

우리나라 신대체 요법의 현황

– 인산 민병석 교수 기념 말기 신부전 환자 등록사업 2014 –

Current Renal Replacement Therapy in Korea

-Insan Memorial Dialysis Registry 2014-



대한신장학회 등록위원회

ESRD Registry Committee, Korean Society of Nephrology

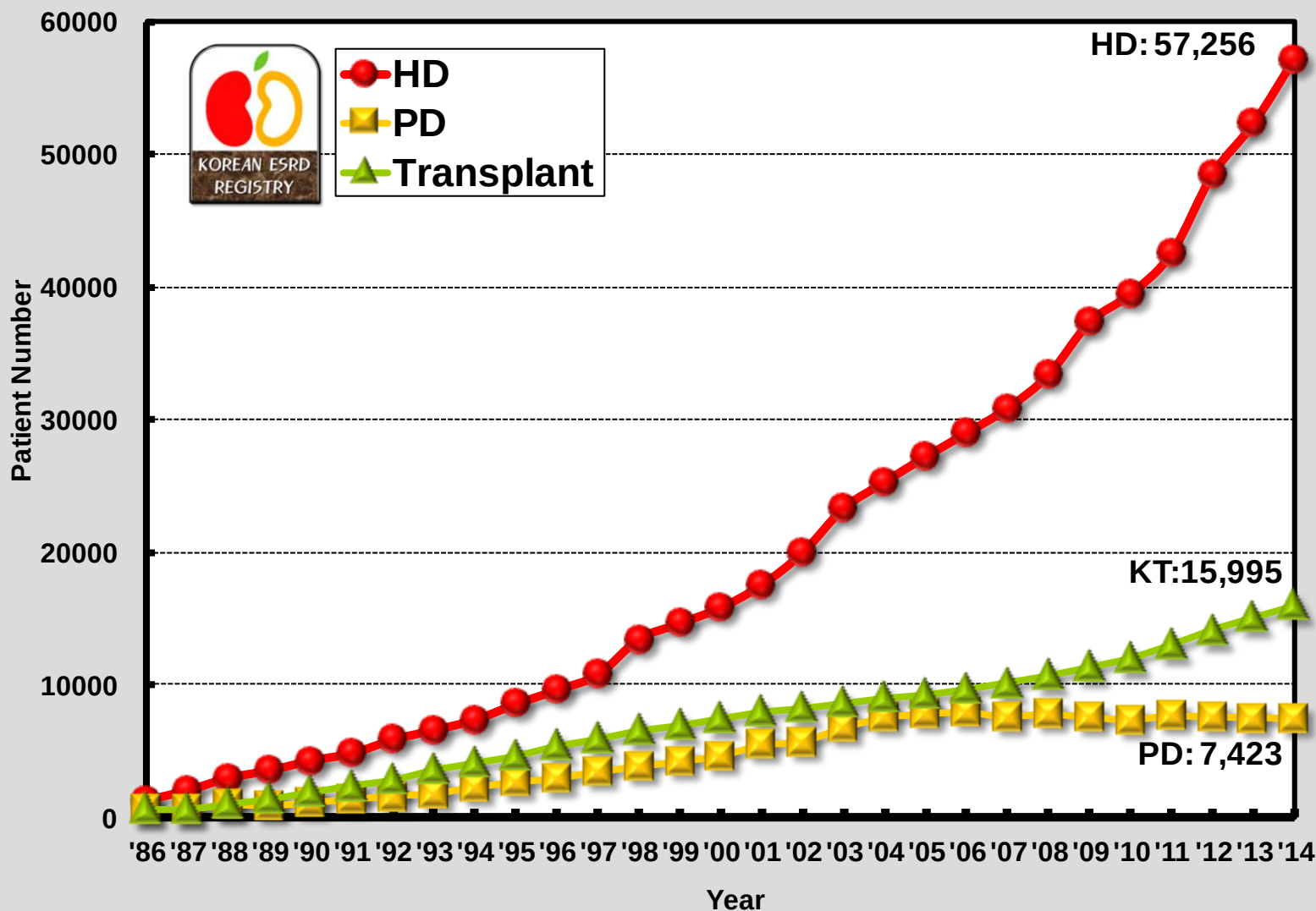
Prevalence of Renal Replacement Therapy



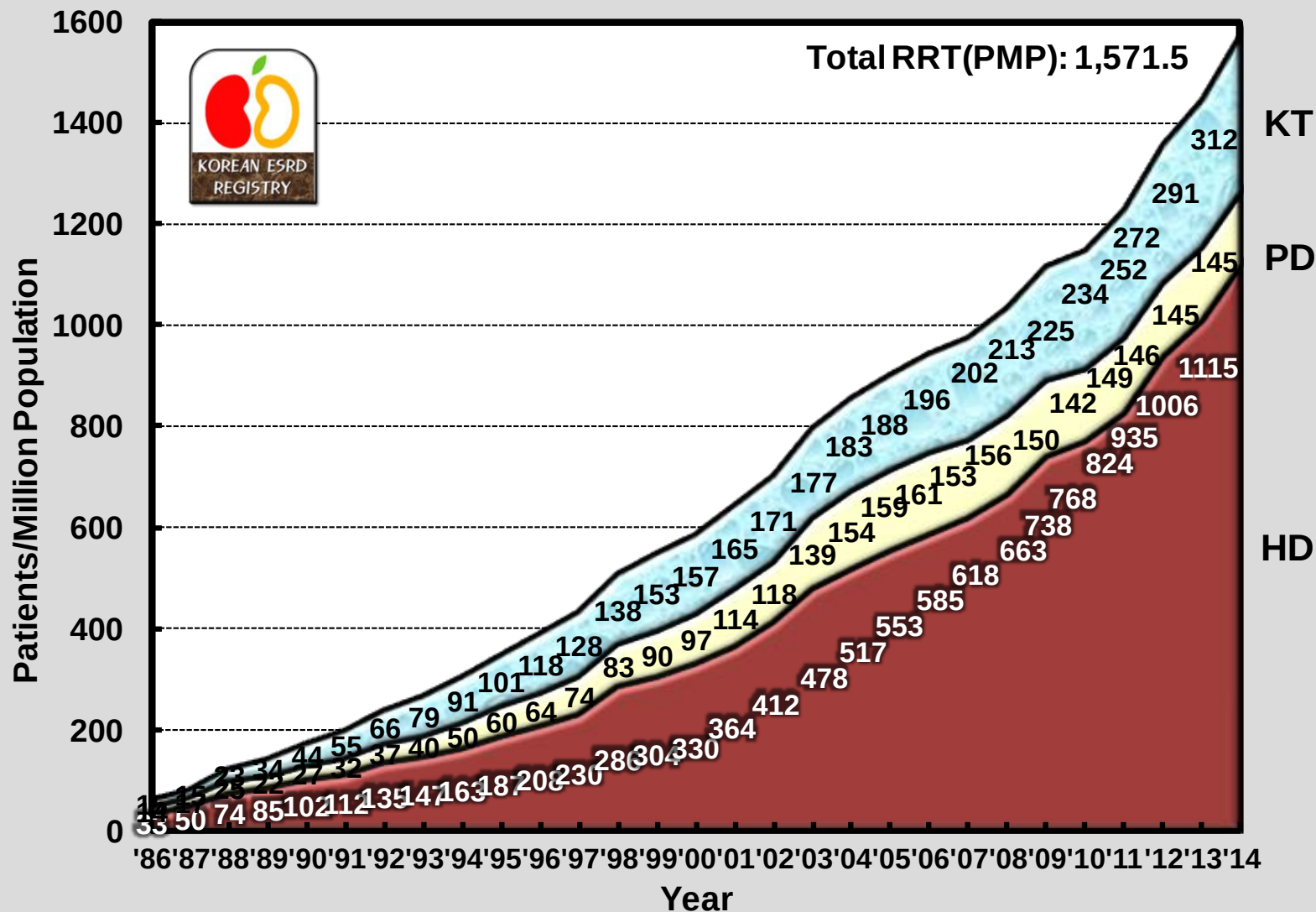
Year	HD		PD		Transplant		Total	
1986	1,335	(32.6)	573	(13.9)	621	(15.1)	2,534	(61.7)
1988	3,012	(74.0)	1,058	(25.2)	982	(23.4)	5,142	(122.7)
1990	4,311	(101.8)	1,130	(26.7)	1,866	(44.1)	7,307	(172.6)
1992	5,890	(135.3)	1,599	(36.7)	2,862	(65.8)	10,351	(237.8)
1994	7,387	(162.7)	2,284	(50.3)	4,116	(90.6)	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.

Patient Number of RRT



Point Prevalence of RRT

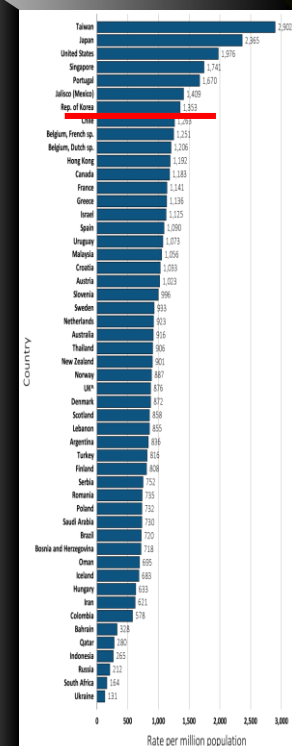
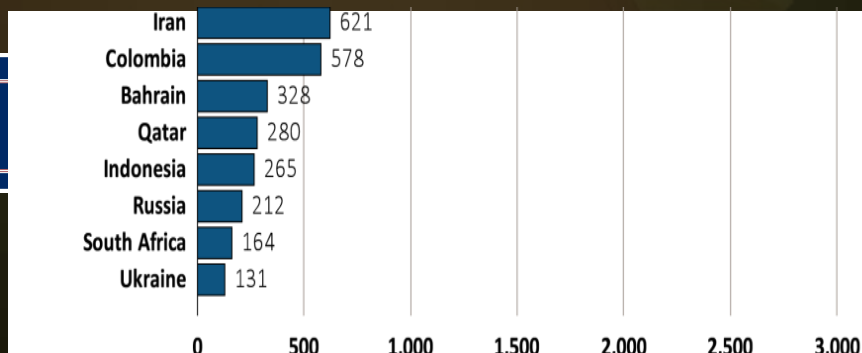
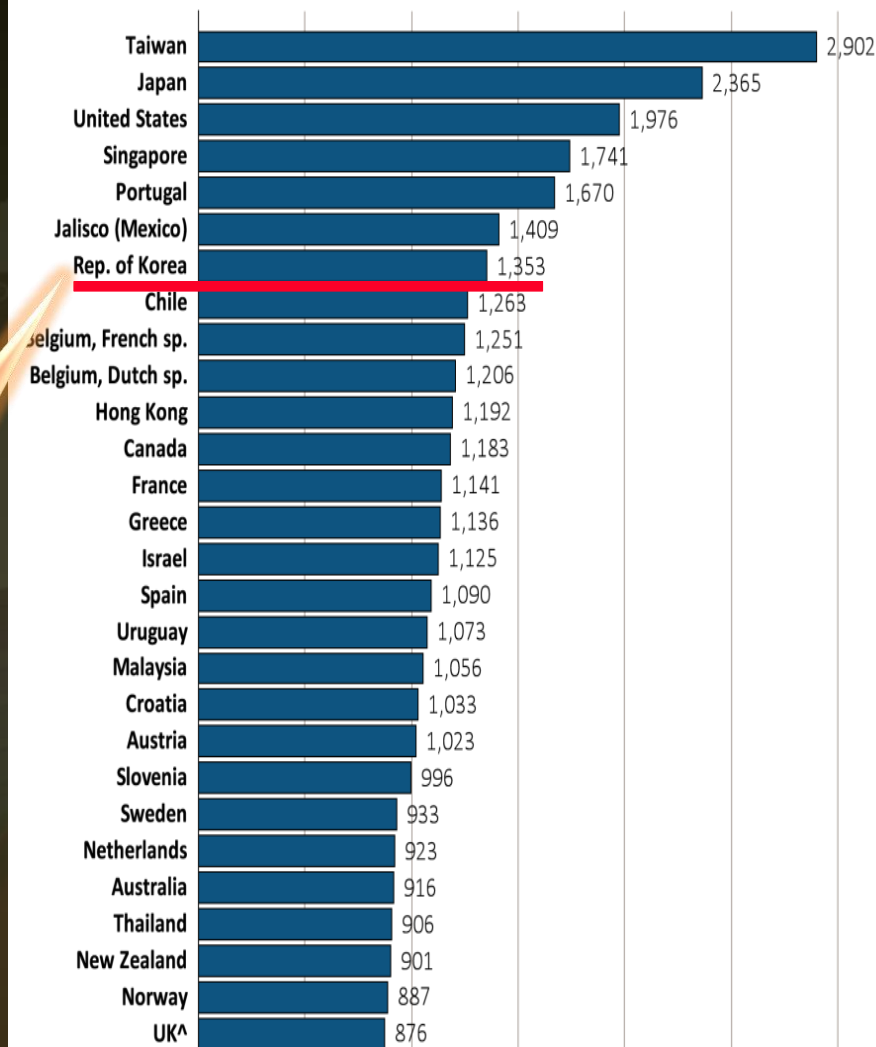


Prevalence of ESRD

**1,353 PMP
End of 2012**

USRDS
UNITED STATES RENAL DATA SYSTEM

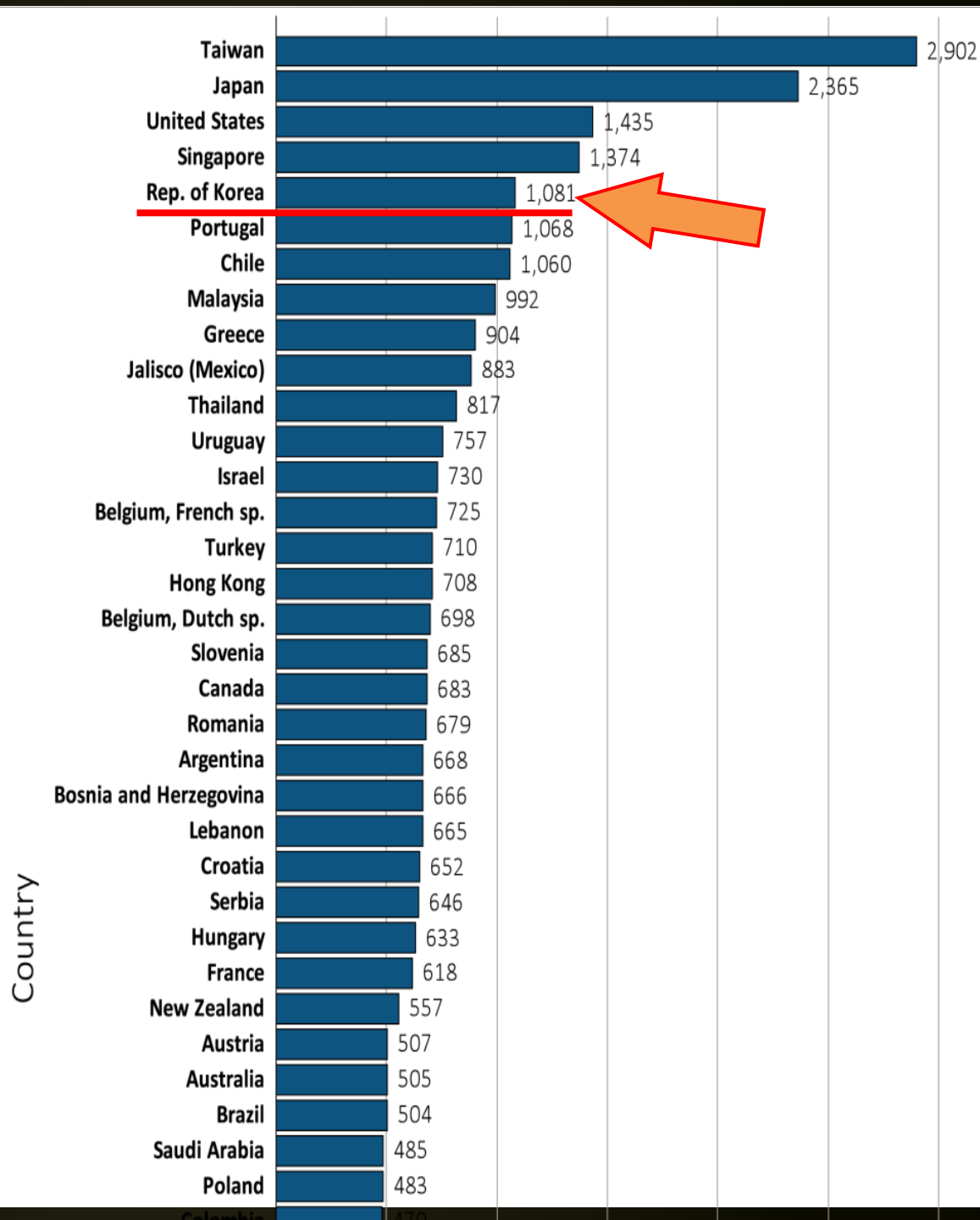
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Volume 2: End-Stage Renal Disease



Prevalence of dialysis, per million population, by country, in 2012



2014 USRDS ANNUAL DATA REPORT
Volume 2: End-Stage Renal Disease



우리나라 혈액투석 환자수 및 진료비 (심평원 자료)

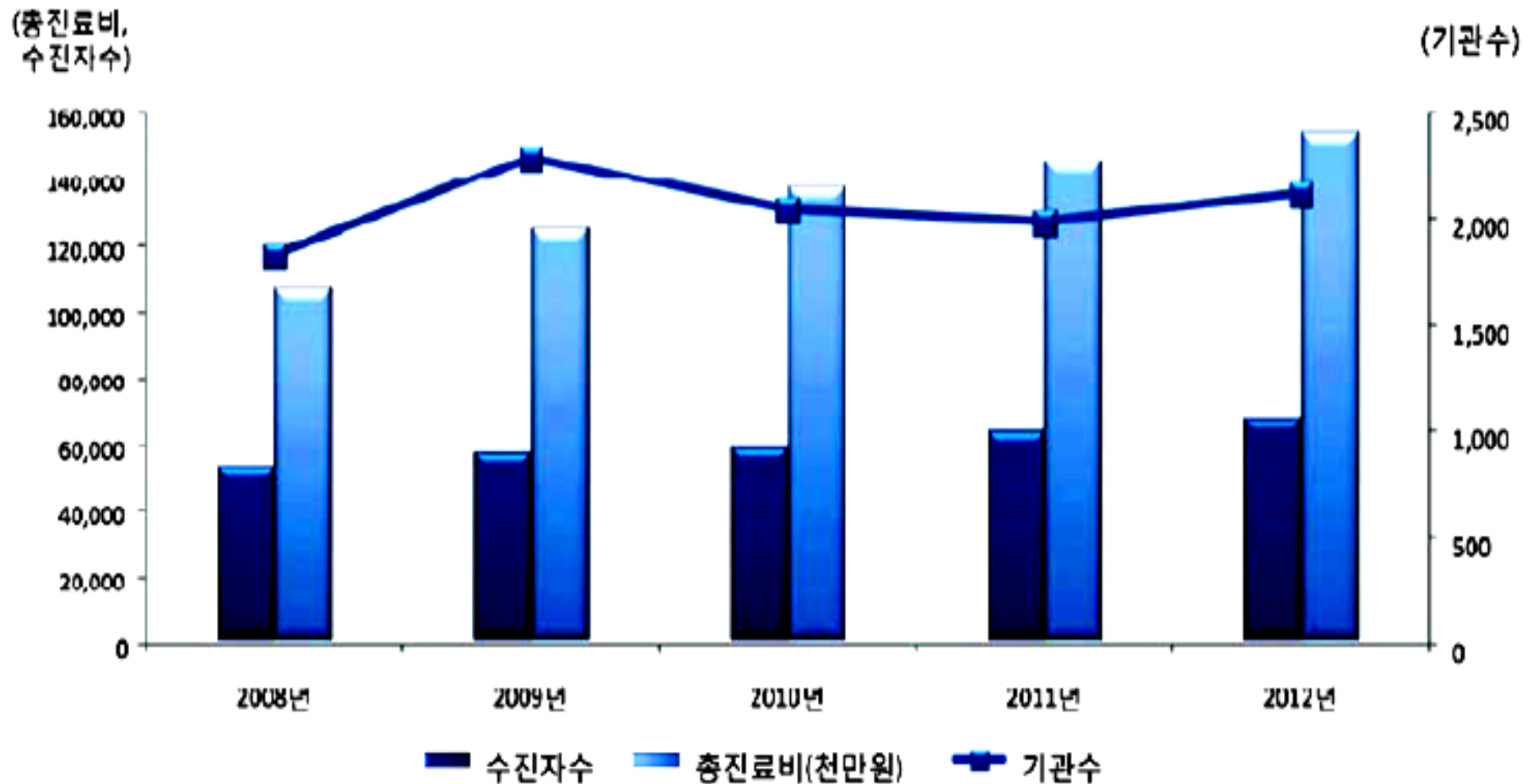


그림 2.36 혈액투석 환자수 및 진료비 증가추이

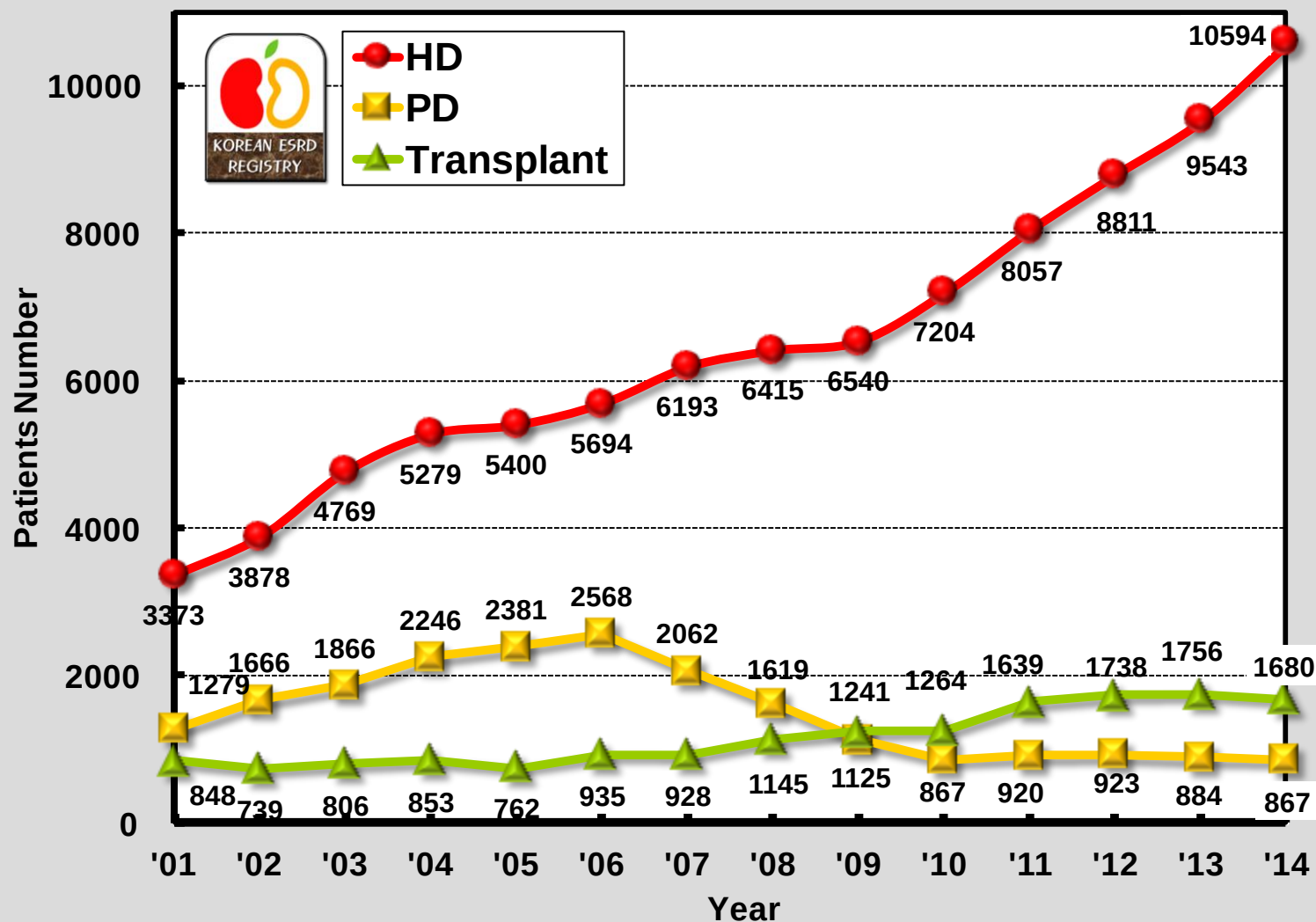
Number of New RRT Patients



	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.

Number of New RRT Patients

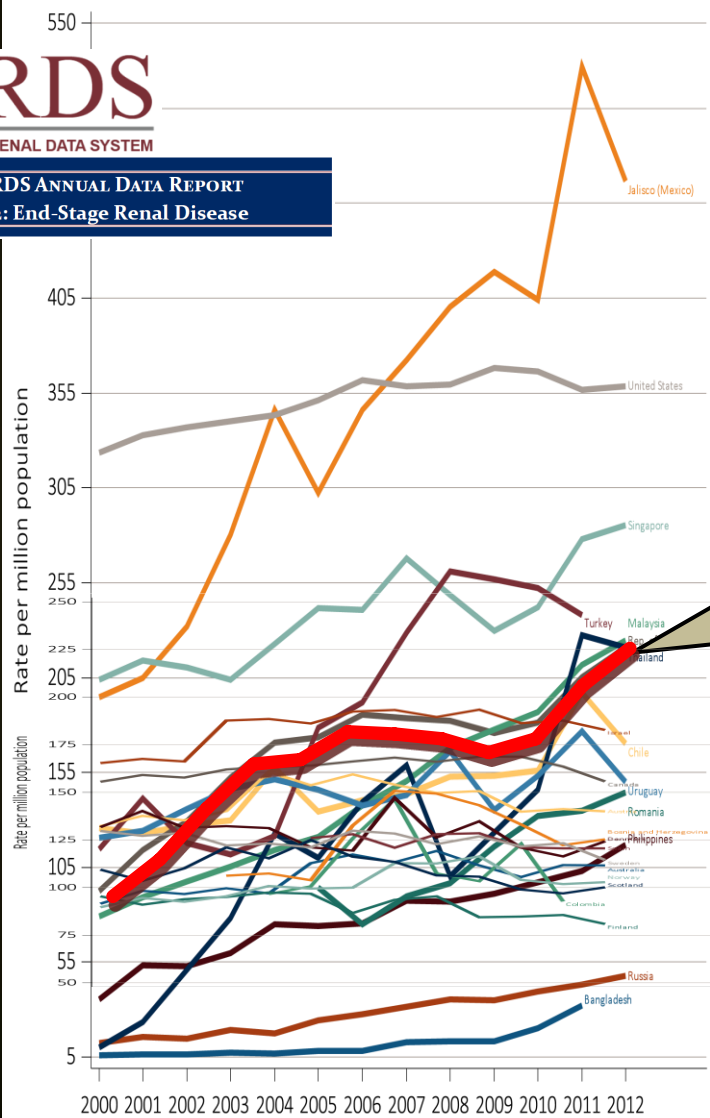


Incidence of ESRD

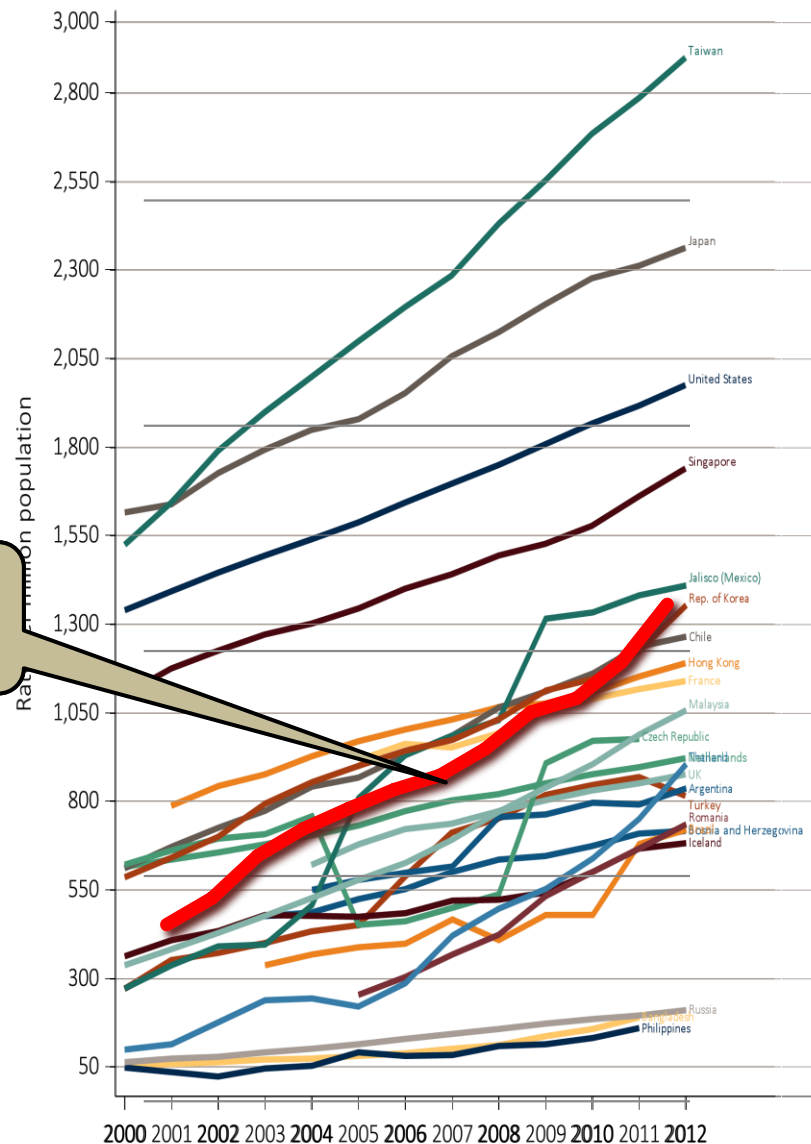
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Prevalence of ESRD

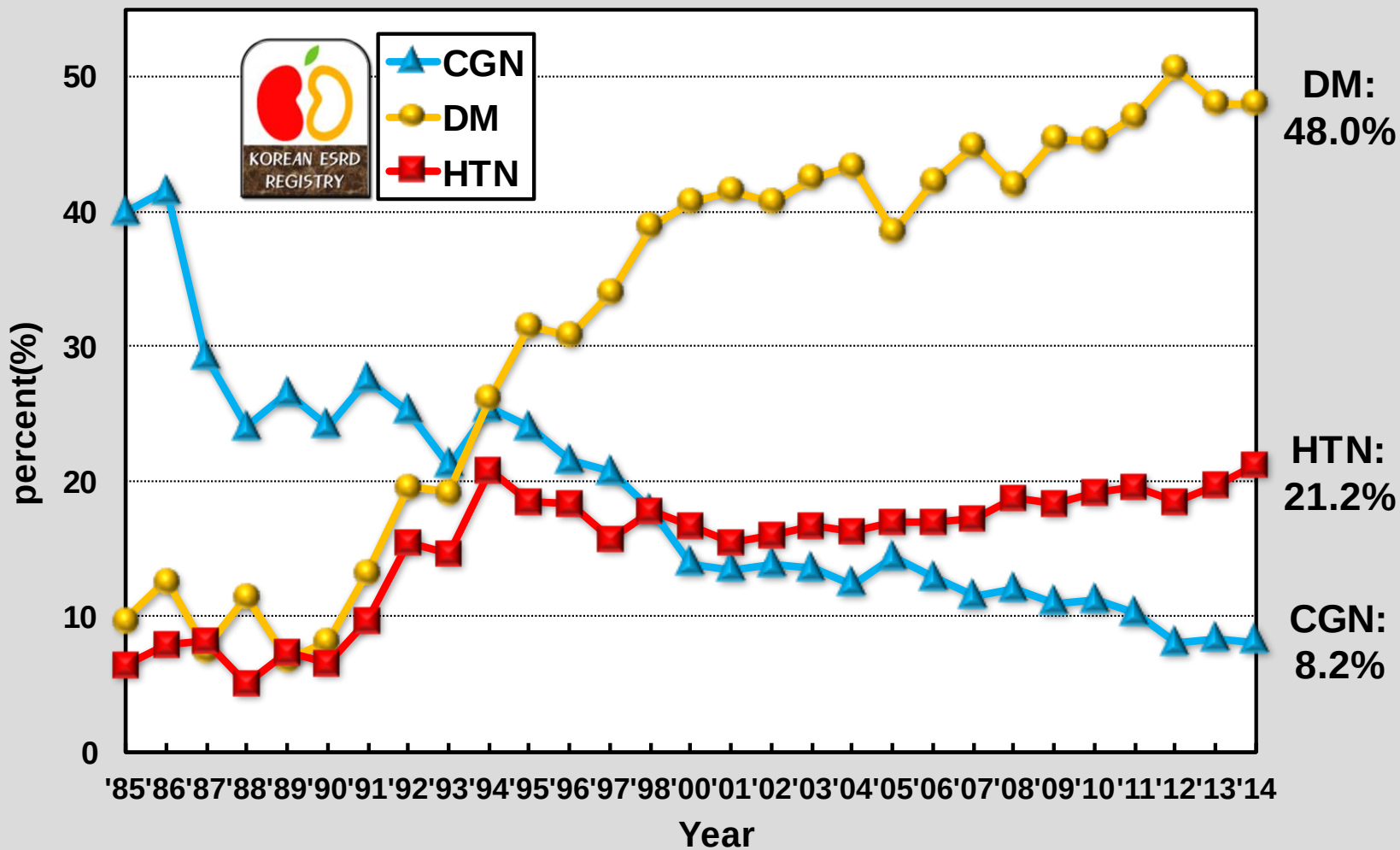


Causes of ESRD in New Patients



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

Three Major Causes of ESRD

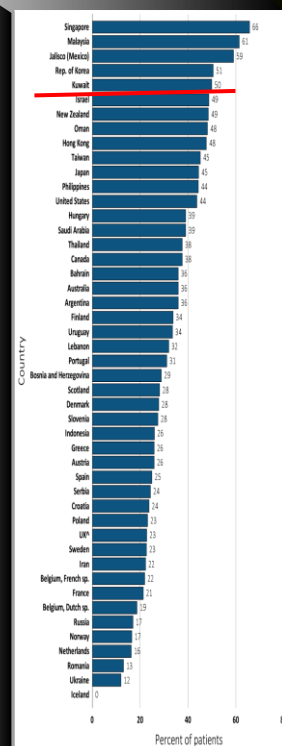
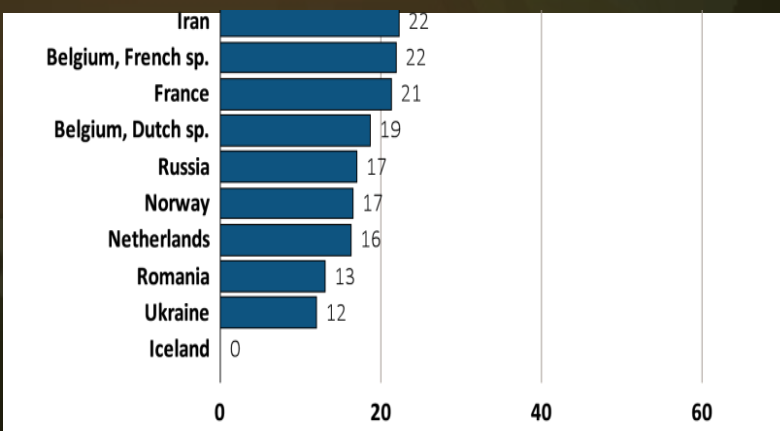
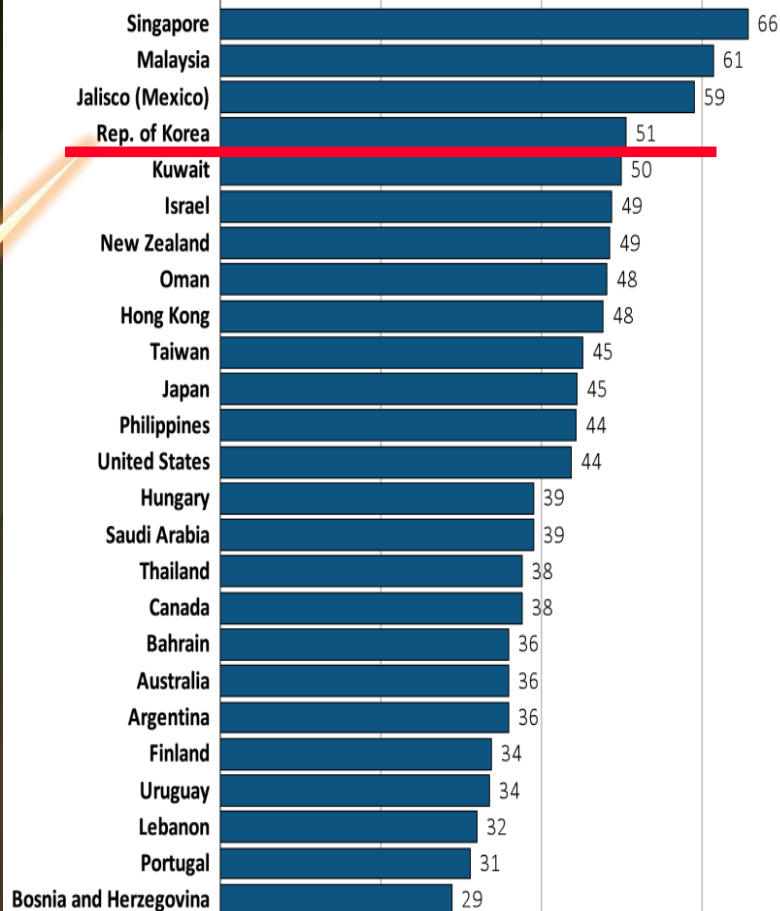


Diabetic ESRD

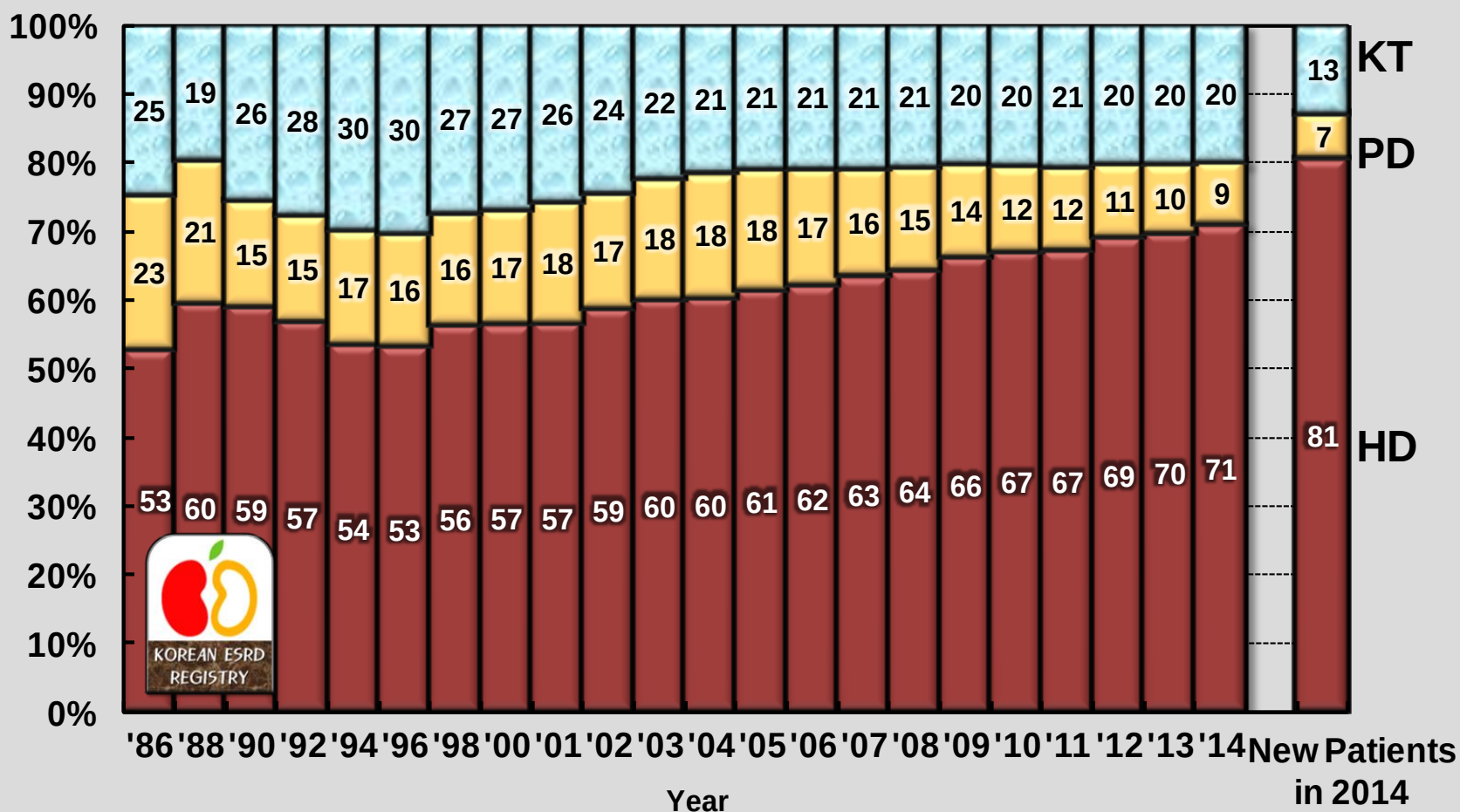
51%
in 2012

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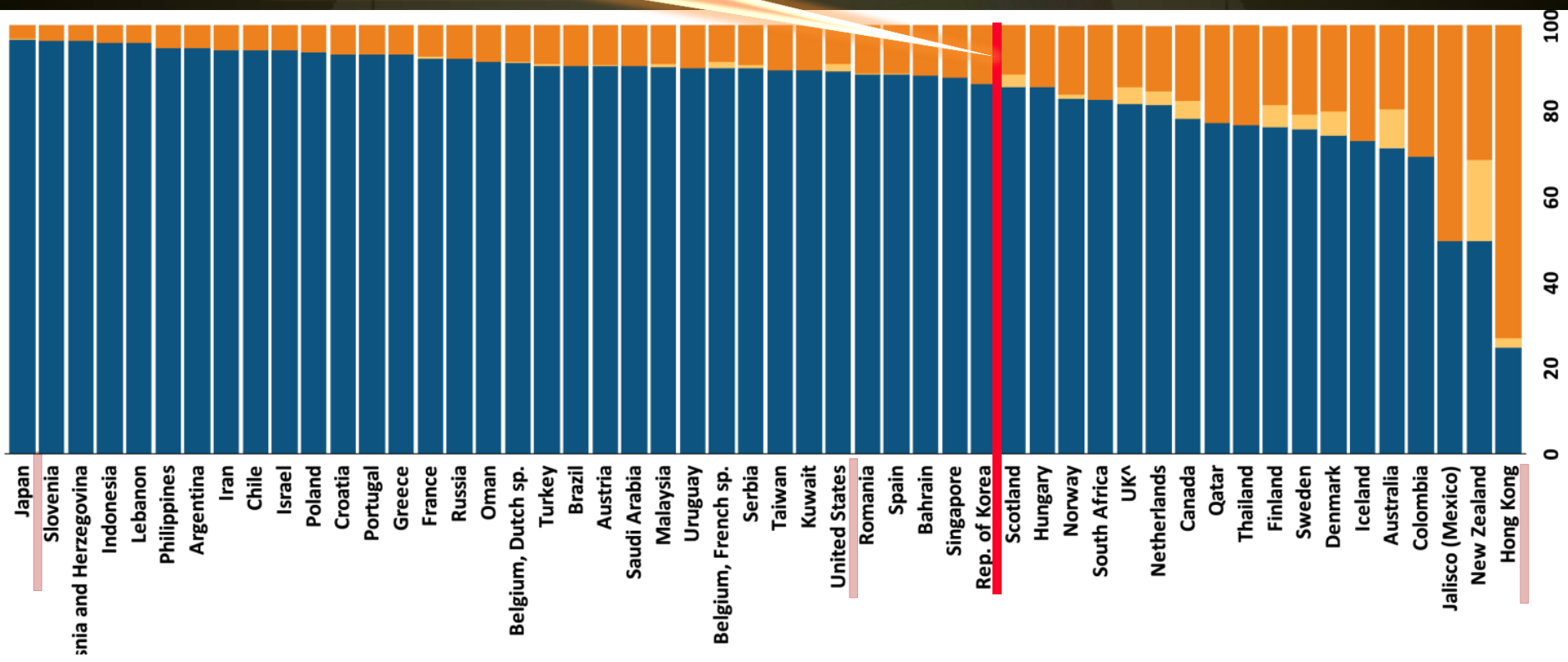
Proportion of RRT Modalities



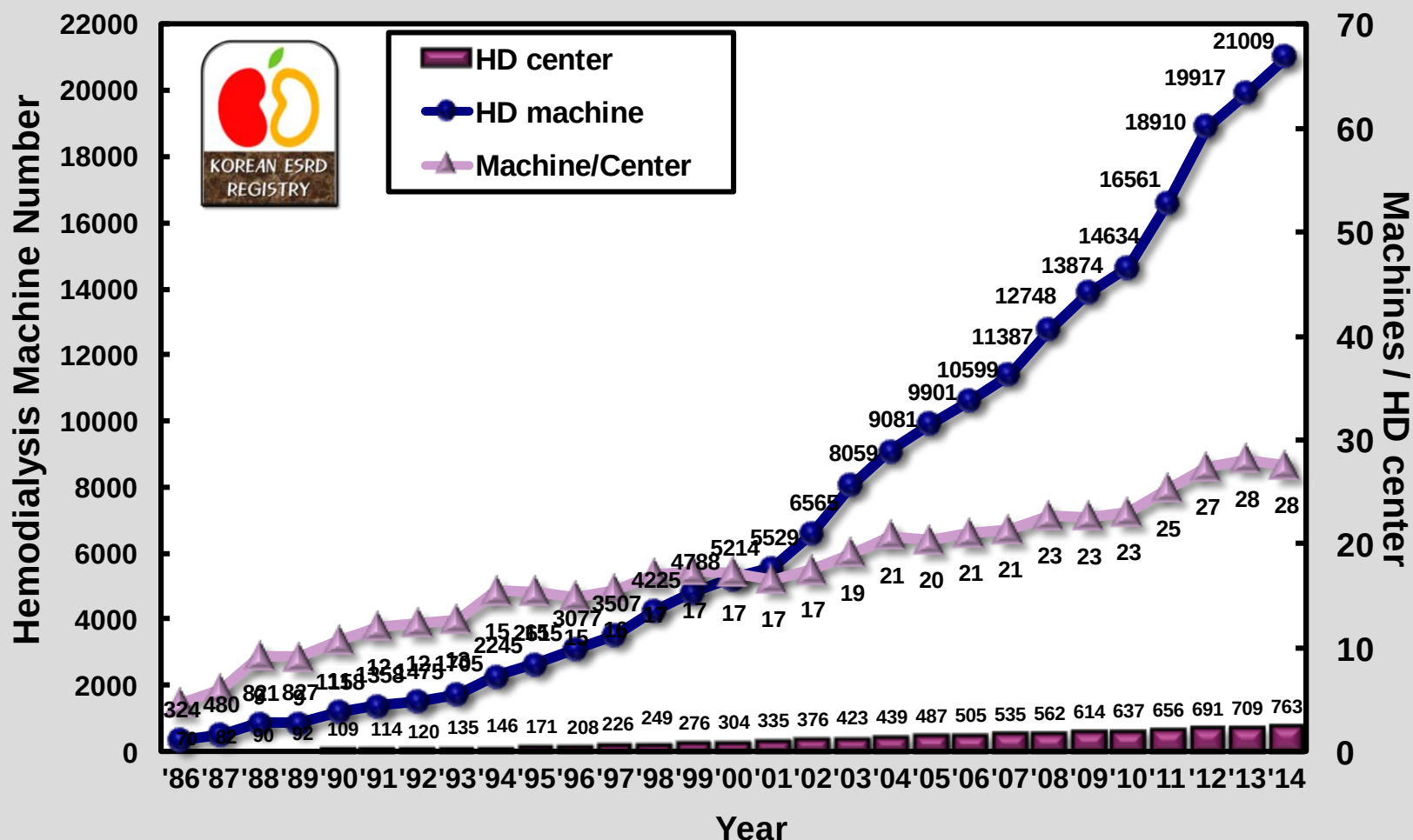
Percent Distribution of Dialysis Modalities

HD:PD = 86.2% : 13.8%
End of 2012

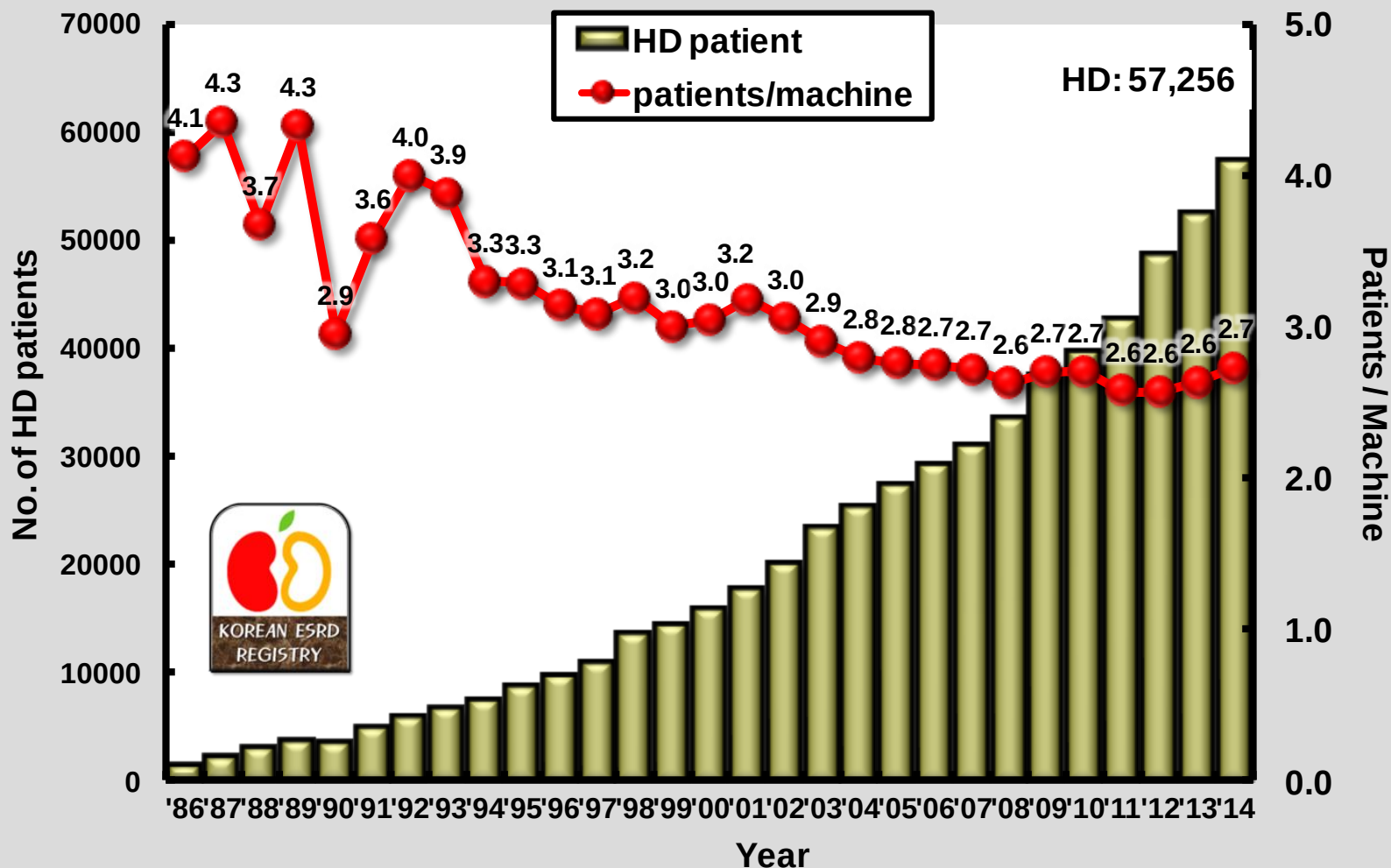
■ In-center HD
■ Home HD
■ CAPD/CCPD



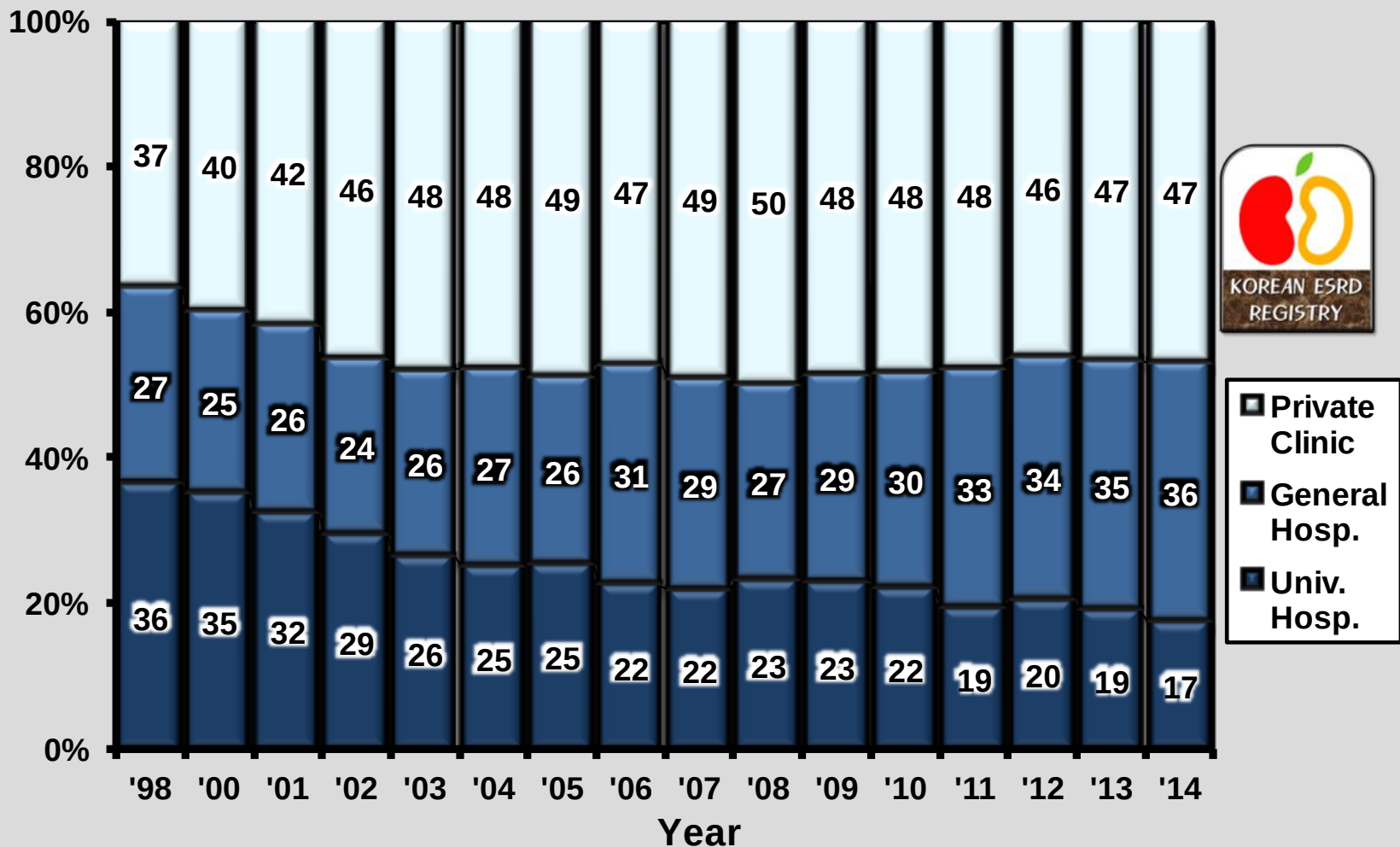
Number of HD Centers & HD Machines



Ratio of HD Machine & HD Patients



HD Pts Proportion by Dialysis Center Type



행정구역별 투석환자 및 혈액투석기 분포



(2014년 12월말 기준)

	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

생활권역별 투석환자 및 혈액투석기 분포



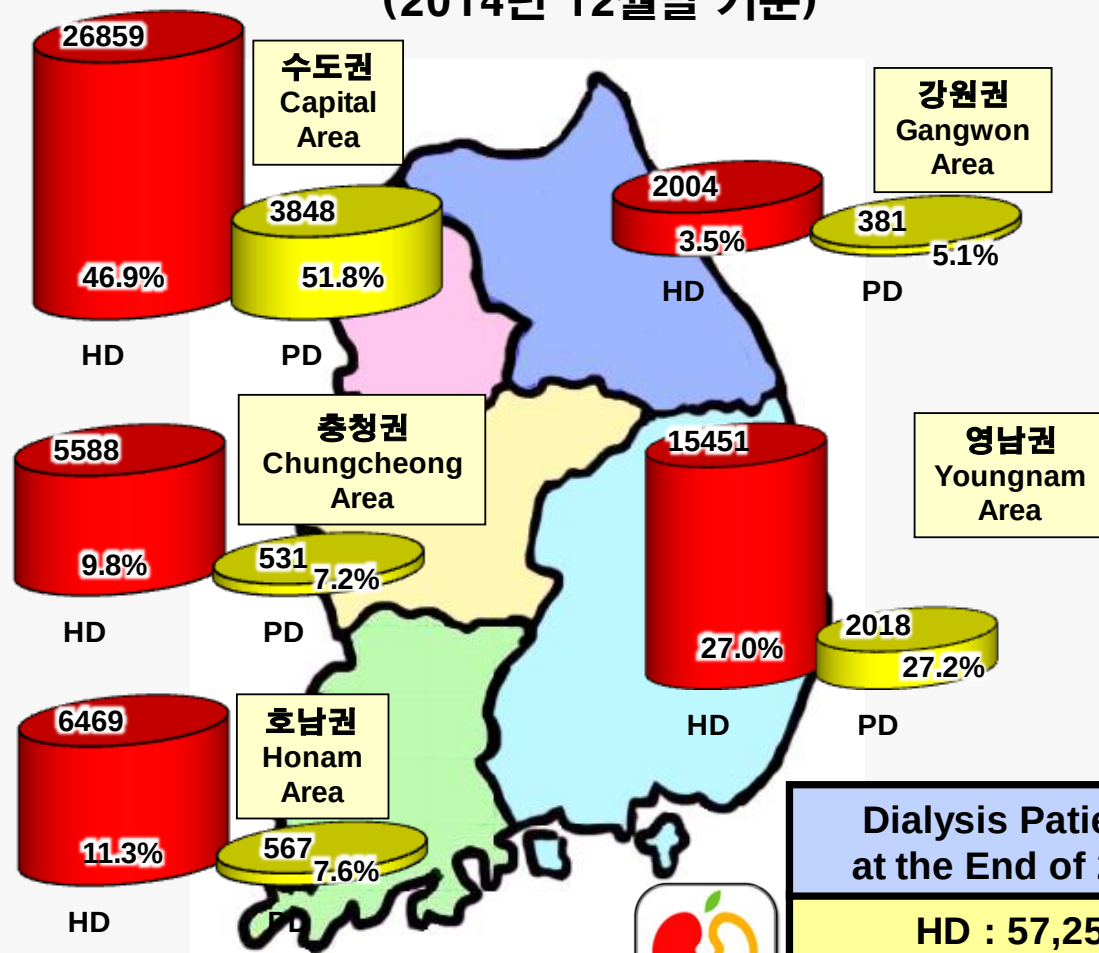
(2014년 12월말 기준)

	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 49.4%	26,859 46.9%	3,848 51.8%	30,707 47.5%	1,210	348 47.1%	10,057 47.9%	2.7
충청권 Chungchung (Daejeon, Chungnam, Chungbuk)	5,318,549 10.4%	5,588 9.8%	531 7.2%	6,119 9.5%	1,151	80 10.8%	2,042 9.7%	2.7
호남권 Honam (Gwangju, Jeonnam, Jeonbuk)	5,253,919 10.2%	6,469 11.3%	567 7.6%	7,036 10.9%	1,339	91 12.3%	2,555 12.2%	2.5
영남권 Youngnam (Busan, Daegu, Gyeongnam, Gyeongbuk, Ulsan)	13,228,875 25.8%	15,451 27.0%	2,018 27.2%	17,469 27.0%	1,321	183 24.8%	5,383 25.6%	2.9
강원권 Gangwon	1,545,896 3.0%	2,004 3.5%	381 5.1%	2,385 3.7%	1,543	27 3.7%	707 3.4%	2.8
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.

생활권역별 투석환자 분포

(2014년 12월말 기준)



Dialysis Patients
at the End of 2014

HD : 57,256

PD : 7,423

Total : 64,679

생활권역별 투석환자 비율의 연도별 변화

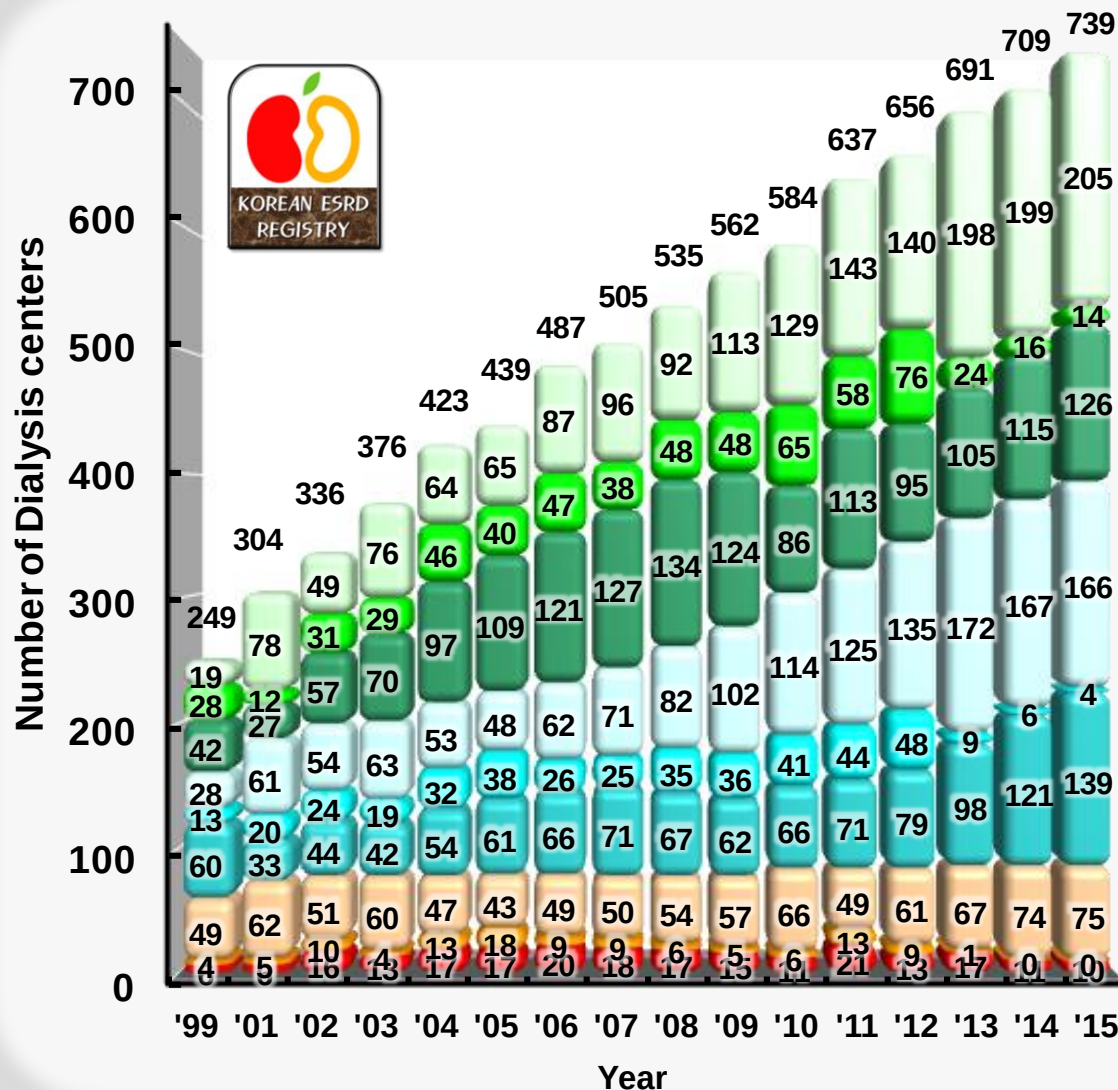


등록사업에 참여한 의료기관 수 및 응답률

	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.

의료기관의 증가와 의료기관별 등록률



Overall Contrib. Rate : 62.8%
(464/739)

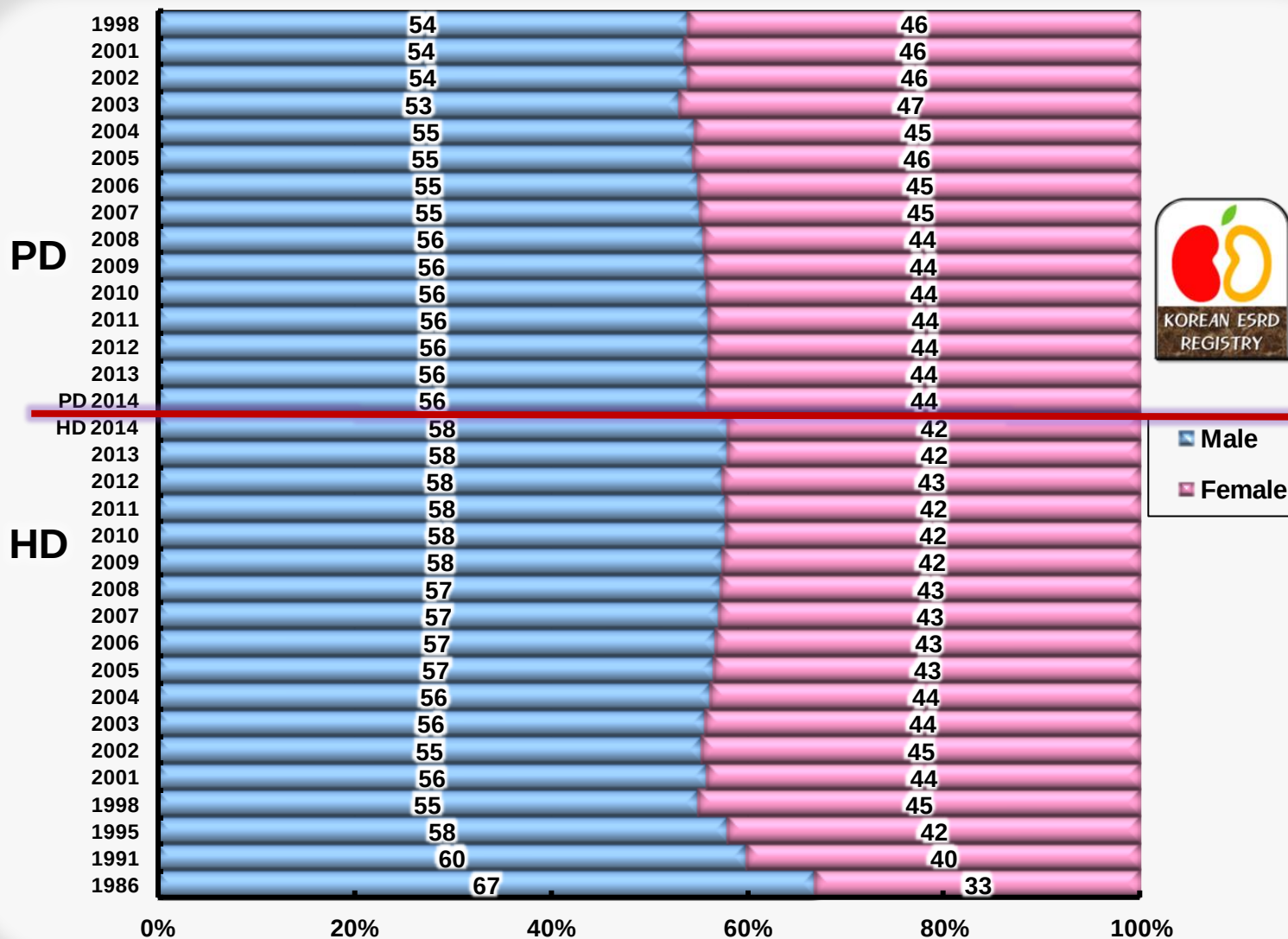
Private Clinic : 63.5%
(219/345)

General Hosp.: 55.0%
(170/309)

Univ. Hosp. : 88.2%
(75/85)

- Internet, Priv. Clinic
- Paper, Priv. Clinic
- No Ans., Priv. Clinic
- Internet, Gen. Hosp.
- Paper, Gen. Hosp.
- No Ans., Gen. Hosp.
- Internet, Univ. Hosp.
- Paper, Univ. Hosp.
- No Ans., Univ. Hosp.

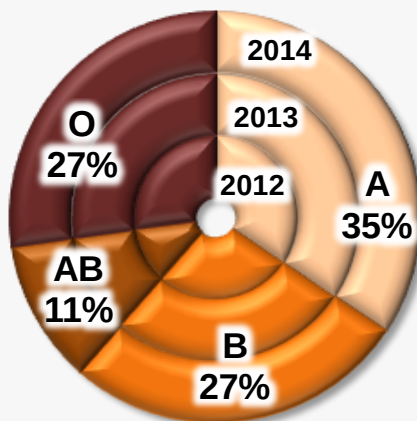
Gender Ratio of Dialysis Patients



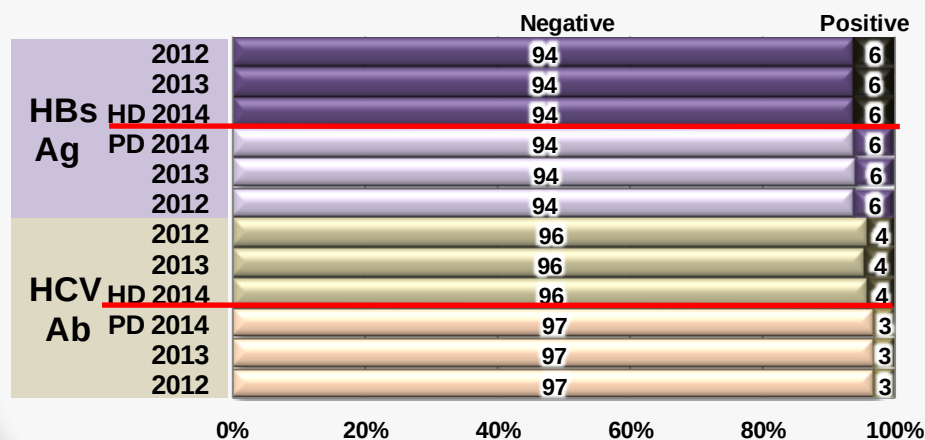
■ Male
■ Female

ABO Blood type, Hepatitis virus, Insurance

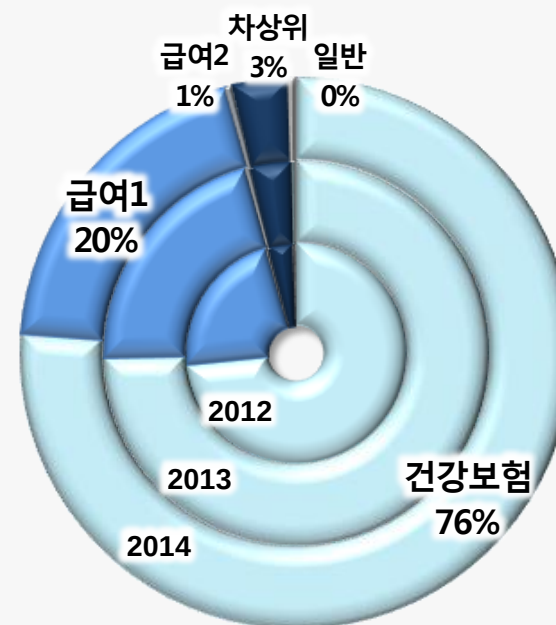
ABO Blood Type



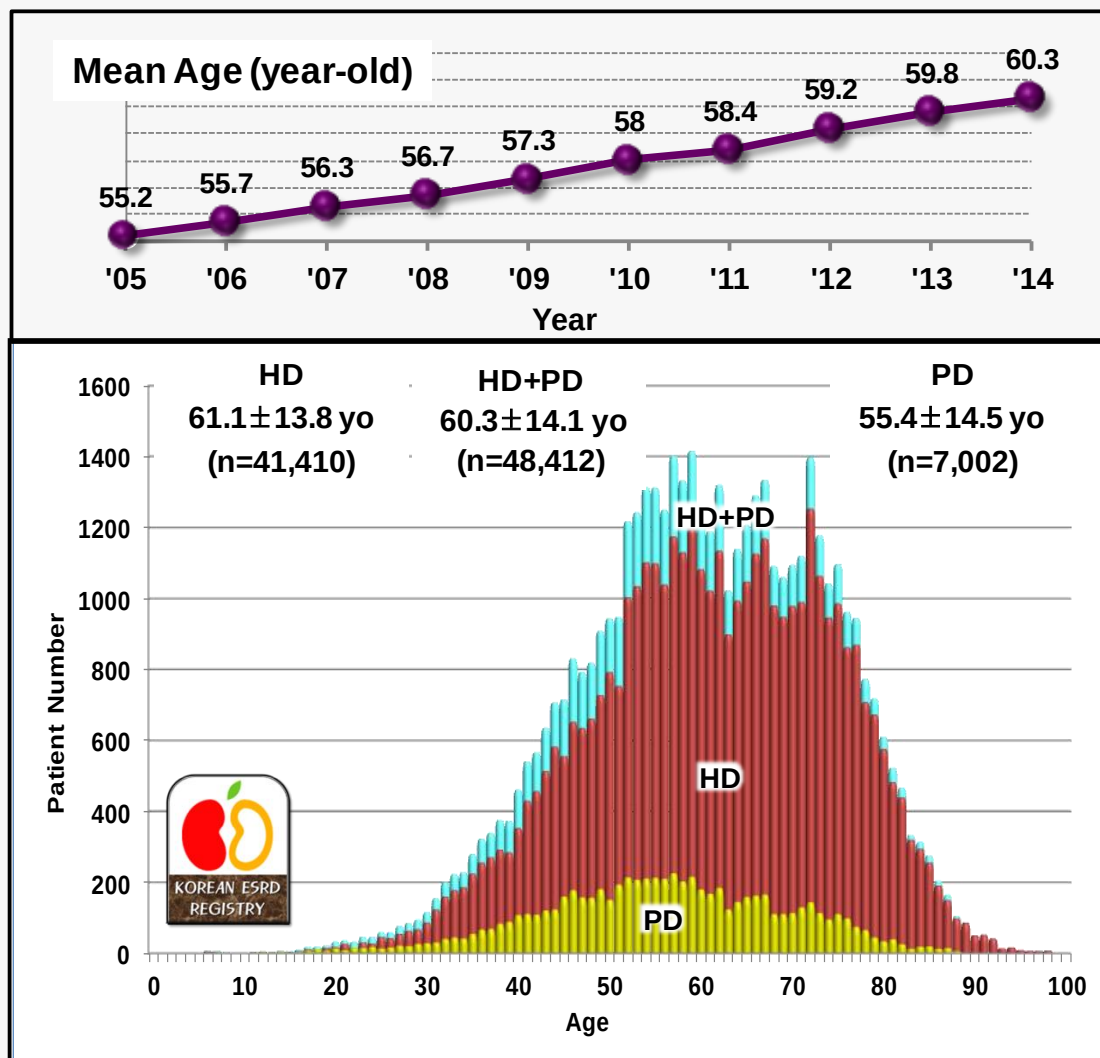
Hepatitis Virus



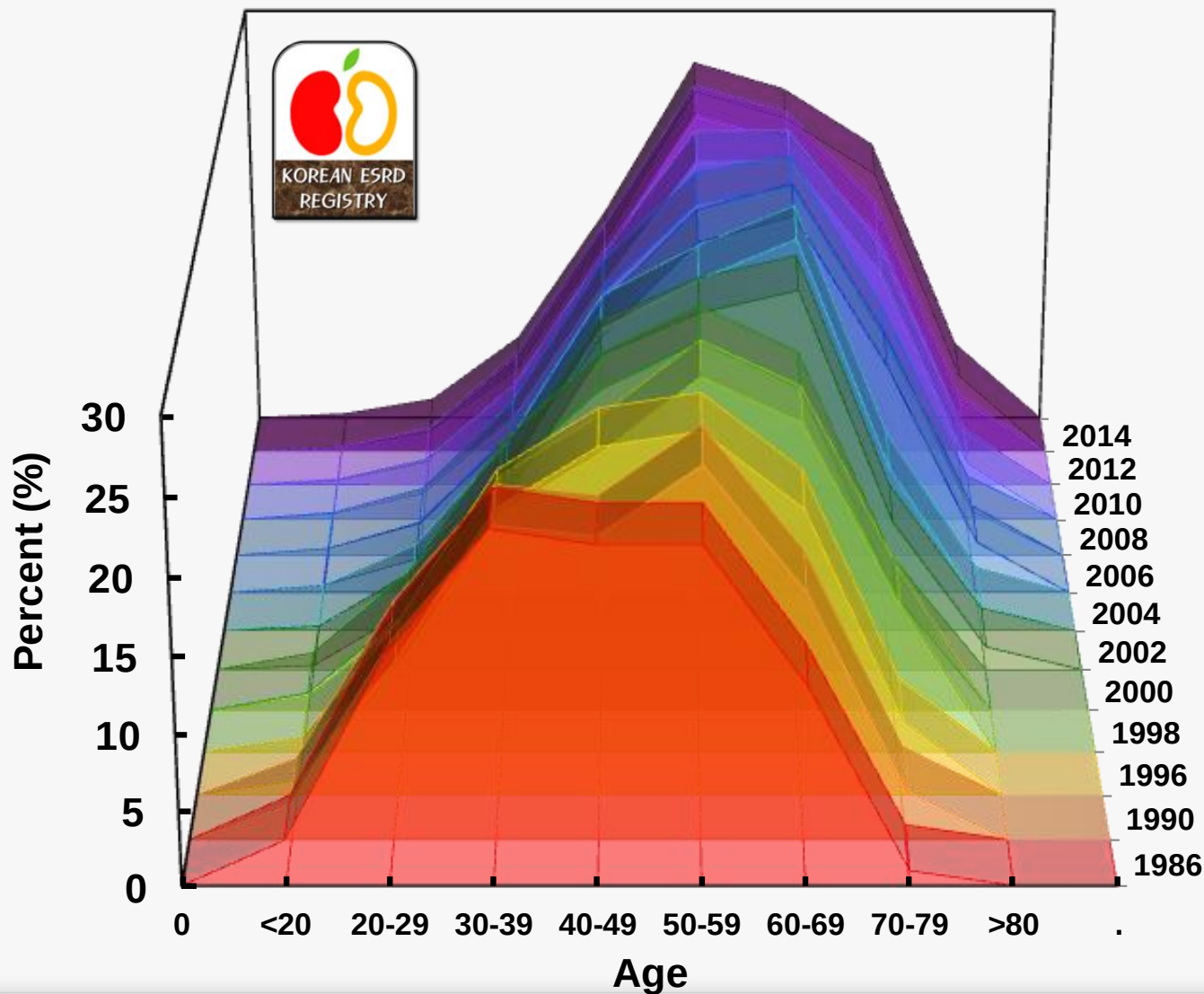
Insurance



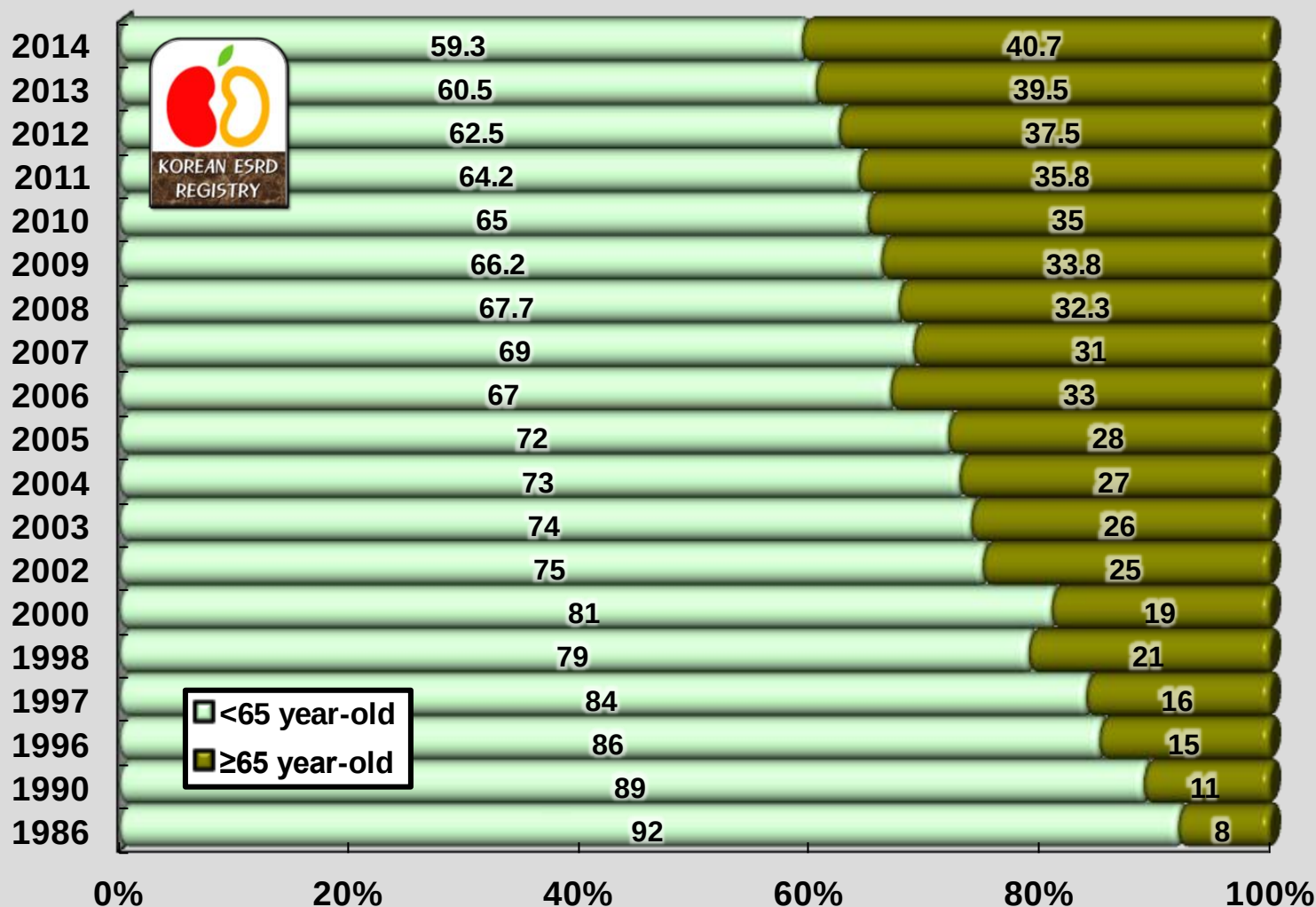
Age Distribution of Dialysis Patients



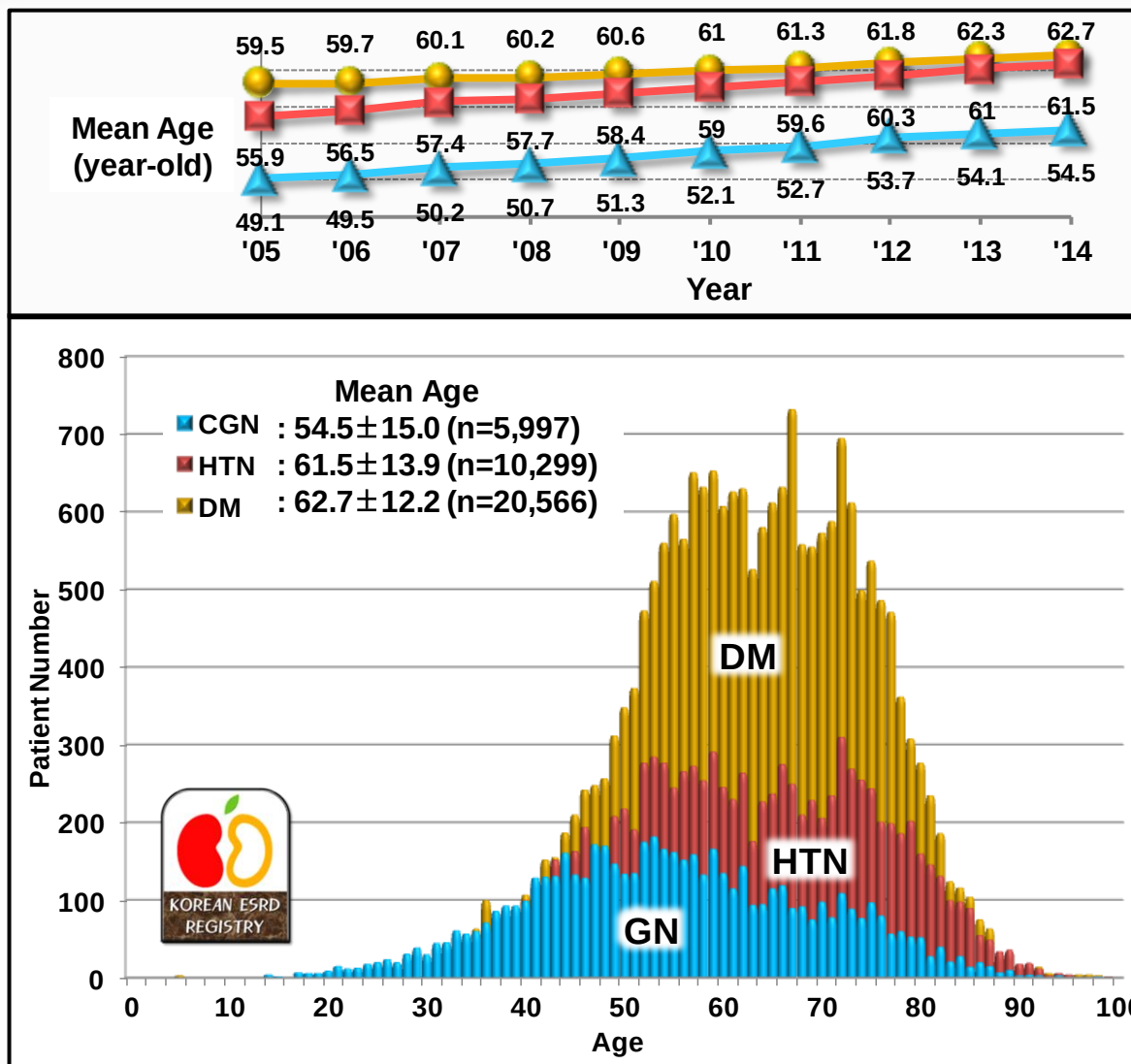
Age Distribution of HD Pts according to Year



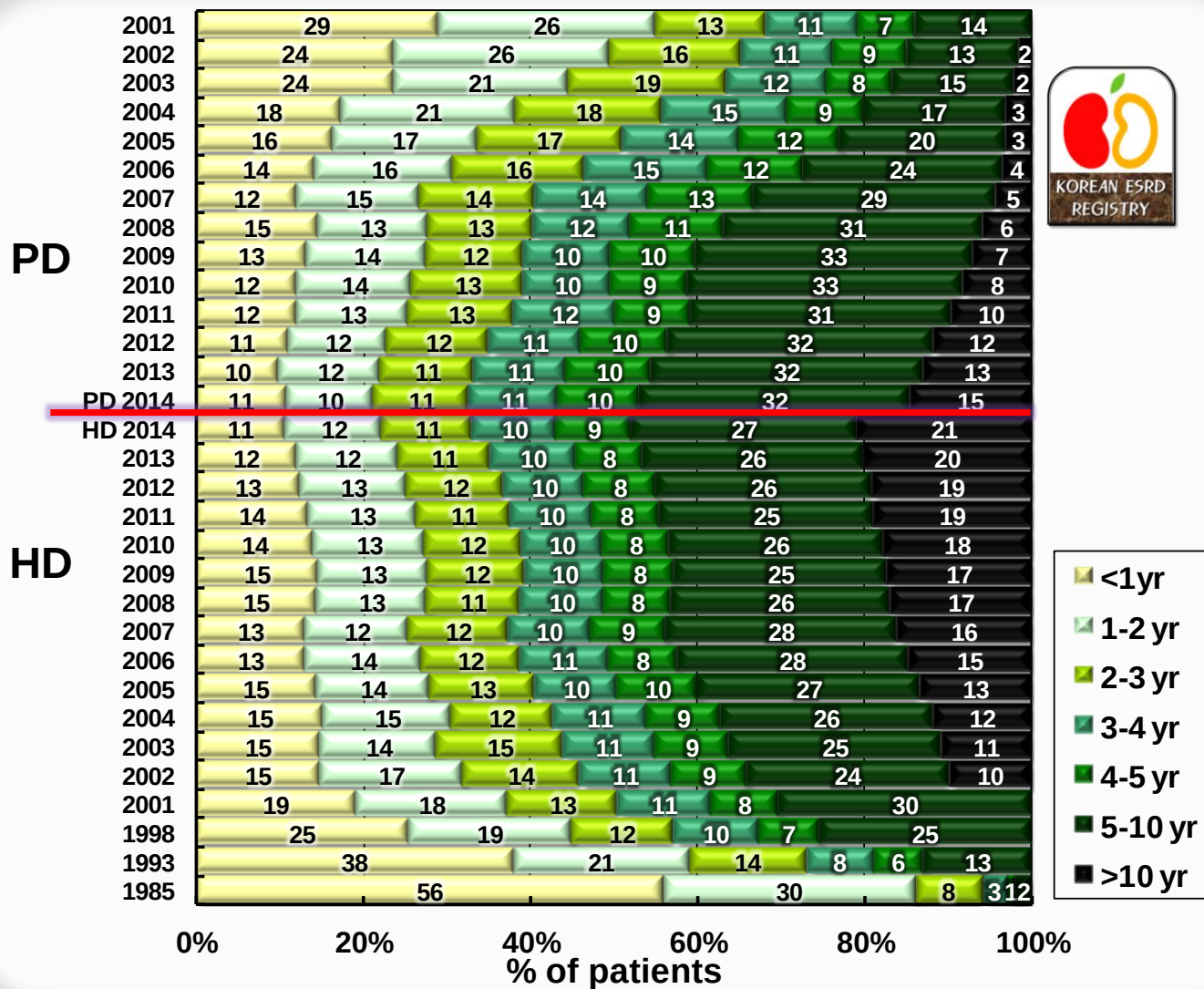
Percent of Elderly Dialysis Patients



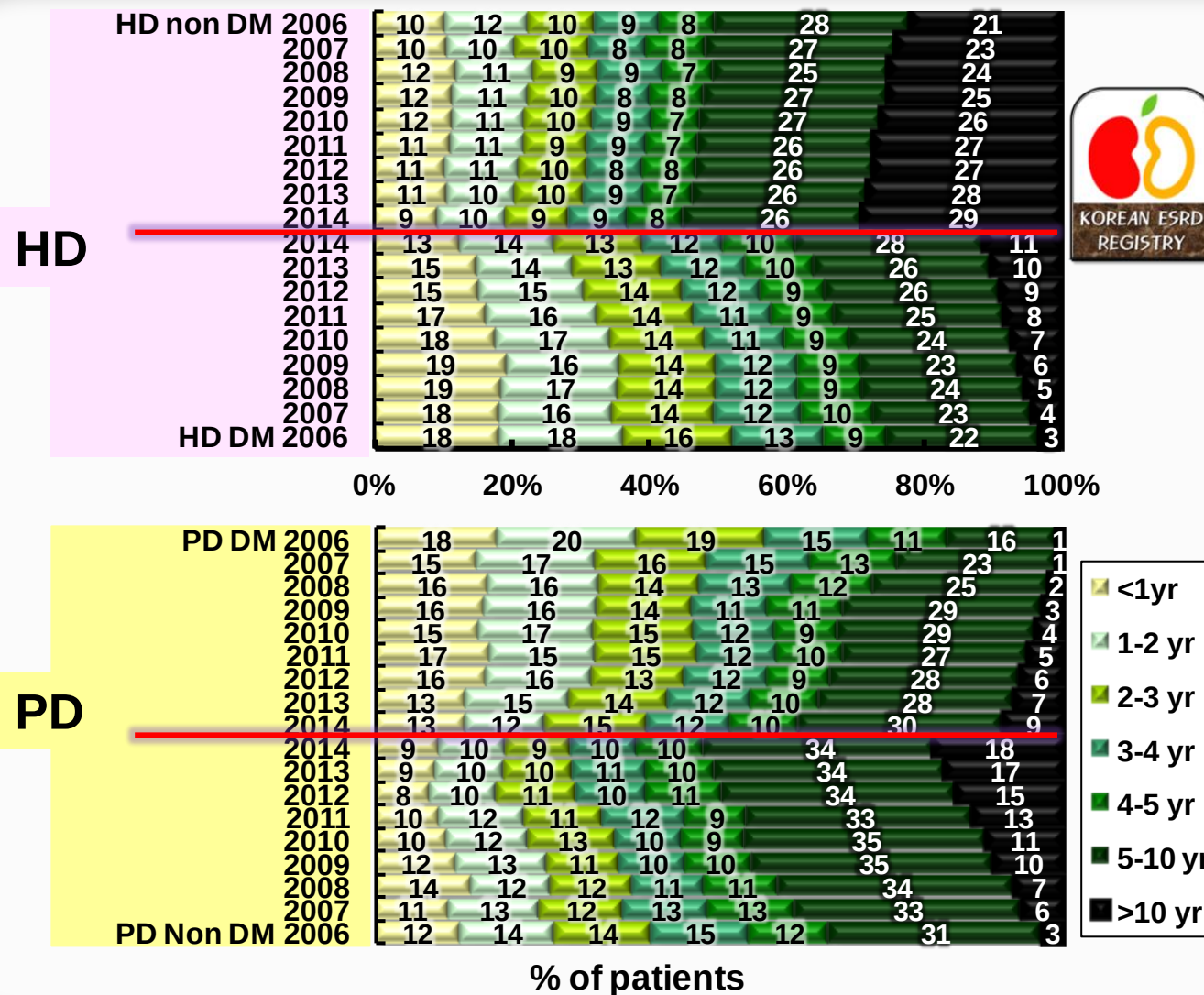
Age Distribution according to ESRD Causes



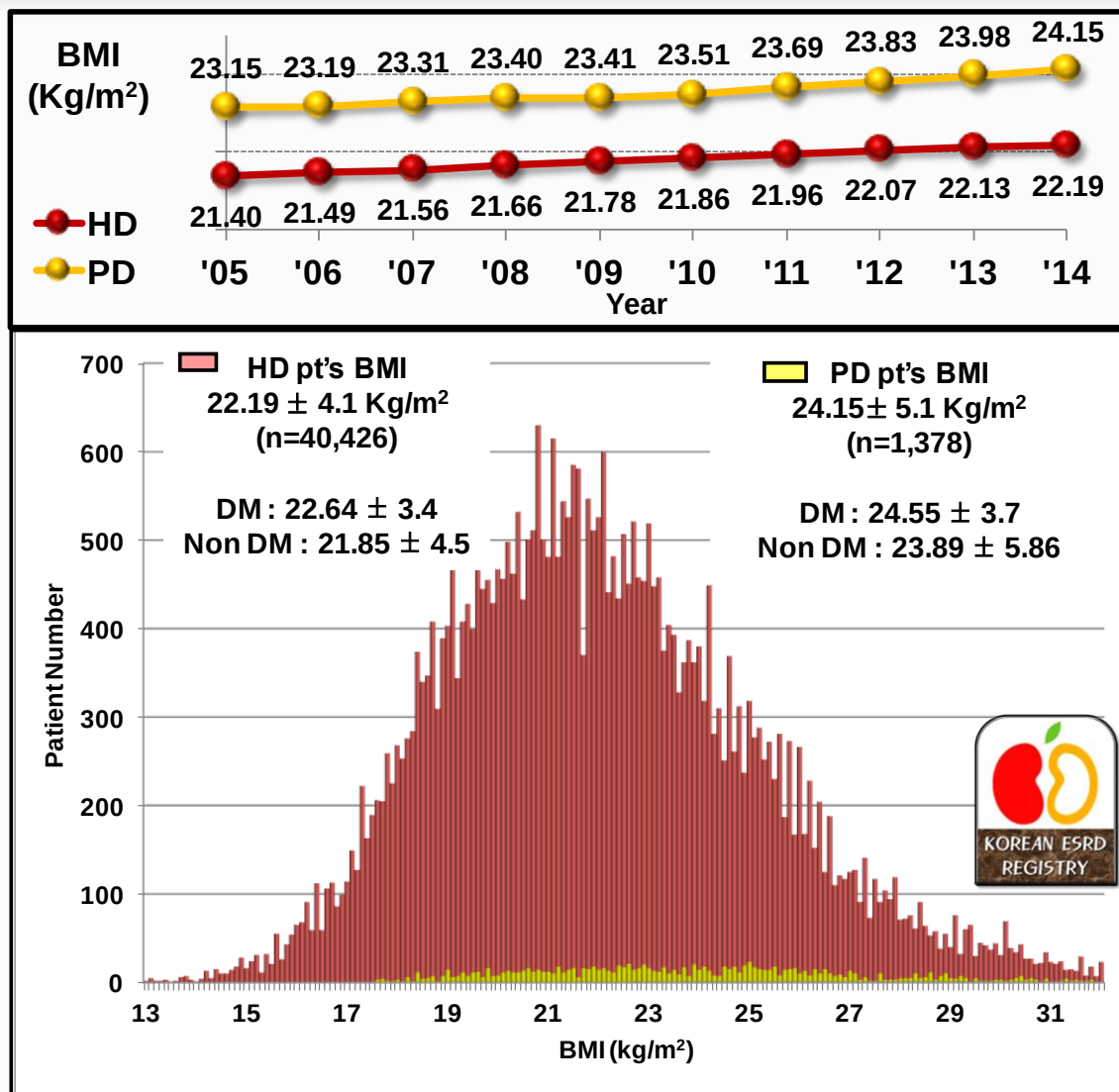
Duration of Dialysis Maintenance



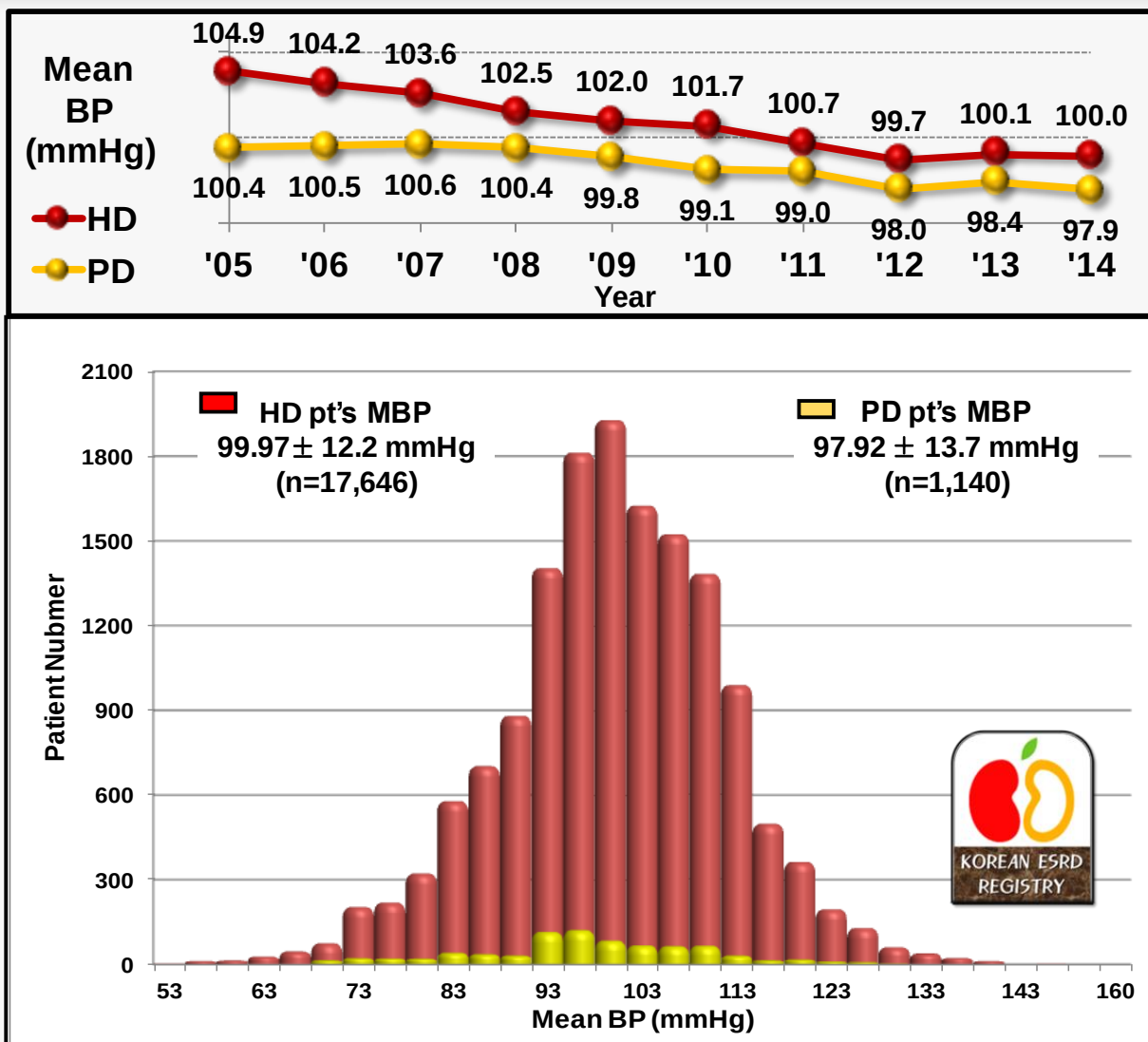
Duration of Dialysis : DM & Non-DM



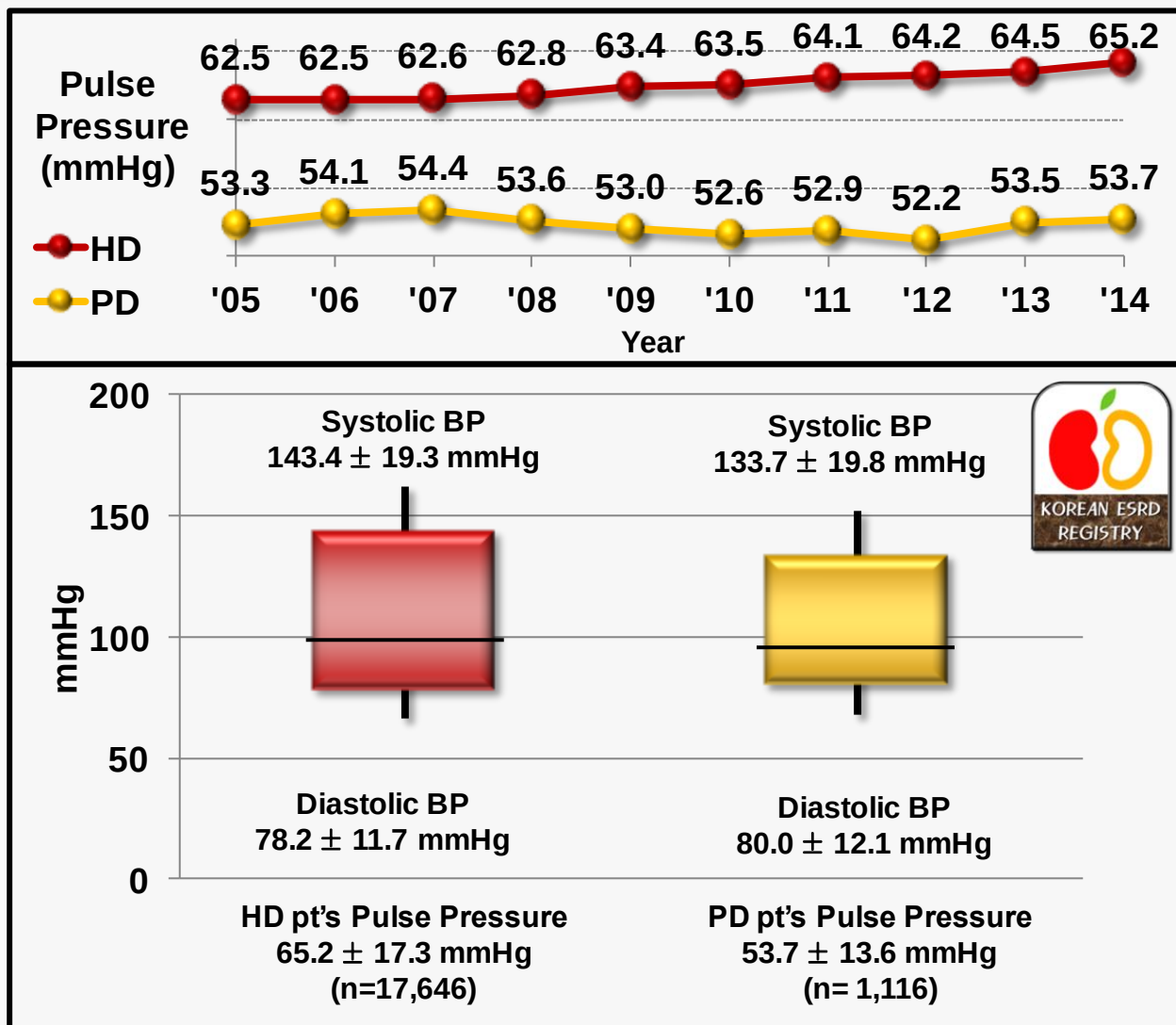
Body Mass Index : HD & PD



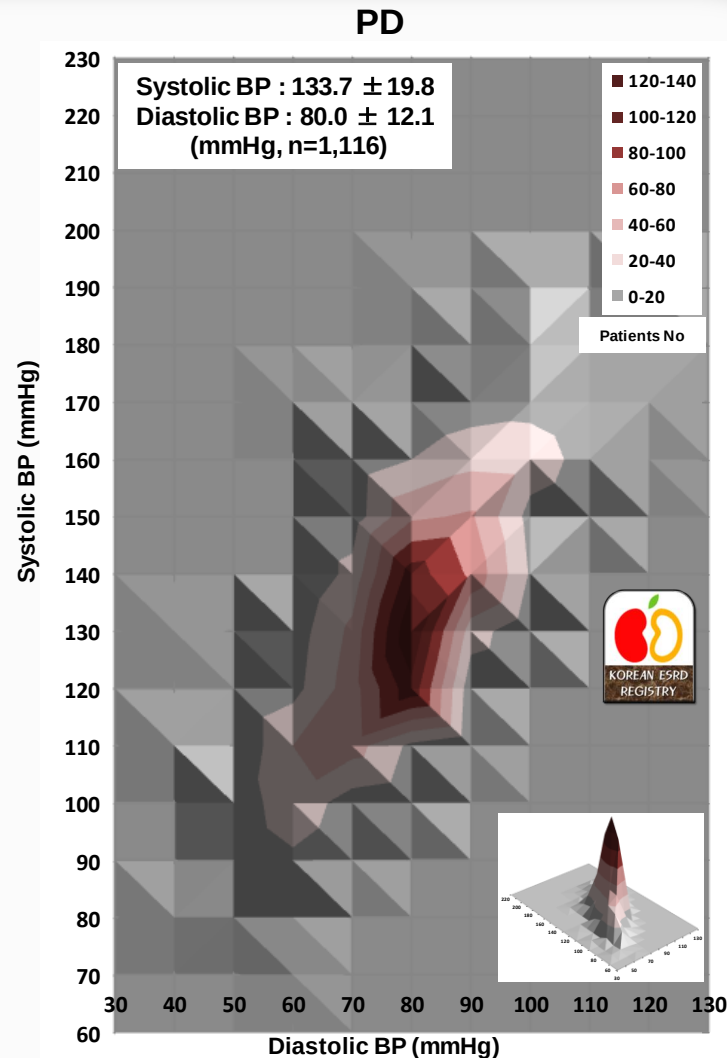
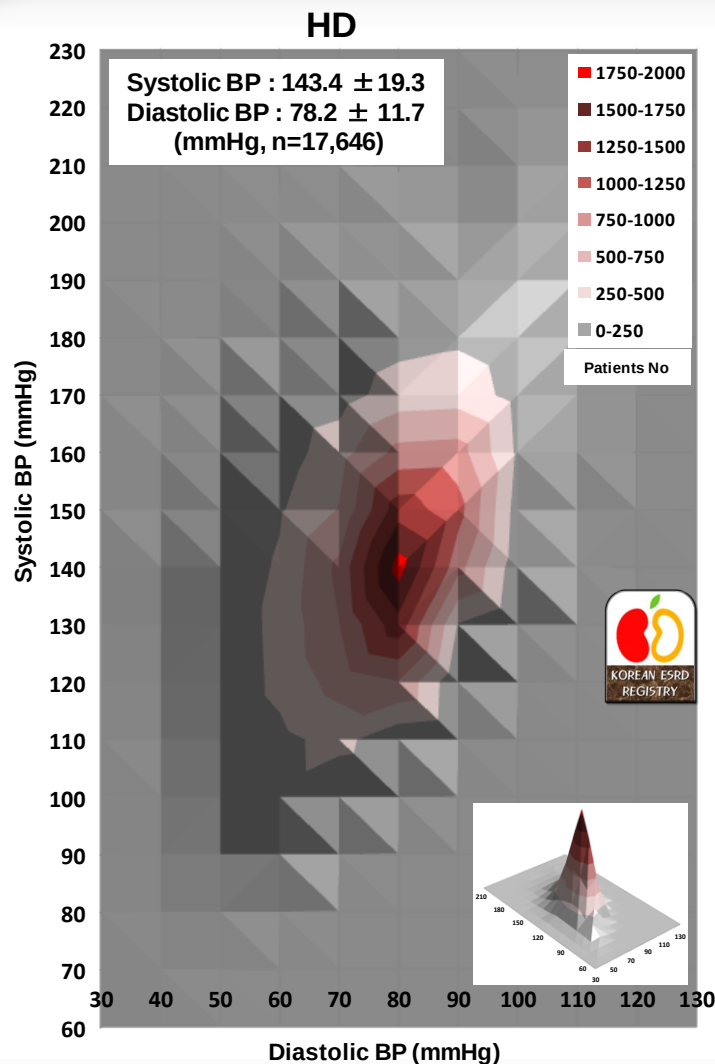
Mean Blood Pressure : HD & PD



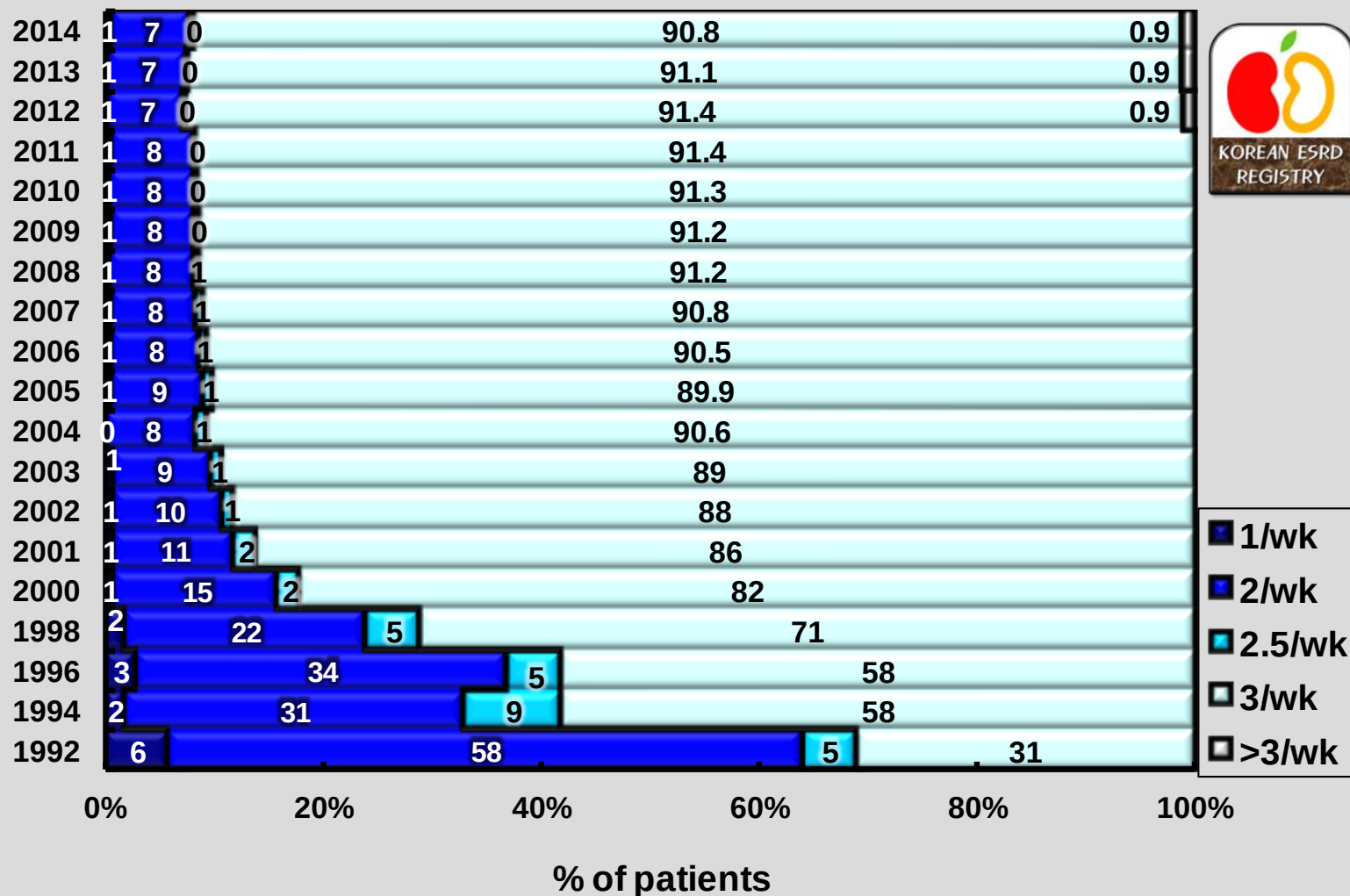
Pulse Pressure : HD & PD



Patients' Distribution according to BP



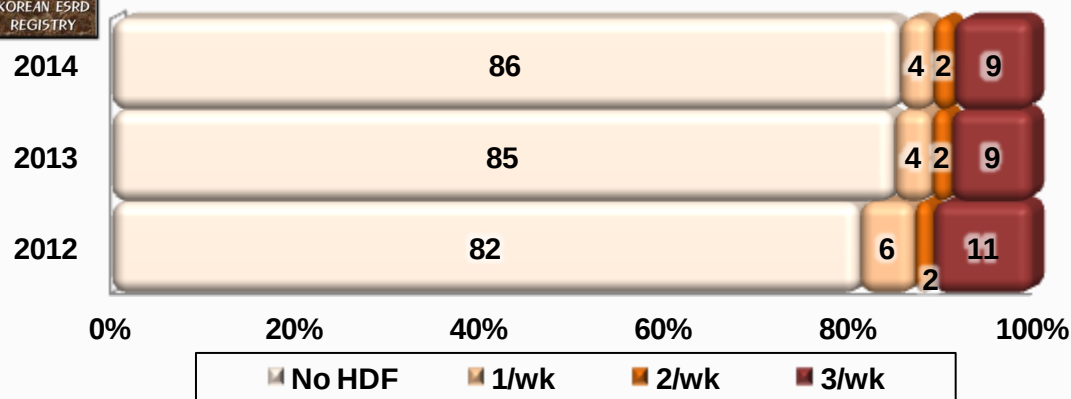
Frequency of HD per Week



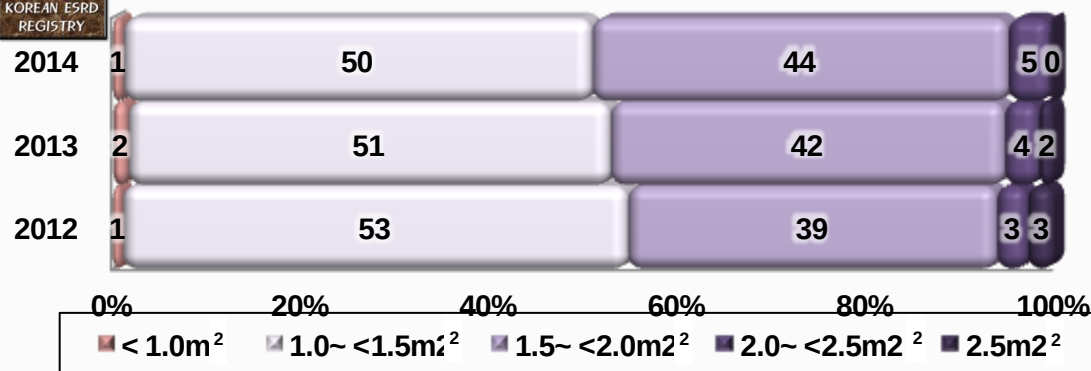
Hemodiafiltration & Dialyzer



Hemodiafiltration



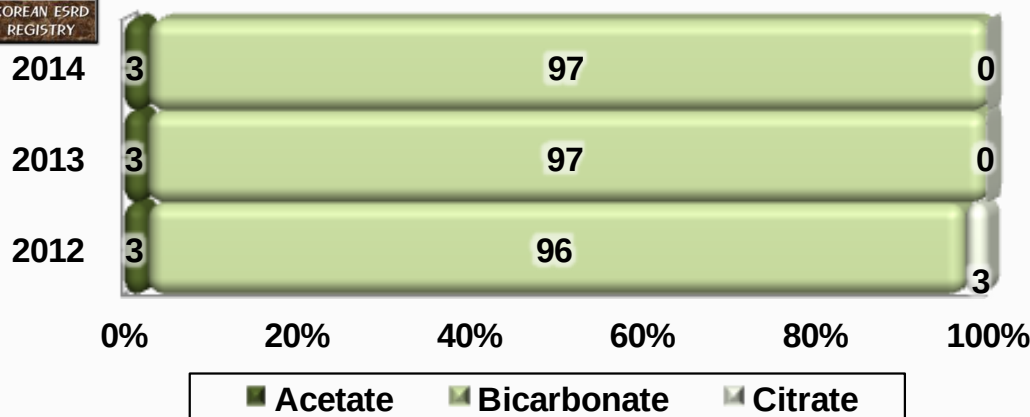
Dialyzer Surface Area



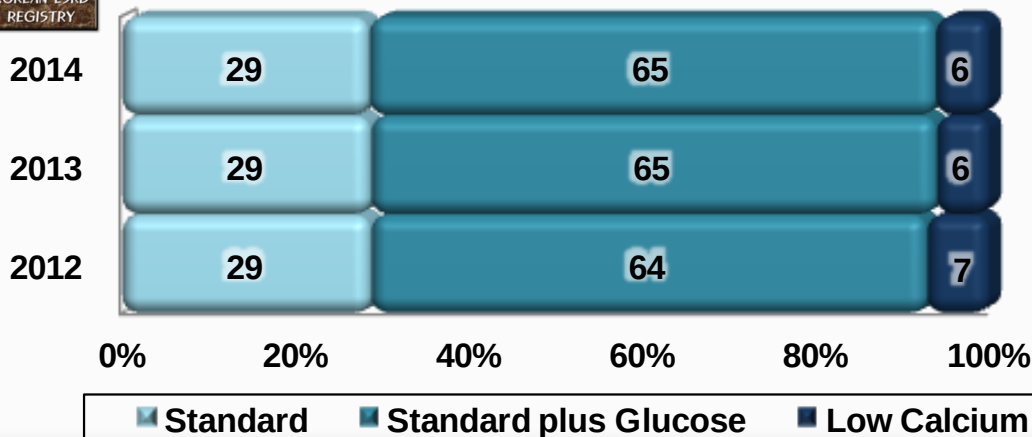
HD Dialysate



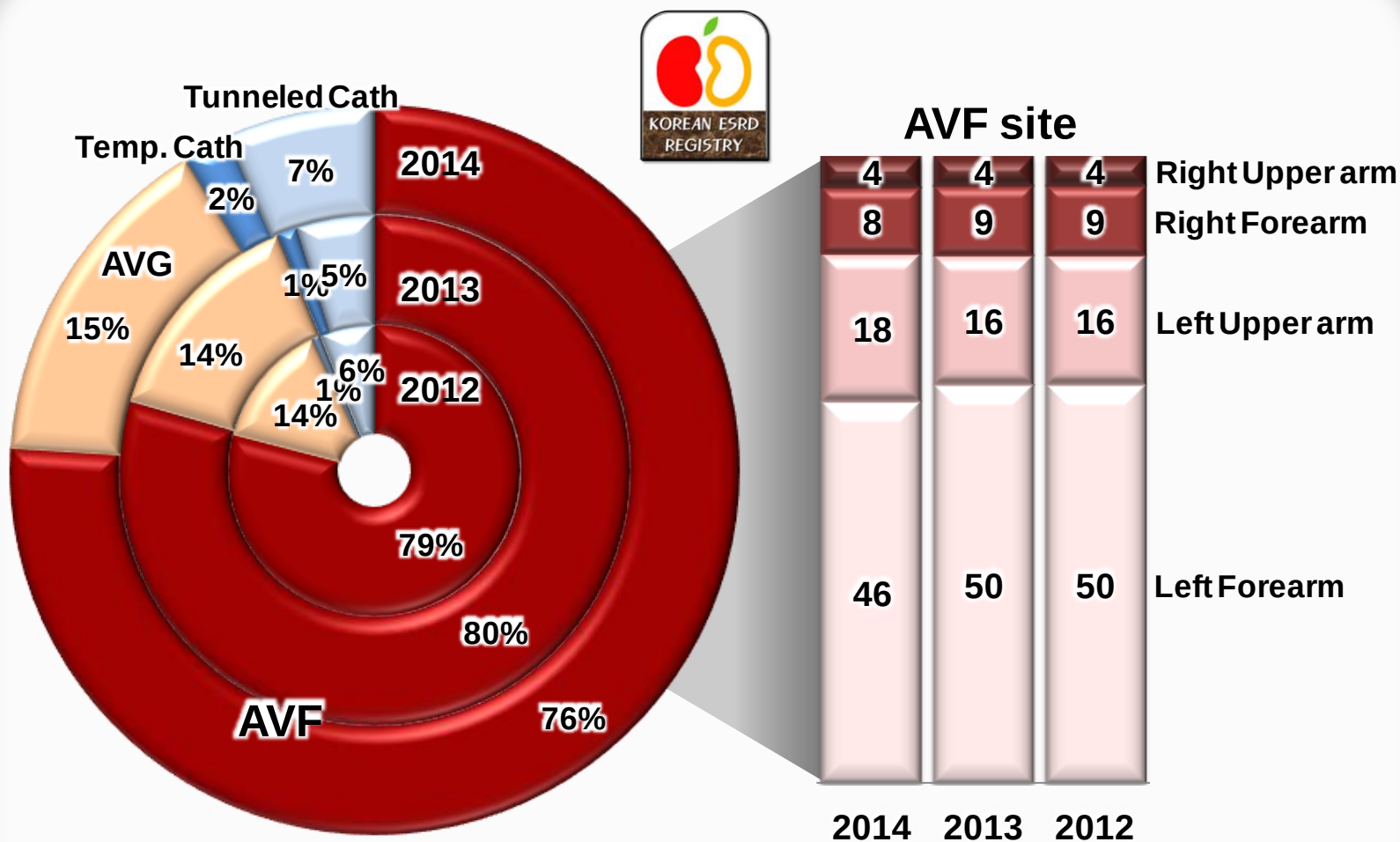
Dialysate (I)



Dialysate (II)

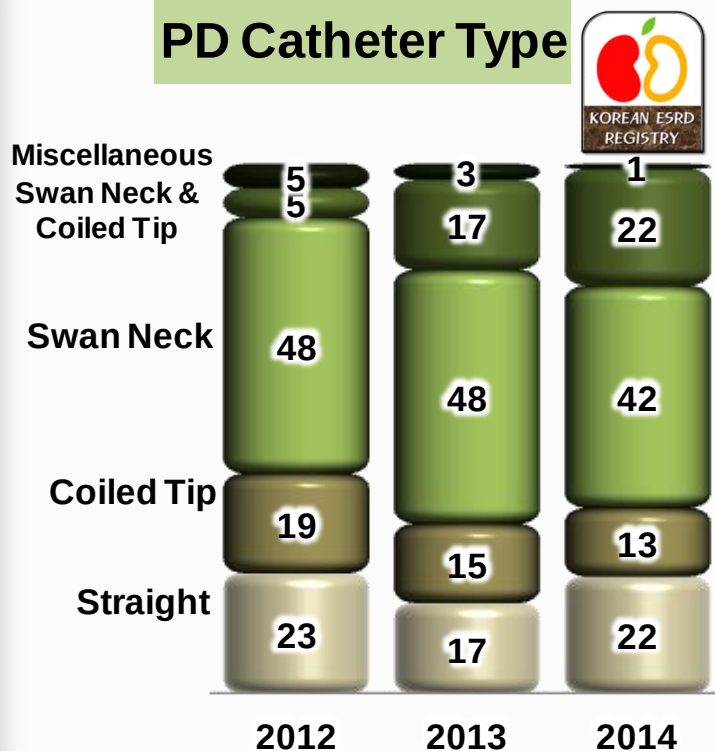


Vascular Access

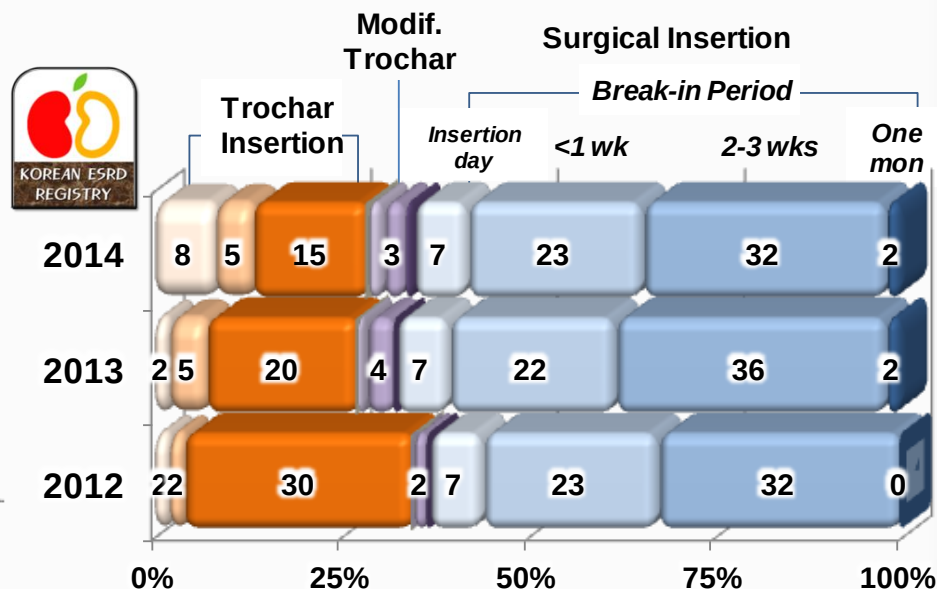


PD Catheter

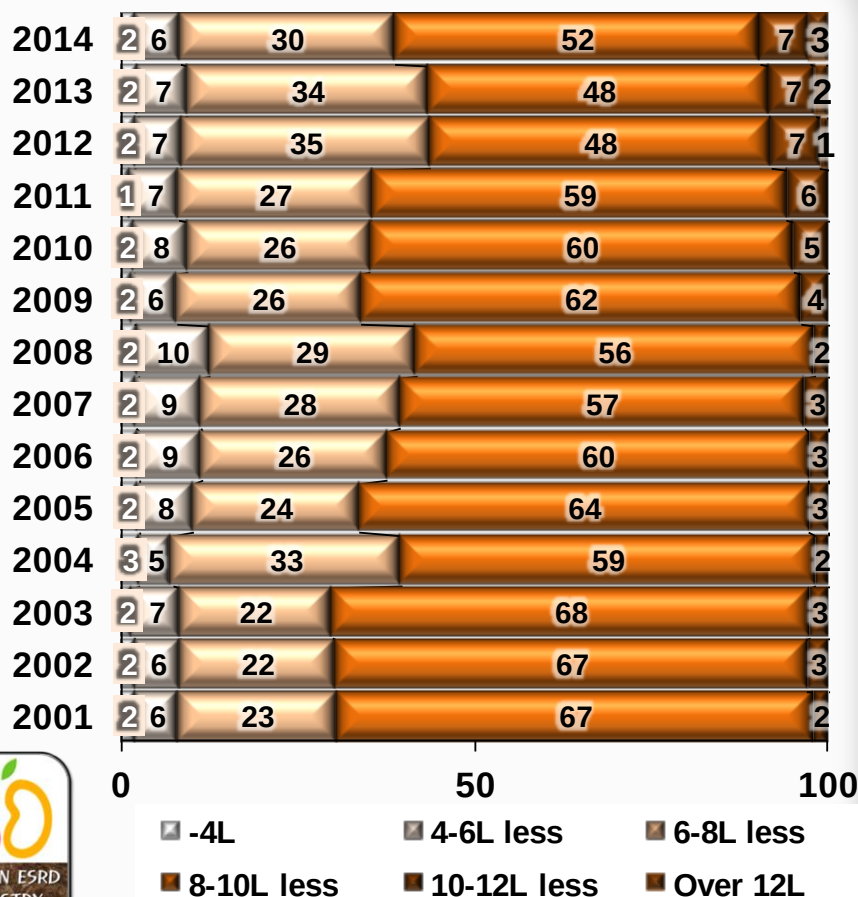
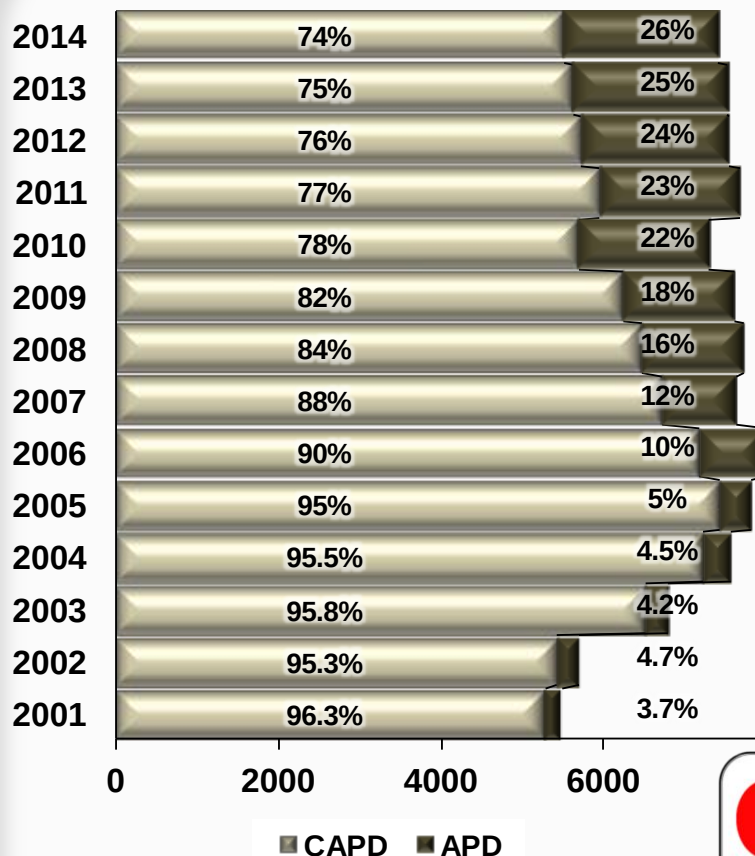
PD Catheter Type



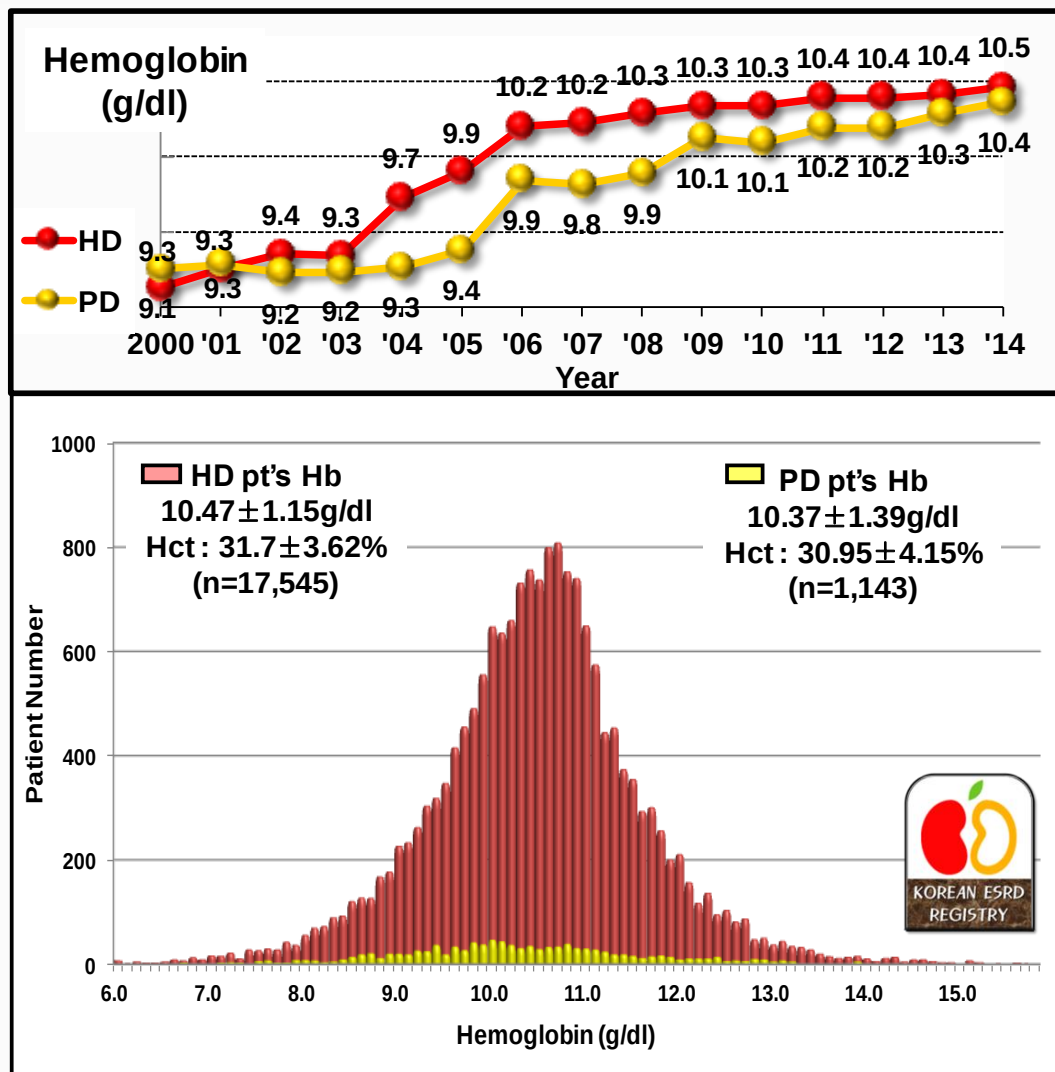
PD Catheter Insertion Method & Break-In Period



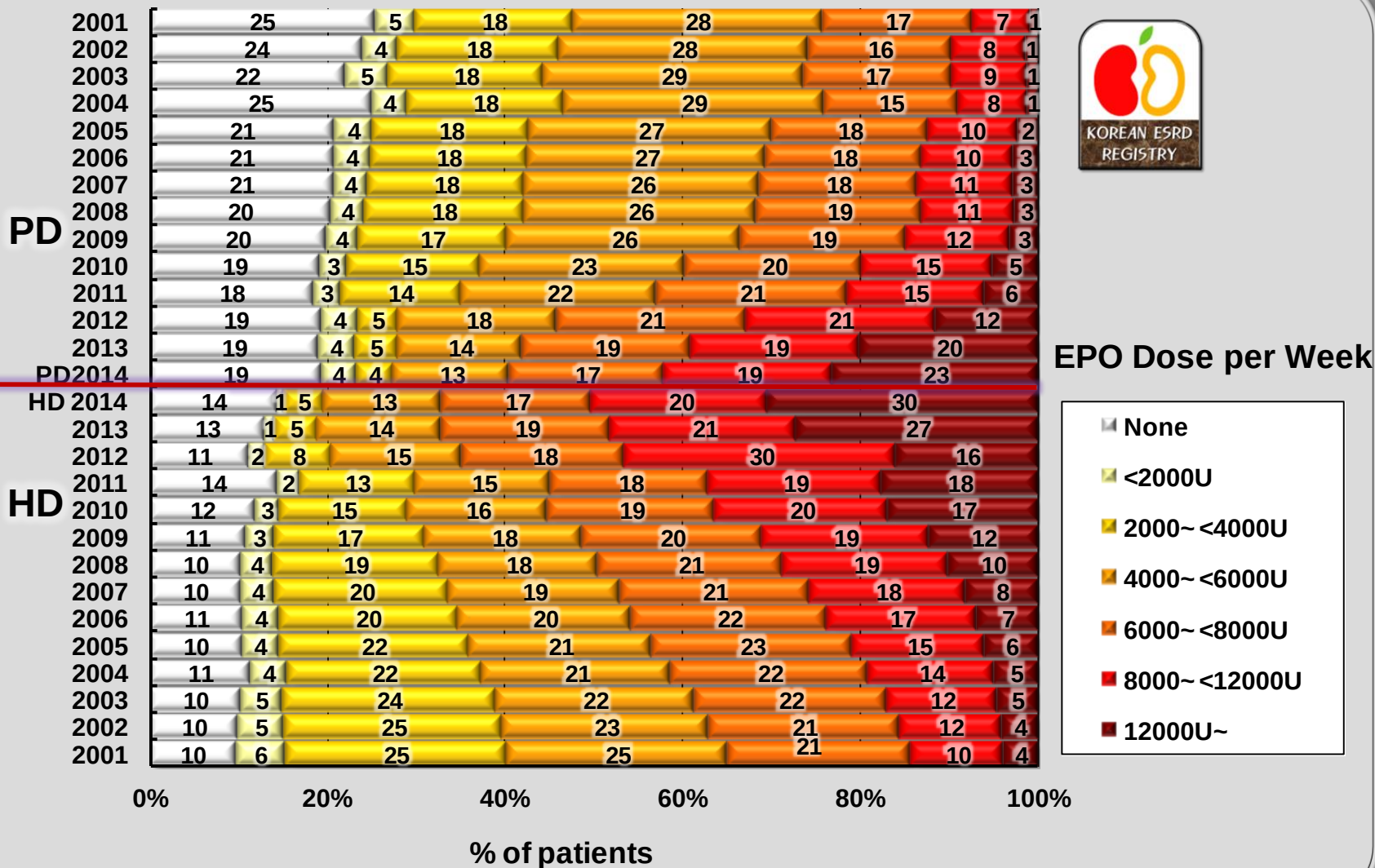
PD Type & Doses



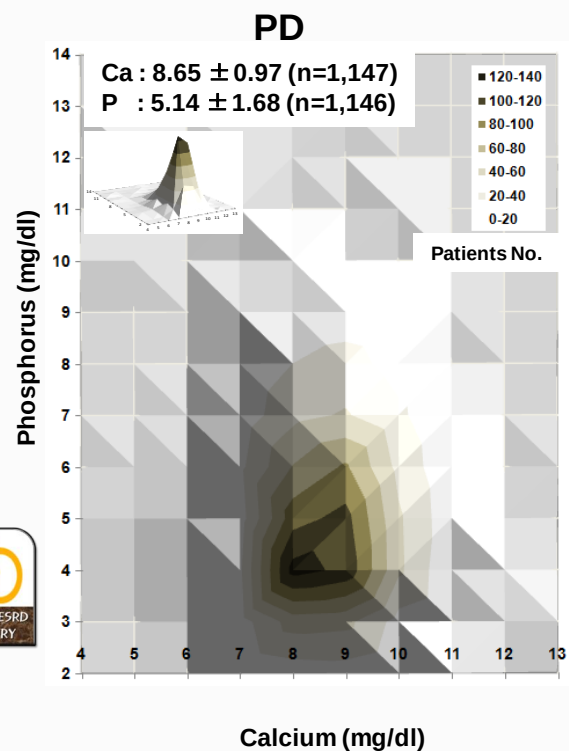
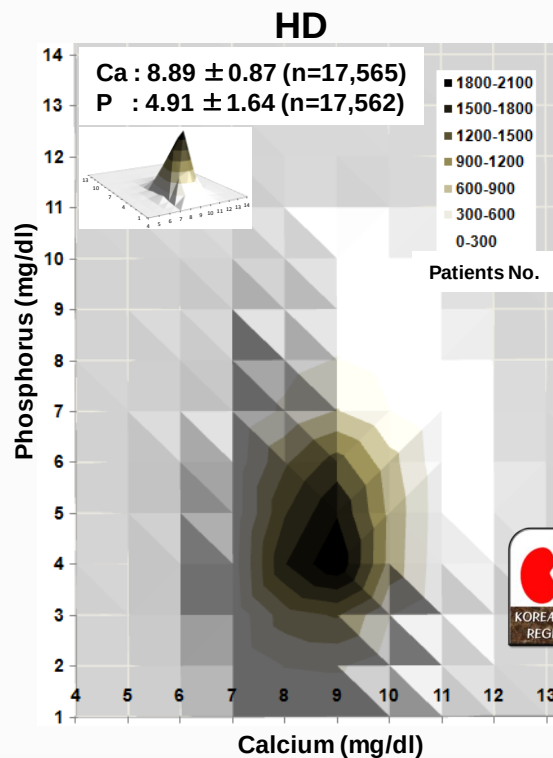
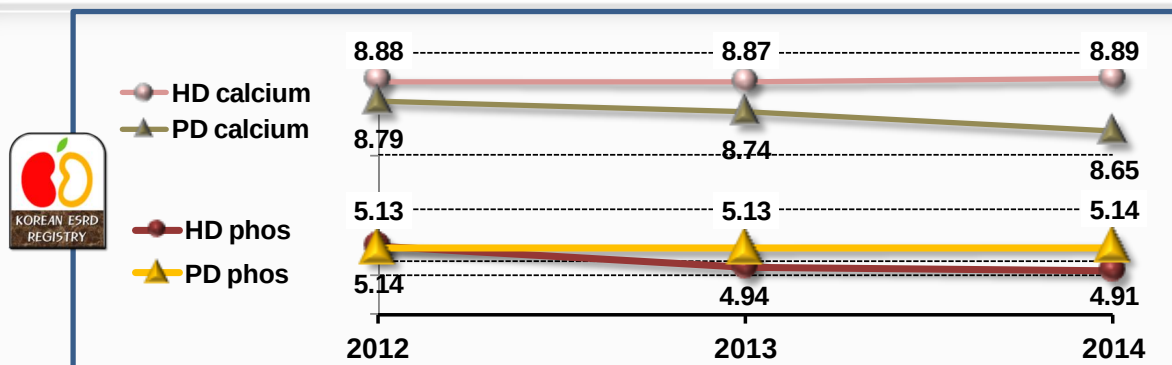
Hemoglobin : HD & PD



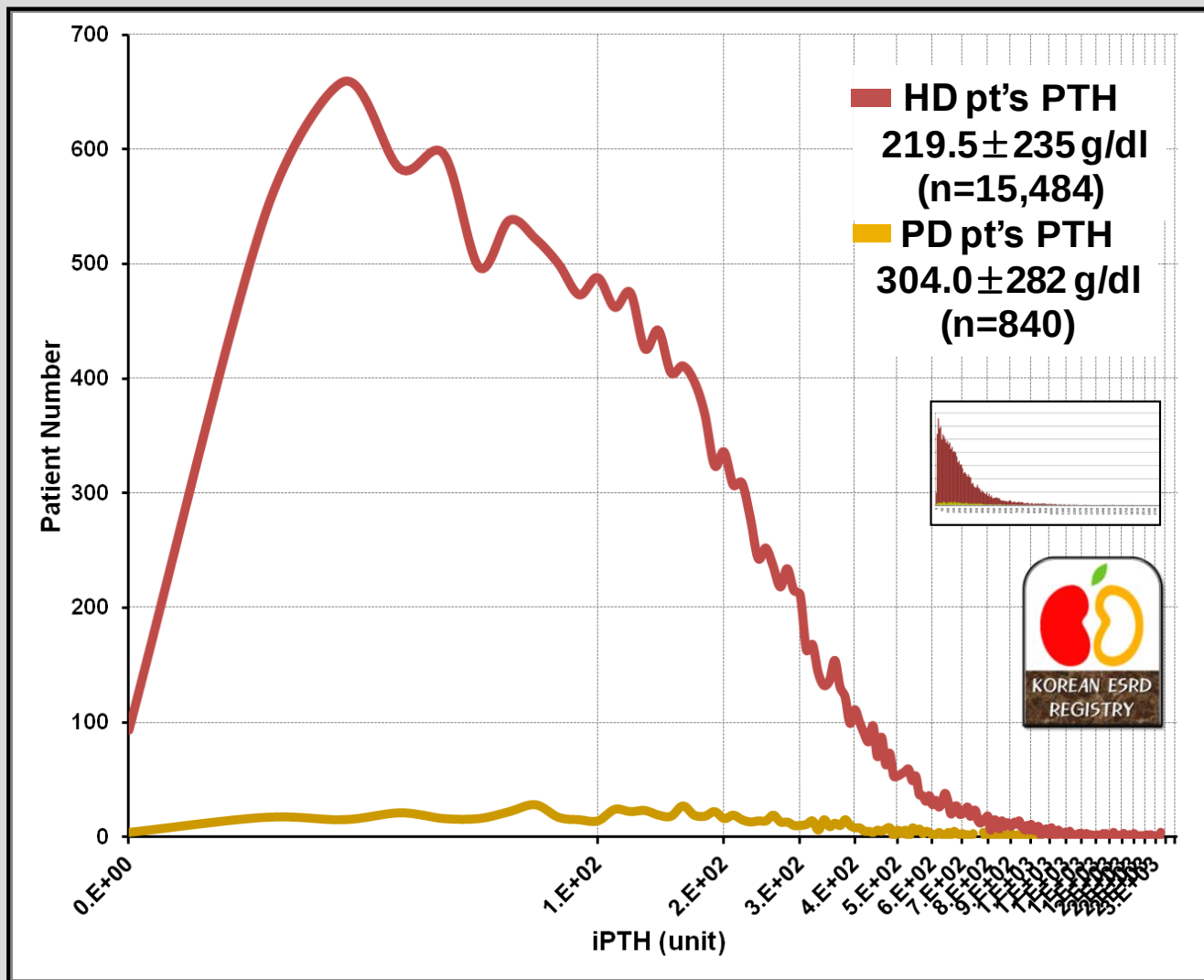
Erythropoietin Doses



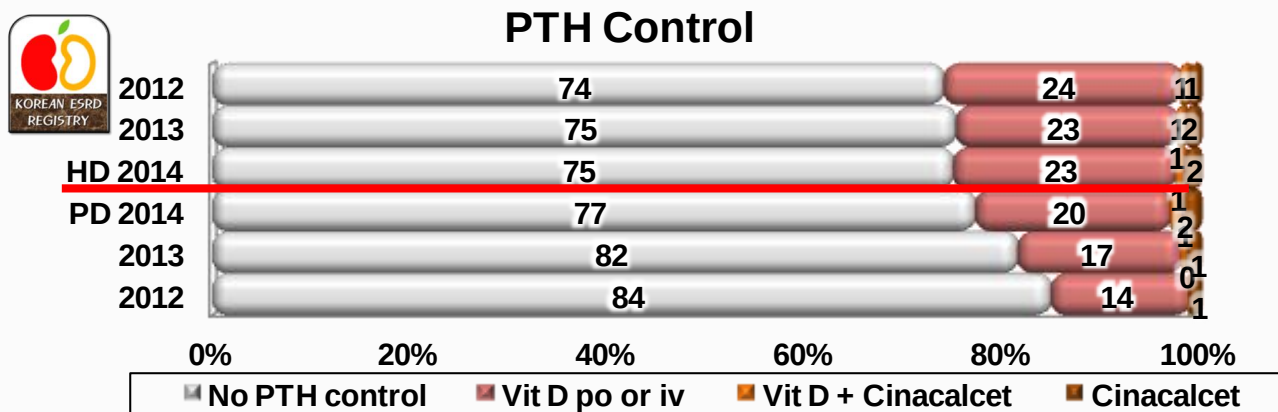
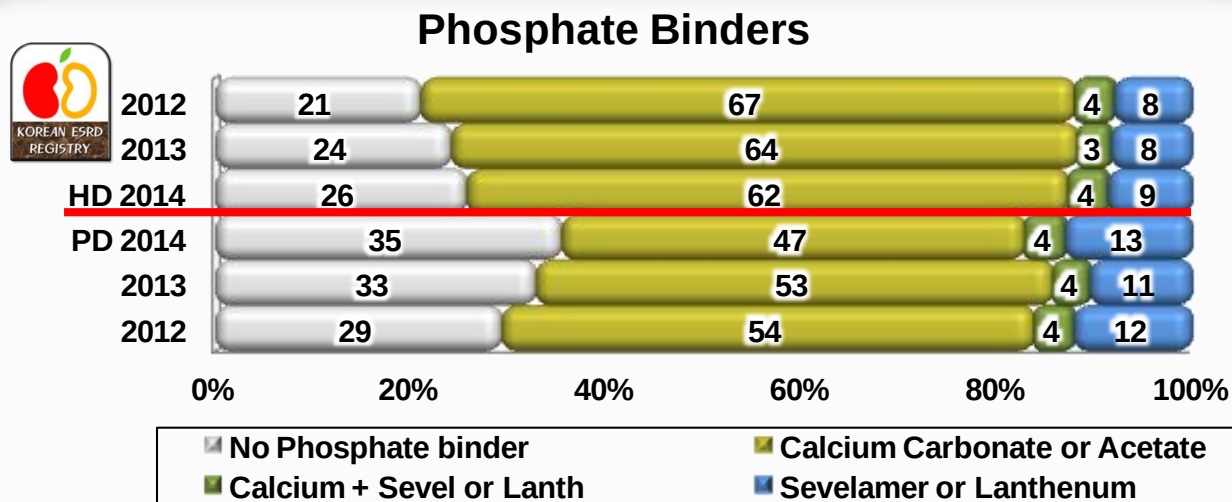
Calcium & Phosphorous



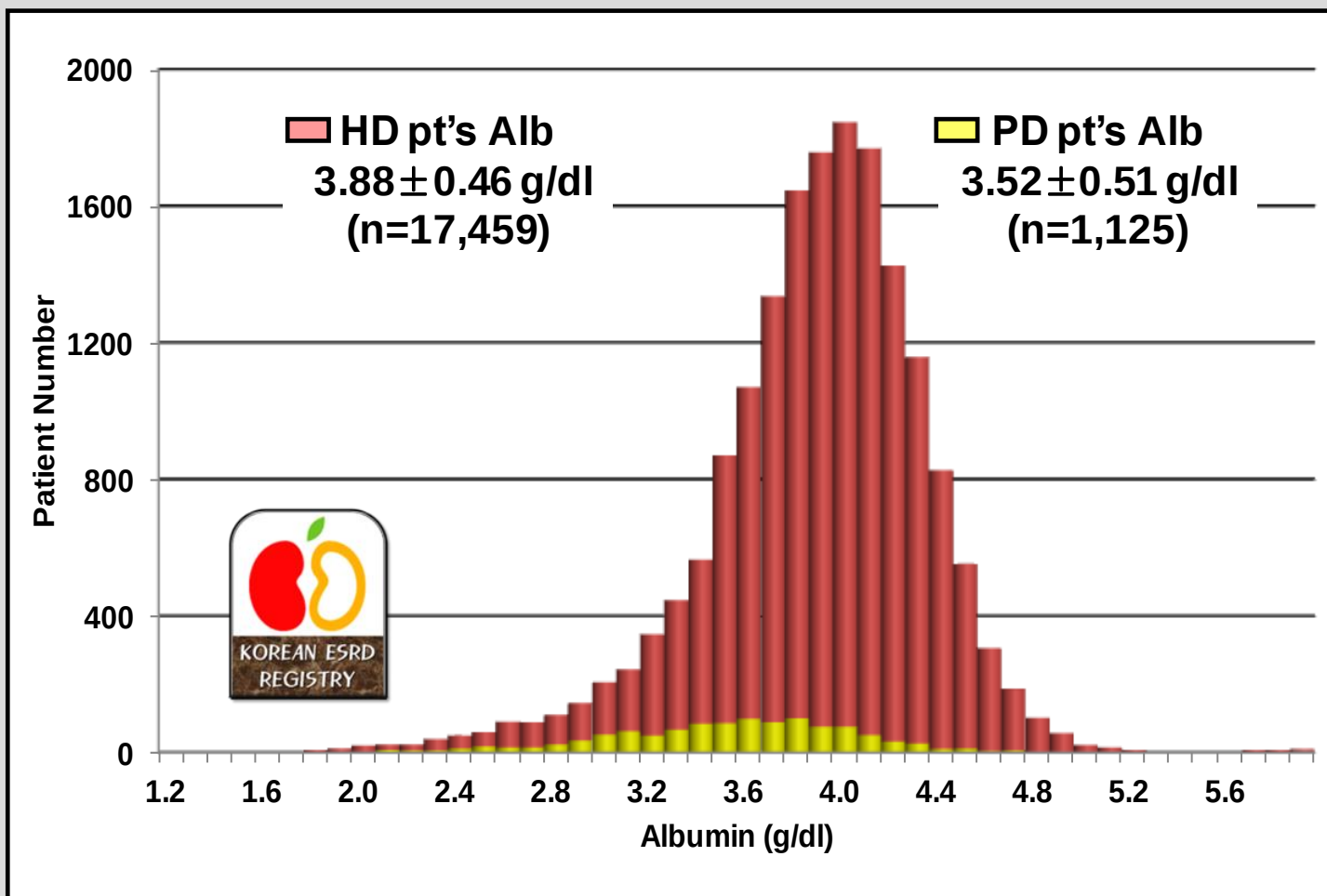
PTH



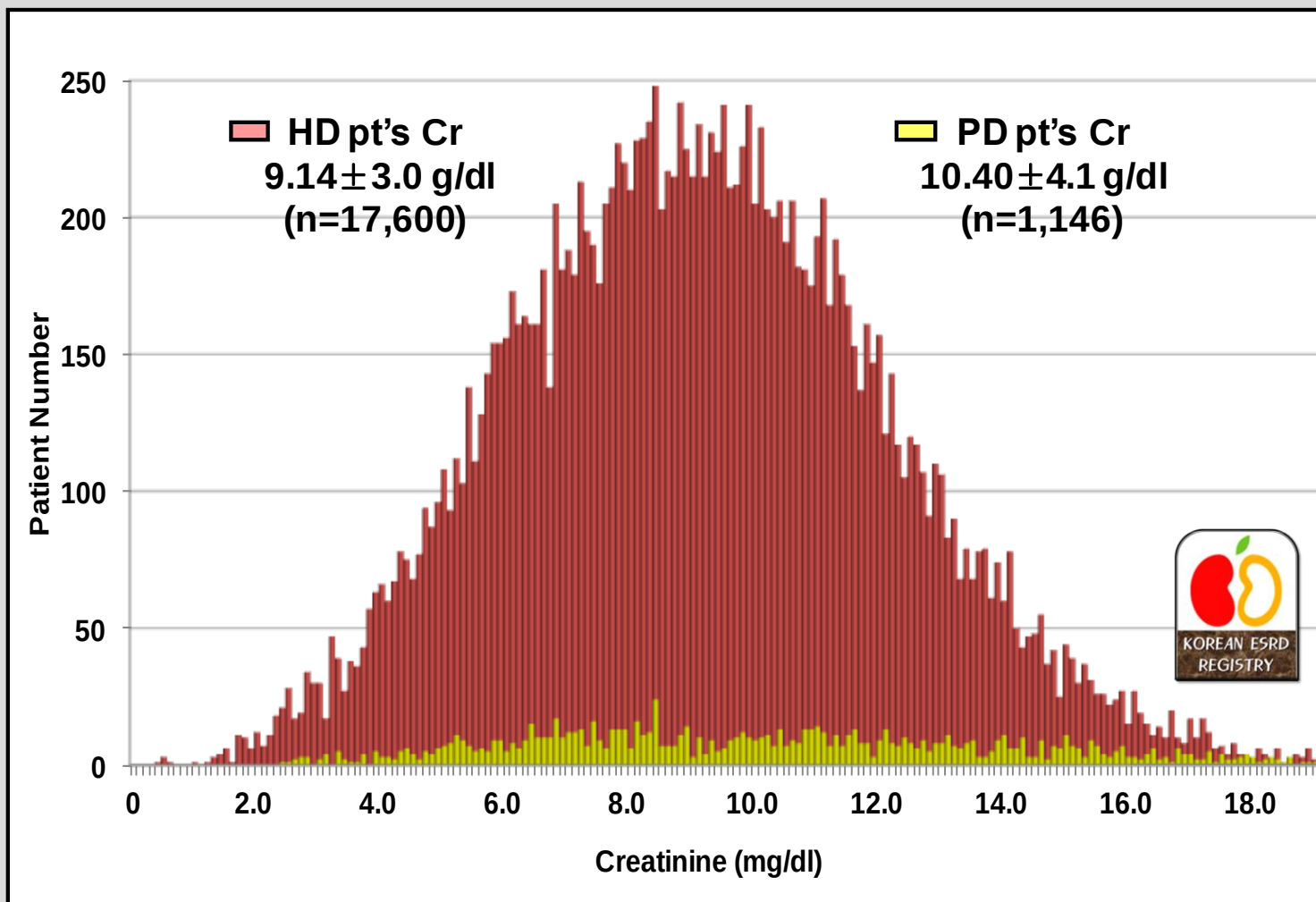
Phosphate Binders & PTH Control



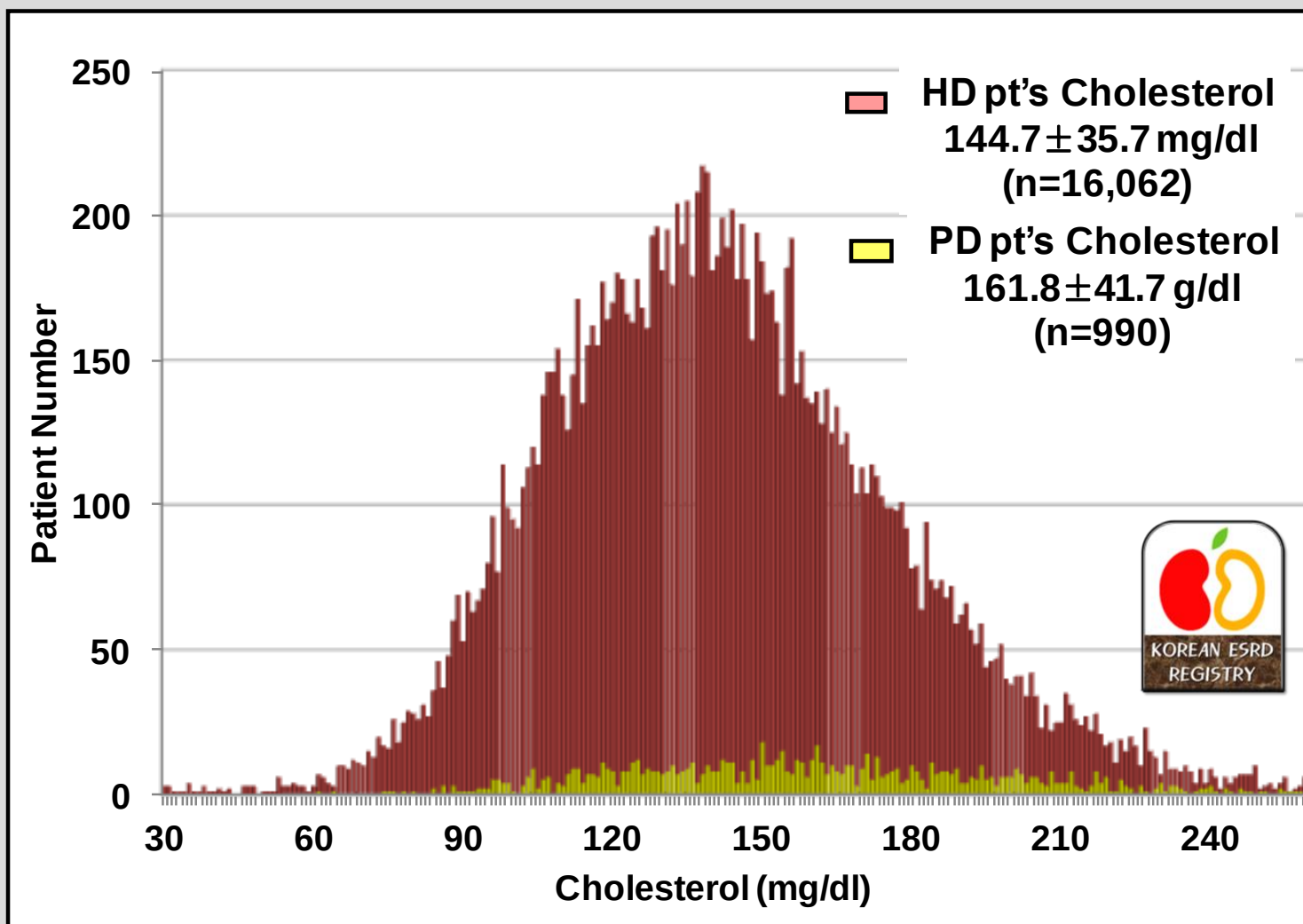
Serum Albumin



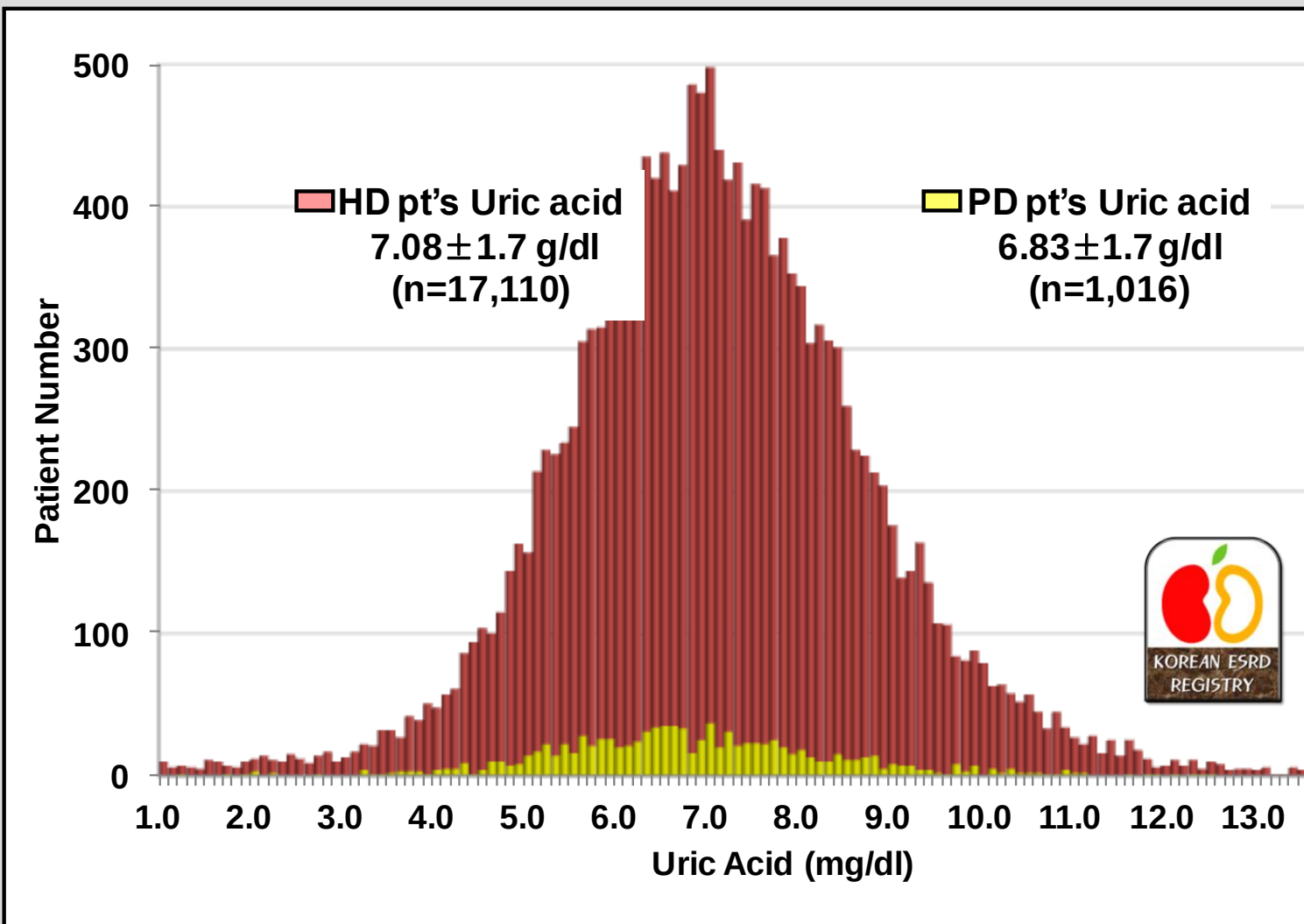
Serum Creatinine



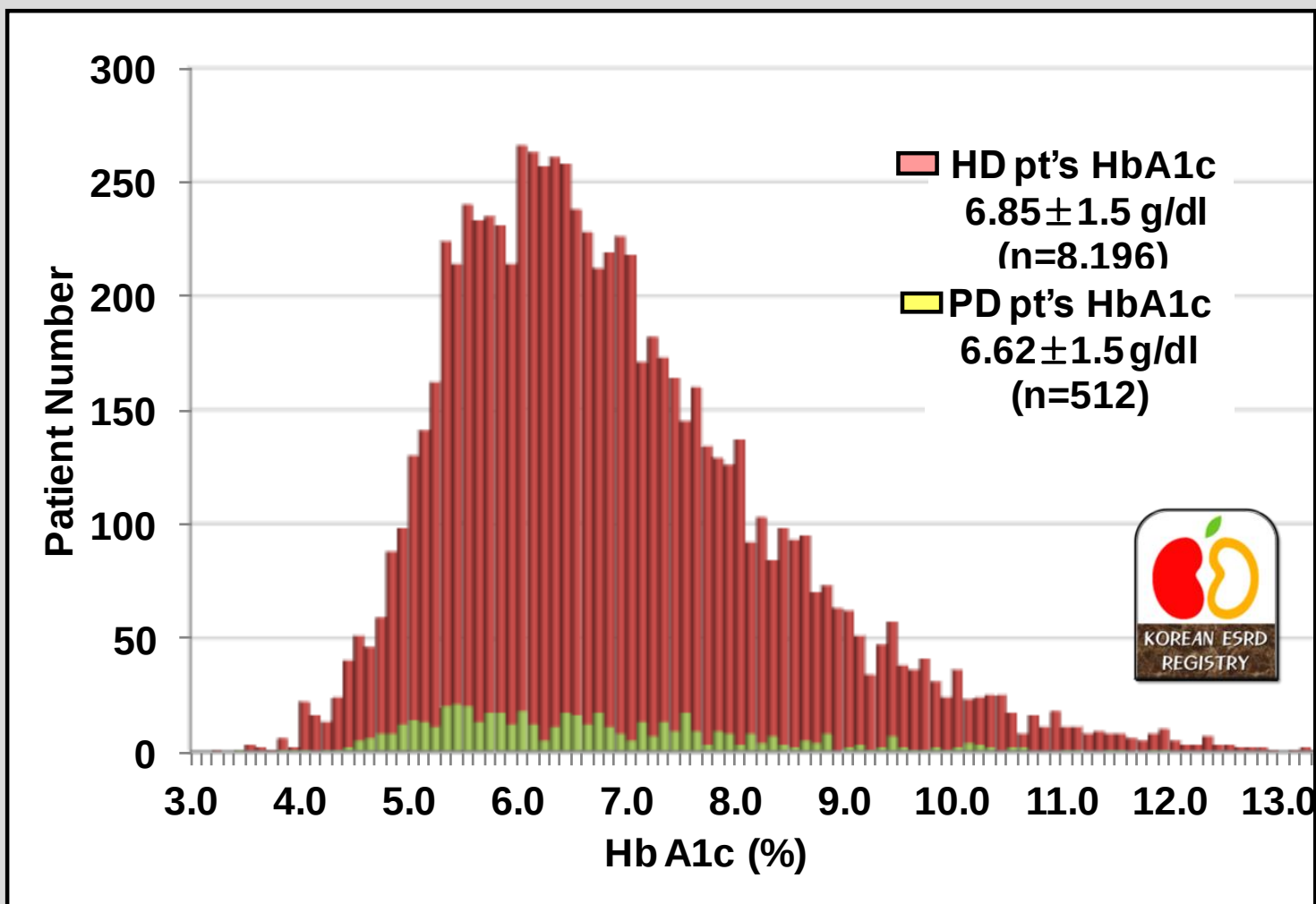
Total Cholesterol



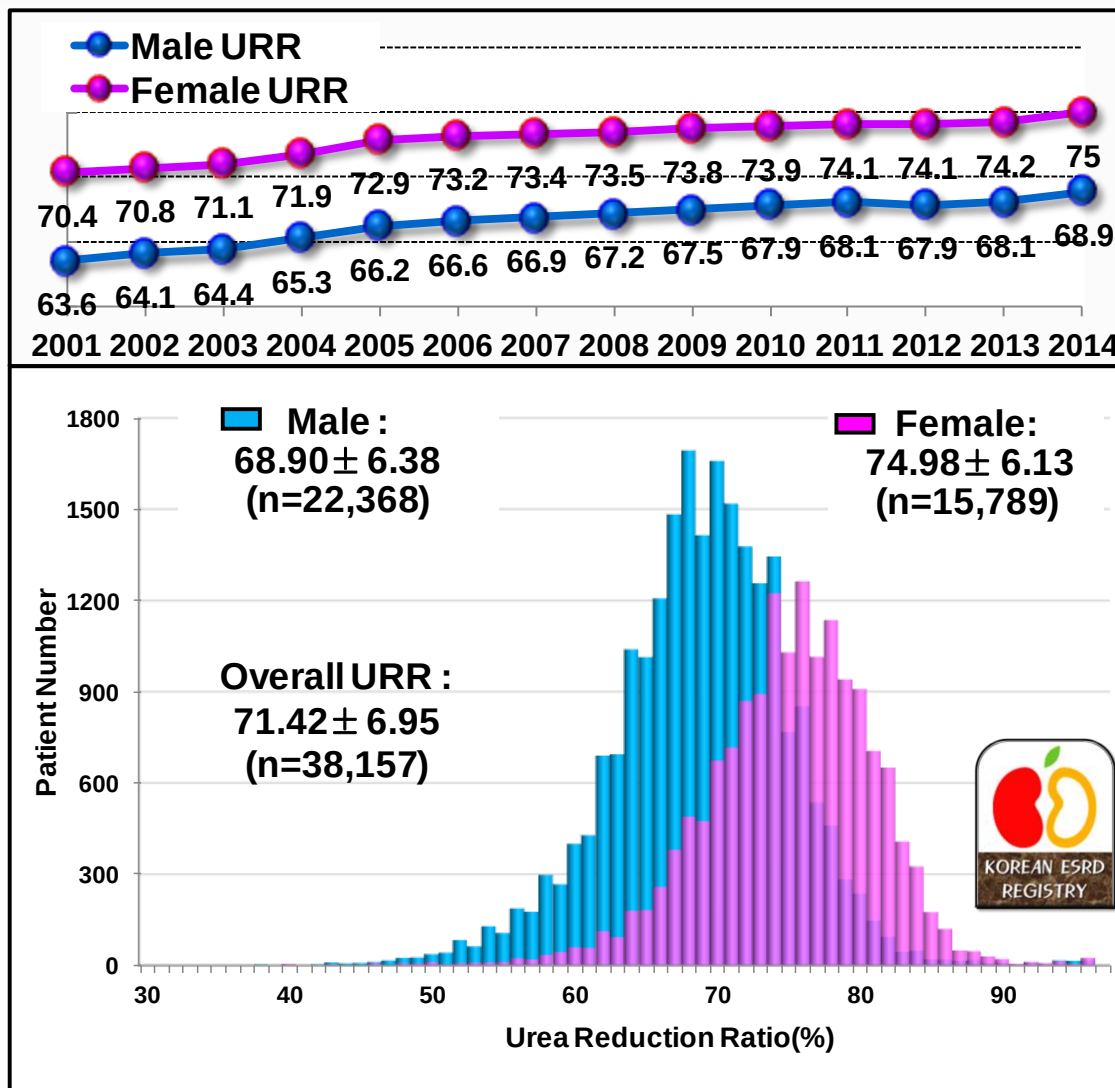
Uric Acid



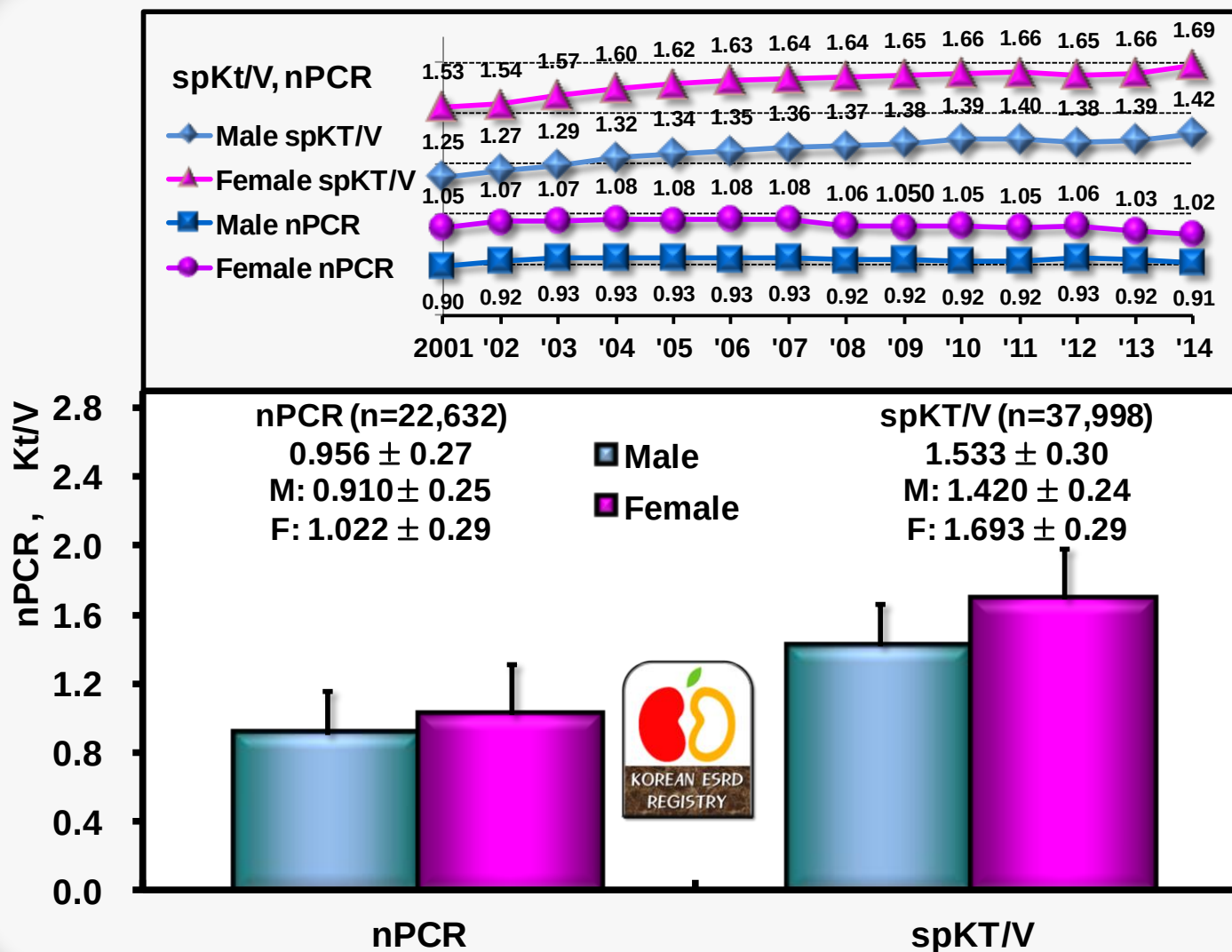
Hb A1c



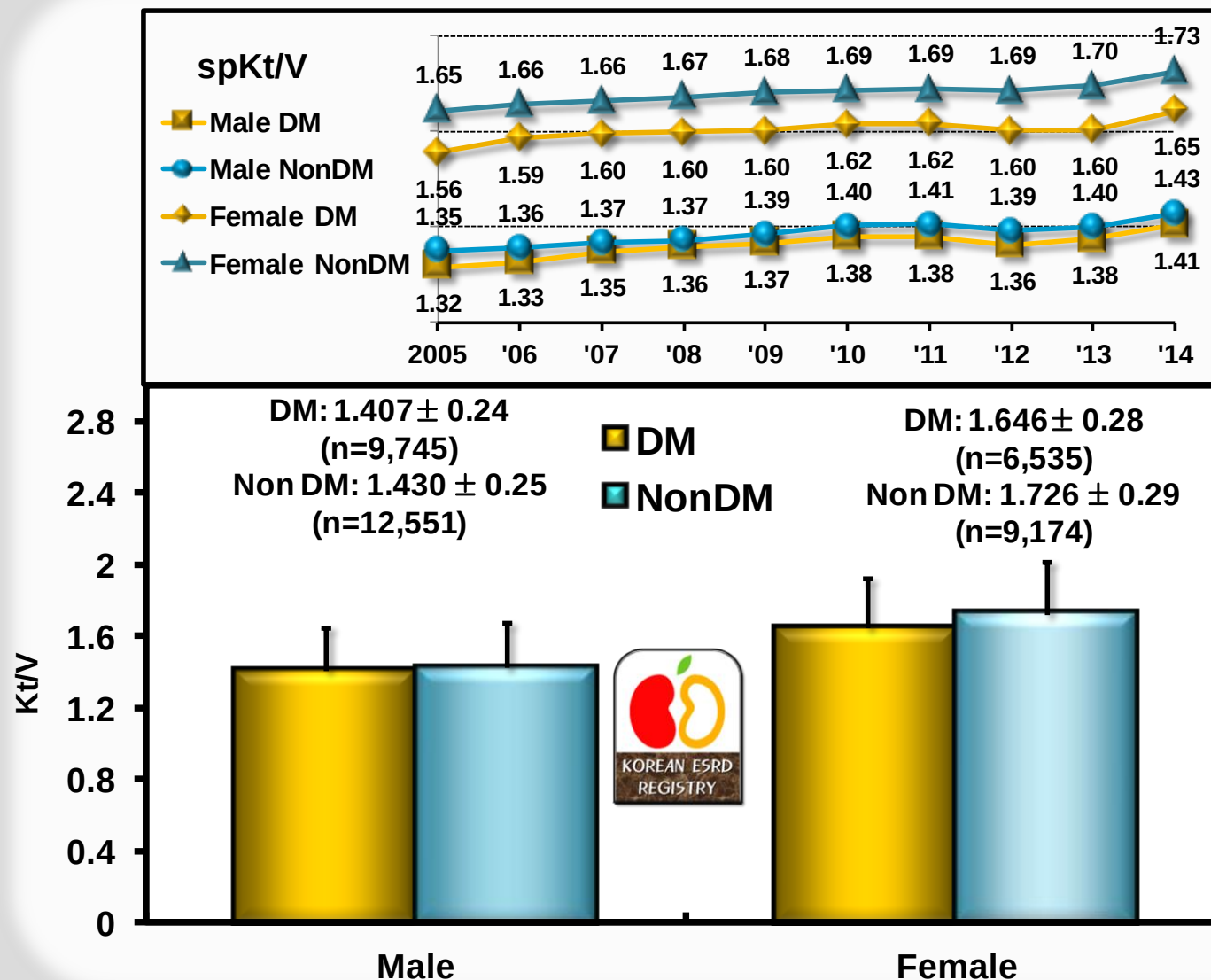
Urea Reduction Ratio



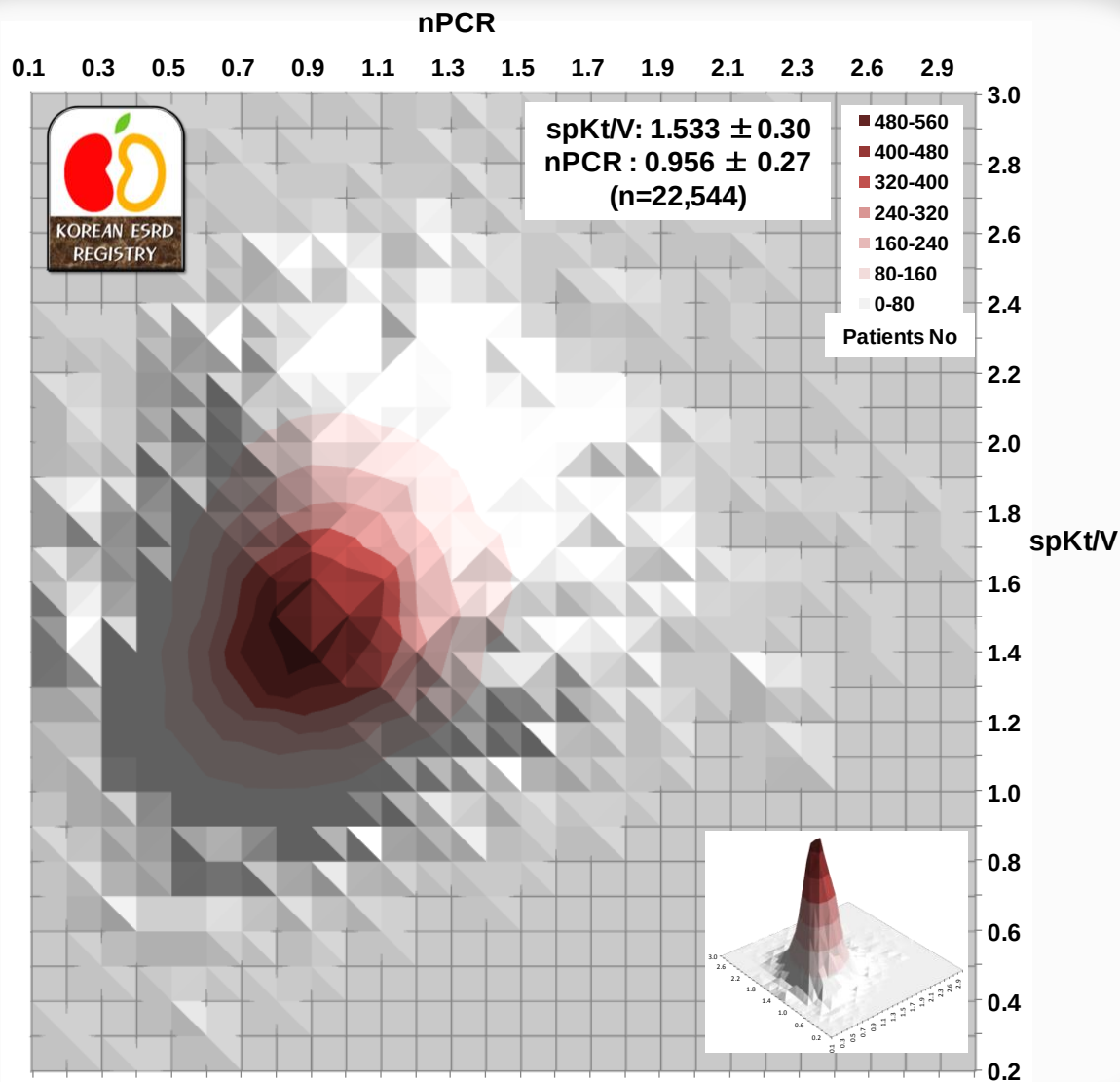
HD Adequacy



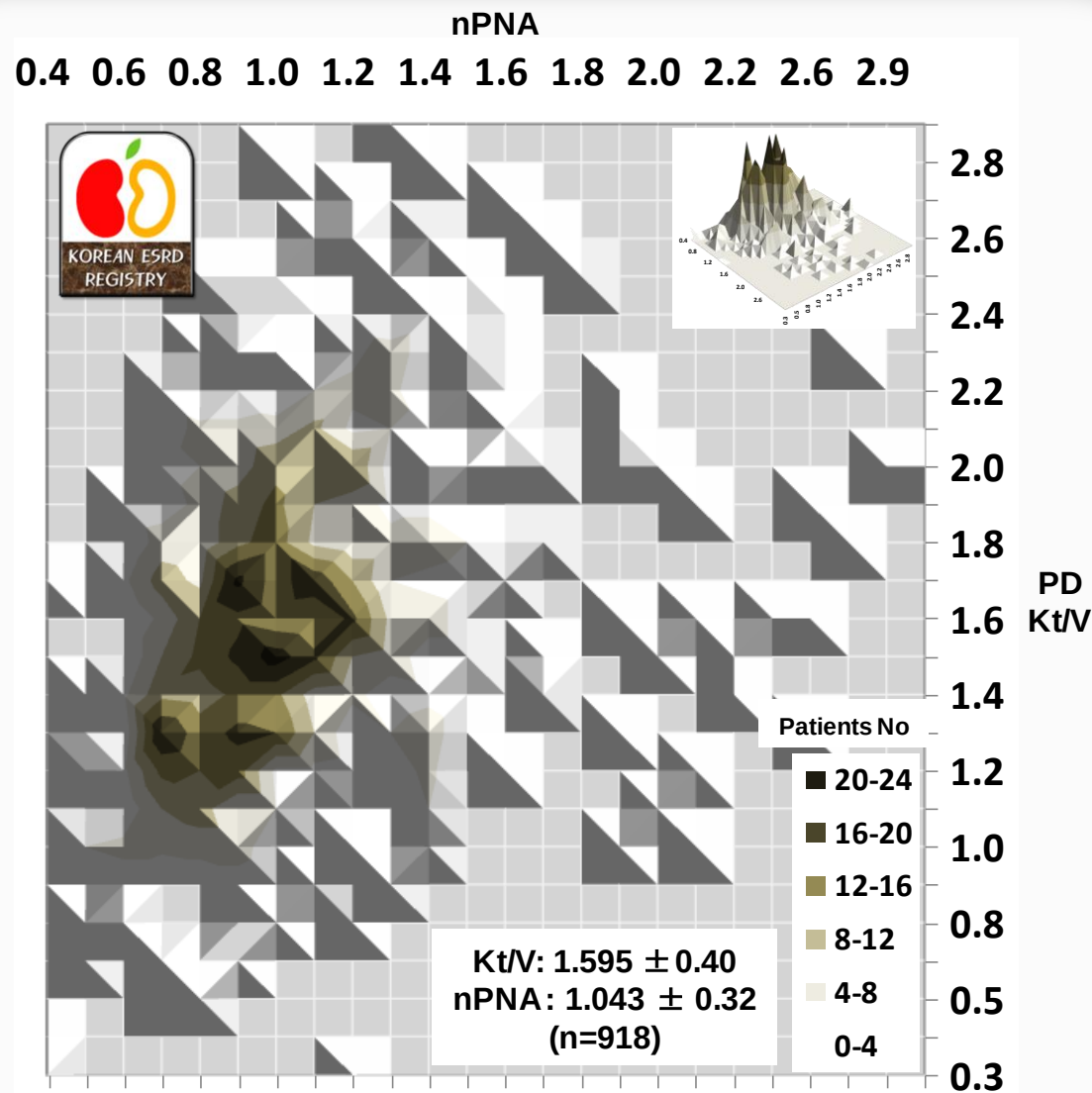
HD Adequacy : DM & Non-DM



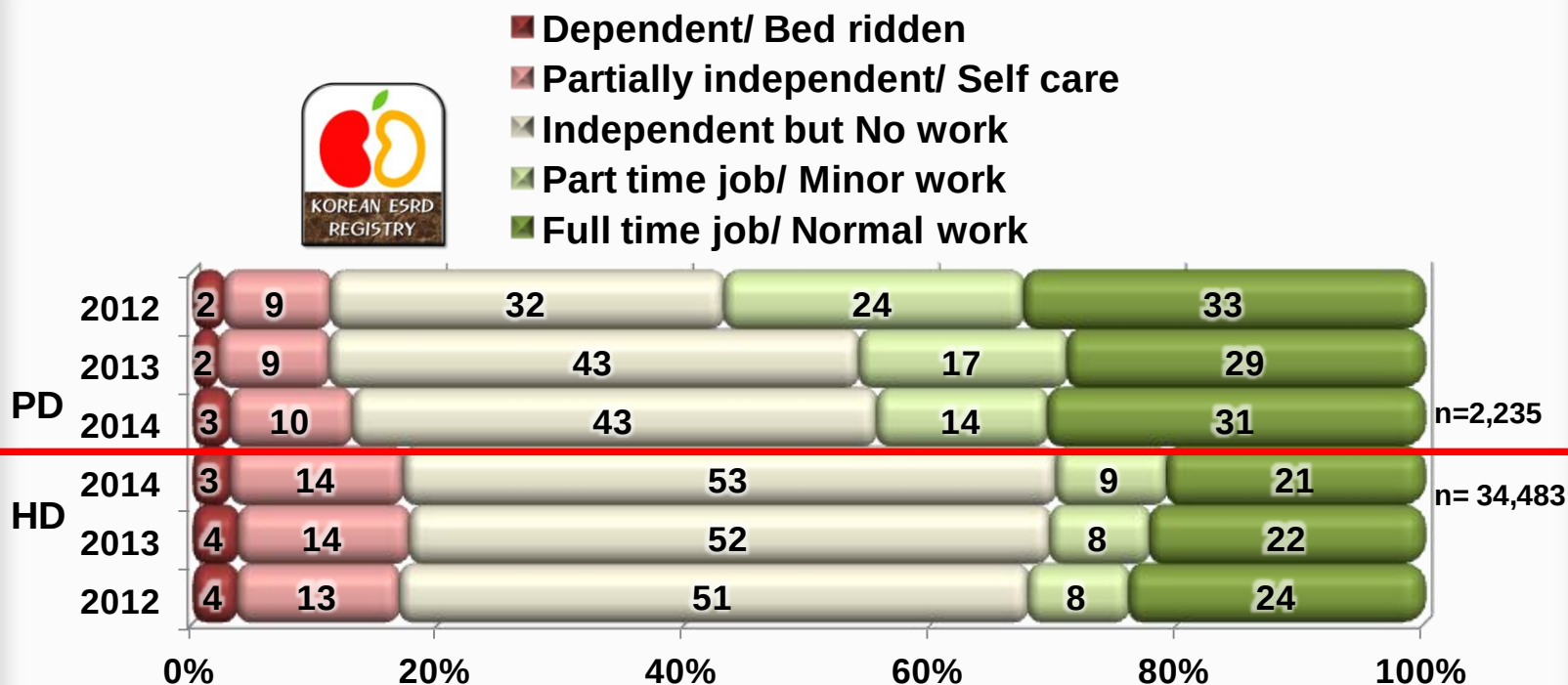
HD Adequacy : spKt/V vs nPCR



PD Adequacy : Kt/V vs nPNA



Rehabilitation of Dialysis Patients



Co-Morbidity of Dialysis Patients

	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
Arrhythmia	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

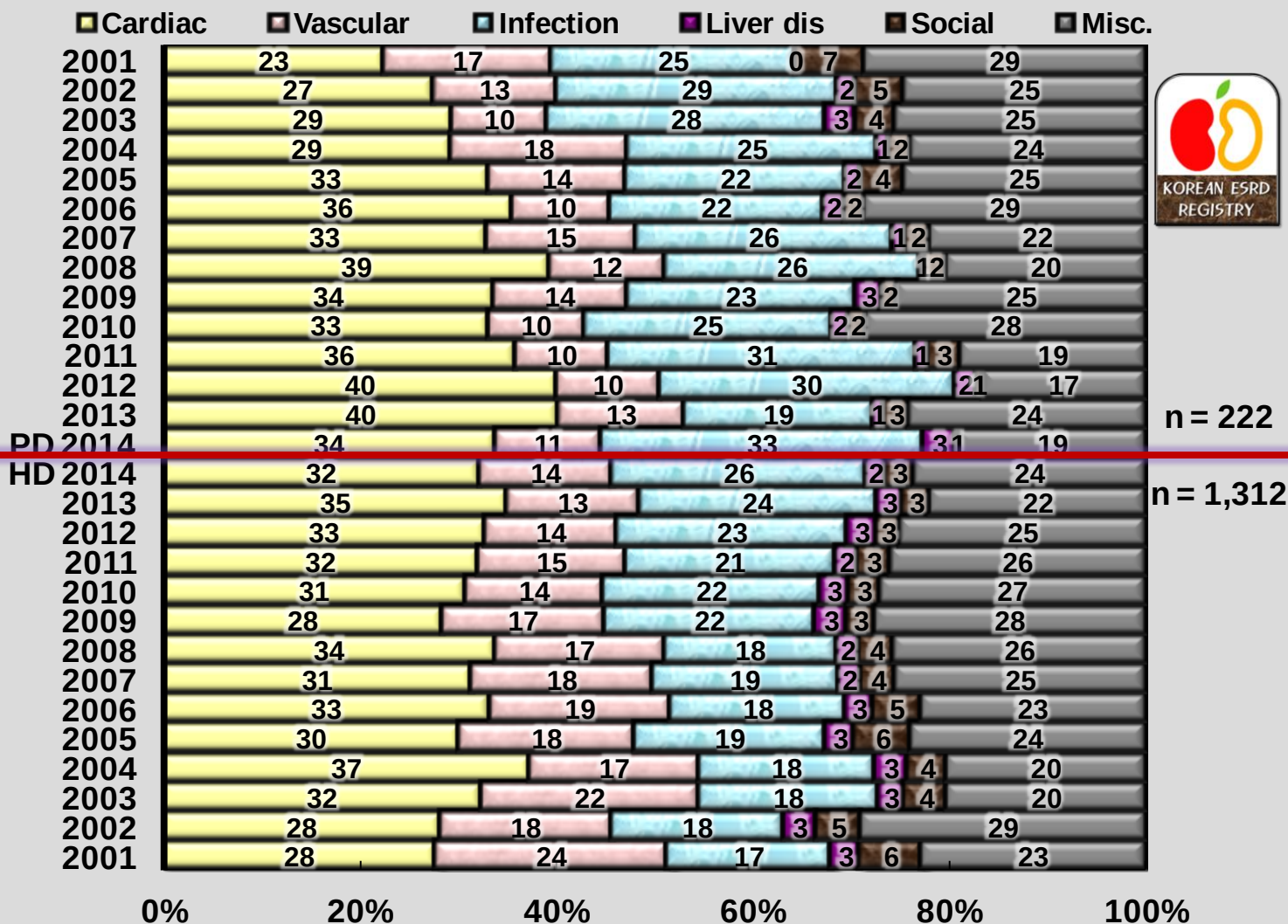
Causes of Death (%), 1994-2014



	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

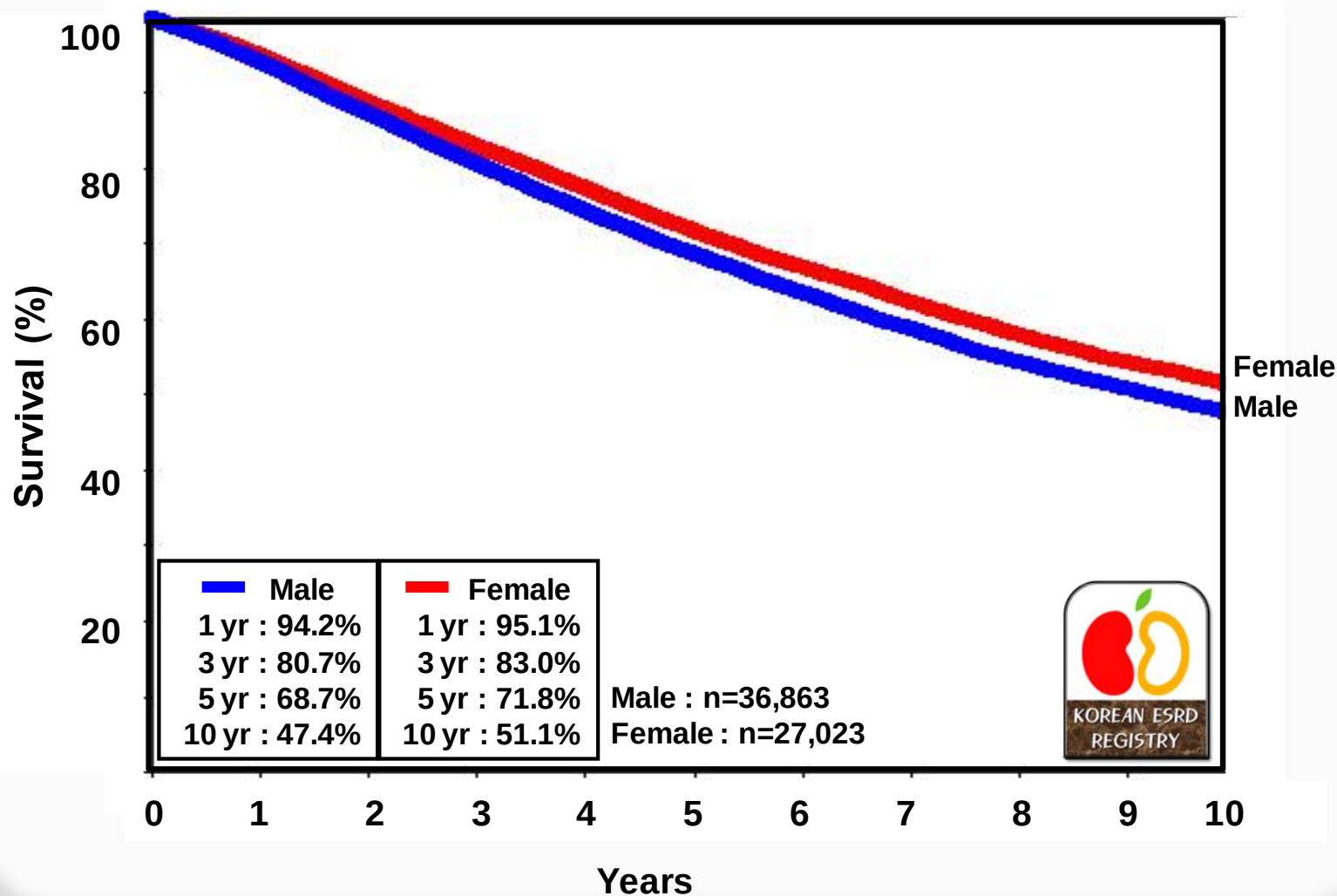
*Number of patients :1994-1996=981, 1998=911, 2001=761, 2003=894, 2005=1,256, 2007=1,531, 2009=1,727, 2010=1,802, 2011=1,828, 2012=1,745, 2013=1,604, 2014=1,534.

Death Causes, HD & PD



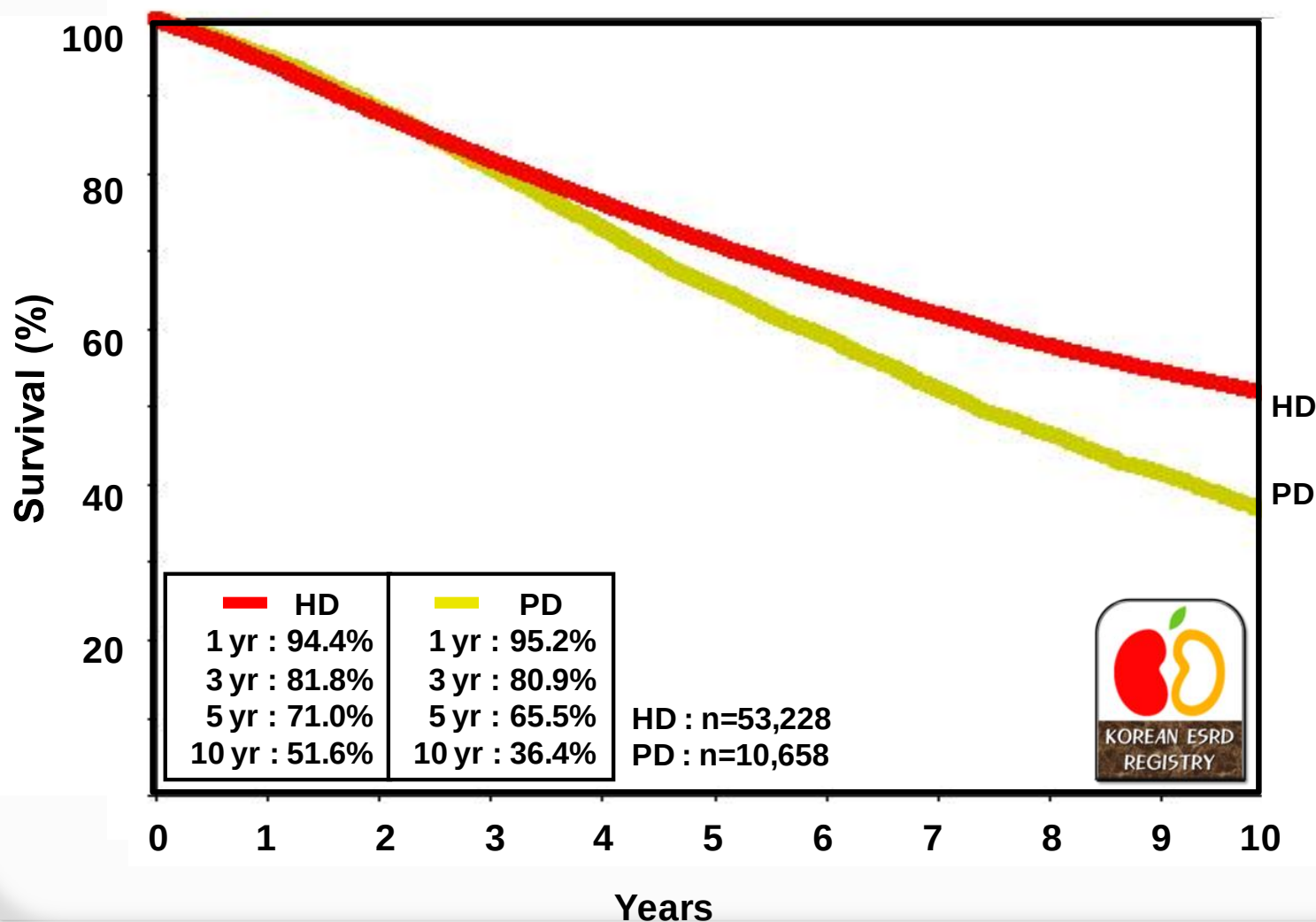
Overall Patient Survival

- Registered Dialysis Patients since 2001-



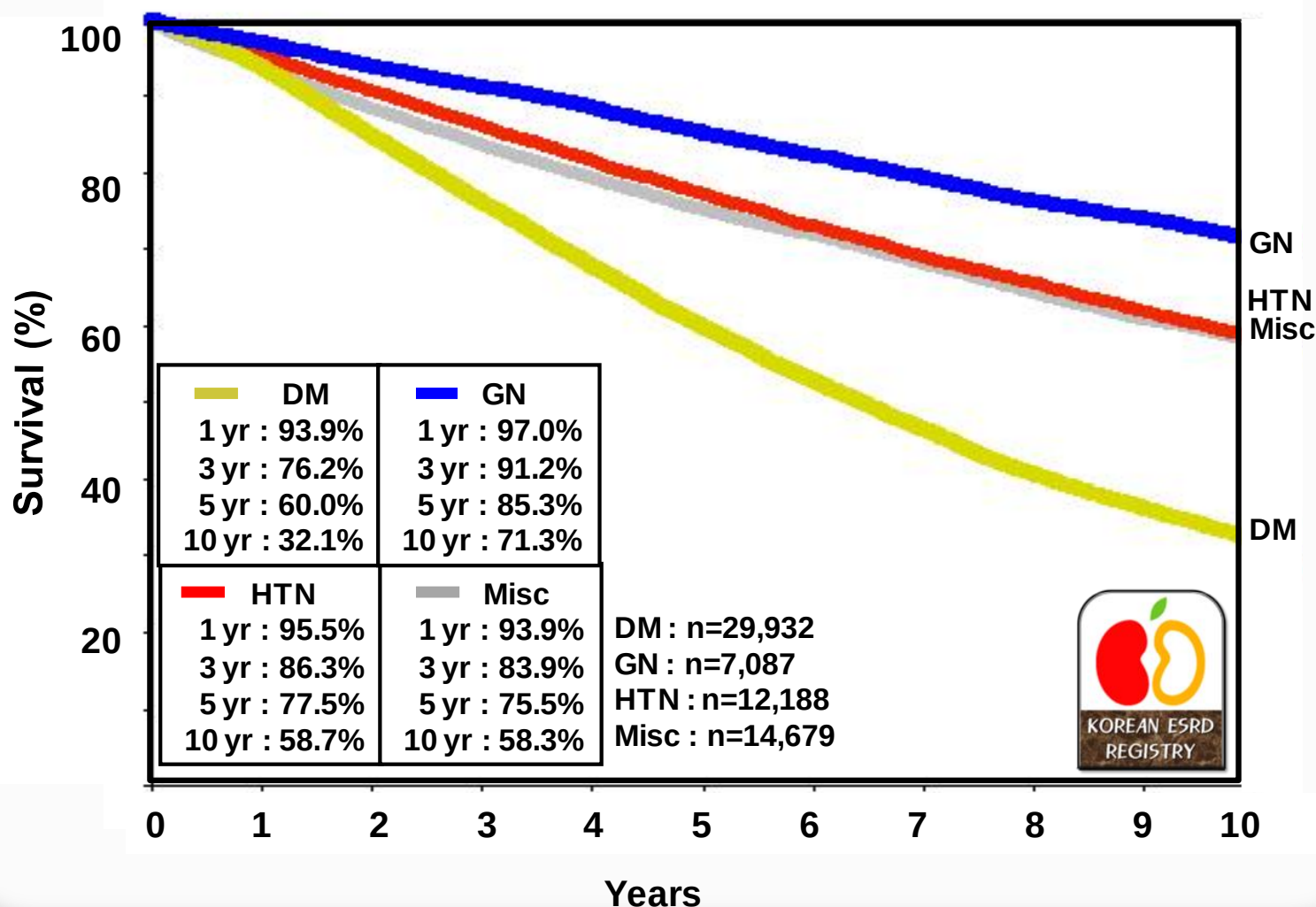
Patient Survival : HD vs PD

- Registered Dialysis Patients since 2001-



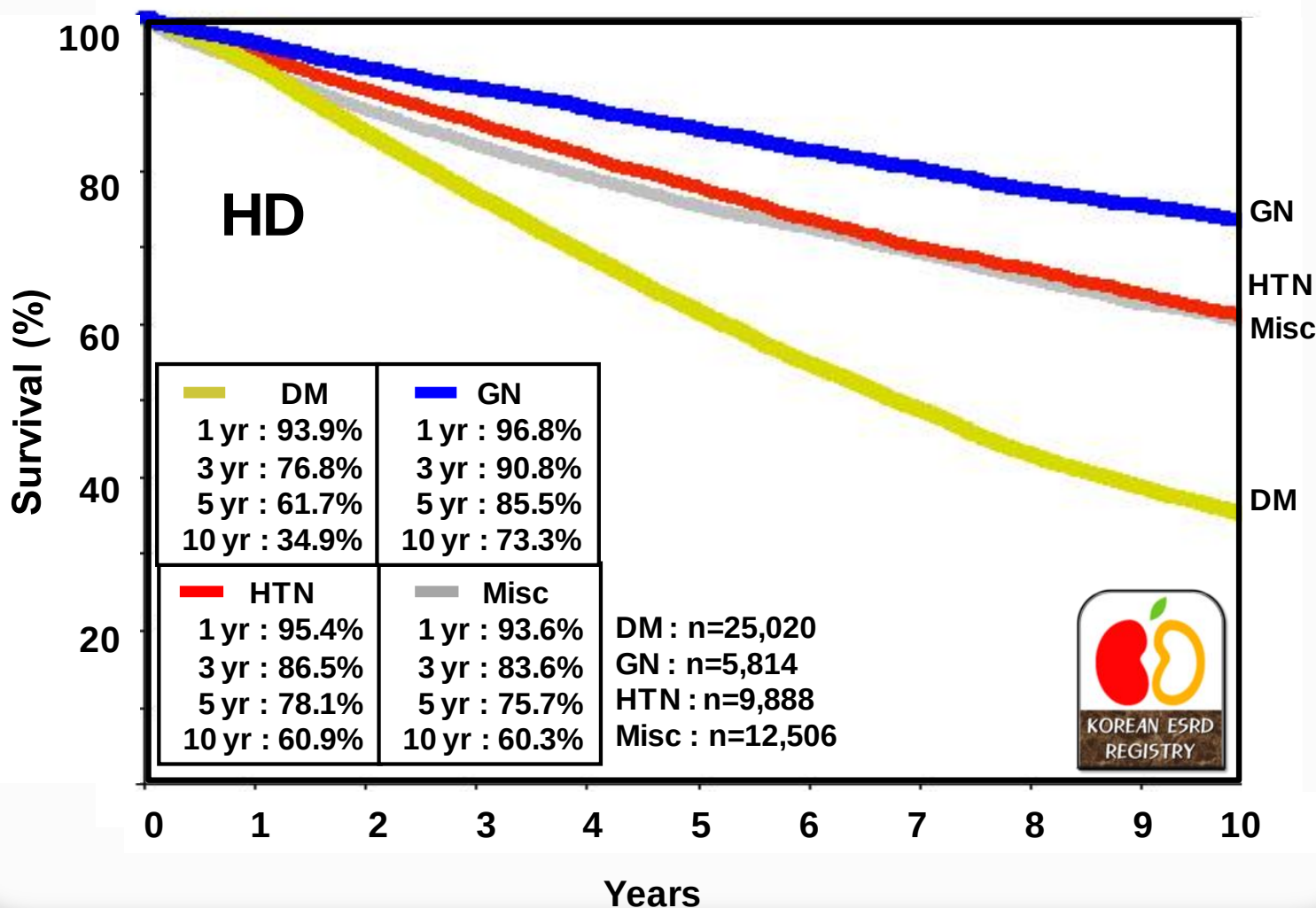
Patients Survival : Cause of ESRD

- Registered Dialysis Patients since 2001-



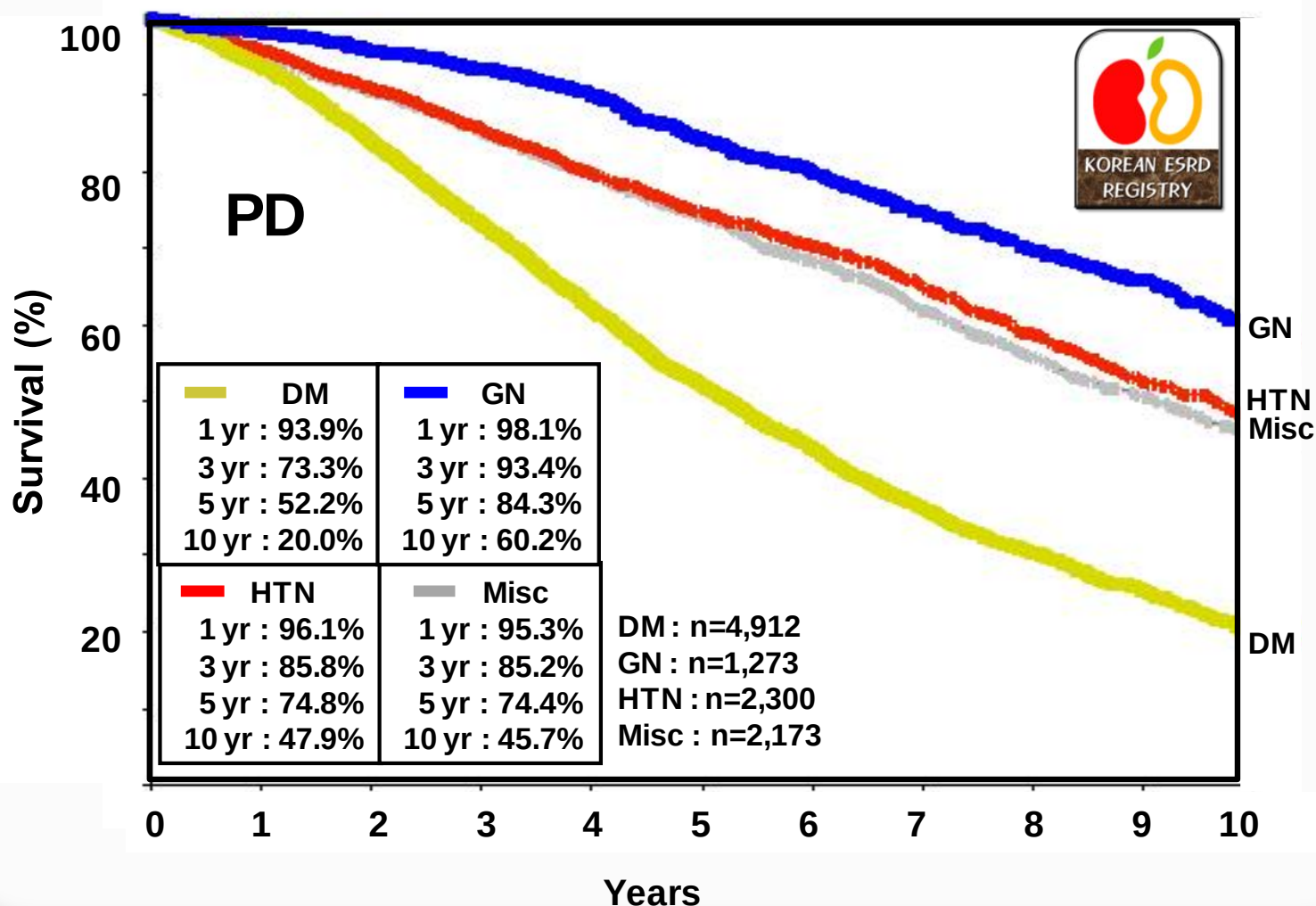
Patients Survival : Cause of ESRD, HD

- Registered Dialysis Patients since 2001-



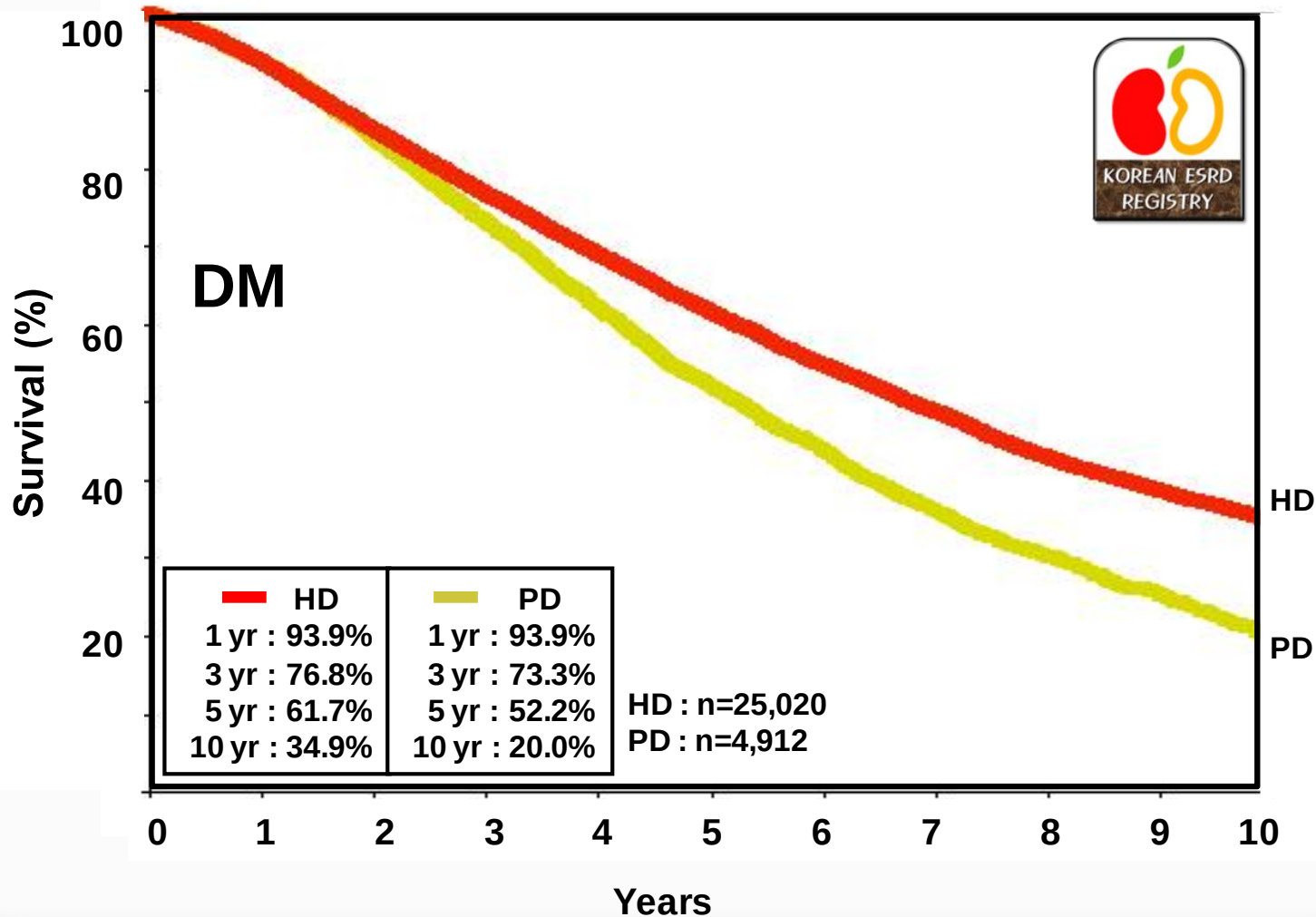
Patients Survival : Cause of ESRD, PD

- Registered Dialysis Patients since 2001-



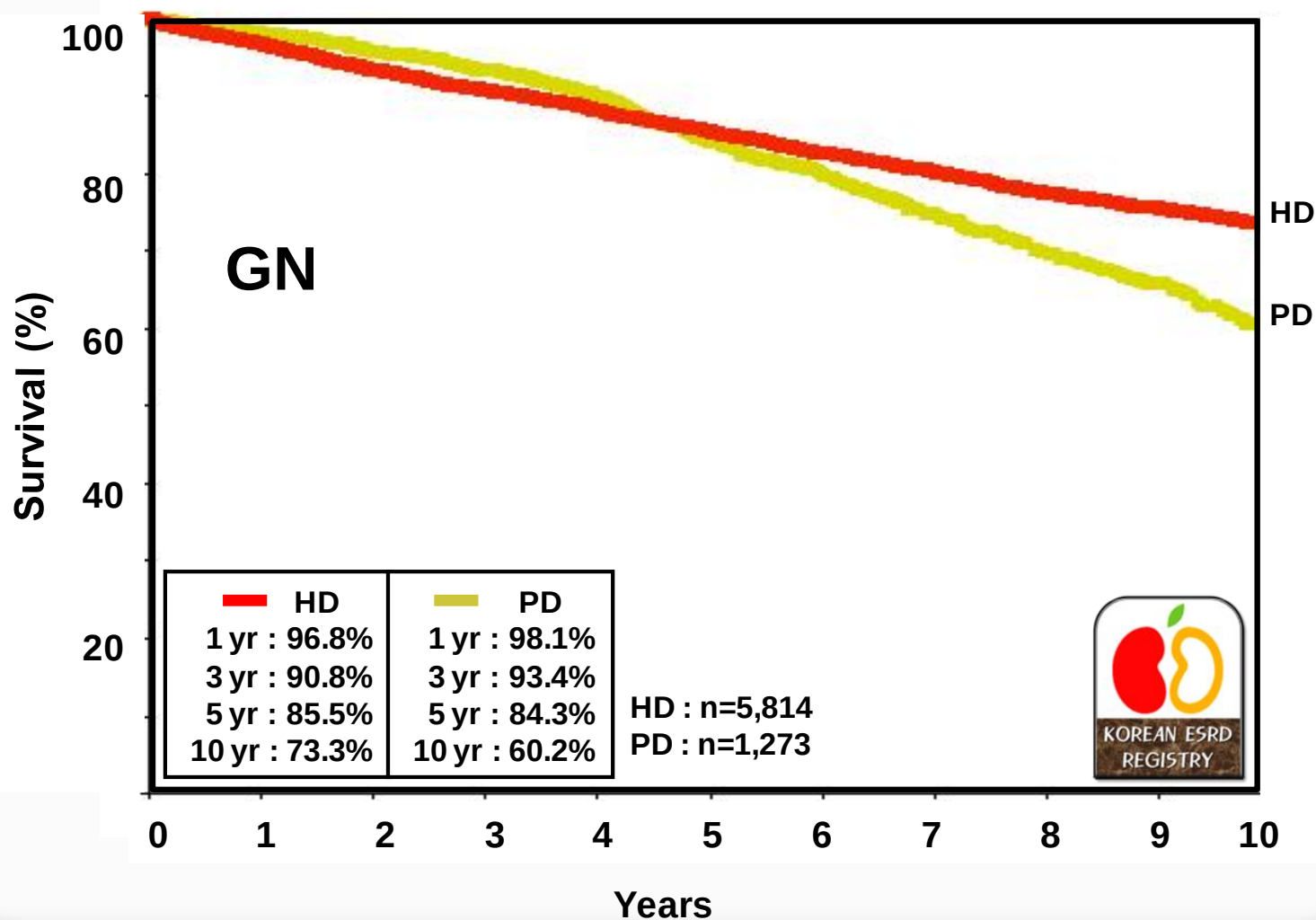
Patients Survival : HD vs PD in DM pts

- Registered Dialysis Patients since 2001-



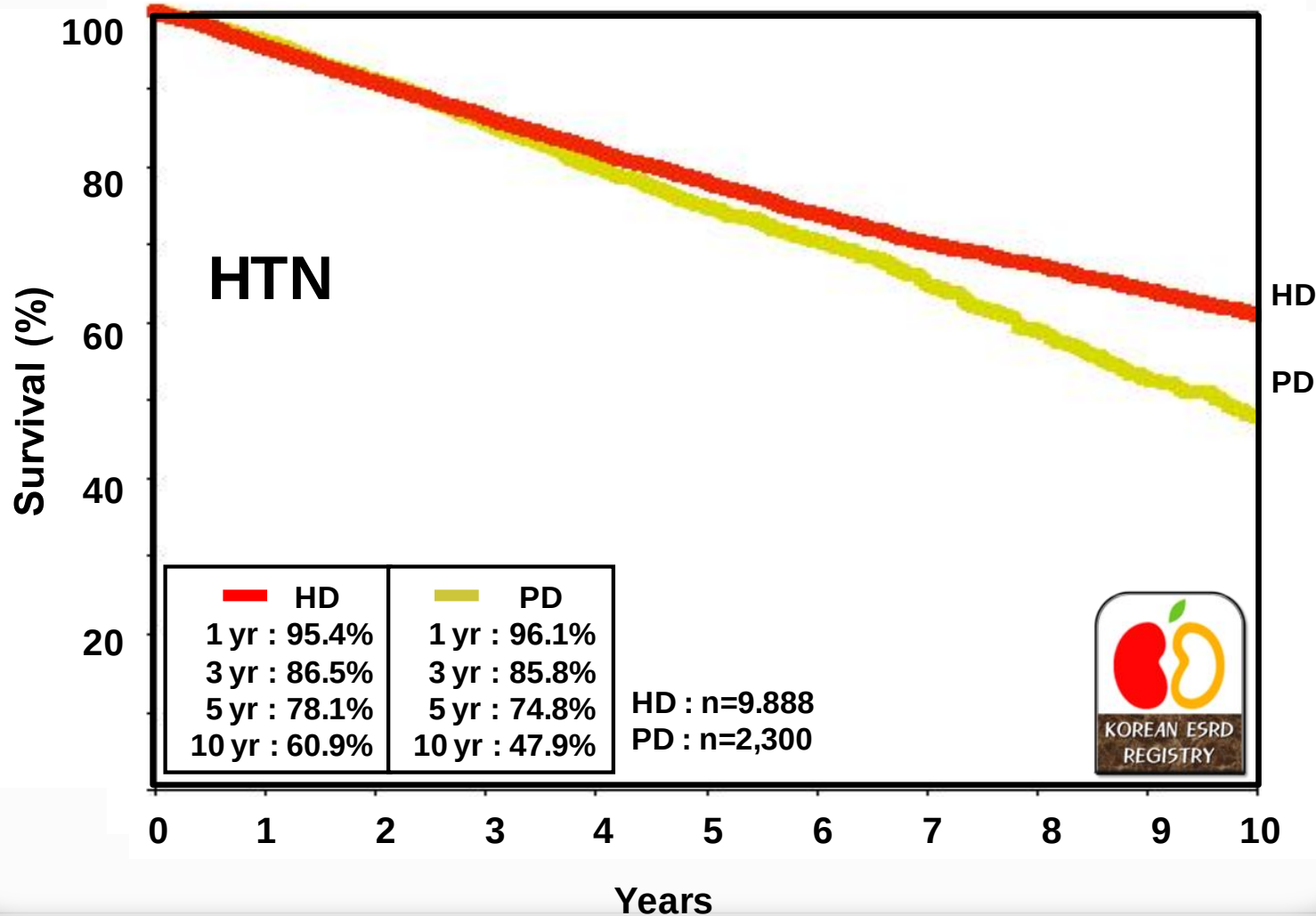
Patients Survival : HD vs PD in GN pts

- Registered Dialysis Patients since 2001-



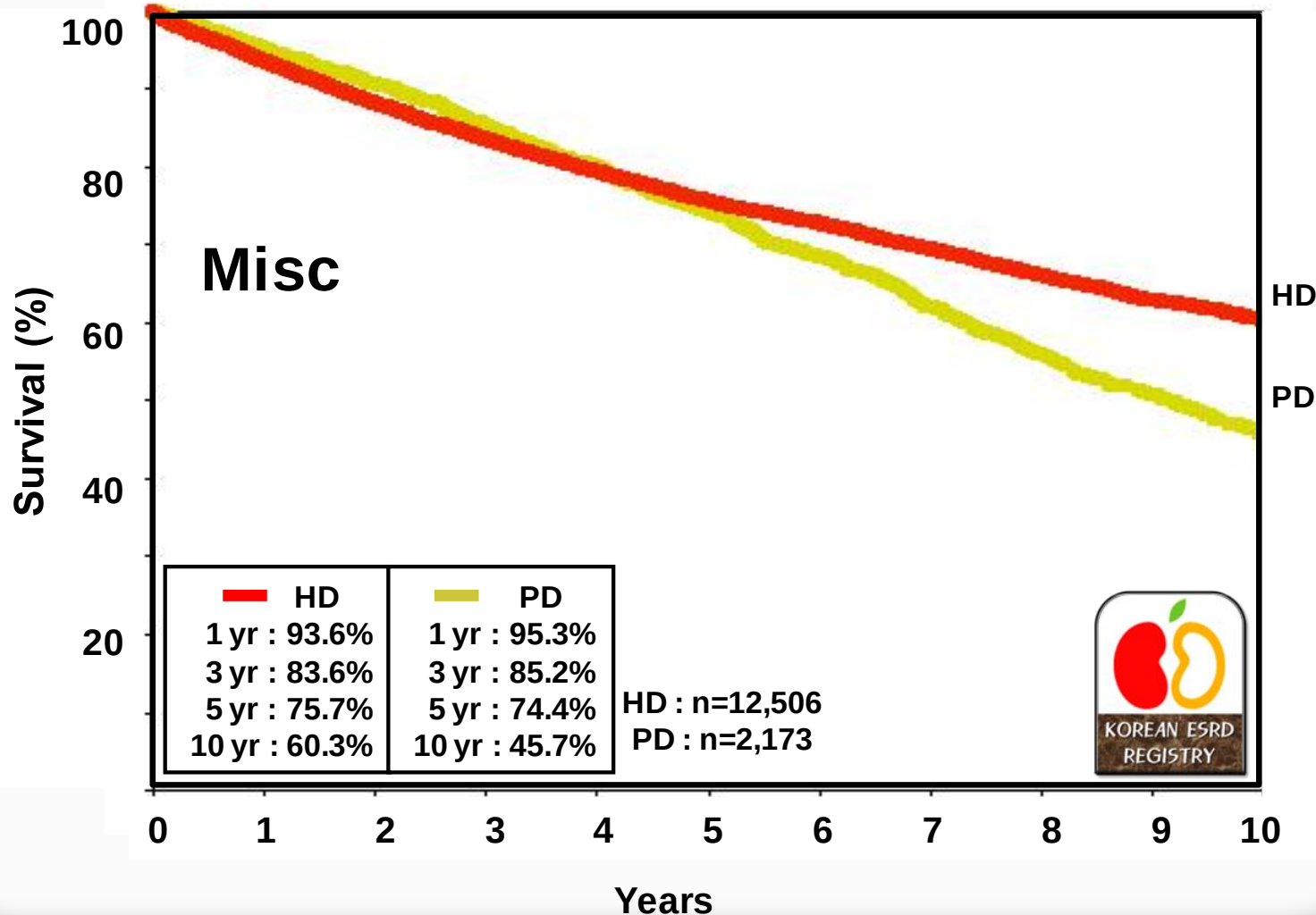
Patients Survival : HD vs PD in HTN pts

- Registered Dialysis Patients since 2001-

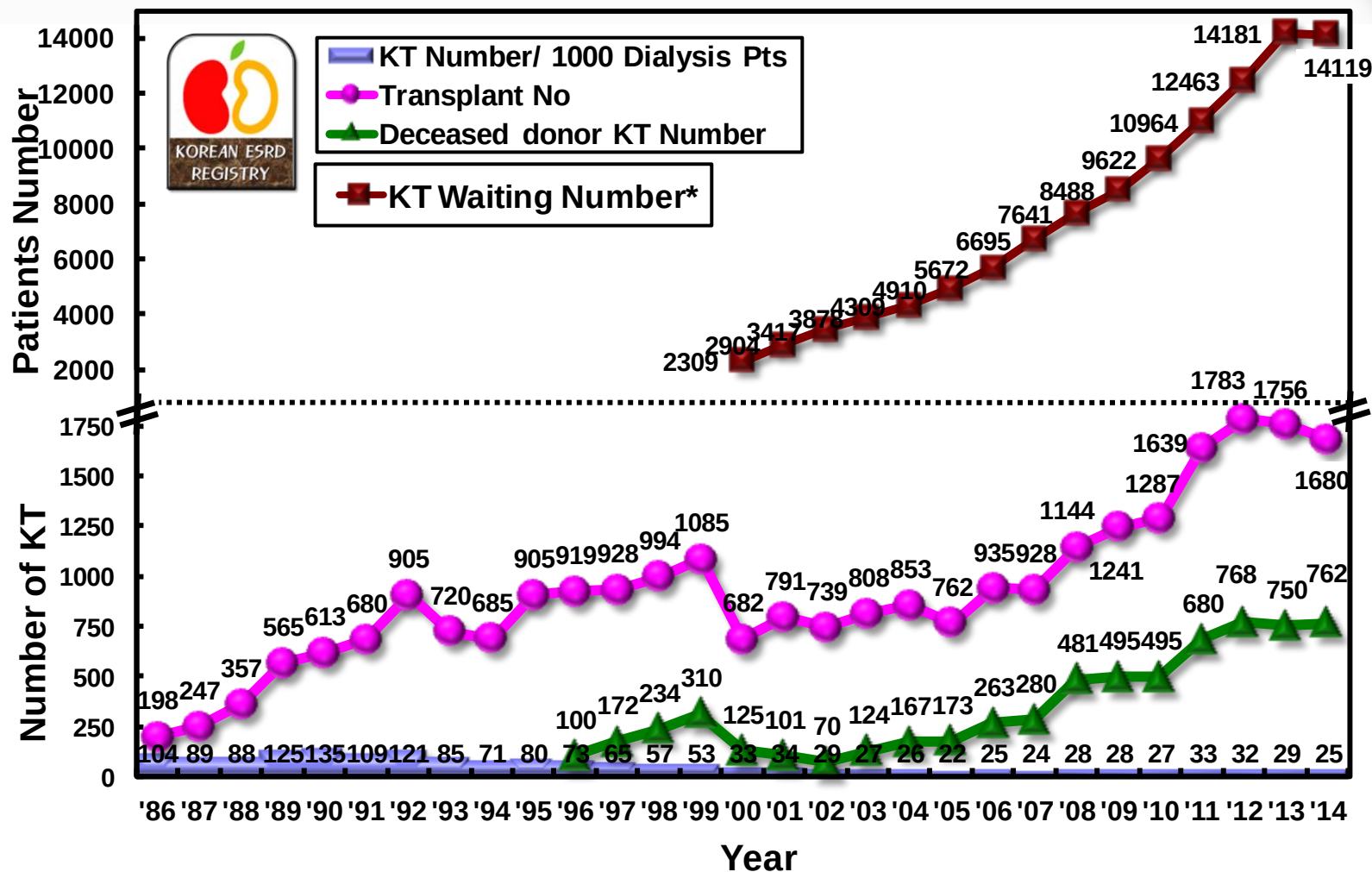


Patients Survival : HD vs PD in Misc pts

- Registered Dialysis Patients since 2001-



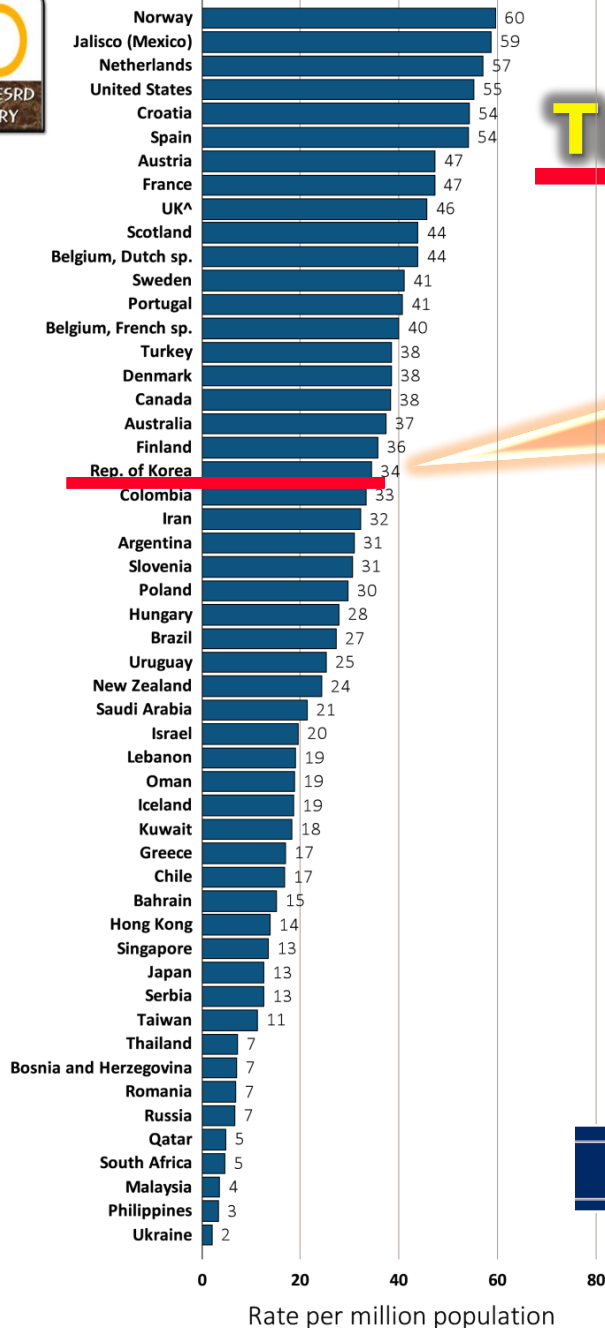
Kidney Transplantation





Kidney Transplantation

Country



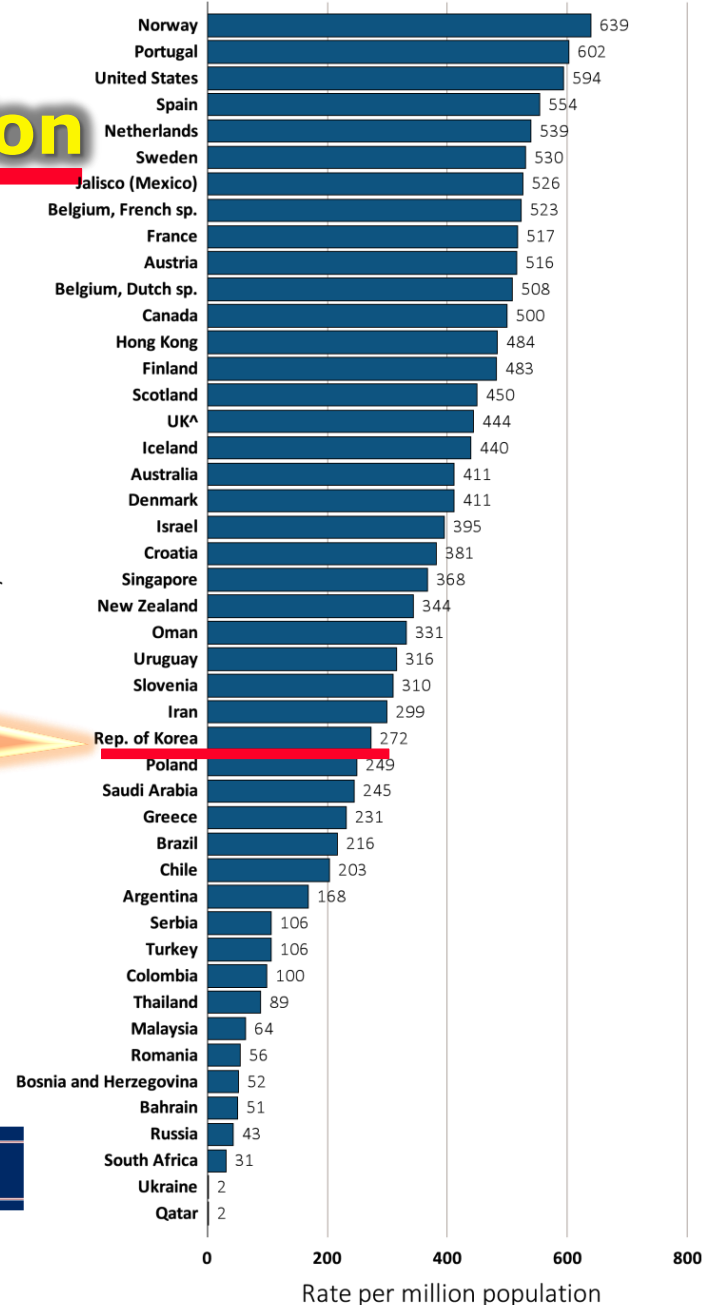
Incidence
34 PMP
2012

Prevalence
272 PMP
2012

USRDS
UNITED STATES RENAL DATA SYSTEM

2014 USRDS ANNUAL DATA REPORT
Volume 2: End-Stage Renal Disease

Country



Rate per million population

특 징 요약

- 2013년부터 새로운 등록프로그램 사용시작
 - 투석 방법, 합병증, 검사 수치, 재활상태 추가 등재, 자료누적
- 전체 투석환자 및 혈액투석기관수의 꾸준한 증가
- 비윤리 의료기관 존재, 요양병원 증가
- 복막투석의 정체 및 상대적 혈액투석 비율의 증가
- 원인 신질환에서 당뇨병성 신증의 비율 높이 유지
- 혈액투석 효율 점진적 향상, 빈혈 개선, 혈압저하
- 신장이식 최근 증가없음, 특히 뇌사공여 정체
- 의료보험 심사평가원의 적정성 평가, 대한신장학회의 투석기관 인증제와 약제 비용에 따른 투석 치료의 변화 (특히 칼슘,인)

감사의 글

- **전국의 인공신장실 담당의료진**
- **대한신장학회 사무국**
- **투석용 의료물품 공급업체 자료:**
(Baxter Korea, FMC Korea)