특별 강연 IV

우리나라 신대체 요법의 현황
-인산 민병석교수 기념 말기신부전 환자 등록사업 2014 -

대한신장학회 등록위원회

Current Renal Replacement Therapy in Korea
- Insan Memorial Dialysis Registry, 2014 -

ESRD Registry Committee, Korean Society of Nephrology*

=Abstracts=

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 2014 was as follows:

1) The total number of patients with renal replacement therapy (RRT) was 80,674 (hemodialysis : HD 57,256, peritoneal dialysis : PD 7,423, functioning kidney transplant :KT 15,995). Prevalence of RRT was 1,571.5 patients per million population (pmp). The proportion of RRT was HD 71.0%, PD 9.2%, and renal transplant 19.8%.
2) New RRT patients in 2014 were 13,141 (HD 10,594, PD 867, KT 1,680). Incidence rate was 256.0 pmp in 2014.
3) The most common primary cause of end stage renal diseases was diabetic nephropathy (48.0%), hypertensive nephrosclerosis (21.2%) and chronic glomerulonephritis (8.2%), in order.
4) The number of RRT centers was 739 and total number of HD machines was 21,009. Dialysis patients' individual data were collected from 62.8% of overall RRT centers.
5) Mean age of HD patient was 61.1 years old, of PD was 55.4 years old. Proportion of patients on HD more than 5 years' maintenance was 48%. Mean blood pressure was 100.0 mmHg in HD and 97.9 mmHg in PD patients. Pulse pressure was 65.2 mmHg in HD and 53.7 mmHg in PD patients. Mean hemoglobin of HD patient was 10.5 g/dL (hematocrit 31.7%), PD was 10.4 g/dL (Hct: 31.0%). Mean urea reduction ratio was 68.9% in male HD patients and 75.0% in female HD patients. Mean single pool Kt/V was 1.420 in male patient, 1.693 in female patients.
7) Common causes of death were uremia associated cardiac arrest (14.1%), sepsis (13.6%), unknown cause or not uremia associated cardiac arrest (12.6%), pulmonary infection (9.0%) and cerebrovascular accident (8.5%) in 2014. Overall patient survival of male dialysis patient in 5 years was 68.7%, female patients was 71.8%. HD patient's 5 year survival was 71.0% and PD was 65.5%. Five year survival of diabetic dialysis patients was 60.0%, chronic glomerulonephritis patients 85.3%, hypertensive nephrosclerosis patients 77.5%, respectively.
8) Survey on rehabilitation status of dialysis patients showed that 21% of HD patients have full time job and 9% have part time job. 31% of PD patients have full time job, and 14% have part time job.
9) The number of kidney transplantation was 1,680 (deceased donor 762) in 2014.

Key words: Renal replacement therapy, Hemodialysis, Peritoneal dialysis, Prevalence, Incidence, Survival, Dialysis adequacy

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Part 1. Prevalence & Incidence of ESRD (1)

Table 1-1. Prevalence of renal replacement therapy.

	HD		PD		Transplant		Total	
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)
2001	17,568	(363.8)	5,489	(113.7)	7,957	(164.8)	31,014	(642.3)
2002	20,010	(412.4)	5,712	(117.7)	8,271	(170.5)	33,993	(700.6)
2003	23,348	(478.2)	6,807	(139.4)	8,635	(176.9)	38,790	(794.5)
2004	25,335	(516.5)	7,569	(154.3)	8,987	(183.2)	41,891	(854.0)
2005	27,246	(553.0)	7,816	(158.6)	9,271	(188.2)	44,333	(899.8)
2006	29,031	(585.0)	7,990	(161.0)	9,709	(195.7)	46,730	(941.7)
2007	30,907	(617.7)	7,649	(152.9)	10,119	(202.2)	48,675	(972.8)
2008	33,427	(663.3)	7,840	(155.6)	10,722	(212.8)	51,989	(1031.6)
2009	37,391	(738.3)	7,618	(150.4)	11,387	(224.8)	56,396	(1113.6)
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)

( ): number of patients per million population, Population in Korea at the end of in 2014: 51,334,654.

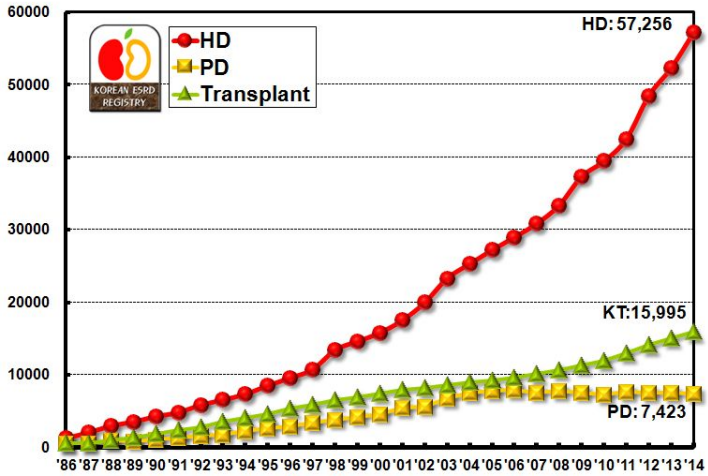


Fig. 1-1. Patient numbers of renal replacement therapy at the end of each year.

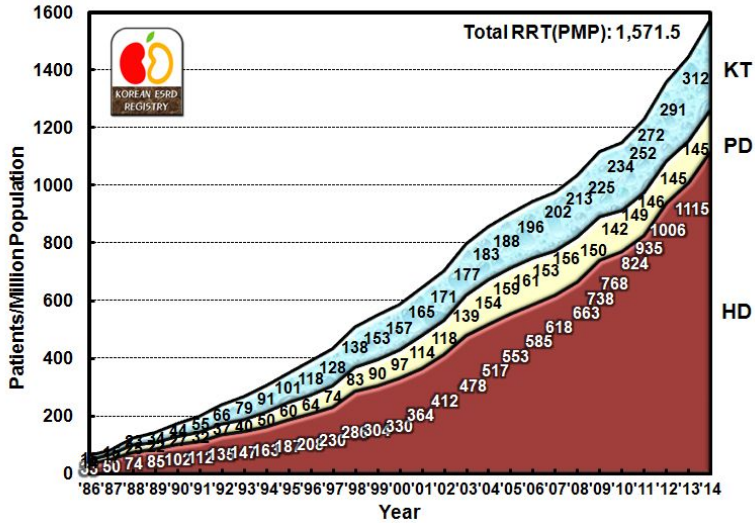


Fig. 1-2. Point prevalence of renal replacement therapy (Patients numbers per million population, HD: hemodialysis, PD: peritoneal dialysis, KT: kidney transplantation).

Part 1. Prevalence & 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)
2001	3,373	(69.9)	1,279	(26.5)	848	(17.6)	5,500	(113.9)
2002	3,878	(79.9)	1,666	(34.3)	739	(15.2)	6,283	(129.5)
2003	4,769	(97.7)	1,866	(38.2)	806	(16.5)	7,441	(152.4)
2004	5,279	(107.6)	2,246	(45.8)	853	(17.4)	8,378	(170.8)
2005	5,400	(109.6)	2,381	(48.3)	762	(15.5)	8,543	(173.4)
2006	5,694	(114.7)	2,568	(51.7)	935	(18.8)	9,197	(185.3)
2007	6,193	(123.8)	2,062	(41.2)	928	(18.5)	9,183	(183.5)
2008	6,415	(127.3)	1,619	(32.1)	1,145	(22.7)	9,179	(182.1)
2009	6,540	(129.1)	1,125	(22.2)	1,241	(24.5)	8,906	(175.9)
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)

( ): number of patients per million population. The population of Korea in 2014: 51,334,654.

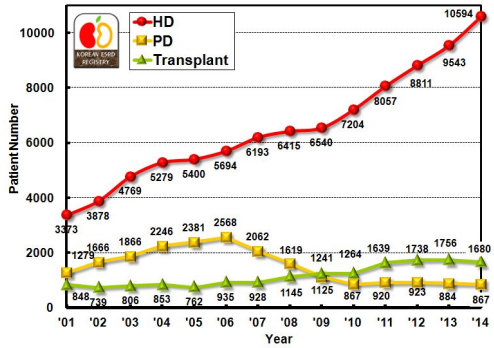


Fig. 1-3. New renal replacement therapy patients number in each year.

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	2013	2014
Chronic Glomerulonephritis	25.3	25.5	21.6	17.9	14	13.9	12.5	13.0	12.1	11.3	8.1	8.3	8.2
Not Histologically confirmed	19.7	20.4	16.7	13.6	10.6	10	8.6	9.0	8.2	7.7	4.5	4.3	4.4
Histologically confirmed	5.6	5	4.9	4.3	3.4	3.9	3.9	3.9	3.8	3.6	3.6	4.0	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	48.0
Hypertensive nephrosclerosis	15.4	20.8	18.3	17.8	16.6	16	16.2	16.9	18.7	19.2	18.5	19.7	21.2
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	1.5	1.8
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
Pyelo/interstitial nephritis	1.3	1.1	0.7	1	0.8	0.6	0.6	0.6	0.5	0.4	0.5	0.5	0.8
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	0.3	0.2
Lupus nephritis	0.8	0.7	1	0.5	0.9	0.8	0.6	0.6	0.6	0.5	0.6	0.6	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	0.3
Hereditary nephropathy	0.3	0.7	0.4	0.2	0.1	0.2	0.3	0.3	0.3	0.2	0.5	0.4	0.5
Kidney tumor	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.5	0.3
Other	4.1	2.7	2.8	3.9	3	5.6	5.9	6.0	5.8	5.1	6.8	7.2	6.1
Uncertain	28.6	17.8	15.9	16.6	20.2	19	17.8	17.5	17.6	15.3	11.4	12.7	12.1

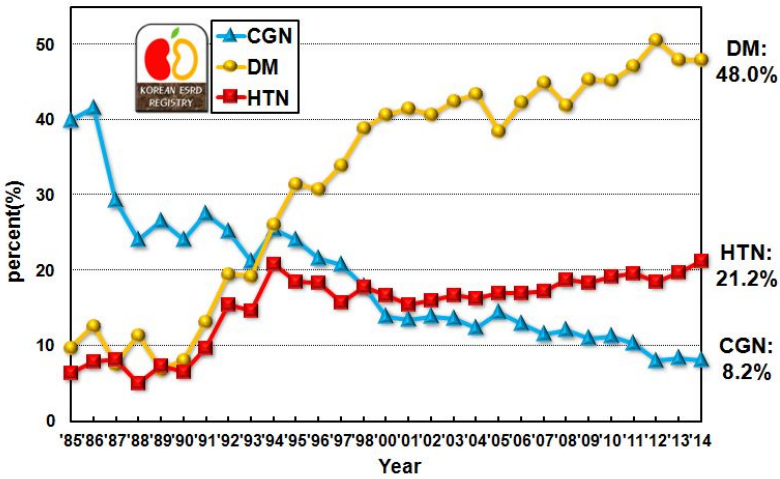


Fig. 1-4. Three major causes of end stage renal disease patients who were initiated renal replacement therapy in each year. (DM: diabetic nephropathy, CGN: chronic glomerulonephritis, HTN: hypertensive nephrosclerosis). Note increase of DM and decrease of CGN.

Part 2. Renal Replacement Therapy Modalities

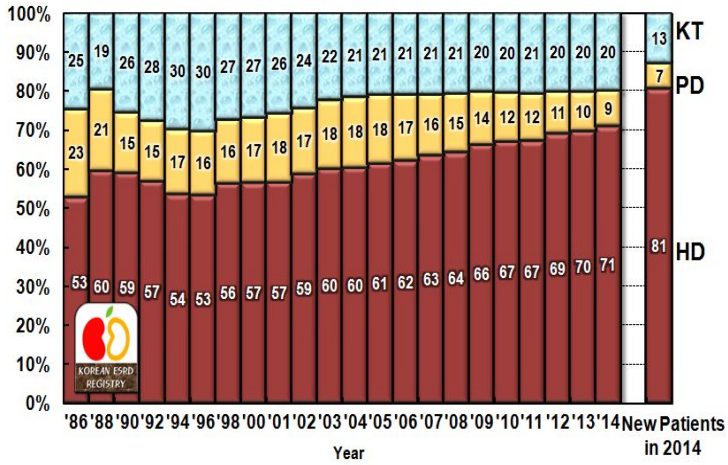


Fig. 2-1. Proportion of renal replacement modalities, annual prevalence and incidence. HD: hemodialysis, PD: peritoneal dialysis, KT: kidney transplantation.

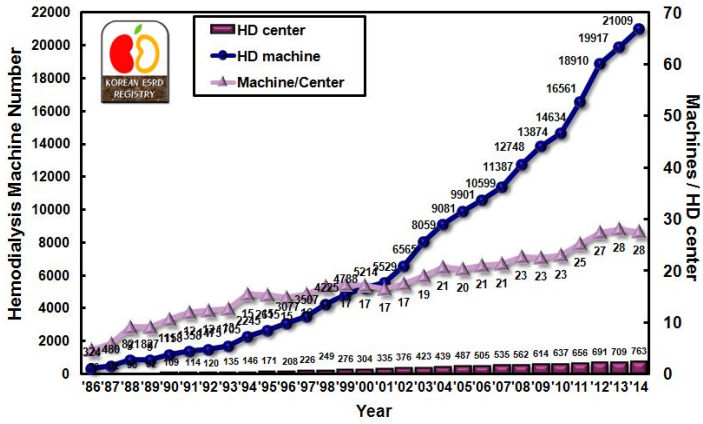


Fig. 2-2. Numbers of dialysis centers, hemodialysis machines and machine per each dialysis center in Korea.

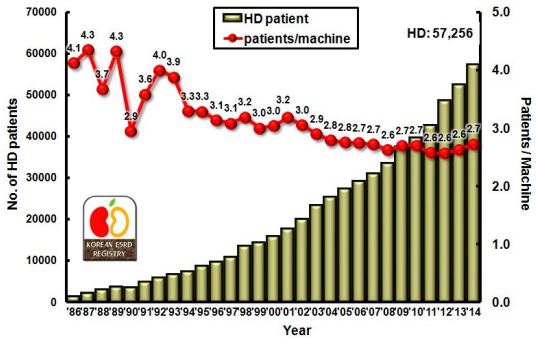


Fig. 2-3. Number of hemodialaysis patients and hemodialysis patients per hemodialysis machine.

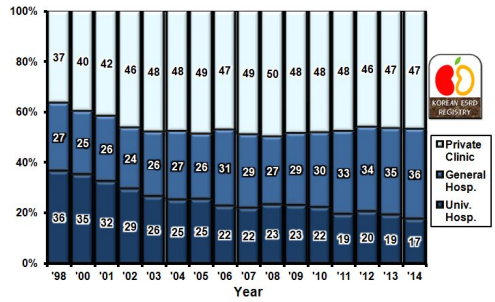


Fig. 2-4. Percentage of hemodialysis patients number according to dialysis center.

Part 3. Regional Distribution of Patients & Facilities

Table 3-1. Administrative 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	12,172	2,146	14,318	1,419	157	4,441	2.7
부산 Busan	4,315	881	5,196	1,477	48	1,513	2.9
대구 Daegu	3,491	719	4,211	1,686	36	1,104	3.2
인천 Incheon	3,118	354	3,471	1,191	35	1,157	2.7
광주 Gwangju	2,008	239	2,247	1,522	34	874	2.3
대전 Daejeon	1,031	352	1,383	897	16	420	2.5
울산 Ulsan	1,104	57	1,161	996	13	390	2.8
경기 Gyeonggi	11,569	1,348	12,917	1,044	156	4,459	2.6
강원 Gangwon	2,004	381	2,385	1,543	27	707	2.8
충북 Chungbuk	2,020	88	2,109	1,335	28	737	2.7
충남 Chungnam	2,537	91	2,628	1,196	36	885	2.9
전북 Jeonbuk	2,376	165	2,541	1,357	23	783	3.0
전남 Jeonnam	2,085	163	2,248	1,180	34	898	2.3
경북 Gyeongbuk	2,627	144	2,771	1,026	38	955	2.7
경남 Gyeongnam	3,914	217	4,131	1,234	48	1,421	2.8
제주 Jeju	884	77	962	1,592	10	266	3.3
Total	57,256	7,423	64,679	1,260	739	21,009	2.7

Table 3-2. Distribution of dialysis patients and machines according to life zone*.

	Population (%)	HD patients	PD patients	Total Dialysis patients	Dialysis pts /Million	Dialysis centers	Dialysis machine	HD pts / HD machine
수도권 Capital Area (Seoul, Incheon, Gyeonggi)	25,383,516	26,859	3,848	30,707	1,210	348	10,057	2.7
	49.4%	46.9%	51.8%	47.5%		47.1%	47.9%	
충청권 Chungchung (Daejeon, Chungnam, Chungbuk)	5,318,549	5,588	531	6,119	1,151	80	2,042	2.7
	10.4%	9.8%	7.2%	9.5%		10.8%	9.7%	
호남권 Honam (Gwangju, Jeonnam, Jeonbuk)	5,253,919	6,469	567	7,036	1,339	91	2,555	2.5
	10.2%	11.3%	7.6%	10.9%		12.3%	12.2%	
영남권 Youngnam (Busan, Daegu, Gyeongnam, Gyeongbuk, Ulsan)	13,228,875	15,451	2,018	17,469	1,321	183	5,383	2.9
	25.8%	27.0%	27.2%	27.0%		24.8%	25.6%	
강원권 Gangwon	1,545,896	2,004	381	2,385	1,543	27	707	2.8
	3.0%	3.5%	5.1%	3.7%		3.7%	3.4%	
Total	51,334,654	57,256	7,423	64,679	1,260	739	21,009	2.7

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

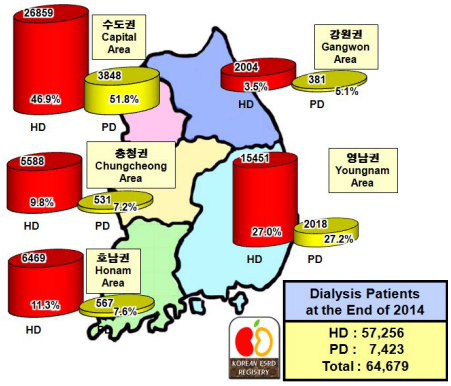


Fig. 3-1. Distribution of dialysis patients and machines according to life zone.

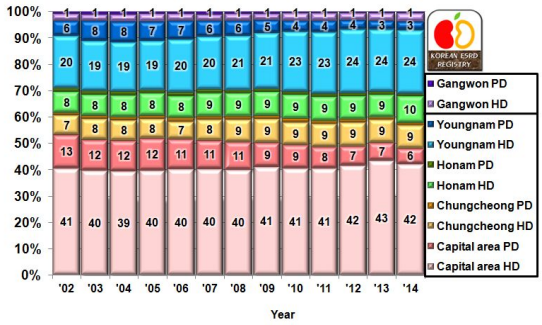


Fig. 3-2. Regional proportion of dialysis patient number in each year.

Part 4. Dialysis Patients Demographics (1)

Table 4-1. Percent of dialysis centers contributing individual patient data.

	Dialysis centers*	Internet Input	Paper data	Total contributed center	Contributing rate (%)
서울 Seoul	157	104	4	108	68.8
부산 Busan	48	25	1	26	54.2
대구 Daegu	36	20	0	20	55.6
인천 Incheon	35	18	1	19	54.3
광주 Gwangju	34	19	1	20	58.8
대전 Daejeon	16	10	0	10	62.5
울산 Ulsan	13	8	2	10	76.9
경기 Gyeonggi	156	89	6	95	60.9
강원 Gangwon	27	18	0	18	66.7
충북 Chungbuk	28	18	0	18	64.3
충남 Chungnam	36	24	1	25	69.4
전북 Jeonbuk	23	15	0	15	65.2
전남 Jeonnam	34	16	0	16	47.1
경북 Gyeongbuk	38	23	0	23	60.5
경남 Gyeongnam	48	32	2	34	70.8
제주 Jeju	10	7	0	7	70.0
Total	739	446	18	464	62.8

* 투석의료기관 수에서 비윤리 의료기관(약 50개소)은 제외함.

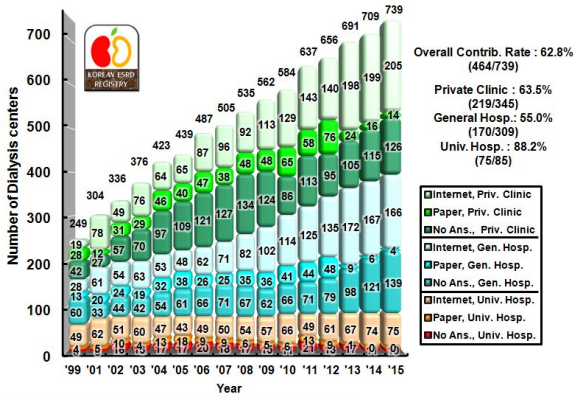


Fig. 4-1. Individual patients data contributing rate of dialysis centers according to hospital classification.

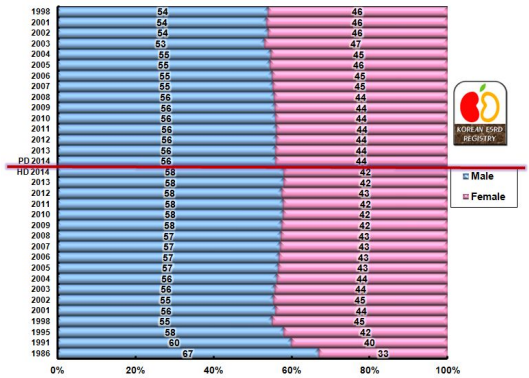


Fig. 4-2. Gender ratio of HD & PD patients according to years.

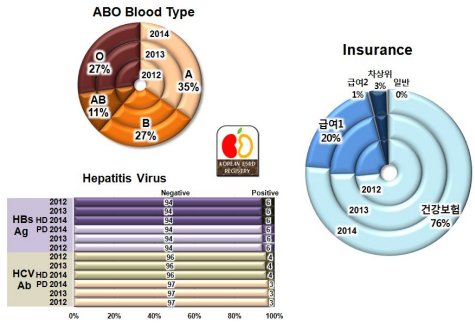


Fig. 4-3. ABO blood type and hepatitis virus, health insurance of HD & PD patients.

Part 4. Dialysis Patients Demographics (2) - Age

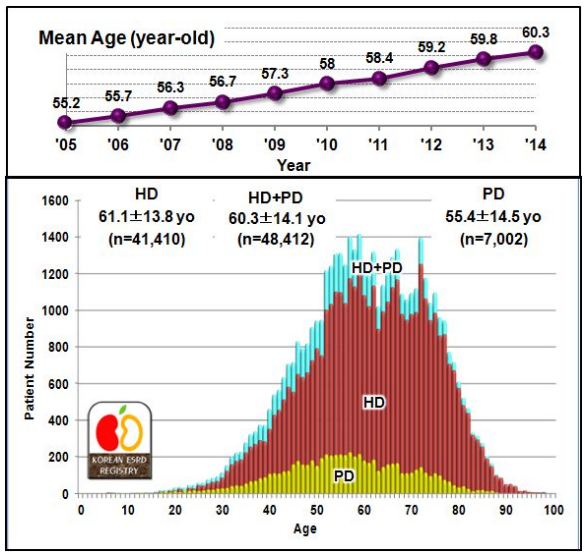


Fig. 4-4. Age distribution of dialysis patients according to dialysis modalities.

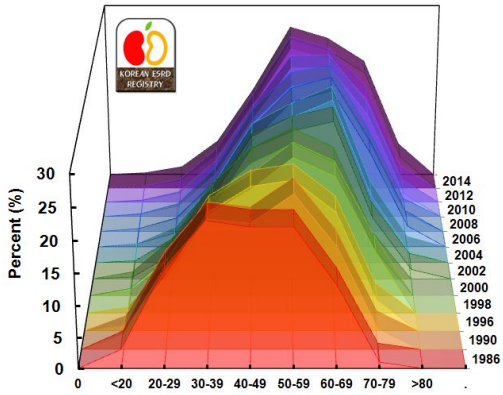


Fig. 4-5. Age distribution of dialysis patients according to years. Note the peak age was shift to old age.

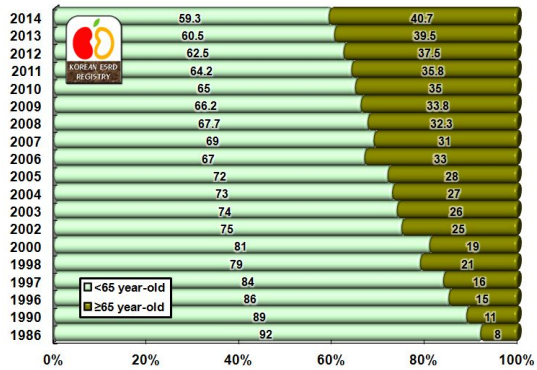


Fig. 4-6. Elderly dialysis patient (over 65 year-old) proportion according to year.

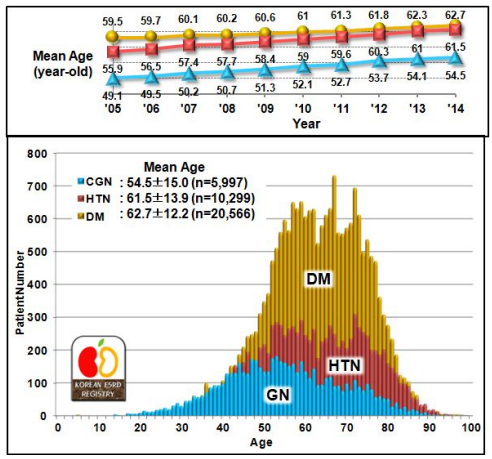


Fig. 4-7. Age distribution of dialysis patients according to underlying diseases, diabetic patients (DM), hypertensive nephrosclerosis (HTN) and glomerulonephritis (GN). Note difference of peak age between GN and DM.

Part 4. Dialysis Patients Demographics (3) - Dialysis Duration

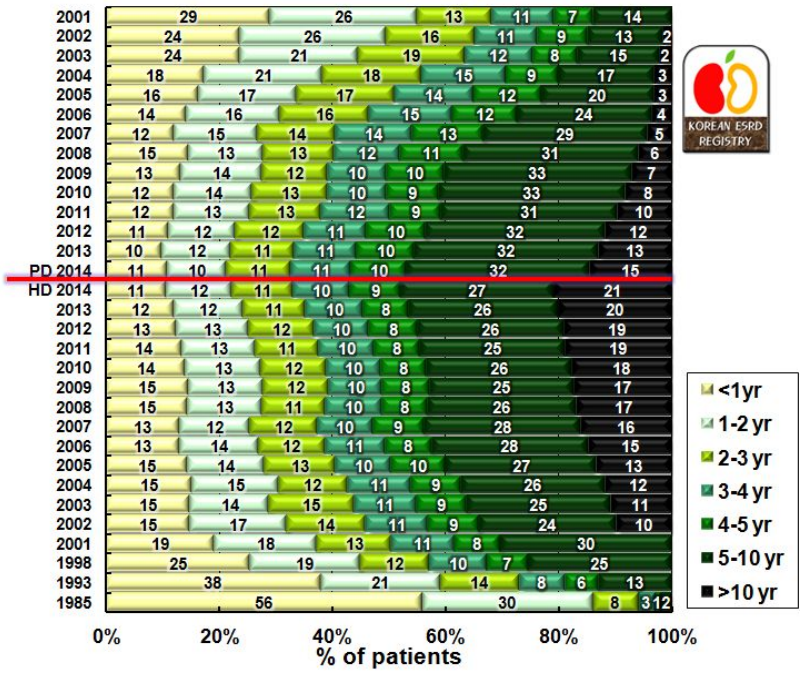


Fig. 4-8. Duration of maintenance hemodialysis and peritoneal dialysis. Percent of estimated patient number according to year.

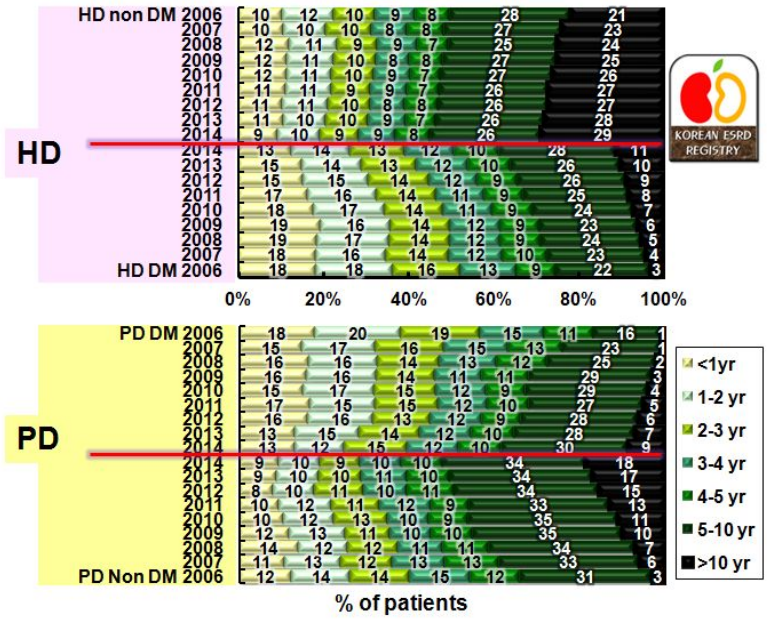


Fig 4-9. Diabetic and non-diabetic patient's duration of dialysis maintenance.

Part 4. Dialysis Patients Demographics (4) - BMI & BP

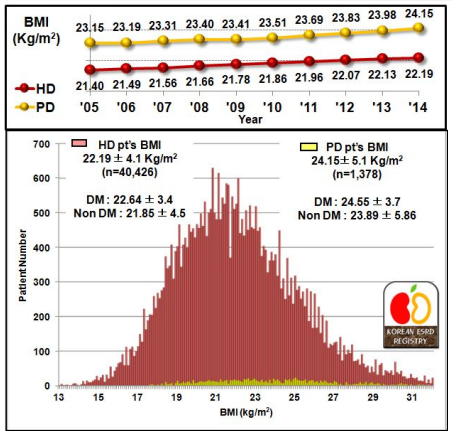


Fig. 4-10. Distribution of body mass index (BMI) in hemodialysis (HD) and peritoneal dialysis (PD) patients

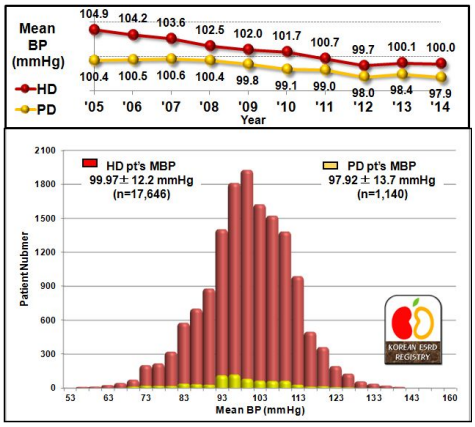


Fig. 4-11. Distribution of mean blood pressure (MBP) in hemodialysis and peritoneal dialysis patients. Blood pressure of HD patients was higher than PD patients BP.

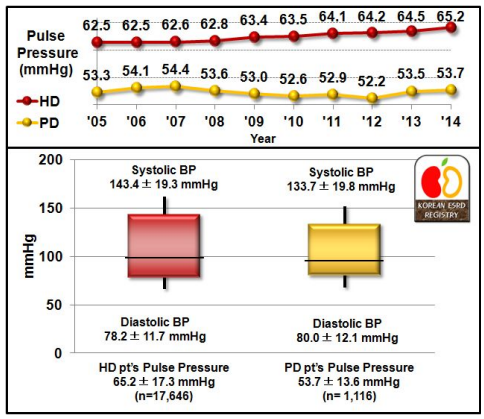


Fig. 4-12. Systolic and diastolic blood pressure with pulse pressure in HD and PD patients. Note difference of pulse pressure between HD and PD patients.

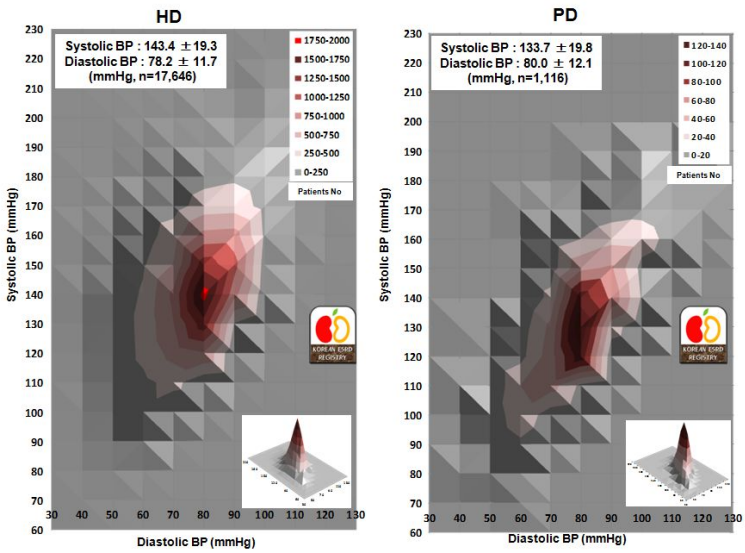


Fig. 4-13. HD and PD patients' number distribution according to systolic and diastolic blood pressure.

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

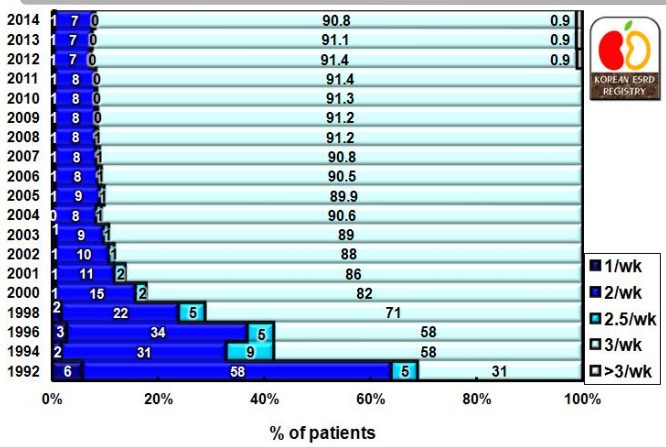
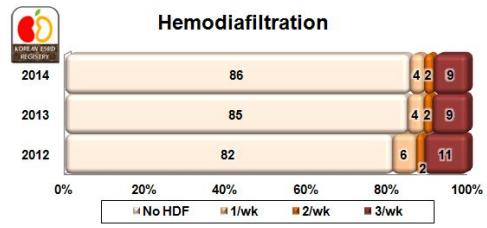


Fig. 5-1. Frequency of HD per week.



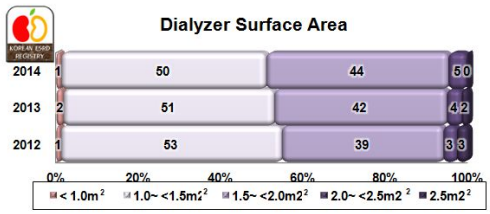
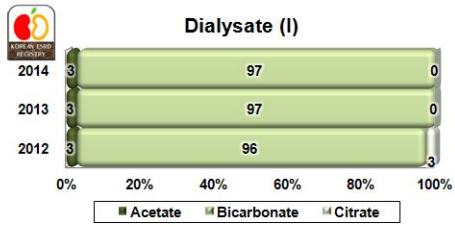


Fig. 5-2. Percent of hemodiafiltration (HDF) applied patients and dialyzer membrane surface area.



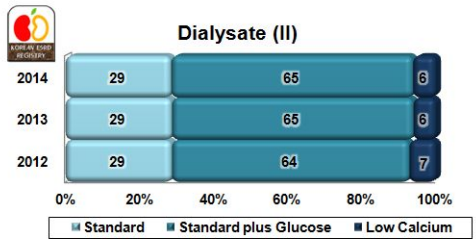


Fig. 5-3. HD dialyste.

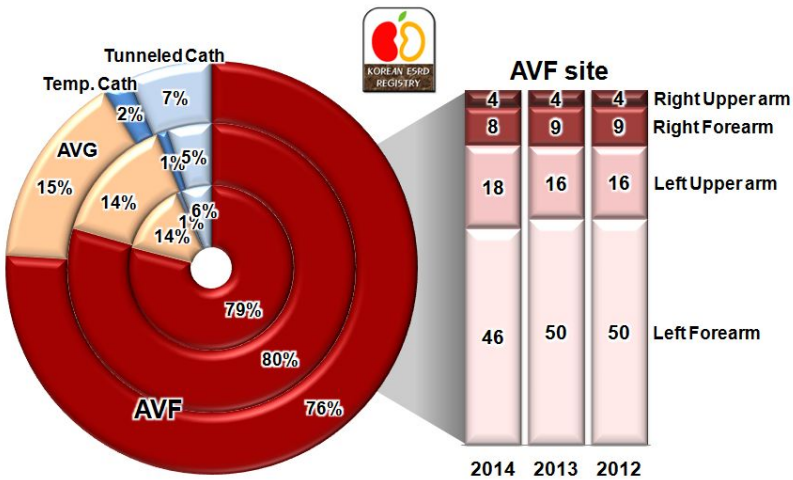


Fig. 5-4. Vascular access for HD.

Part 5. Dialysis Therapy (2) - PD

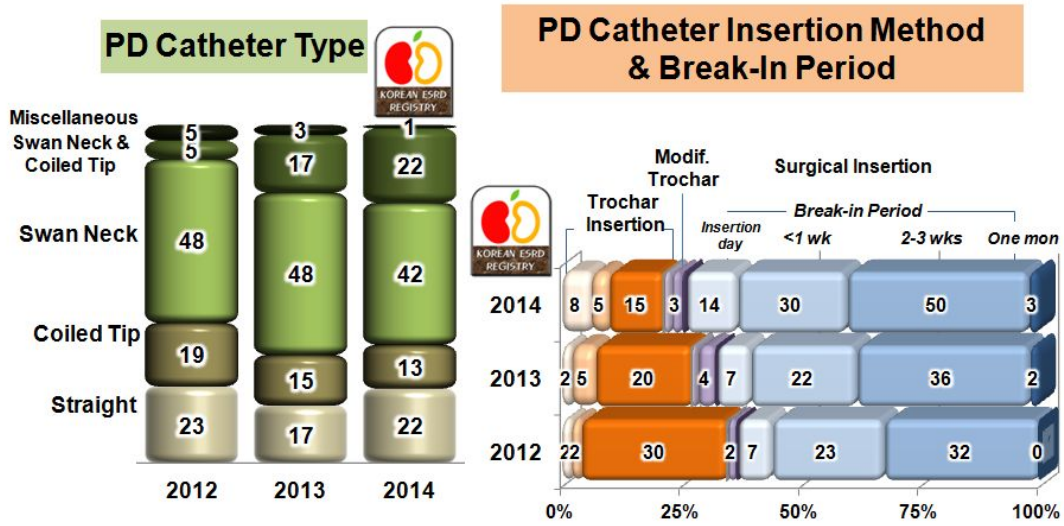


Fig. 5-5. PD catheter type and PD catheter insertion methods.

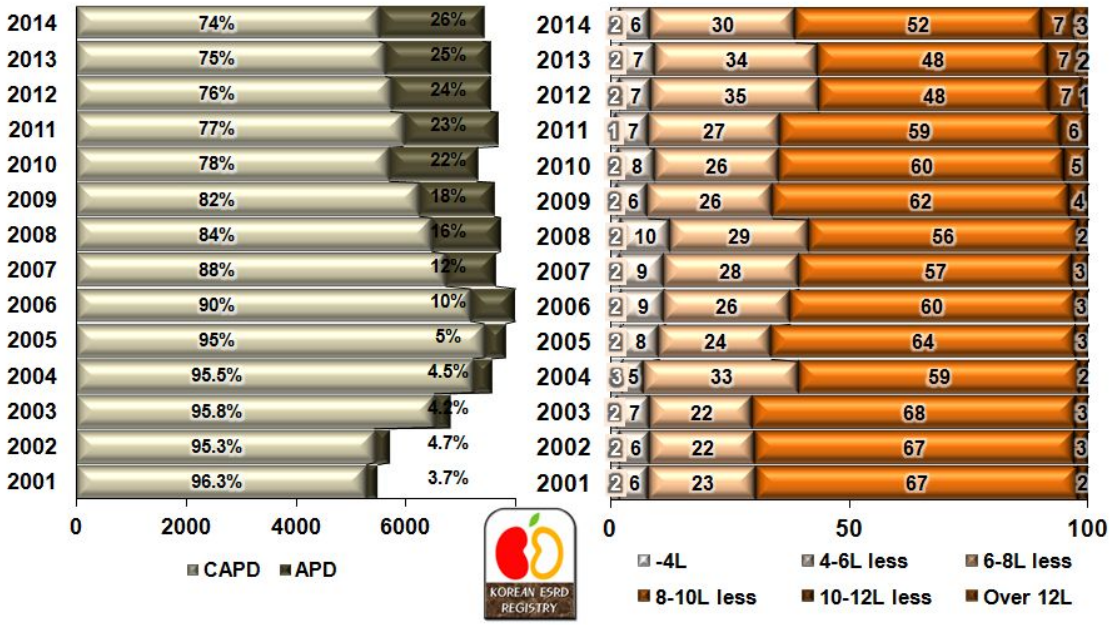


Fig. 5-6. Percent distribution of PD type and dialysate doses according to year.

Part 6. Lab data & Drugs (1)

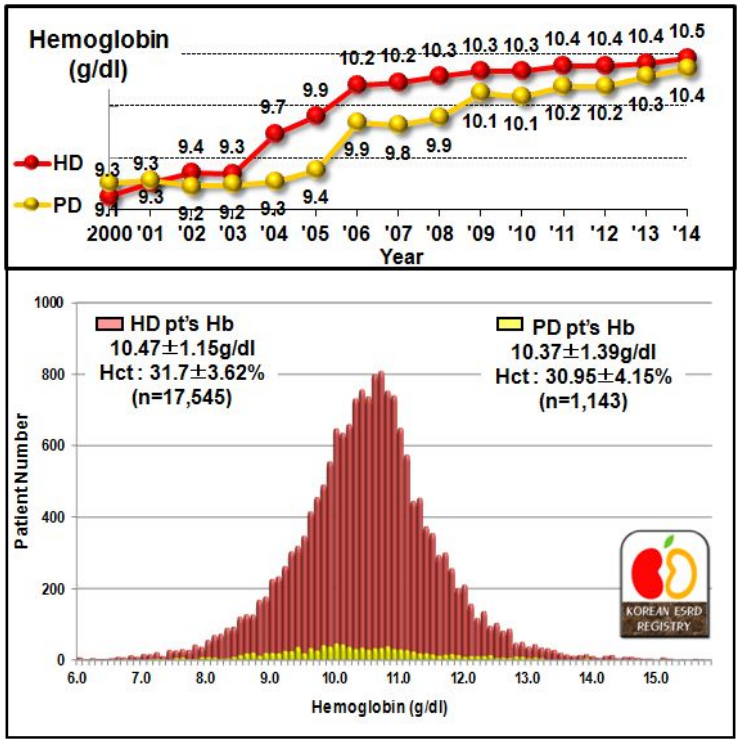


Fig. 6-1. Distribution of hemoglobin levels in HD and PD patients.

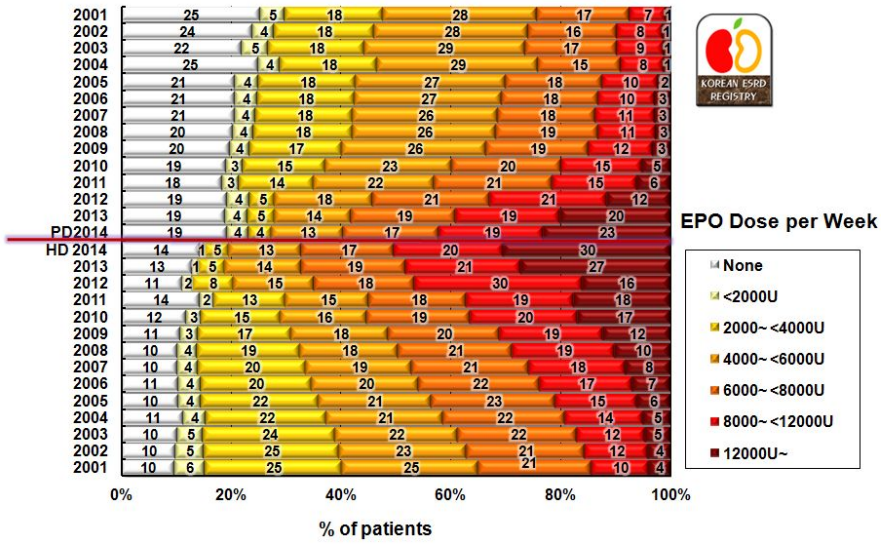


Fig. 6-2. Percent distribution of prescribed erythropoietin doses for hemodialysis and peritoneal dialysis patients.

Part 6. Lab data & Drugs (2)

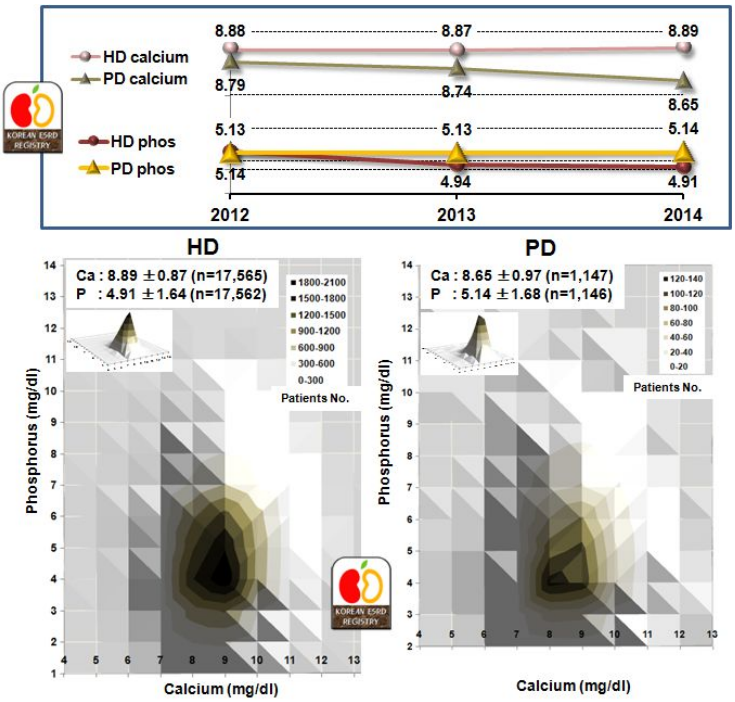


Fig. 6-3. Distribution of patients numbers according to calcium and phosphorus level.

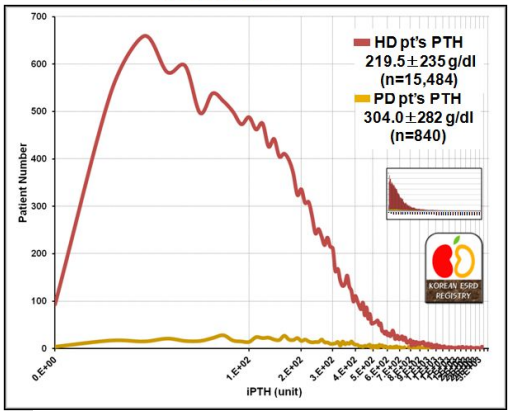


Fig. 6-4. PTH level of HD and PD patients. (x-axis is on logarithmic scale.)

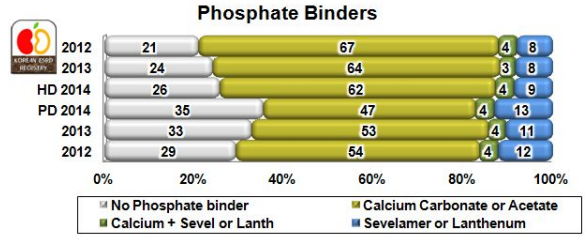


Fig. 6-5. Phosphate binders.

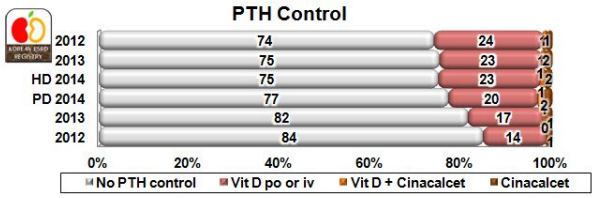


Fig. 6-6. PTH control medications.

Part 6. Lab data & Drugs (3)

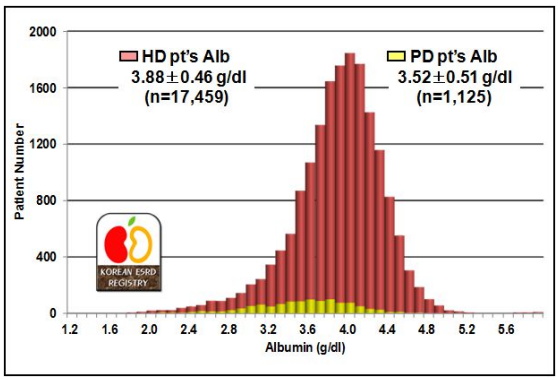


Fig. 6-7. Albumin level of HD and PD patients.

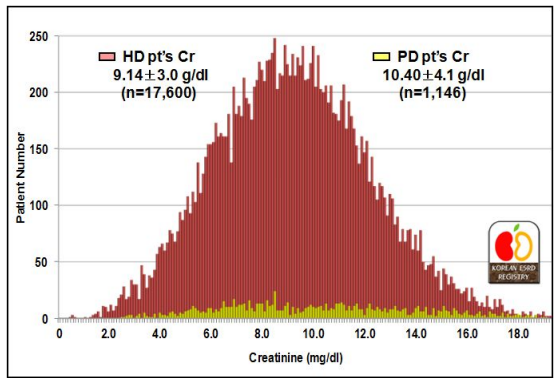


Fig. 6-8. Creatinine level of HD and PD patients.

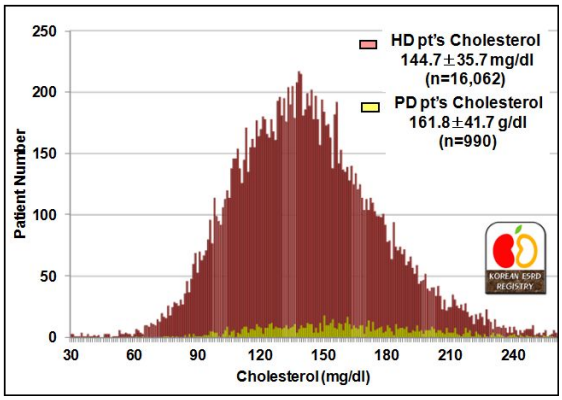


Fig. 6-9. Total cholesterol level of HD and PD patients.

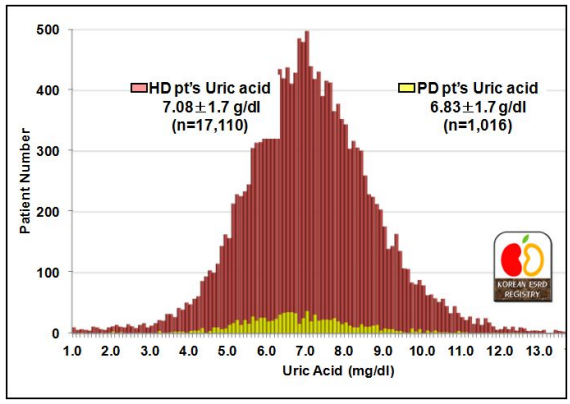


Fig. 6-10. Uric acid level of HD and PD patients.

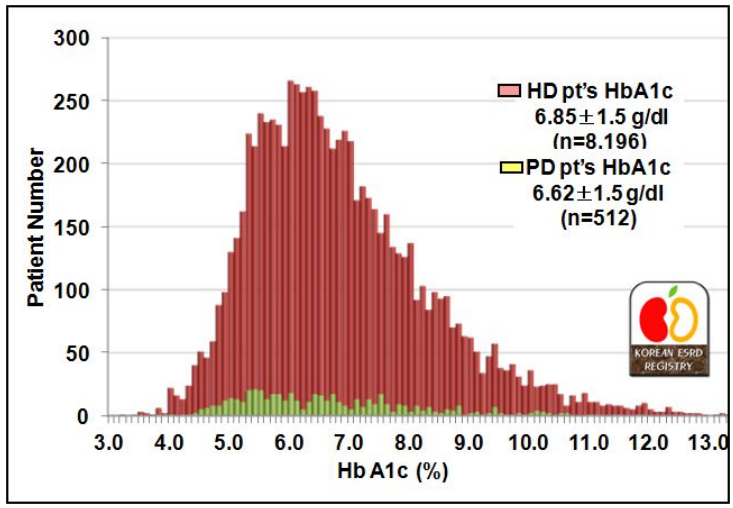


Fig. 6-11. HbA1c level of diabetic HD and PD patients.

Part 7. Dialysis Adequacy (1)

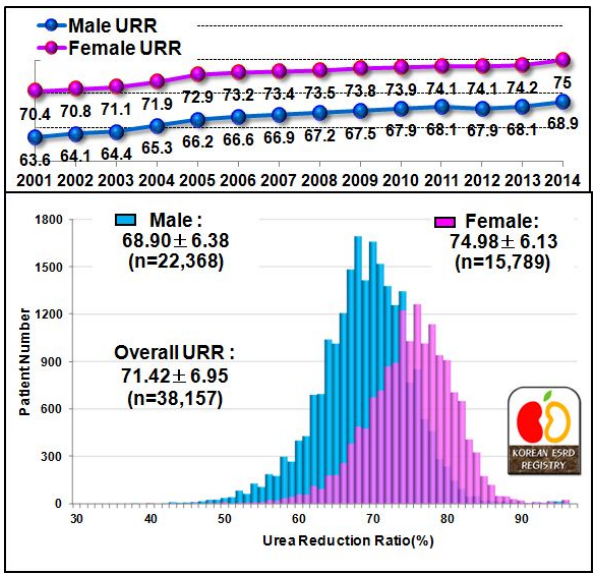


Fig. 7-1. Distribution of urea reduction ratio (URR) of hemodialysis patients. Note the difference between male and female.

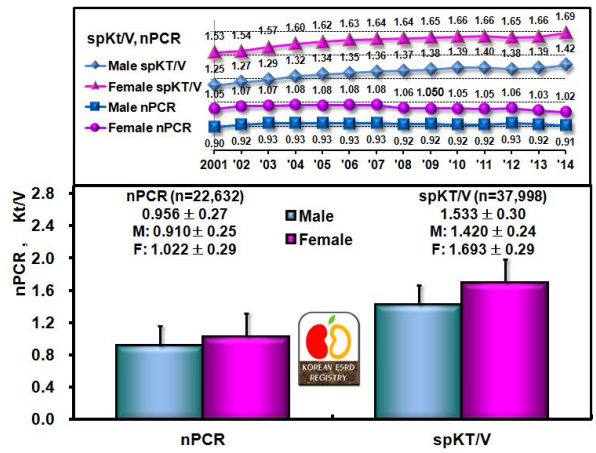


Fig. 7-2. Dialysis adequacy parameters (nPCR & KT/V) of hemodialysis patients.

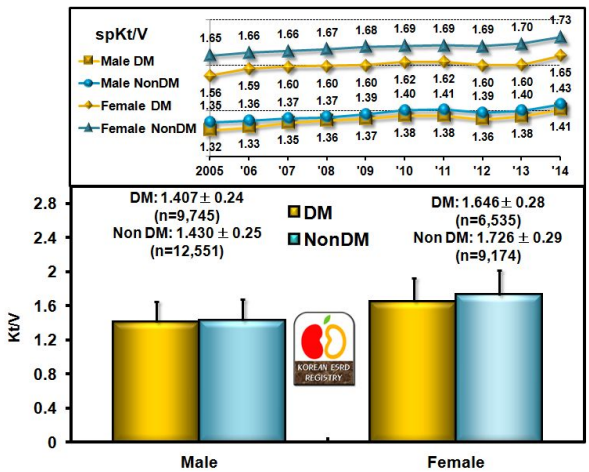


Fig. 7-3. Dialysis adequacy parameters (Kt/V) of diabetic and non-diabetic hemodialysis patients.

Part 7. Dialysis Adequacy (2)

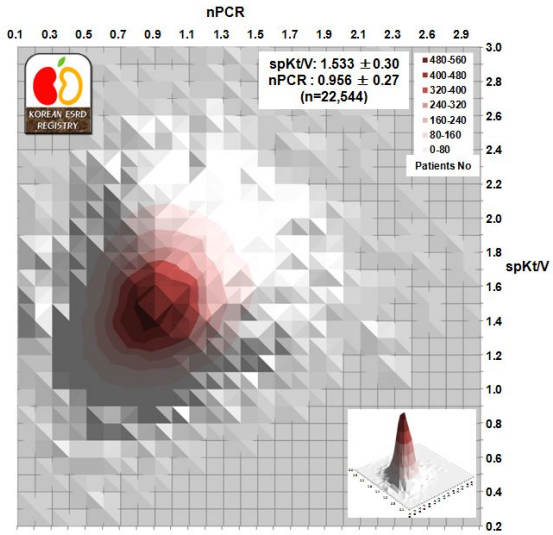


Fig. 7-4. Distribution of patients number according to nPCR and single pool Kt/V in HD patients.

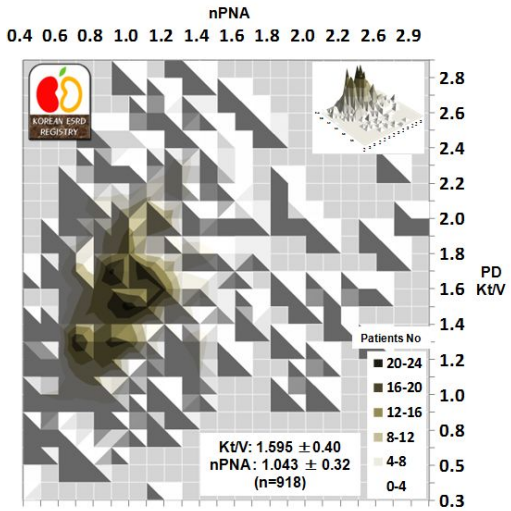


Fig. 7-5. Distribution of patients number according to nPNA and PD Kt/V in PD patients.

Part 8. Rehabilitation Status of Dialysis Patients

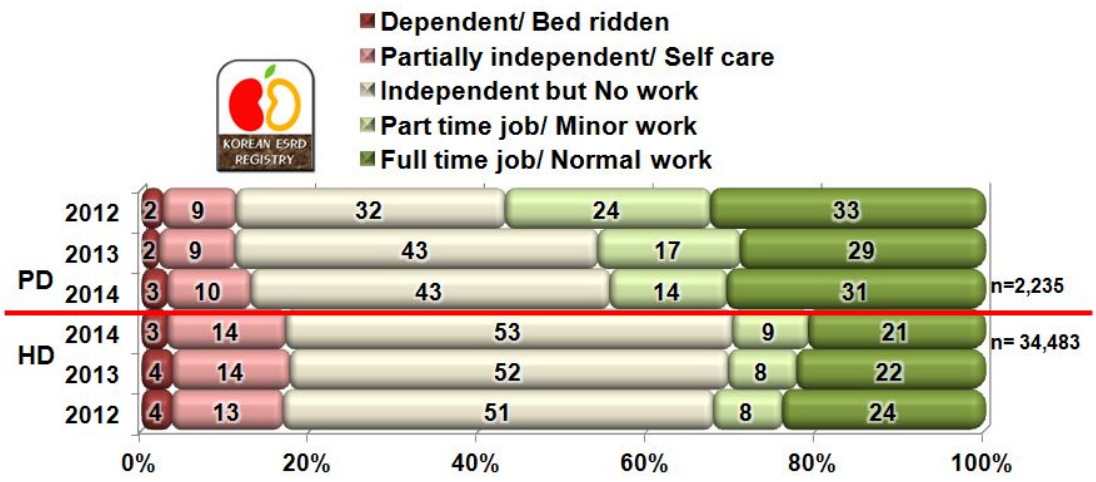


Fig. 8-1. Rehabilitation status of HD and PD patients.

Part 9. Co-morbidity of Dialysis Patients

Table 9-1. Co-morbidity of dialysis patients in 2014.

	HD (%, n=52,024)		PD (%, n=4,499)	
Cardiac	**16.9**		**14.9**	
Coronary Artery Disease		9.3		7.4
Congestive Heart Failure		4.2		5.7
Pericardial Effusion		0.3		0.1
Arrythmia		3.2		1.7
Vascular	**48.3**		**56.8**	
Cerebrovascular accident		3.2		4.2
Hypertension		43.3		51.5
Other vascular disease		1.8		1.1
Infection	**5.2**		**10.0**	
Pneumonia		1.4		1.4
Tuberculosis		0.5		0.6
Peritonitis		0.2		5.1
Herpes zoster		0.3		0.3
Access/ exit site infection		0.9		1.2
Other Infection		2.0		1.4
Liver disease	**6.1**		**5.5**	
Hepatitis B		3.6		3.7
Hepatitis C		2.2		1.4
Congestive Liver		0.1		0.2
Hemochromatosis		0.0		0.0
Other liver diseases		0.3		0.2
Gastrointestinal	**15.7**		**7.2**	
Gastric Ulcer		1.6		0.8
Duodenal Ulcer		0.3		0.1
Constipation		5.7		1.7
Other Gastrointestinal Diseases		8.1		4.6
Miscellaneous	**7.7**		**5.5**	
Malnutrition (Alb<2.5g/dl)		0.2		0.5
Malignancy		1.2		1.2
Hypertensive Retinopathy		0.4		0.4
Uremic Dermatitis		1.8		0.4
Uremic Neuritis		0.8		0.5
Uremic Dementia		0.2		0.3
Uremic Ascites / Pleural Effusion		0.2		0.3
Osteodystrophy		0.5		0.2
COPD & other pulm disease		0.4		0.2
Decubitus ulcer/ DM foot		2.0		1.6

Part 10. Causes of Death in Dialysis Patients

Table 10-1. Causes of death (%) in dialysis patients, 1994-2014.

	1994-96	1998	2001	2003	2005	2007	2009	2010	2011	2012	2013	2014
Cardiac	**27.4**	**27.4**	**26.9**	**31.7**	**30.7**	**31.7**	**29.5**	**31.1**	**32.7**	**33.9**	**35.8**	**32.5**
Myocardial infarction	6.4	6.4	7.7	7.4	8	7.5	8.0	8.3	6.6	6.8	7.5	5.7
Cardiac arrest, uremia associated	13.7	13.7	11.2	11.7	10.4	10.8	8.5	8.7	11.0	11.1	14.2	14.1
Cardiac arrest, other cause	7.2	7.2	8.1	12.5	12.4	13.3	13	14.2	15.0	16.0	14.2	12.6
Vascular	**17.2**	**17.2**	**22.7**	**19.5**	**17**	**17.8**	**15.9**	**13.3**	**14.1**	**13.0**	**13.3**	**13.2**
Cerebrovascular accident	14.3	14.3	15.1	14.5	12.3	13	11	8.2	8.7	7.9	8.7	8.5
Pulmonary embolus	0.2	0.2	0.5	0.1	0.6	0.5	0.2	0.1	0.2	0.3	0.2	0.2
Gastrointestinal hemorrhage	1.7	1.7	2.7	3.2	1.7	2.7	2.3	2.6	2.2	2.3	1.2	1.7
Gastrointestinal embolism	0.1	0.1	0.1	0	0.5	0.1	0.5	0.4	0.1	0.6	0.2	0.2
Other vascular disease	0.9	0.9	4.3	1.6	1.9	1.6	1.9	2.2	3.0	1.9	3.0	2.6
Infection	**13.5**	**13.5**	**17.8**	**20.5**	**20.1**	**20.2**	**21.9**	**22.6**	**23.1**	**24.5**	**23.5**	**26.8**
Pulmonary infection	2.5	2.5	4.5	3.6	4.5	4.4	5.9	7.5	8.4	10.8	8.4	9.0
Septicemia	6.6	6.6	6.9	9.7	9.6	11.7	10.4	10.7	9.7	8.9	11.9	13.6
Tuberculosis	0.3	0.3	0.8	0.2	0.3	0.2	0.3	0.2	0.1	0.7	0.1	0.1
Peritonitis	2.1	2.1	1.1	2	1.4	1.1	0.8	1.2	1.0	1.0	0.5	0.7
Other Infection	2	2	4.5	4.9	4.3	2.9	4.5	2.9	4.0	3.0	2.7	3.4
Liver disease	**3.4**	**3.4**	**2.6**	**2.8**	**2.7**	**2.2**	**3.1**	**2.7**	**2.1**	**2.8**	**2.4**	**2.2**
Liver failure due to hepatitis B	1.8	1.8	1.6	1.8	1.5	1.3	2.2	1.2	1.0	1.4	1.3	1.0
Liver failure due to other cause	1.6	1.6	1	1	1.2	0.8	0.9	1.6	1.1	1.3	1.1	1.2
Social	**6.2**	**6.2**	**6.3**	**4.4**	**5.4**	**3.3**	**2.5**	**2.9**	**3.3**	**2.2**	**2.8**	**2.5**
Patient refused further treatment	2.9	2.9	2.1	1	1.1	1.1	0.5	0.3	0.4	0.6	0.3	0.3
Suicide	2.5	2.5	3.3	2.3	3.3	1.5	1.3	1.9	1.4	1.4	1.3	1.6
Therapy ceased for other reason	0.8	0.8	0.9	1	1	0.7	0.8	0.7	1.5	0.3	1.2	0.7
Miscellaneous	**32**	**32**	**23.7**	**21.3**	**24**	**24.8**	**27.1**	**27.3**	**24.7**	**23.6**	**22.2**	**22.9**
Cachexia	2.9	2.9	8.1	6.6	4	4.4	3.3	2.8	2.7	2.1	1.6	1.5
Malignant disease	2.1	2.1	4.4	3.5	6.4	5.7	5.7	5.9	6.0	6.7	5.7	6.0
Accident	1.2	1.2	0.9	1.1	1.4	1.2	1.3	0.6	1.6	1.4	1.4	2.0
Uncertain	25.8	25.8	10.3	10.1	12.3	13.4	16.8	18	14.5	13.3	13.4	13.4

*Number of patients :1994-1996=981, 1998=911, 2001=761, 2003=894, 2005=1,256, 2007=1,531, 2009=1,727, 2010=1,802, 2011=1,828, 2012=1,745, 2013=1,604, 2014=1,534.

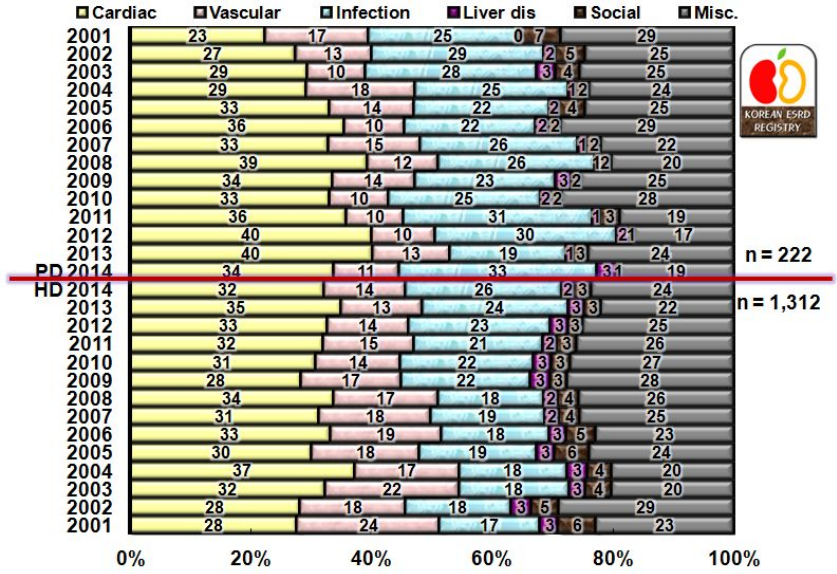


Fig. 10-1. Comparison of death causes, hemodialysis versus peritoneal dialysis patients in 2001-2014.

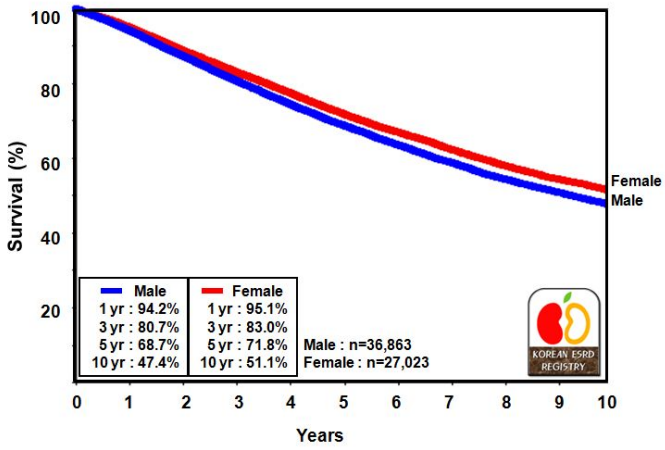


Fig. 11-1. Overall registered dialysis patient survival since 2001.

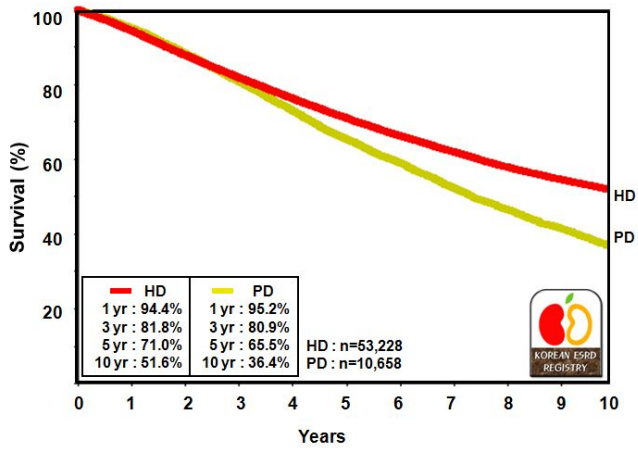


Fig. 11-2. HD and PD patient survival since 2001.

Part 11. Survival of Dialysis Patients (2) - Diseases & Modalities

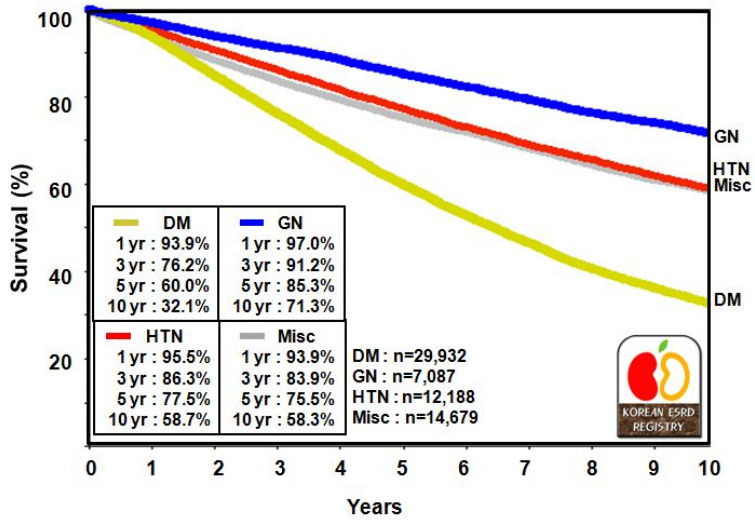


Fig. 11-3. Patient survival according to underlying diseases since 2001 (DM: diabetic nephropathy, GN: chronic glomerulonephritis, HTN: hypertension Misc: miscellaneous).

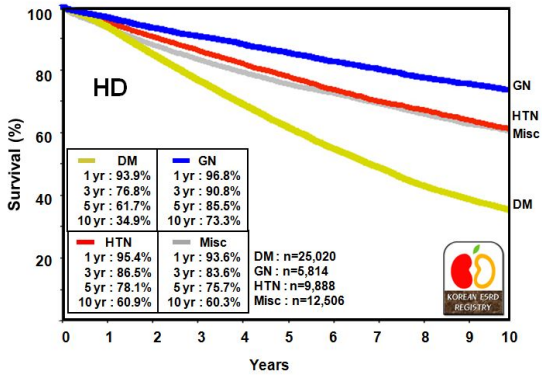


Fig. 11-4 . Patient survival according to underlying diseases in hemodialysis patients since 2001.

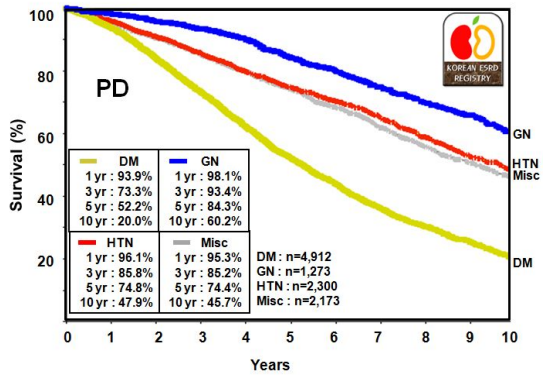


Fig. 11-5. Patient survival according to underlying diseases in peritoneal dialysis patients since 2001.

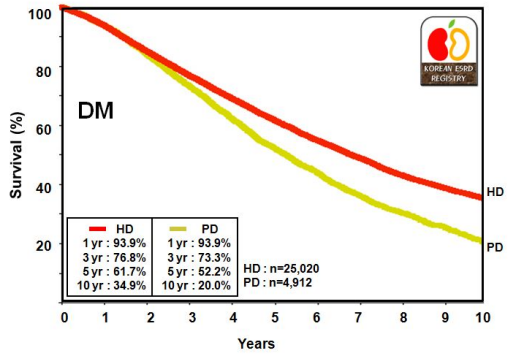


Fig. 11-6. Survival of diabetic dialysis patient according to dialysis modalities since 2001

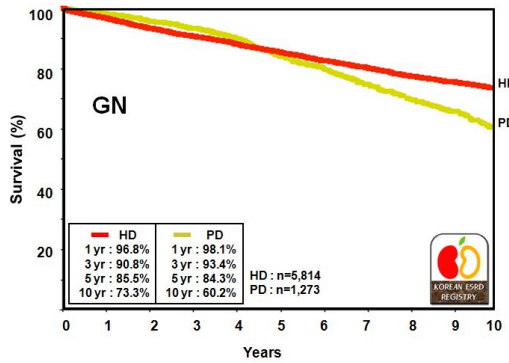


Fig. 11-7. Survival of dialysis patient with underlying glomerulonephritis according to dialysis modalities since 2001.

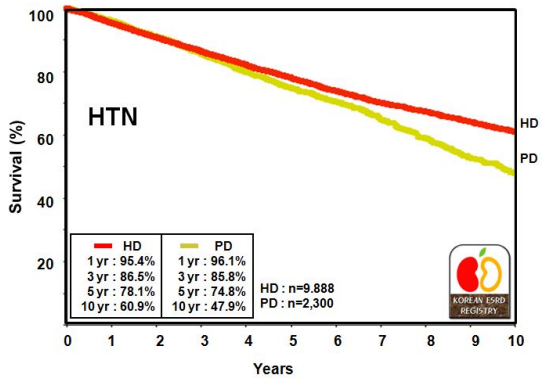


Fig. 11-8. Survival of dialysis patient with underlying hypertensive sclerosis according to dialysis modalities since 2001.

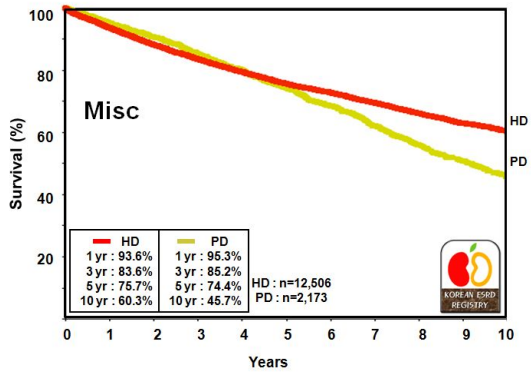


Fig. 11-9. Survival of dialysis patient with miscellaneous underlying diseases according to dialysis modalities since 2001.

Part 12. Kidney Transplantation

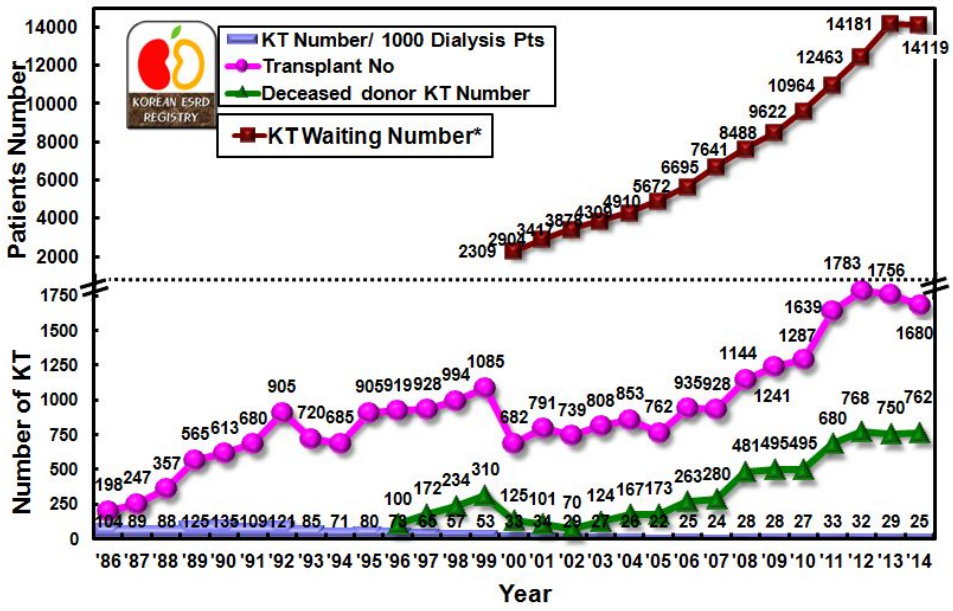


Fig. 12-1. Annual number of kidney transplantation in Korea (including data from KONOS: Korean Network for Organ Sharing). *Survived KT waiting patient number at the end of each year.

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