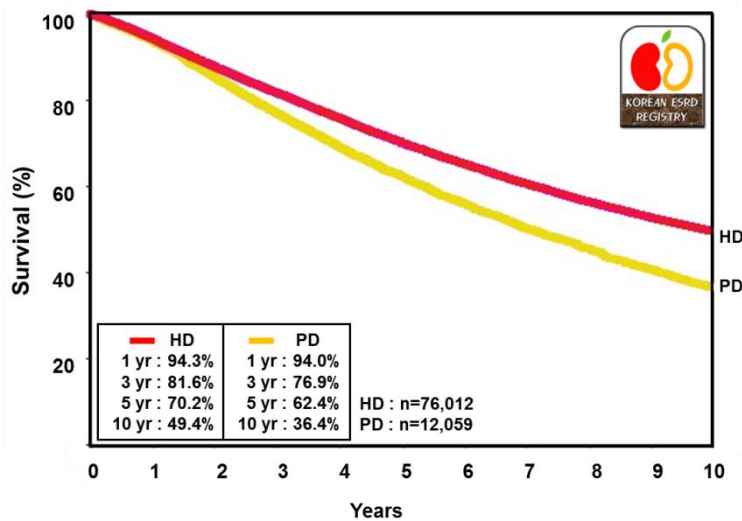


Fig.11-2. Survival rates of hemodialysis and peritoneal dialysis patients. (Registered dialysis patients to Korean Society of Nephrology registry since 2007.).

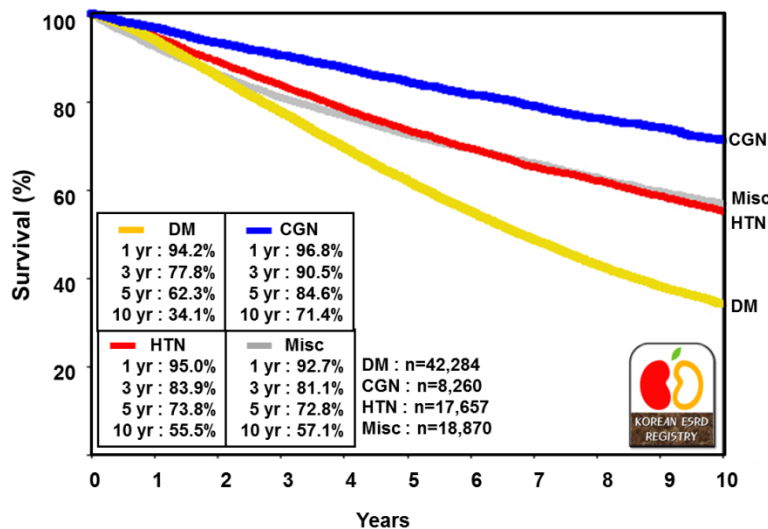


Fig.11-3. Patient survival rates according to underlying diseases (DM: diabetic nephropathy, CGN: chronic glomerulonephritis, HTN: hypertension Misc: miscellaneous, Registered dialysis patients to Korean Society of Nephrology registry since 2007.).

Part 12. Kidney Transplantation

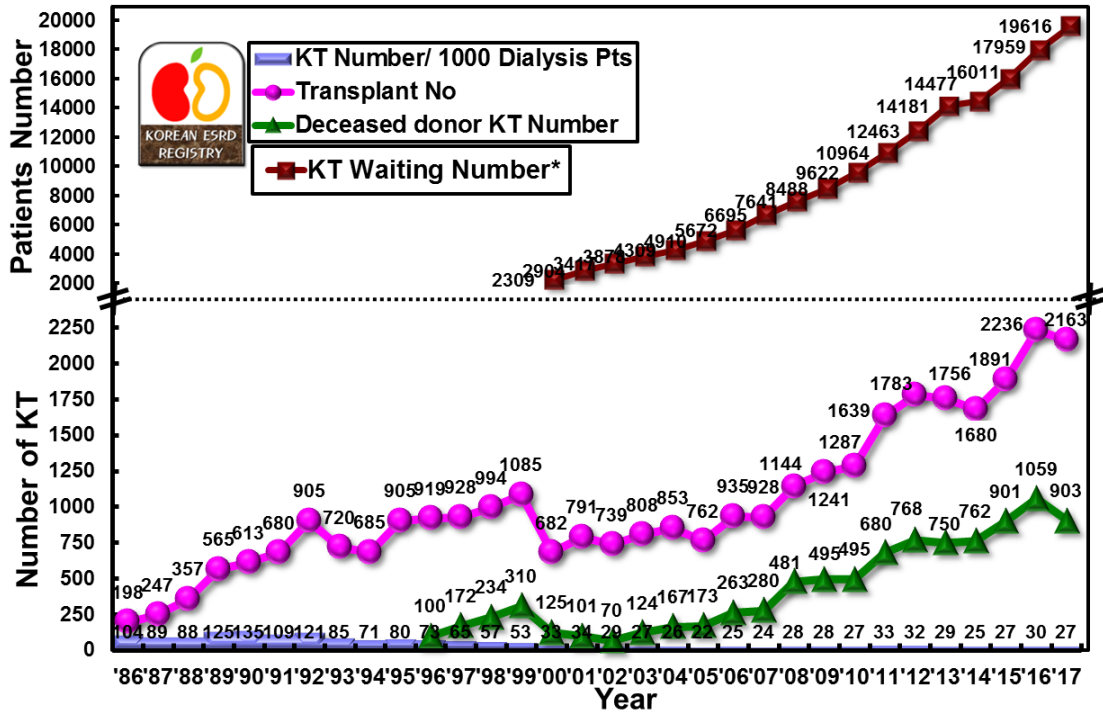


Fig.12-1. Annual number of kidney transplantation in Korea (including data from KONOS: Korean Network for Organ Sharing). *Survived kidney transplantation waiting patient number at the end of each year.

Special Report: Mortality Hazard Ratio of Various Factors

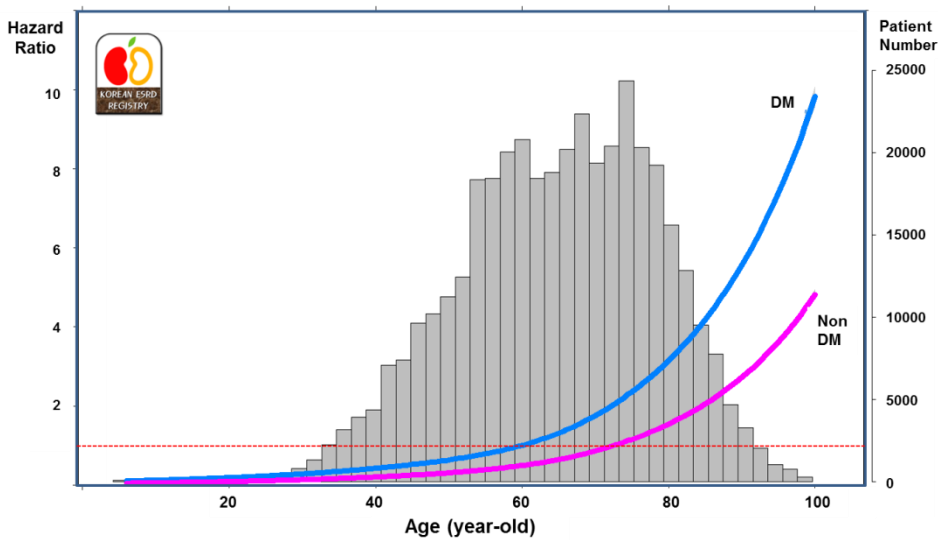


Fig.S-1. Mortality hazard ratio and hemodialysis patient distribution according to the age and diabetics (DM) or not diabetics (non DM).

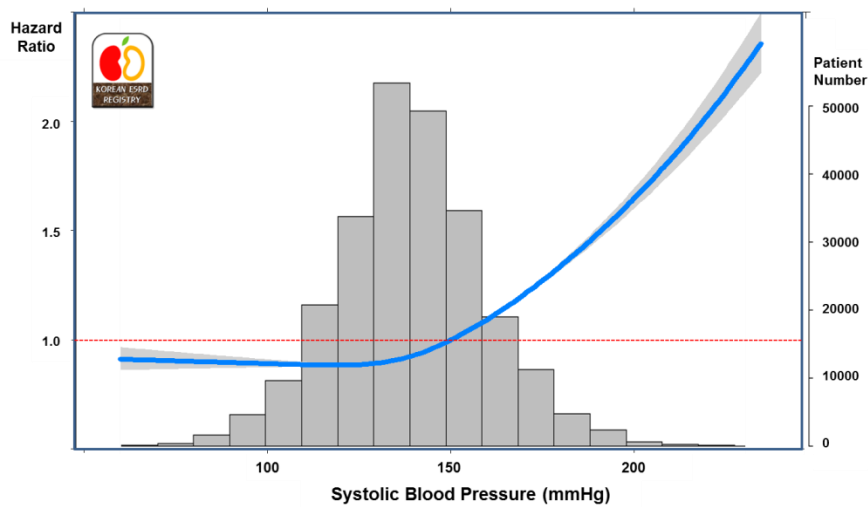


Fig.S-2. Mortality hazard ratio and hemodialysis patient distribution according to the systolic blood pressure .

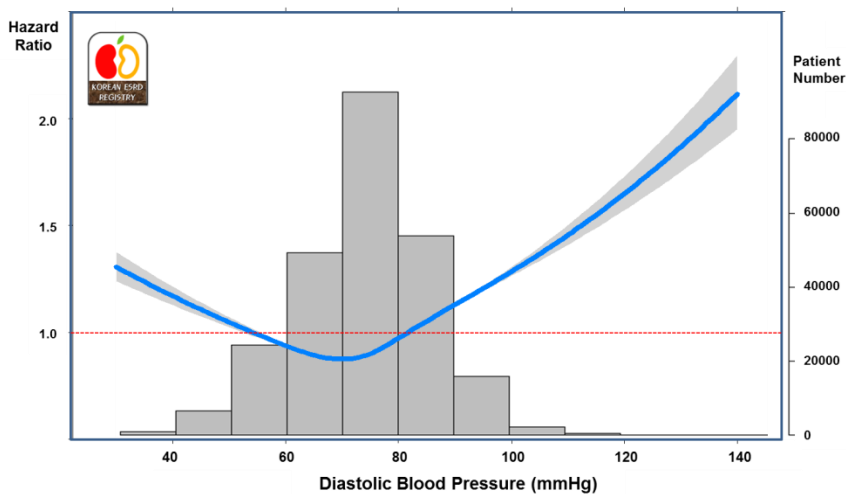


Fig.S-3. Mortality hazard ratio and hemodialysis patient distribution according to the diastolic blood pressure .

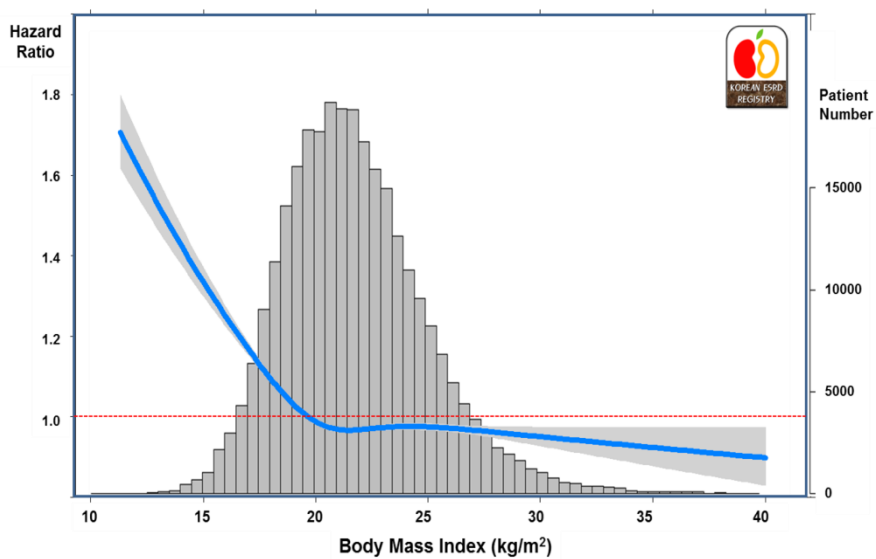


Fig.S-4. Mortality hazard ratio and hemodialysis patient distribution according to the body mass index.

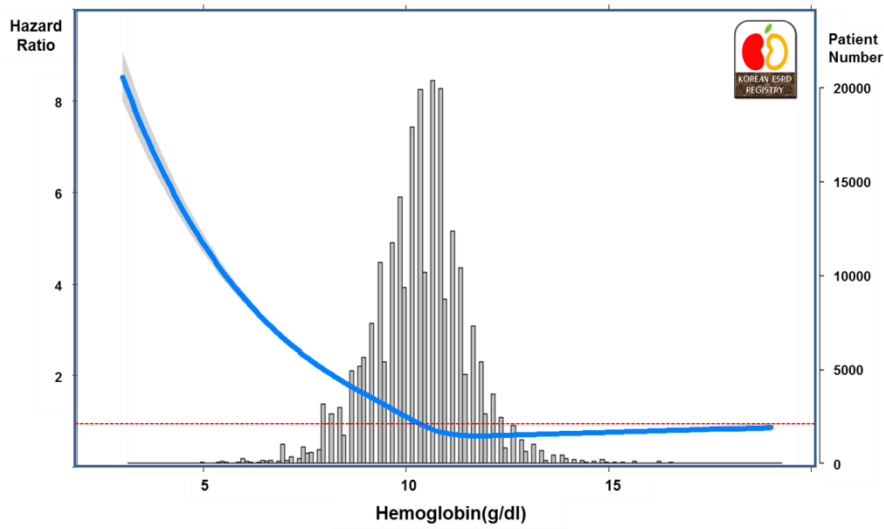


Fig.S-5. Mortality hazard ratio and hemodialysis patient distribution according to the hemoglobin.

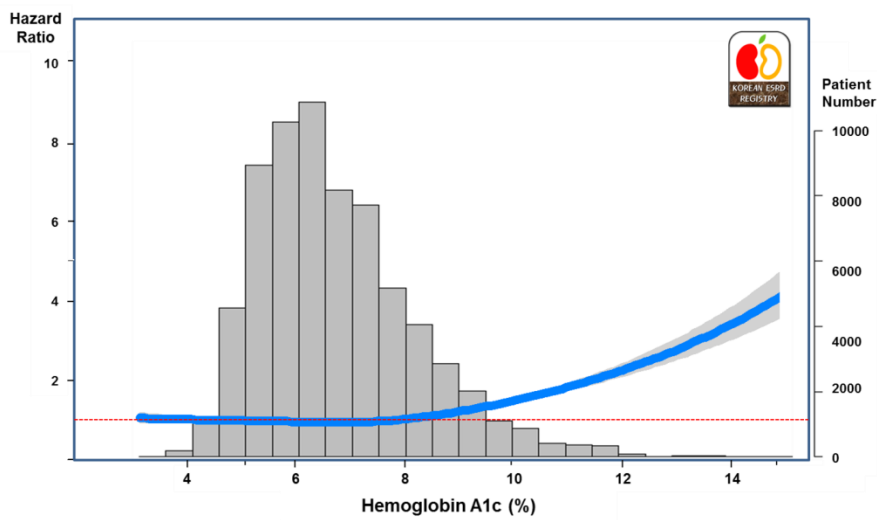


Fig.S-6. Mortality hazard ratio and hemodialysis patient distribution according to the hemoglobin A1c.

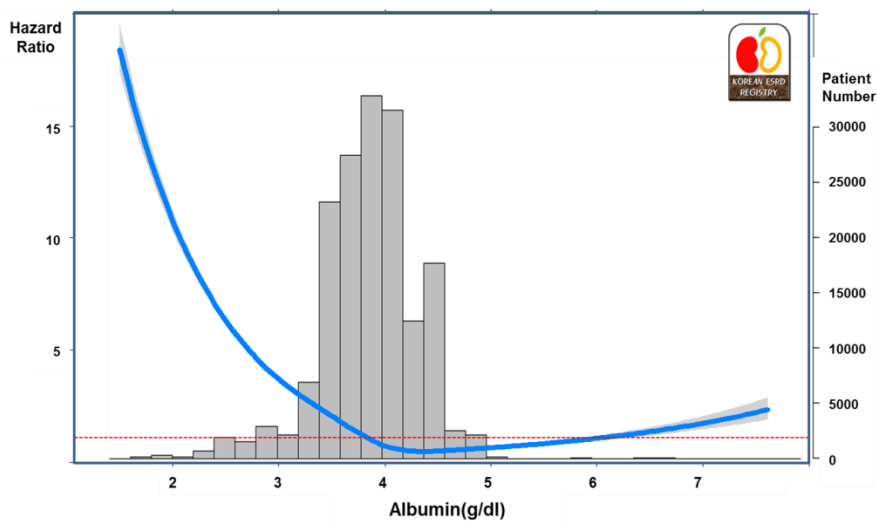


Fig.S-7. Mortality hazard ratio and hemodialysis patient distribution according to the serum albumin.

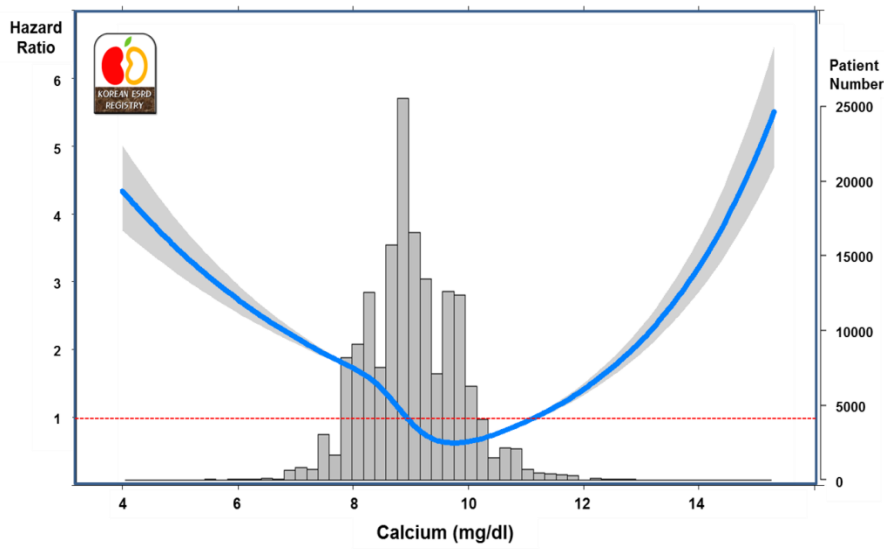


Fig.S-8. Mortality hazard ratio and hemodialysis patient distribution according to the serum calcium.

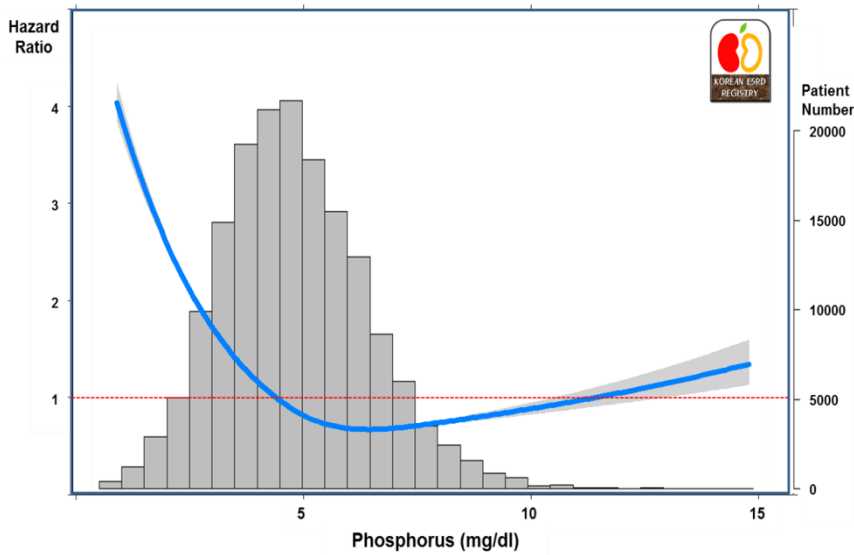


Fig.S-9. Mortality hazard ratio and hemodialysis patient distribution according to the serum phosphorus.

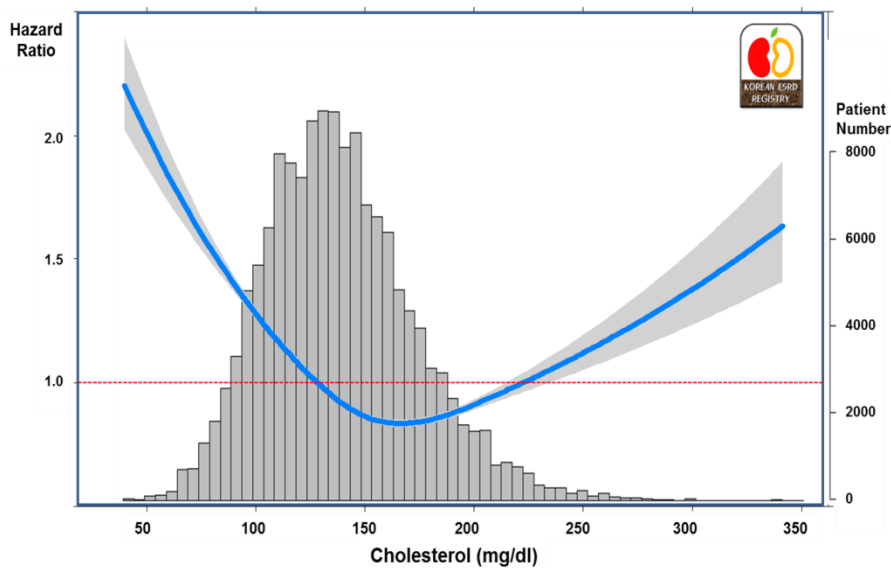


Fig.S-10. Mortality hazard ratio and hemodialysis patient distribution according to the serum total cholesterol.

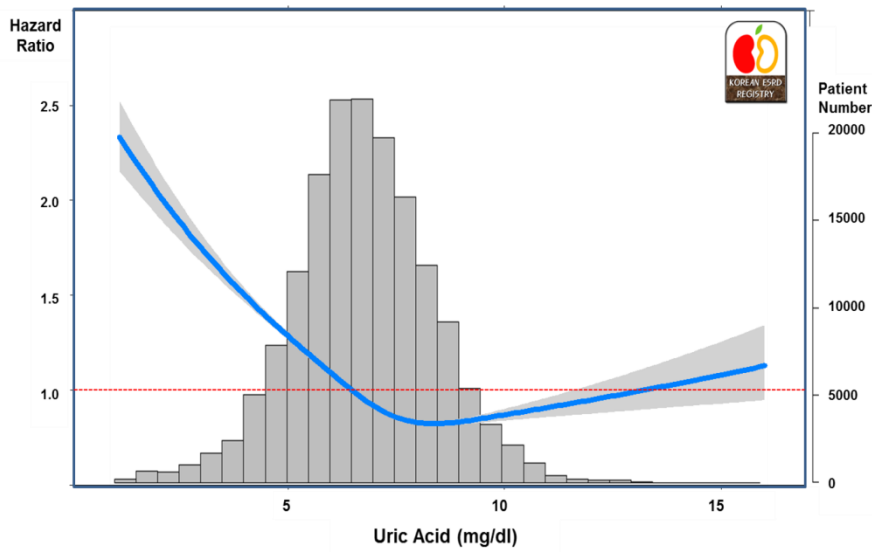


Fig.S-11. Mortality hazard ratio and hemodialysis patient distribution according to the serum uric acid.

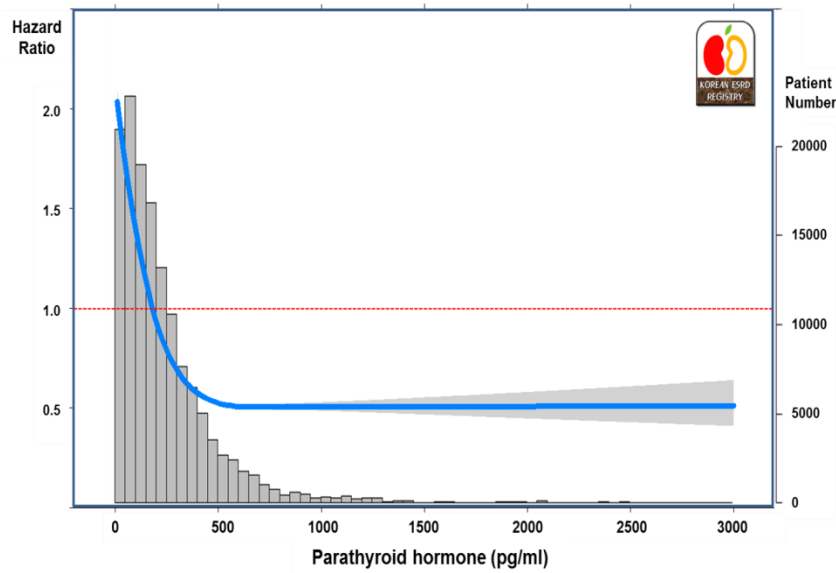


Fig.S-12. Mortality hazard ratio and hemodialysis patient distribution according to the parathyroid hormone level.

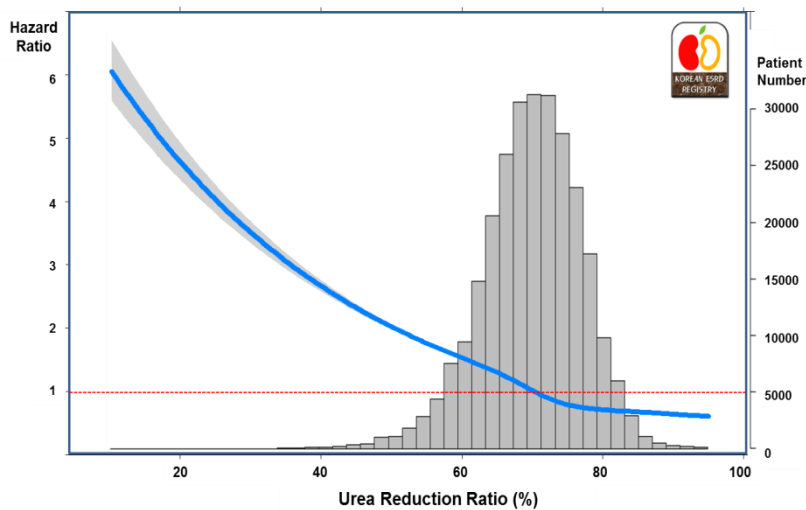


Fig.S-13. Mortality hazard ratio and hemodialysis patient distribution according to the hemodialysis urea reduction ratio.

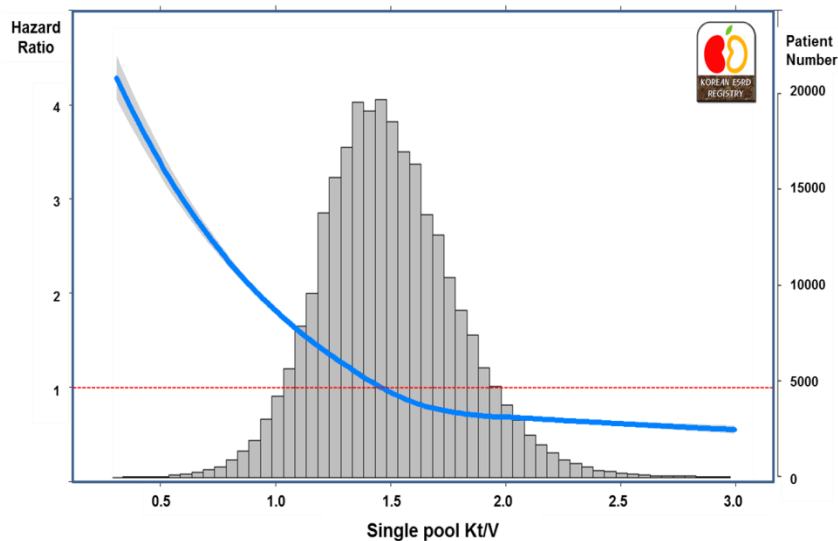


Fig.S-14. Mortality hazard ratio and hemodialysis patient distribution according to the single pool Kt/V of hemodialysis .

		Hazard Ratio		Pr (> z)						
		0.75	1.00	1.20	1.40	1.60	1.80	2.00	2.20	
Age	76 vs 57	[Forest plot point estimate]								<0.0001
Systolic BP*	160 vs 130	[Forest plot point estimate]								0.462
Diastolic BP	90 vs 70	[Forest plot point estimate]								<0.0001
Hemoglobin	11 vs 9.7	[Forest plot point estimate]								<0.0001
Albumin	4.2 vs 3.7	[Forest plot point estimate]								<0.0001
Calcium	9.6 vs 8.5	[Forest plot point estimate]								<0.0001
Phosphorus	5.9 vs 3.8	[Forest plot point estimate]								<0.0001
Cholesterol	162 vs 116	[Forest plot point estimate]								<0.0001
Uric acid*	7.87 vs 5.8	[Forest plot point estimate]								0.376
iPTH	316 vs 82	[Forest plot point estimate]								<0.0001
Hb A1c	7.6 vs 5.7	[Forest plot point estimate]								<0.0001
BMI	23.8 vs 19.6	[Forest plot point estimate]								<0.0001
URR	75.5 vs 66.2	[Forest plot point estimate]								<0.0001
spKt/V*	1.724 vs 1.316	[Forest plot point estimate]								0.063
Female vs Male		[Forest plot point estimate]								<0.0001
DM vs Non-DM		[Forest plot point estimate]								<0.0001

Fig.S-15. Adjusted mortality hazard ratio of various factors. . The factors with asterisk (*) are not statistically significant.

◆ Acknowledgements: We, ESRD registry committee of Korean Society of Nephrology, would like deeply thank to every dialysis centers' medical doctors and nurses for participation in this survey. The dialysis facility sales department of Baxter Korea and Fresenius Medical Care Korea were also shared their data.