



우리나라 신대체 요법의 현황

– 인산 민병석 교수 기념 말기 신부전 환자 등록사업 2008 –

Current Renal Replacement Therapy in Korea

-Insan Memorial Dialysis Registry 2008-



대한신장학회 등록위원회

ESRD Registry Committee, Korean Society of Nephrology

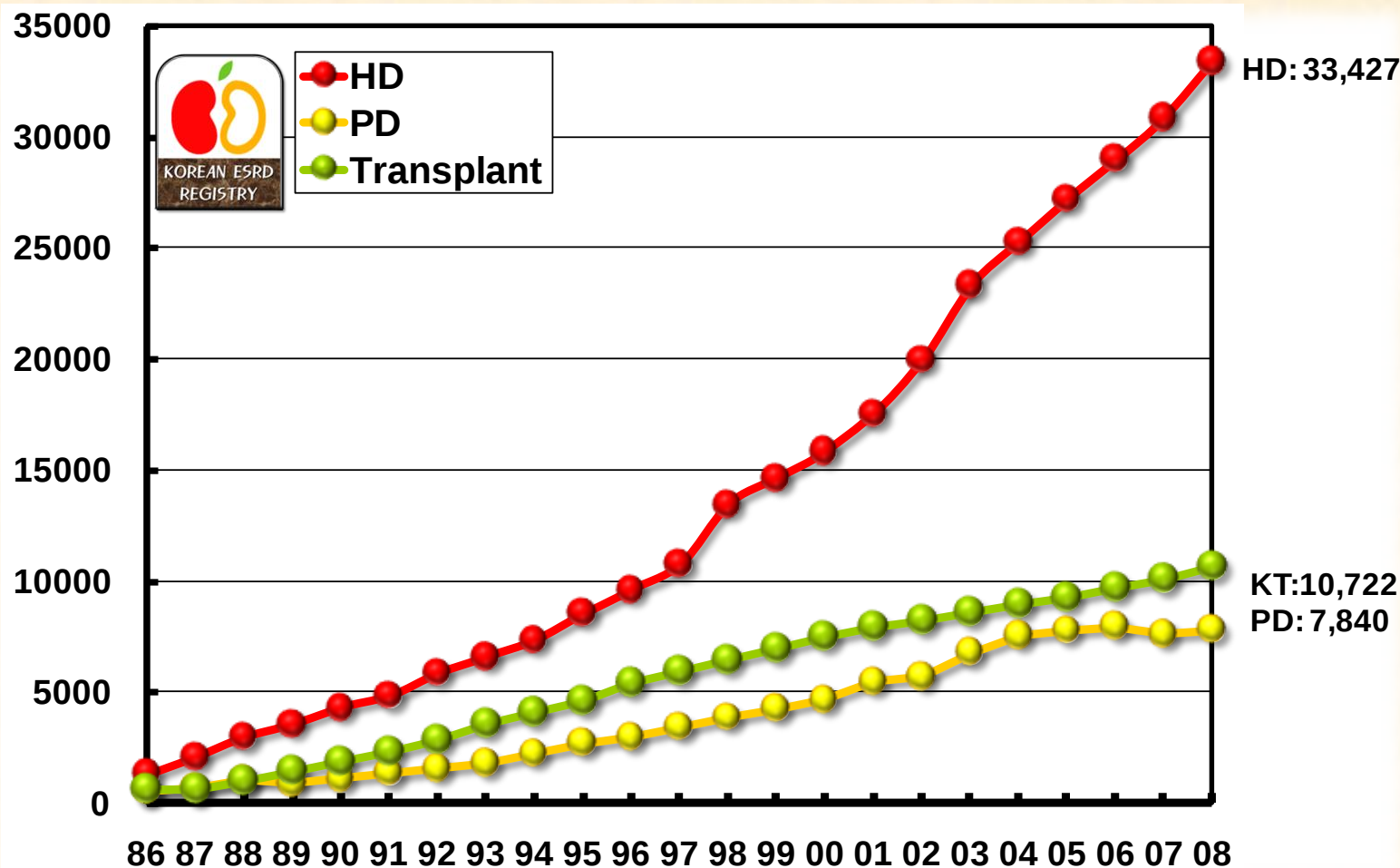
Prevalence of Renal Replacement Therapy

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)

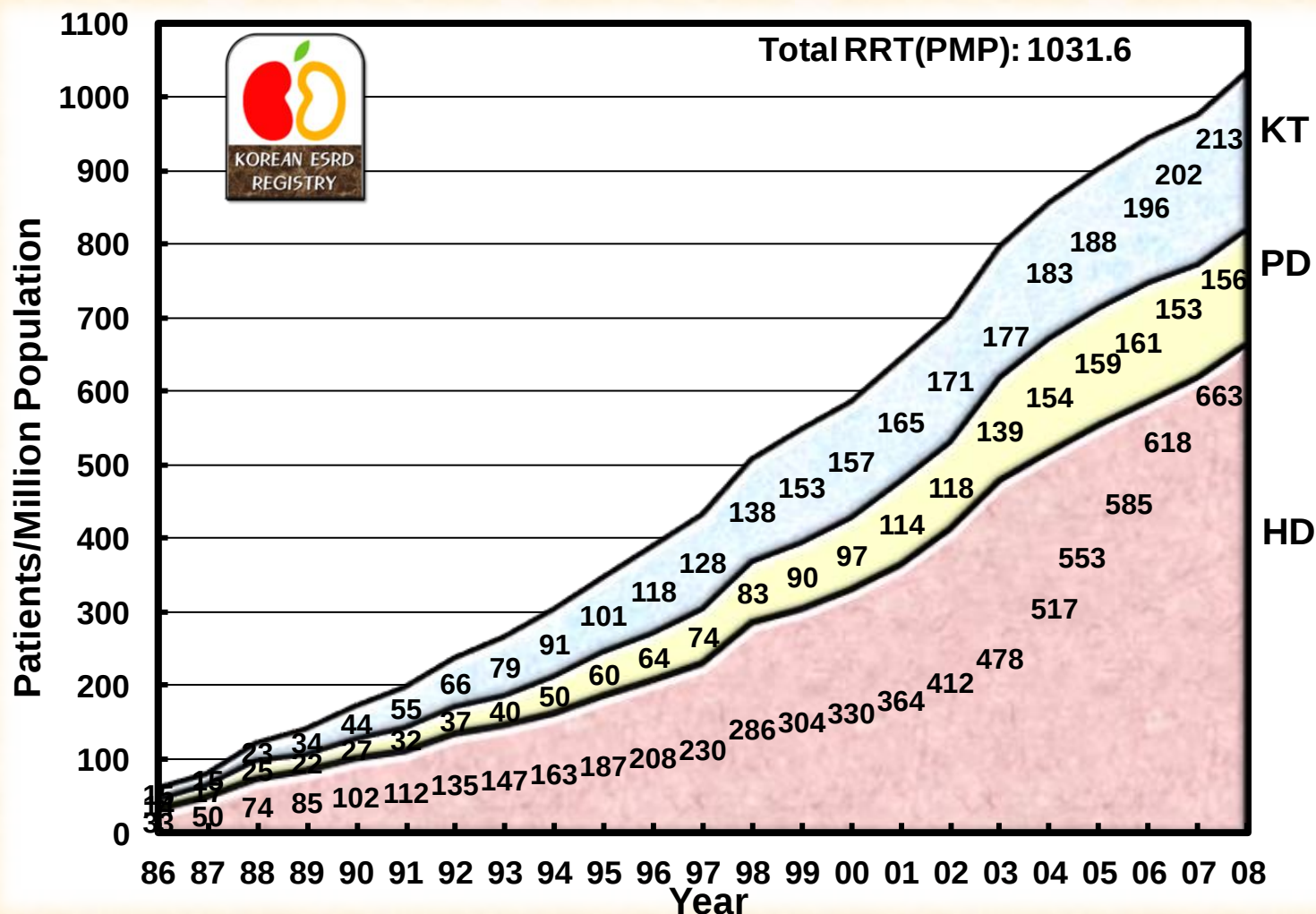
(): number of patients per million population (2008 overall Korean population : 50,394,374)



Patient Number of RRT



Point Prevalence of RRT

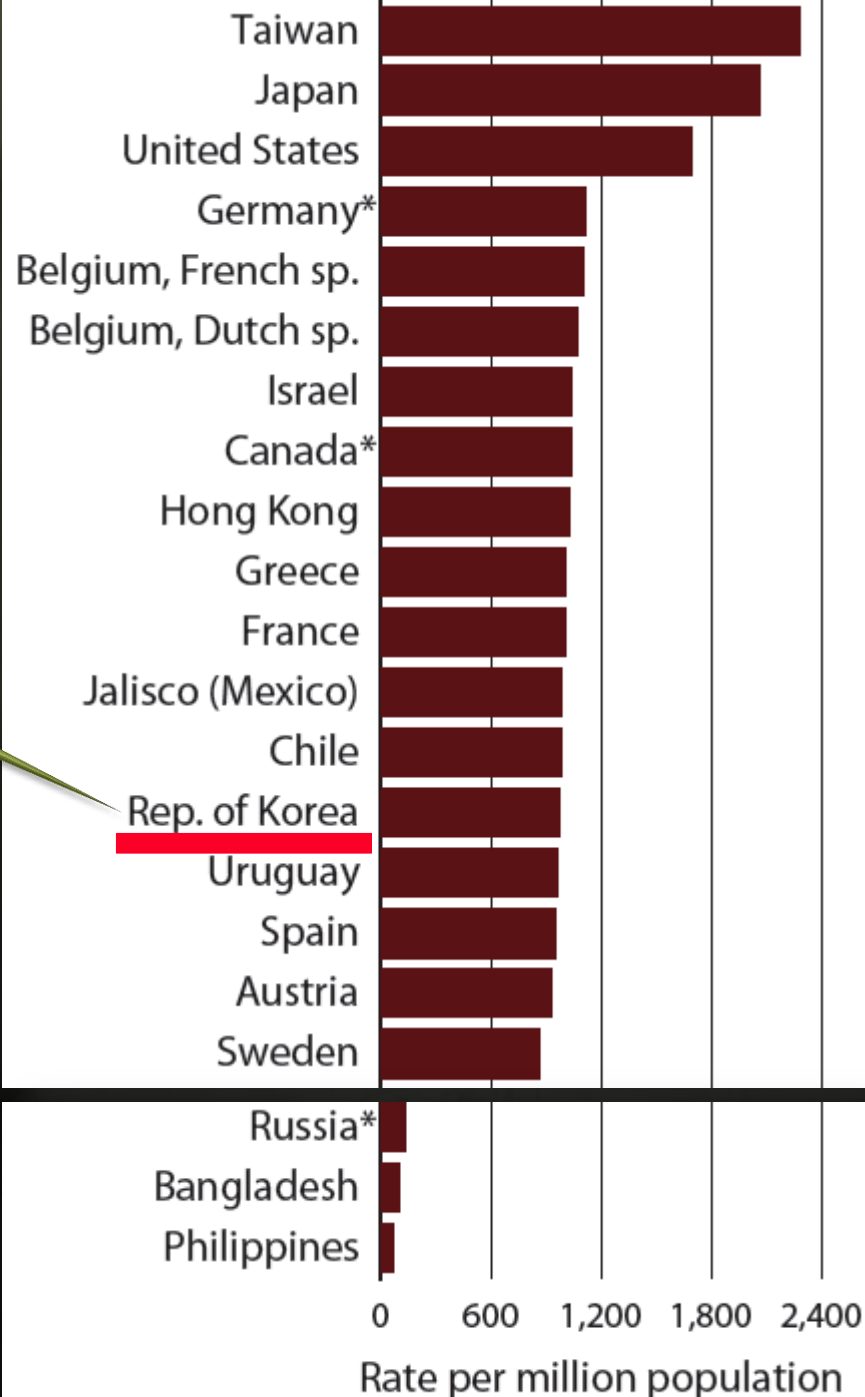


Prevalence of ESRD

972.8 PMP
End of 2007

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Renal
Data
System

2009 Annual
Data Report

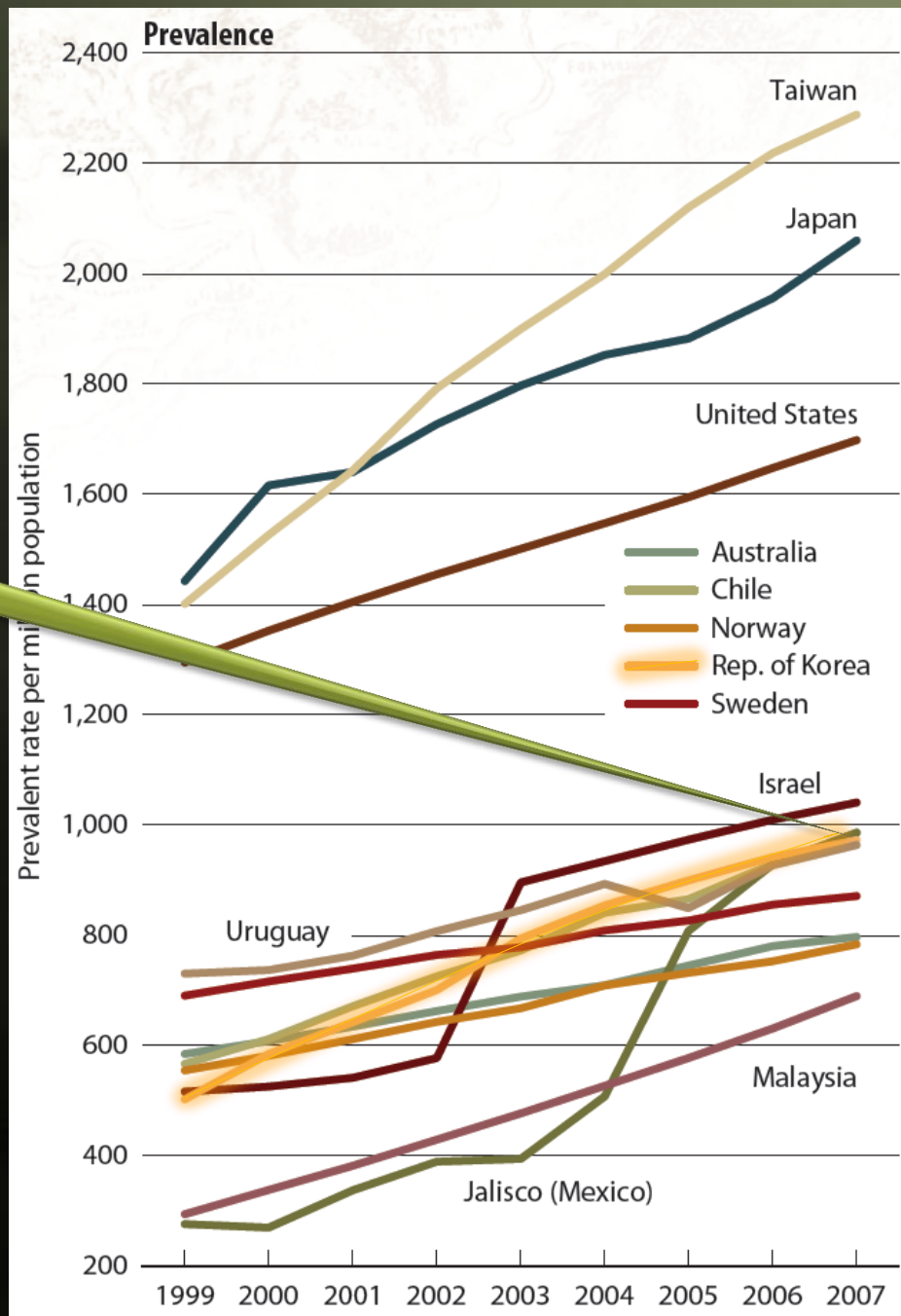


Changes of ESRD Prevalence

972.8 PMP
End of 2007

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Number of New RRT Pts

Year	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)

(): number of patients per million population (2008 overall Korean population : 50,394,374)

Incidence of ESRD

183.5 PMP
End of 2007

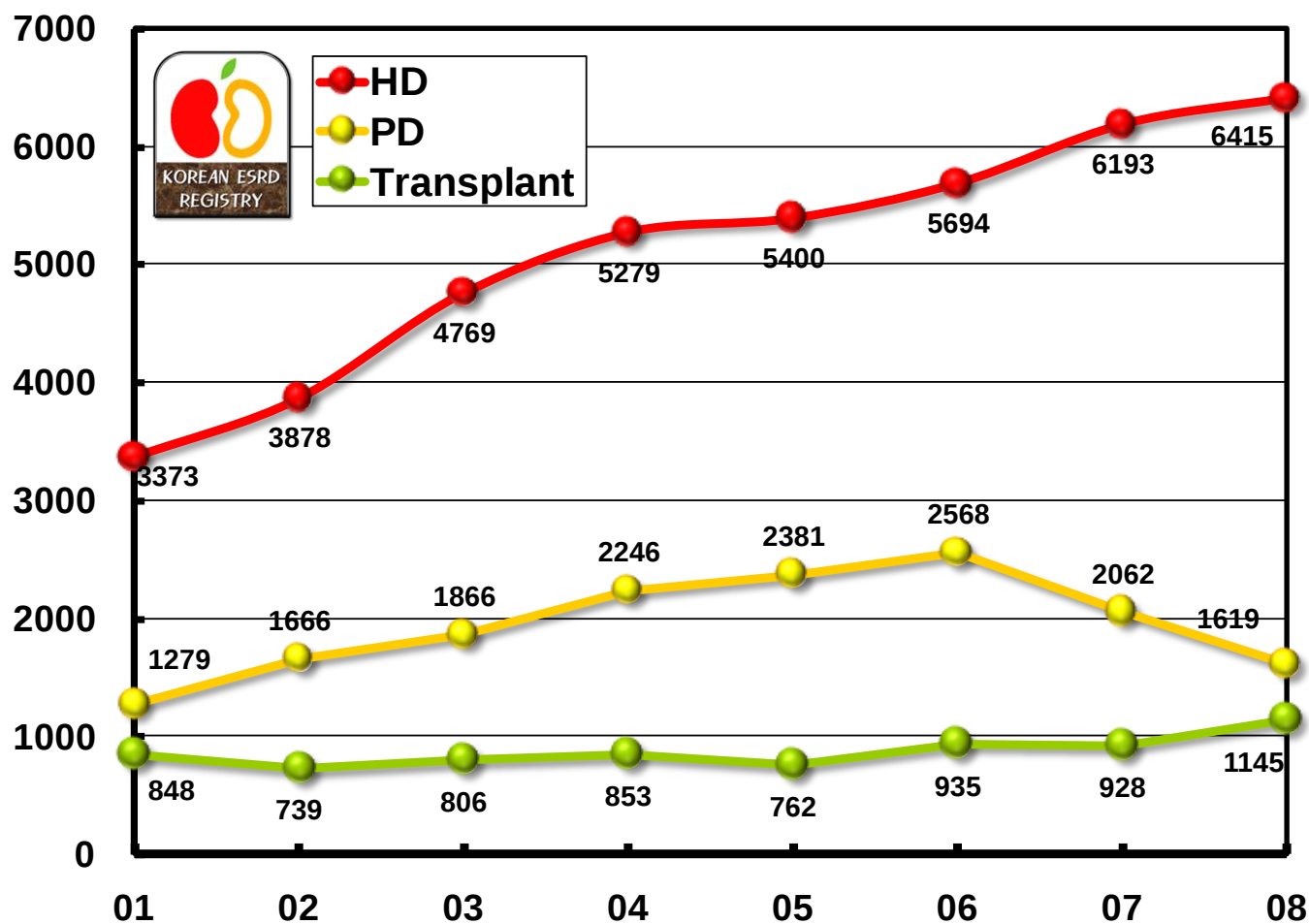
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Number of New RRT Pts



Causes of ESRD in New Pts

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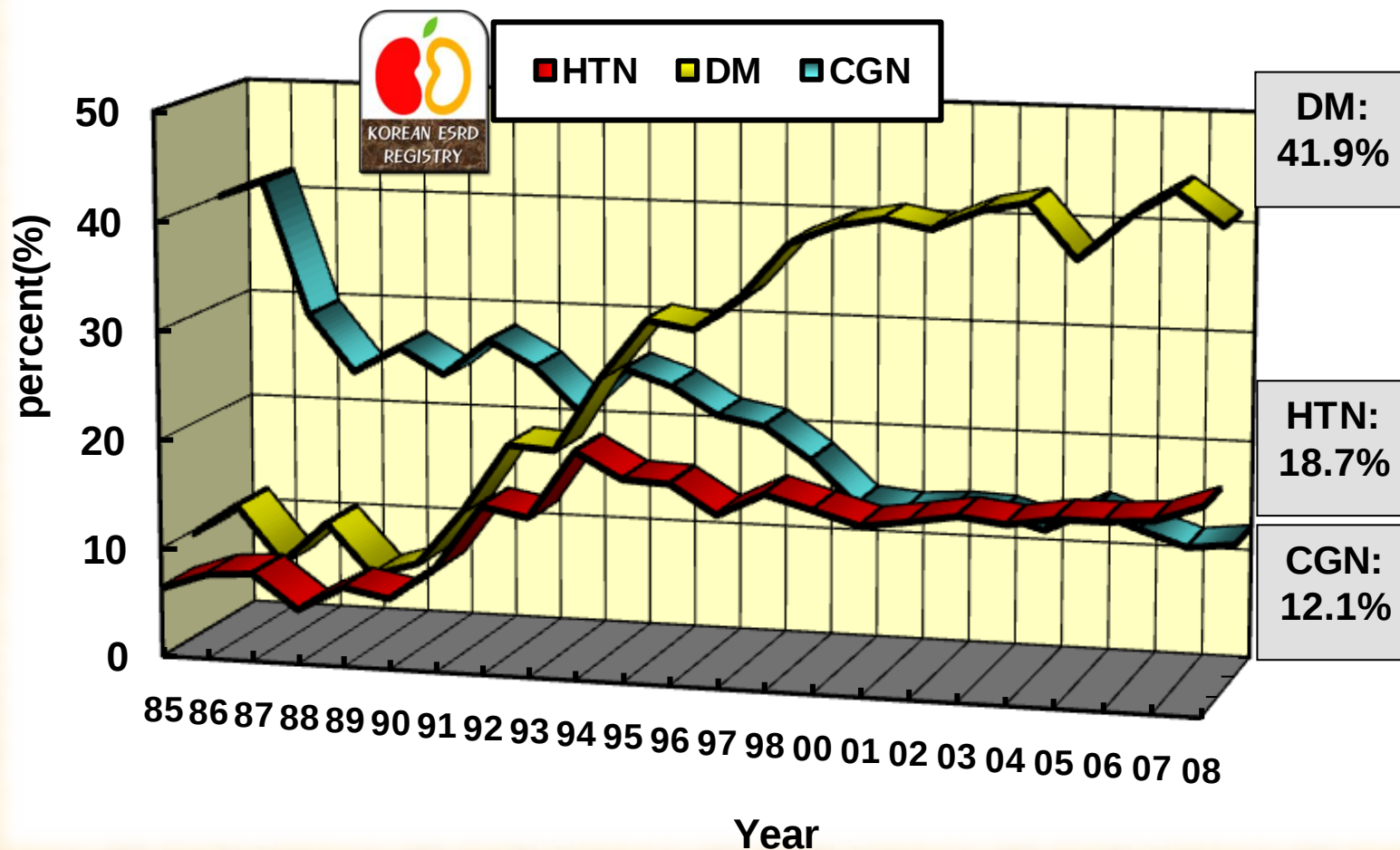
Causes	Percent (%)									
	1992	1994	1996	1998	2000	2002	2004	2006	2007	2008*
Chronic Glomerulonephritis	25.3	25.5	21.6	17.9	14.0	13.9	12.5	13.0	11.6	12.1
Not Histologically confirmed	19.7	20.4	16.7	13.6	10.6	10.0	8.6	9.0	8.3	8.2
Histologically confirmed	5.6	5.0	4.9	4.3	3.4	3.9	3.9	3.9	3.3	3.8
Diabetic nephropathy	19.5	26.1	30.8	38.9	40.7	40.7	43.4	42.3	44.9	41.9
Hypertensive nephrosclerosis	15.4	20.8	18.3	17.8	16.6	16.0	16.2	16.9	17.2	18.7
Cystic kidney disease	2.1	2.2	1.8	1.7	2.2	1.6	1.4	1.7	1.7	1.7
Renal tuberculosis	1.1	1.5	1.2	0.5	0.4	0.5	0.3	0.3	0.3	0.2
Pyelo/interstitial nephritis	1.3	1.1	0.7	1.0	0.8	0.6	0.6	0.6	0.5	0.5
Drugs or nephrotoxic agents	1.3	0.1	0.6	0.3	0.3	0.4	0.2	0.3	0.2	0.3
Lupus nephritis	0.8	0.7	1.0	0.5	0.9	0.8	0.6	0.6	0.6	0.6
Gouty nephropathy	0.7	0.7	0.6	0.5	0.7	0.4	0.5	0.3	0.3	0.3
Hereditary nephropathy	0.3	0.7	0.4	0.2	0.1	0.2	0.3	0.3	0.2	0.3
Kidney tumor	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.1	0.2
Other	4.1	2.7	2.8	3.9	3.0	5.6	5.9	6.0	5.1	5.8
Uncertain	28.6	17.8	15.9	16.6	20.2	19.0	17.8	17.5	17.2	17.6

* n = 8,619



Three Major Causes of ESRD

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Diabetic ESRD

44.9%
2007

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Hong Kong
Rep. of Korea
United States
Japan
Taiwan
Israel
New Zealand
Philippines
Pakistan*
Finland

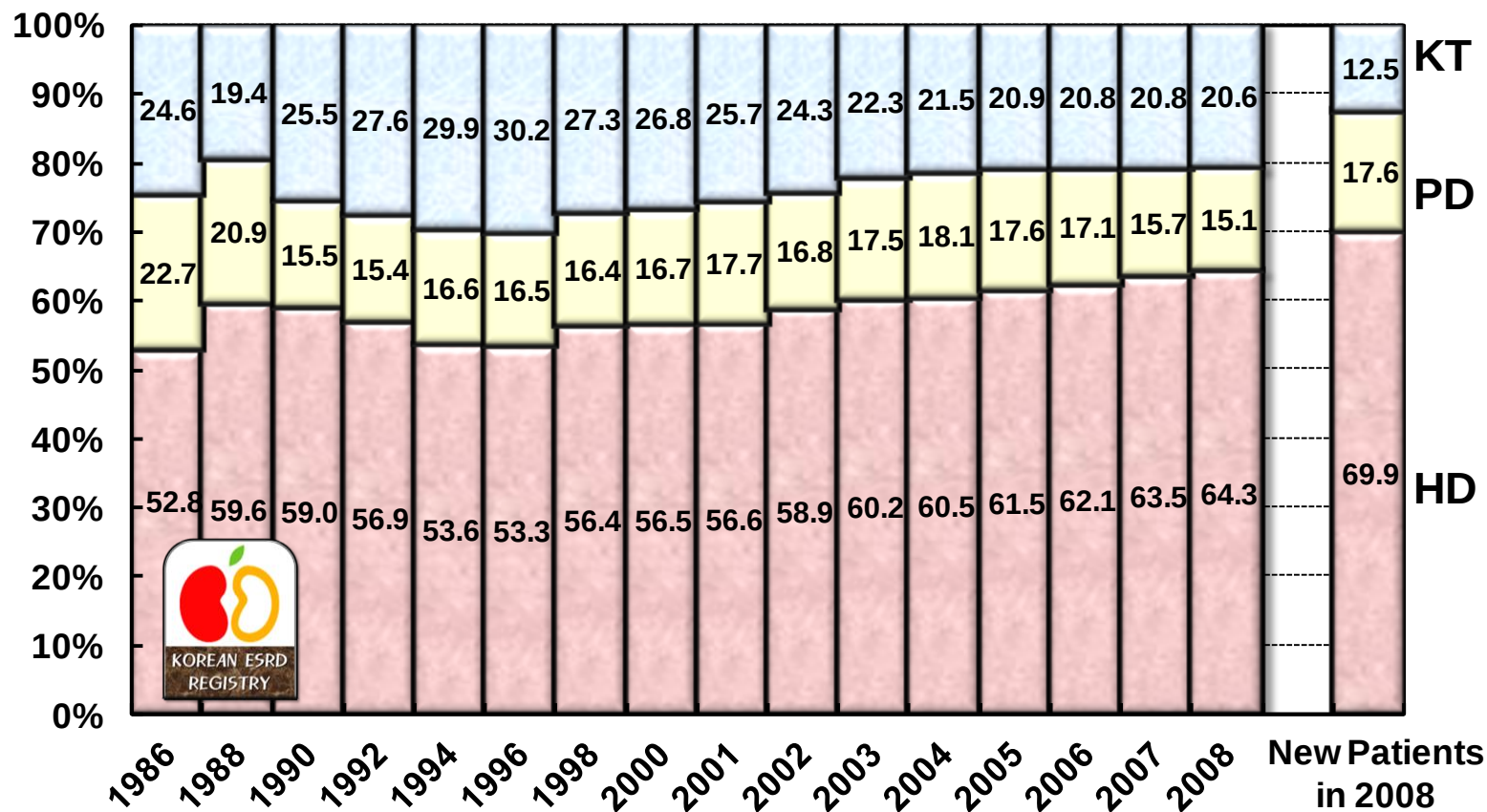
UK^
Netherlands
Scotland
Russia*
Norway
Iceland
Romania

0 15 30 45 60
Percent of patients



Proportion of RRT Modalities

- Annual Prevalence & Incidence -

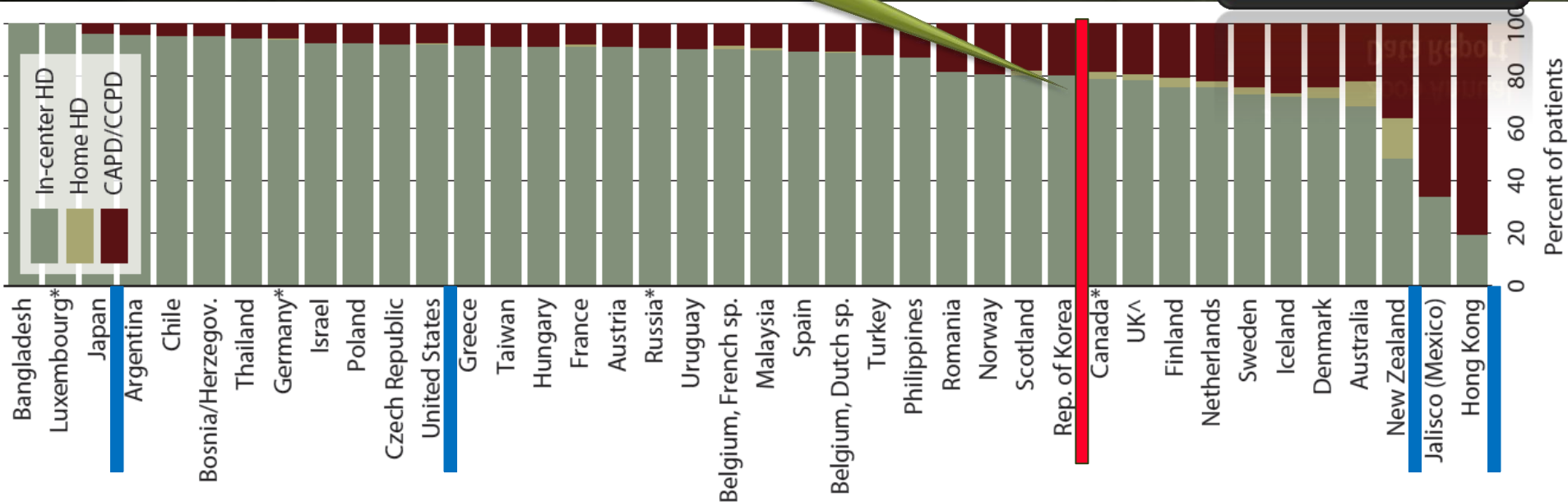


Percent Distribution of Dialysis Modalities

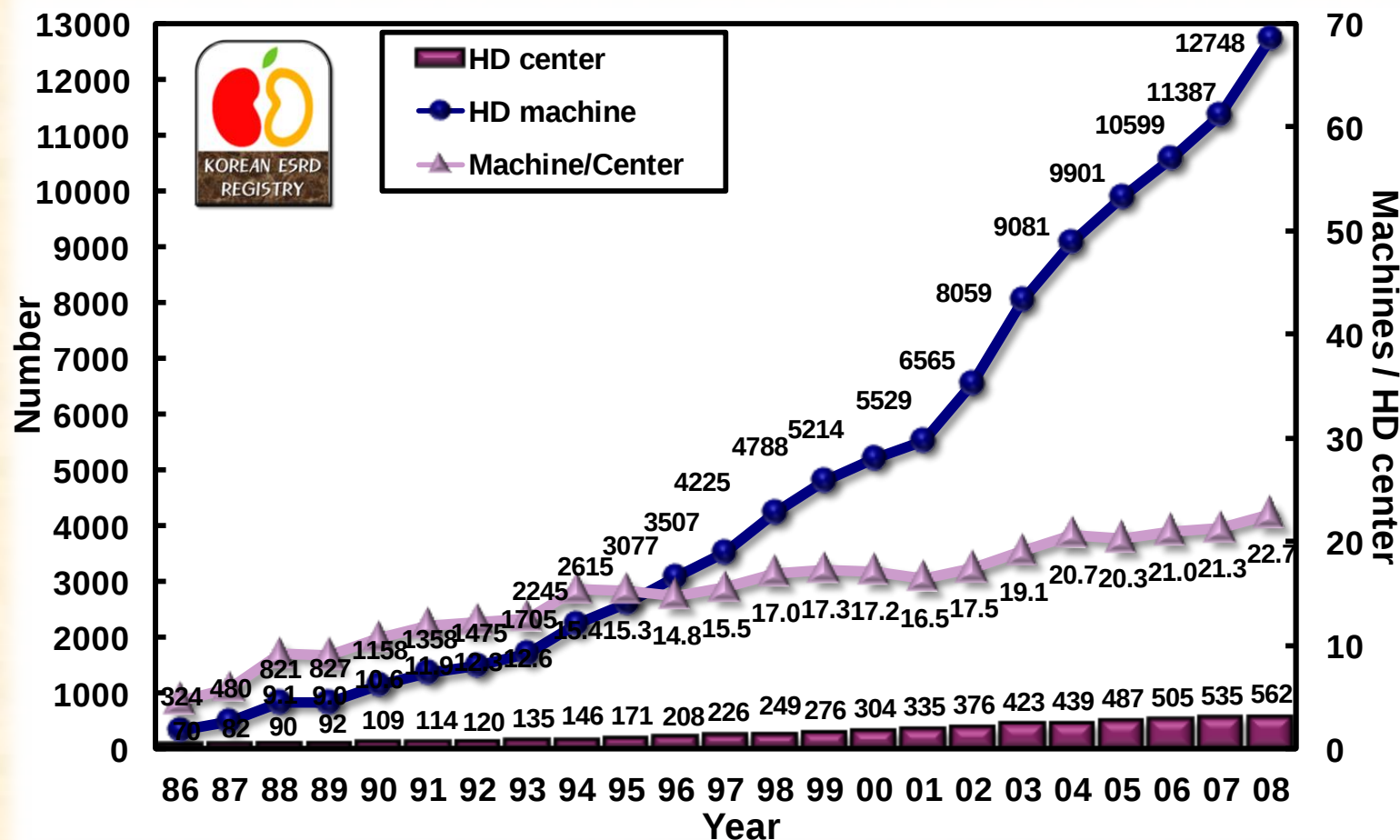
HD:PD = 80.2% : 19.8%
End of 2007

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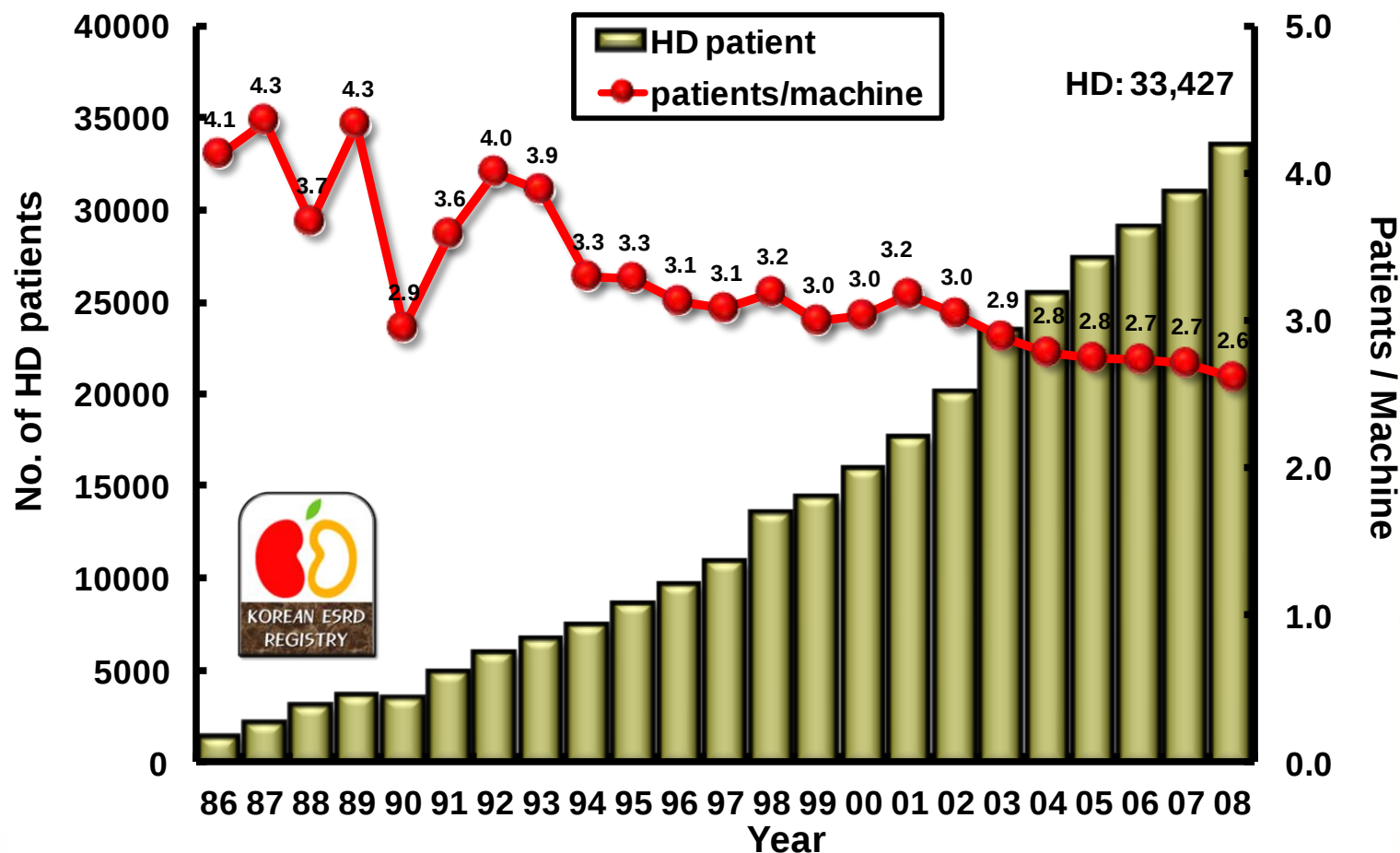
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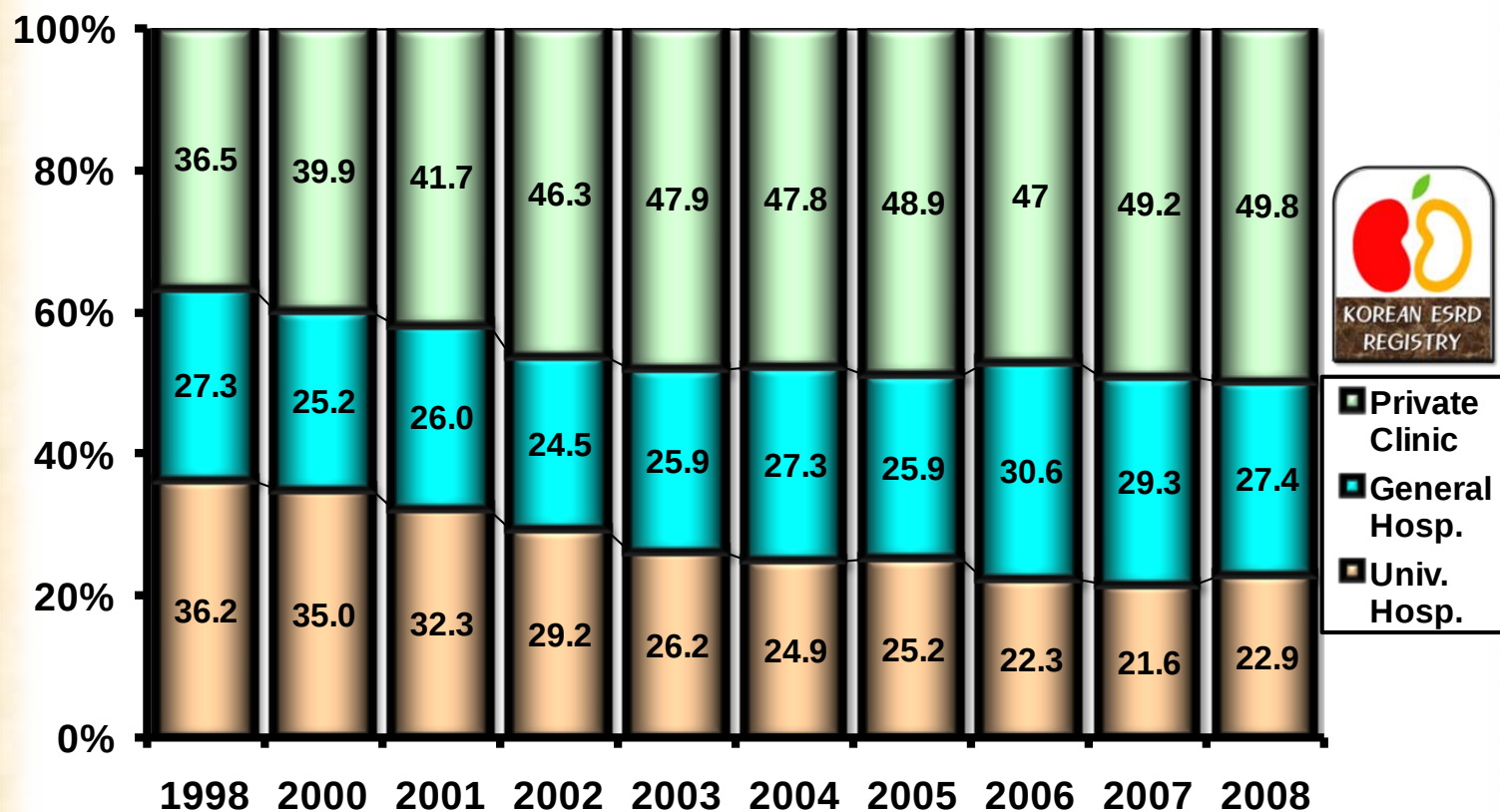
Number of HD Centers & HD Machines



Ratio of HD Machine & HD Pts



HD Pts Proportion of Private Dialysis Clinics



행정구역별 투석환자 및 혈액투석기 분포

(2008년 12월 말 기준)

9

	HD pts	PD pts	Total Dialysis pts	Dialysis pts. / Million pop.	Dialysis Centers	HD machines	HD pts./ HD machine
서울 Seoul	8,084	2,667	10,751	1,028	126	3,019	2.7
부산 Busan	2,663	994	3,657	1,017	37	955	2.8
대구 Daegu	1,846	848	2,694	1,072	29	626	2.9
인천 Incheon	1,537	378	1,915	699	20	529	2.9
광주 Gwangju	1,248	223	1,471	1,025	28	591	2.1
대전 Daejeon	1,041	263	1,304	872	20	493	2.1
울산 Ulsan	568	77	645	572	12	251	2.3
경기 Gyeonggi	6,632	1,246	7,878	682	111	2,678	2.5
강원 Gangwon	1,115	332	1,447	951	21	421	2.6
충북 Chungbuk	1,170	96	1,266	821	22	431	2.7
충남 Chungnam	1,253	71	1,324	645	23	424	3.0
전북 Jeonbuk	1,371	130	1,501	801	16	397	3.5
전남 Jeonnam	1,034	90	1,124	580	24	471	2.2
경북 Gyeongbuk	1,413	115	1,528	564	28	500	2.8
경남 Gyeongnam	1,928	252	2,180	665	37	784	2.5
제주 Jeju	524	58	582	1,029	8	178	2.9
Total	33,427	7,840	41,267	819	562	12,748	2.6

생활권역별 투석기 및 투석환자 분포

(2008년 12월 말 기준)

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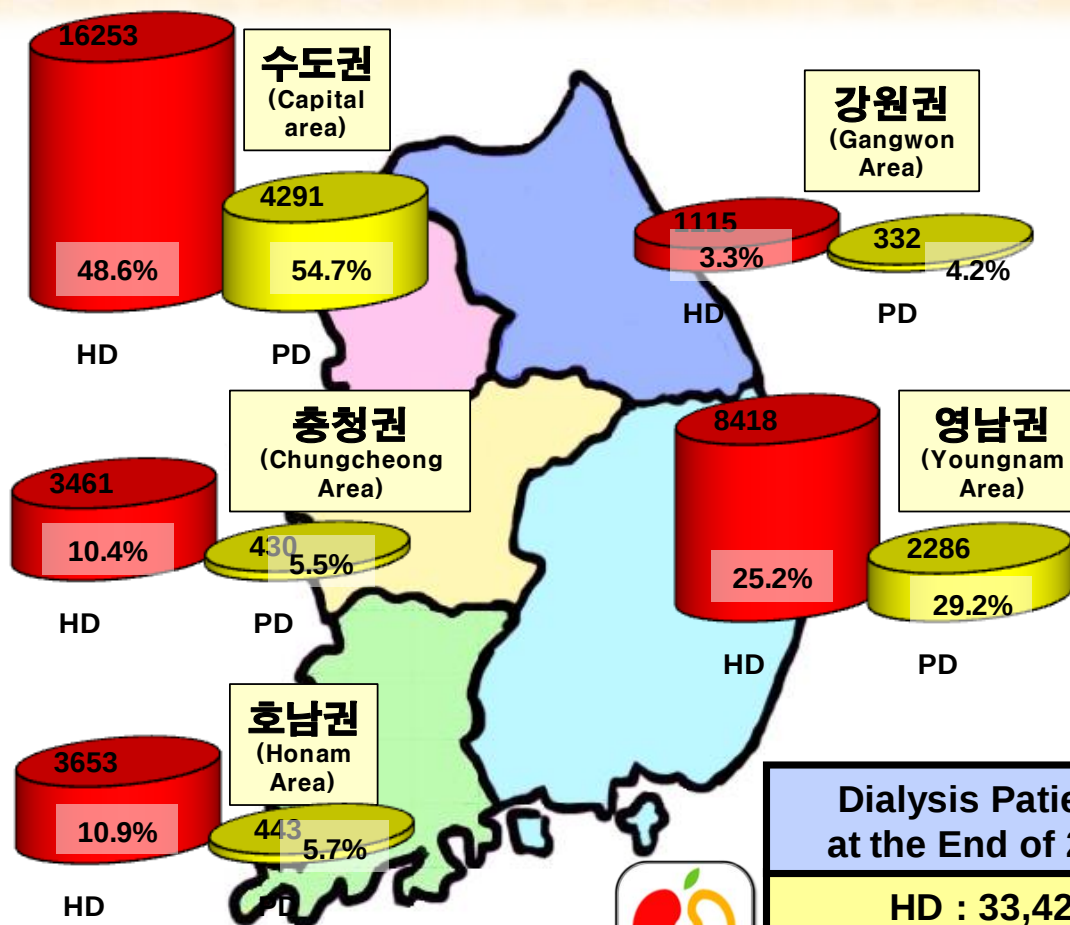
	Population (%)	HD patients	PD patients	Total Dialysis patients	Dialysis pts /Million pop.	Dialysis centers	Dialysis machine	HD pts / HD machine
수도권 (Capital area)	24,746,342	16,253	4,291	20,544	830	257	6,226	2.6
(Seoul, Incheon, Gyeonggi)	49.1%	48.6%	54.7%	49.8%		45.7%	48.8%	
충청권 (Chungchung)	5,091,029	3,464	430	3,894	765	65	1,348	2.6
(Daejeon, Chungnam, Chungbuk)	10.1%	10.4%	5.5%	9.4%		11.6%	10.6%	
호남권 (Honam)	5,247,836	3,653	443	4,096	781	68	1,459	2.5
(Gwangju, Jeonnam, Jeonbuk)	10.4%	10.9%	5.7%	9.9%		12.1%	11.4%	
영남권 (Youngnam)	13,222,180	8,418	2,286	10,704	810	143	3,116	2.7
(Busan, Daegu, Gyeongnam, Gyeongbuk, Ulsan)	26.2%	25.2%	29.2%	25.9%		25.4%	24.4%	
강원권 (Gangwon)	1,521,467	1,115	332	1,447	951	21	421	2.6
	3.0%	3.3%	4.2%	3.5%		3.7%	3.3%	
Total	50,394,374	33,427	7,840	41,267	819	562	12,748	2.6

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

생활권역별 투석기 및 투석환자 분포

(2008년 12월 말 기준)

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Dialysis Patients
at the End of 2008

HD : 33,427

PD : 7,840

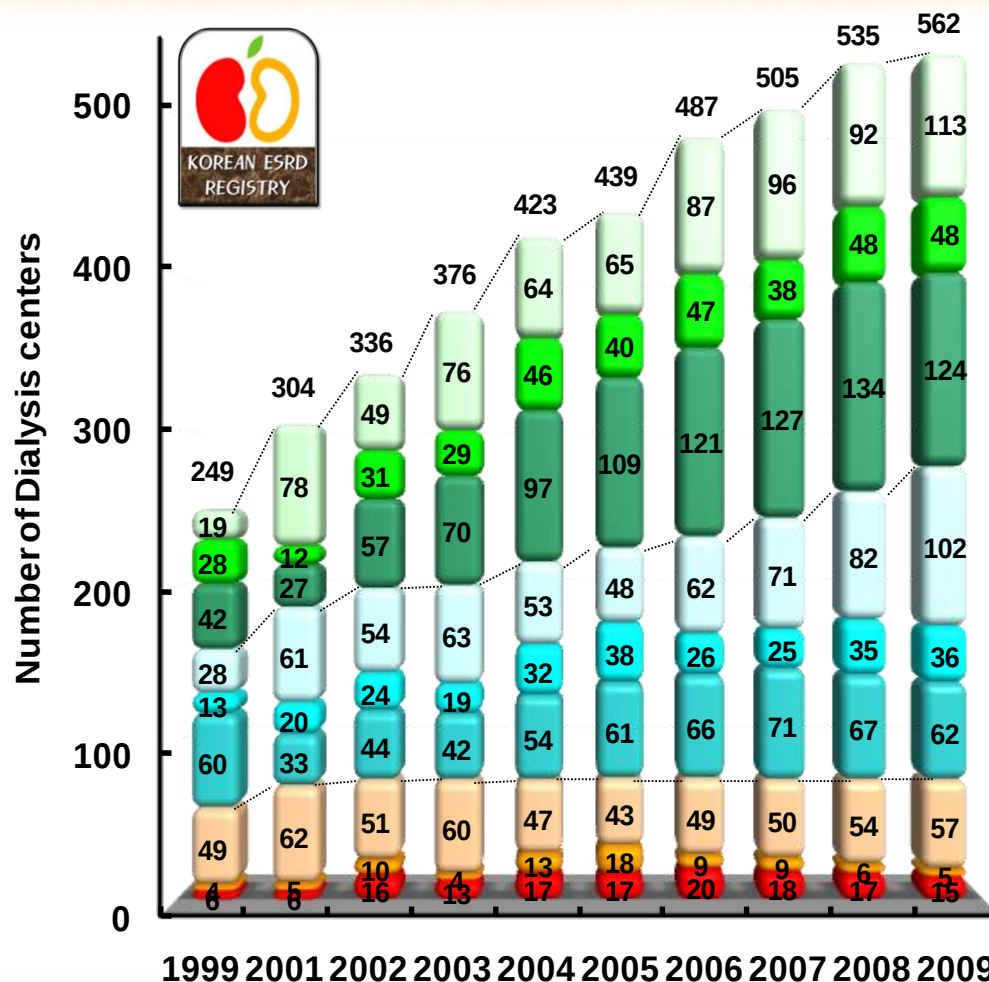
Total : 41,267

등록사업에 참여한 의료기관 수 및 응답률

9

	Dialysis centers	Internet Input	Paper data	Total contributed center	Contributing rate (%)
서울 Seoul	126	65	21	86	68.3
부산 Busan	37	18	7	25	67.6
대구 Daegu	29	15	4	19	65.5
인천 Incheon	20	9	1	10	50.0
광주 Gwangju	28	11	7	18	64.3
대전 Daejeon	20	7	2	9	45.0
울산 Ulsan	12	5	2	7	58.3
경기 Gyeonggi	111	51	19	70	63.1
강원 Gangwon	21	9	3	12	57.1
충북 Chungbuk	22	10	5	15	68.2
충남 Chungnam	23	10	3	13	56.5
전북 Jeonbuk	16	10	2	12	75.0
전남 Jeonnam	24	10	3	13	54.2
경북 Gyeongbuk	28	16	4	20	71.4
경남 Gyeongnam	37	20	6	26	70.3
제주 Jeju	8	6	0	6	75.0
Total	562	272	89	361	64.2

의료기관 증가와 의료기관별 등록률



Overall Contrib. Rate : 64.2%
(361/562)

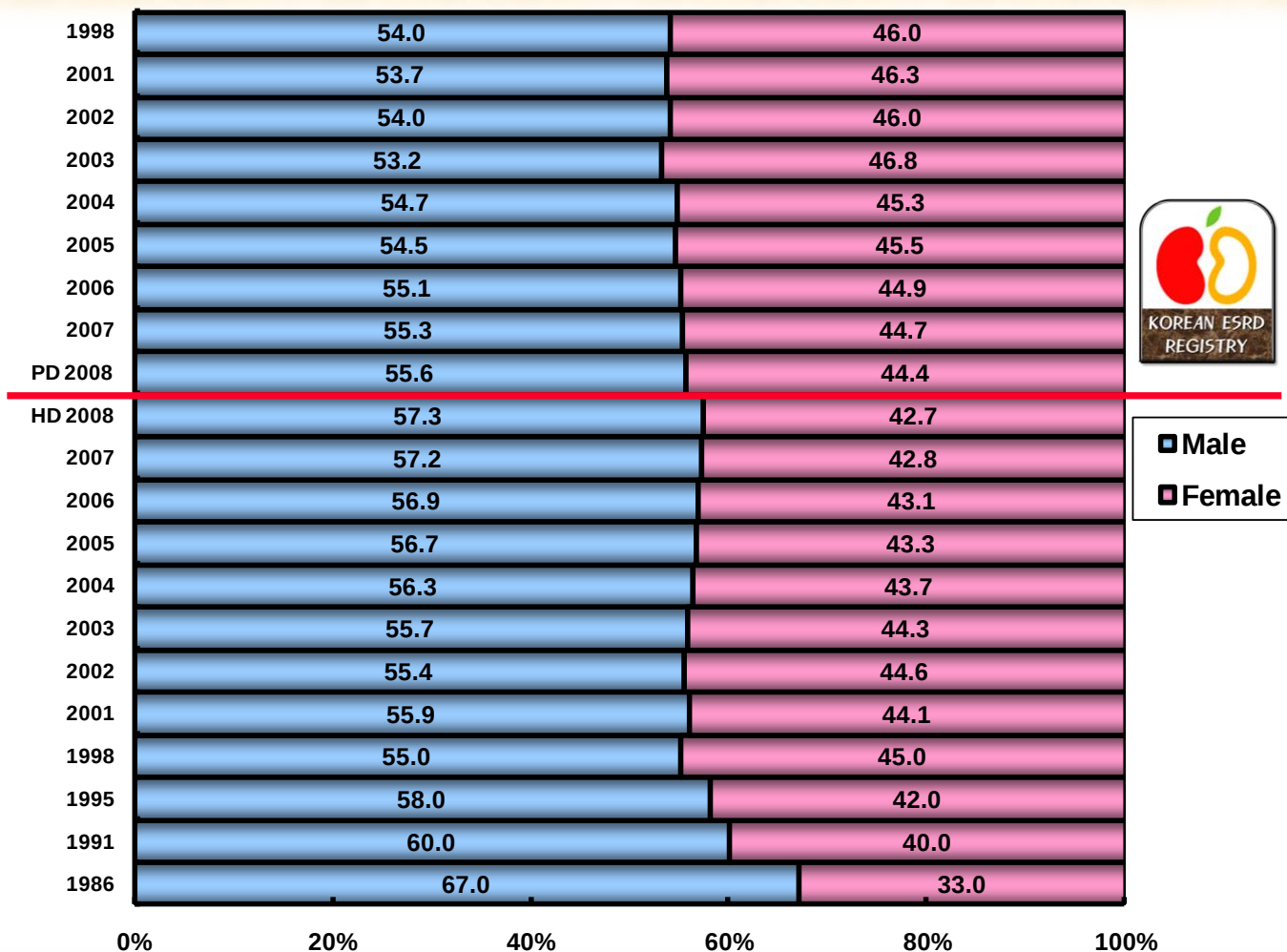
Private Clinic : 56.5%
(161/274)

General Hosp.: 69.0%
(138/184)

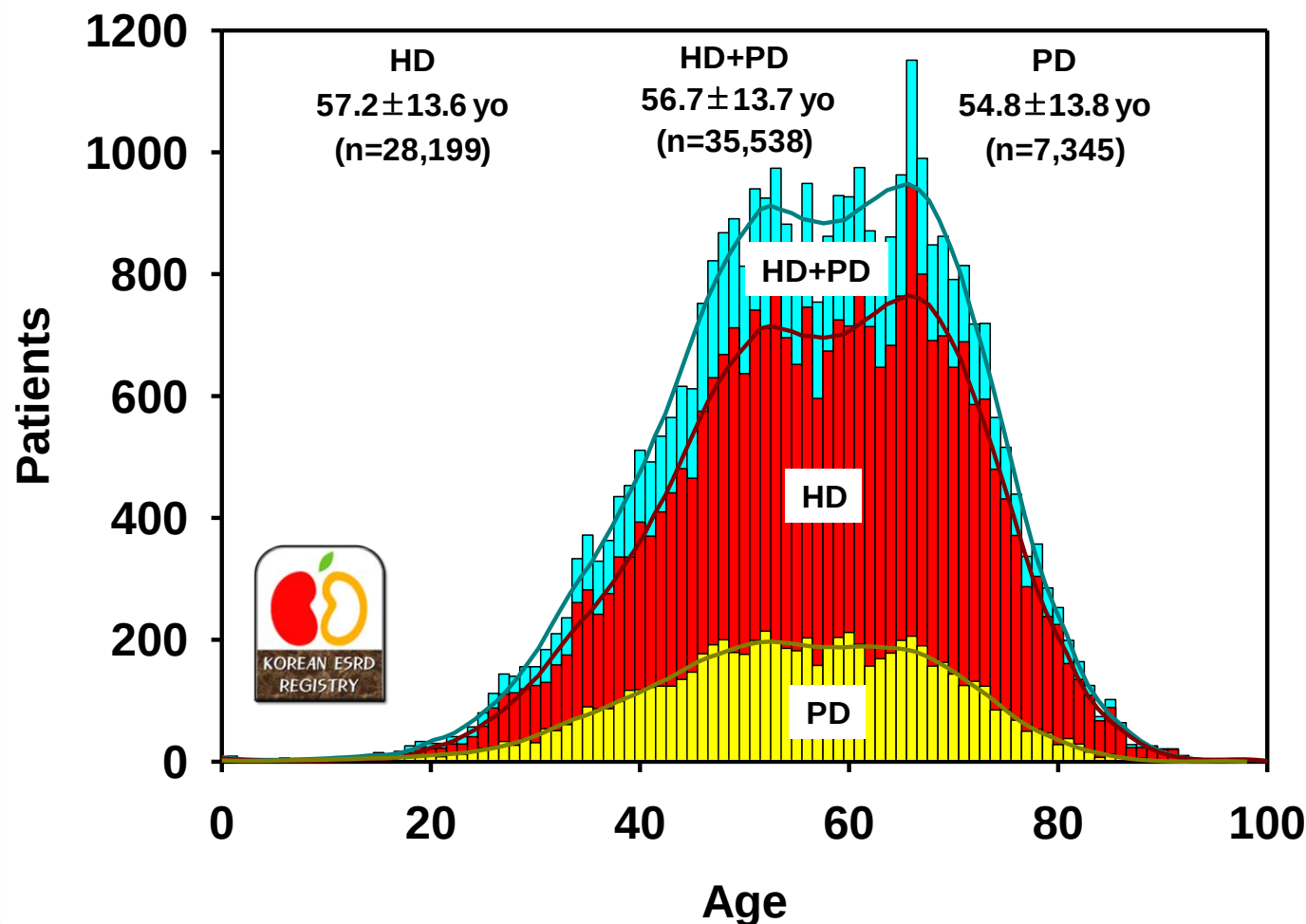
Univ. Hosp. : 80.5%
(62/77)

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

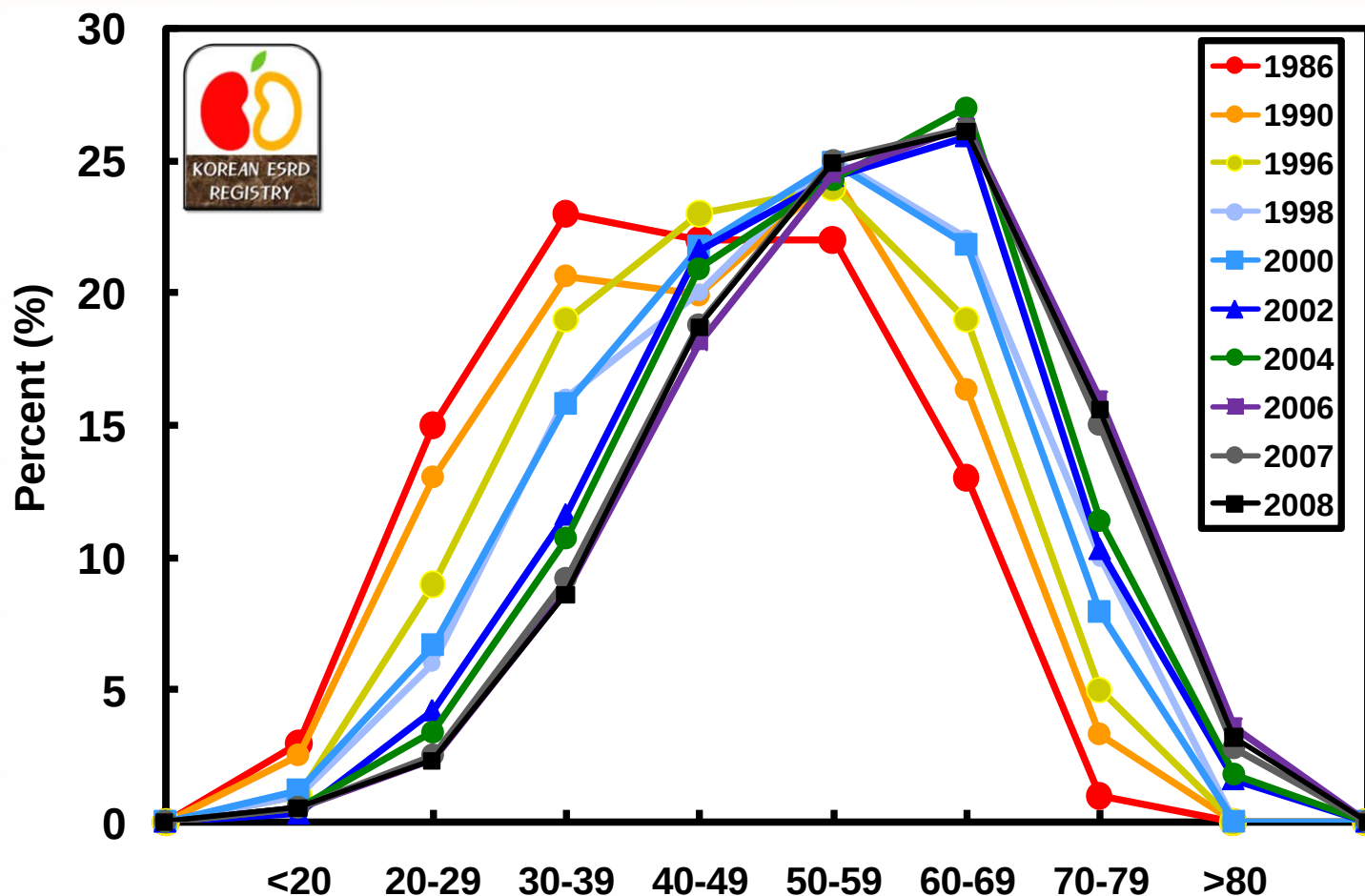
Sex Ratio of HD & PD Pts



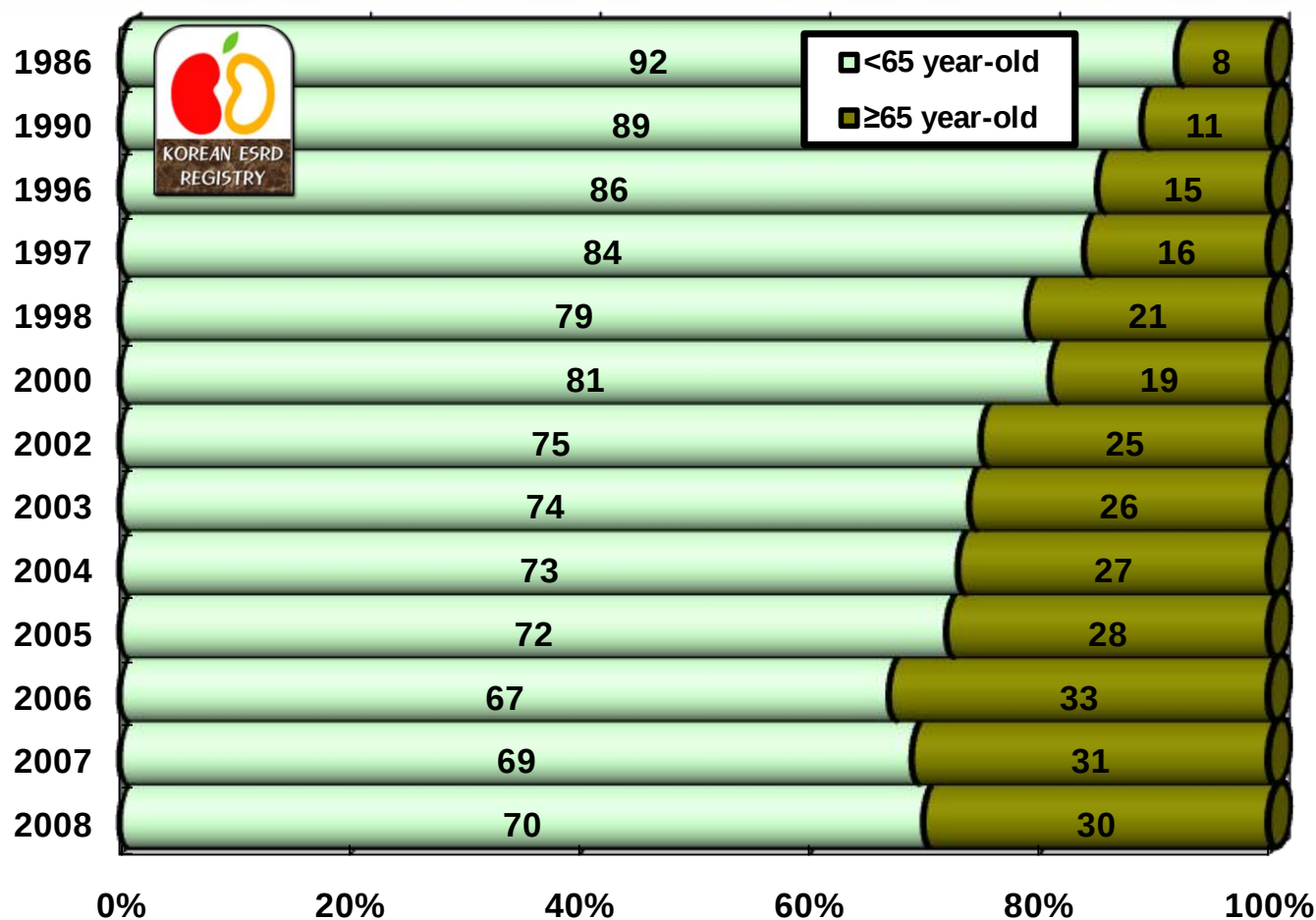
Age Distribution of Dialysis Pts



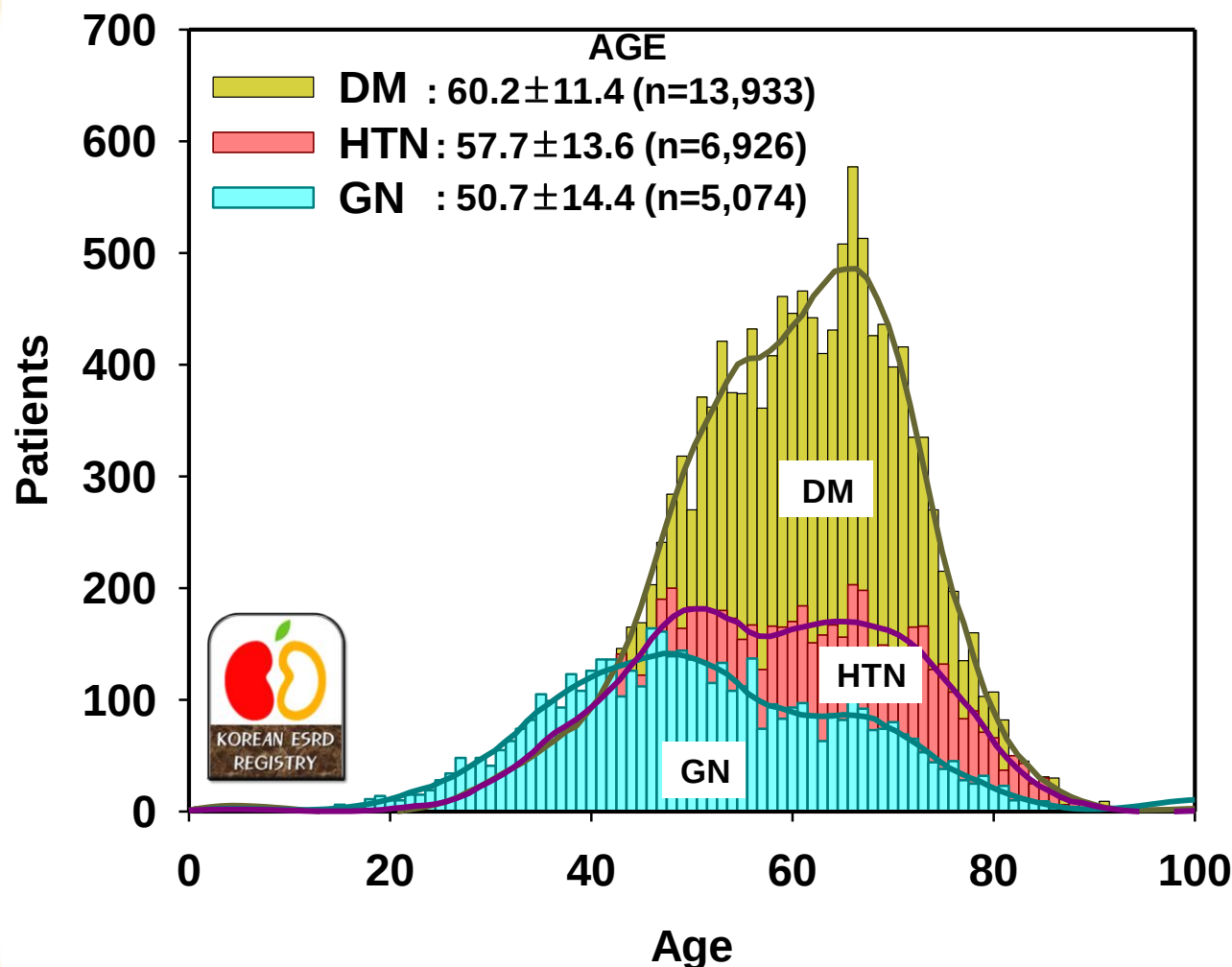
Age Distribution (%) of HD Pts According to Years



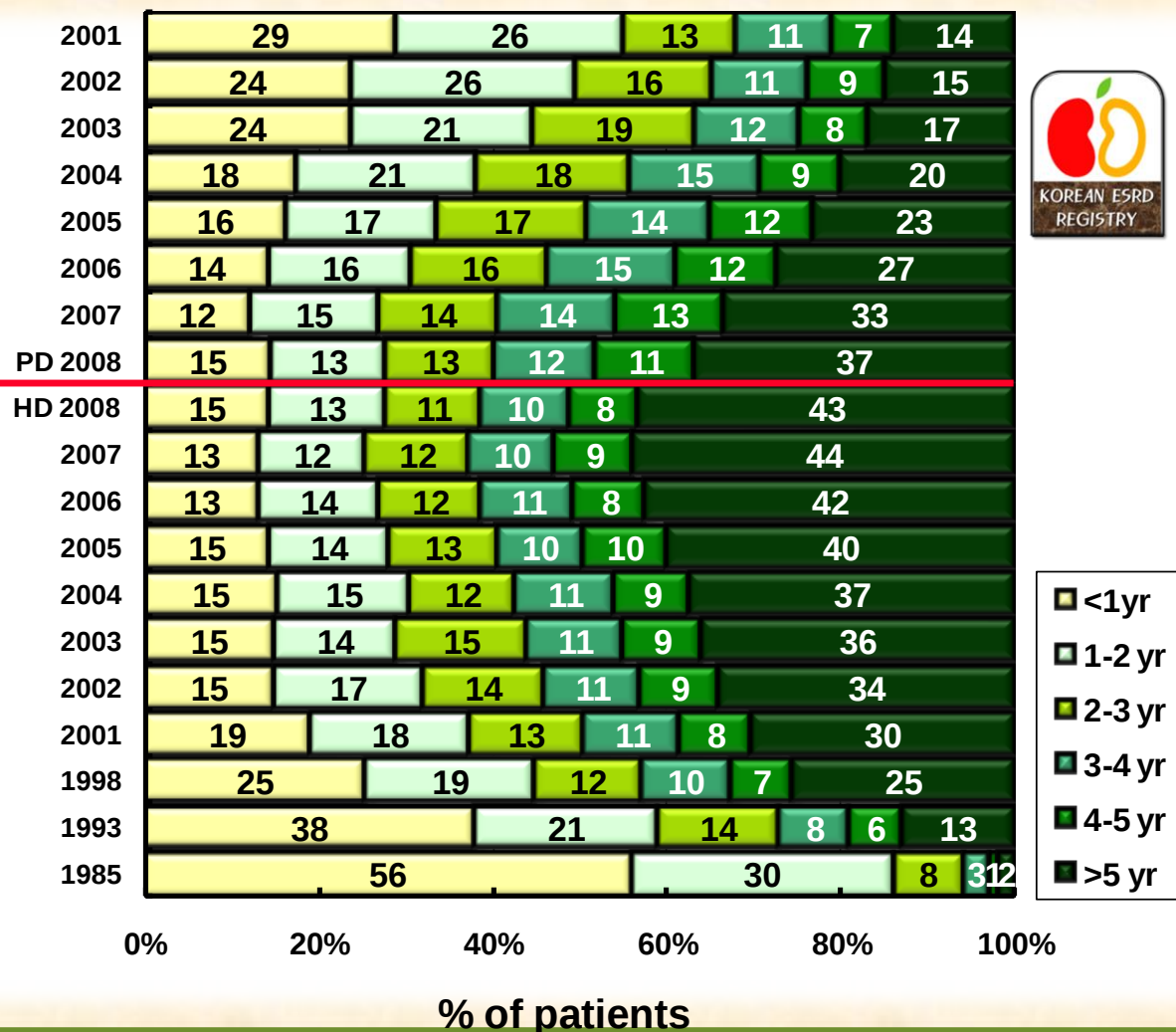
Percent of Elderly Dialysis Patients



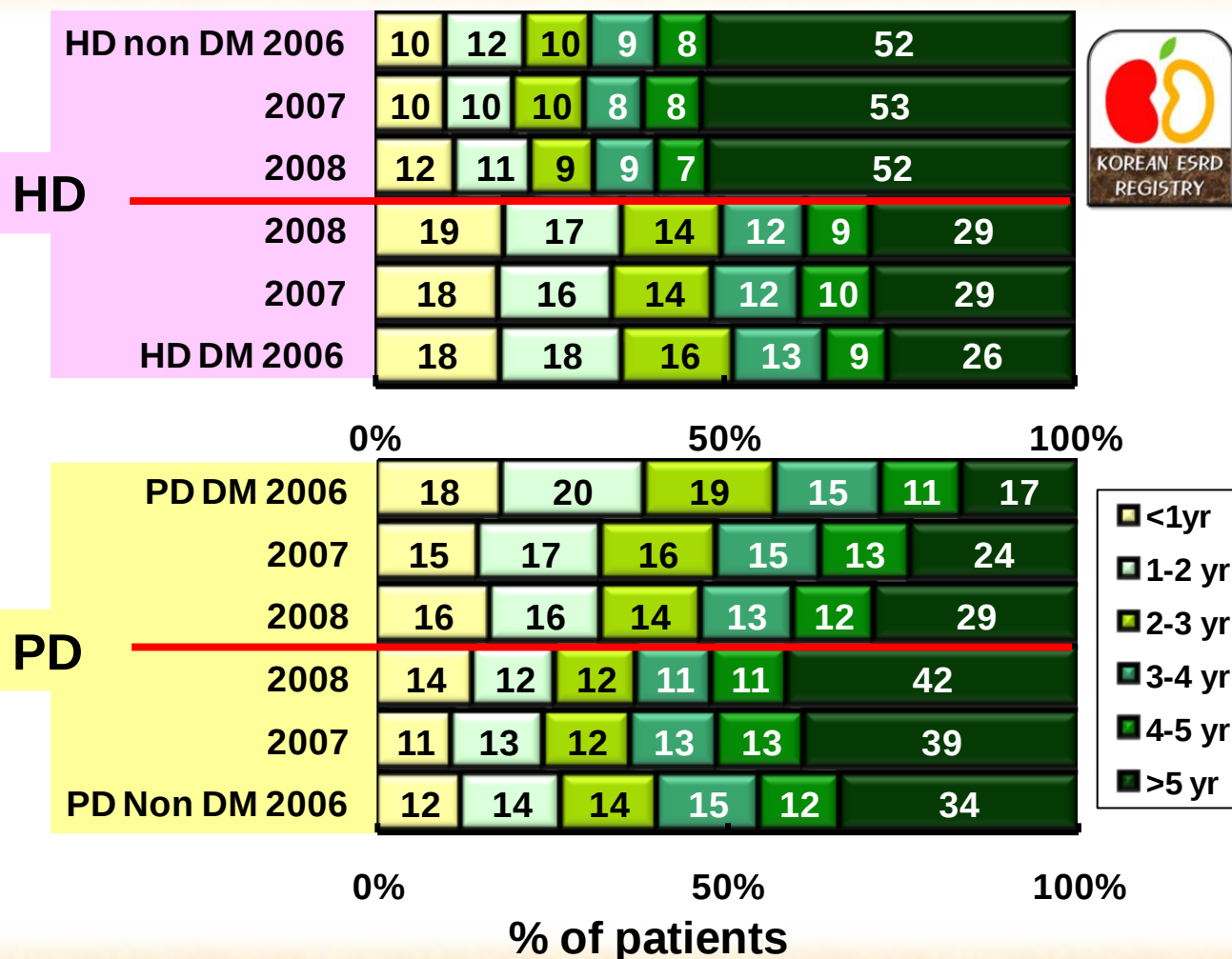
Age Distribution According to ESRD Causes



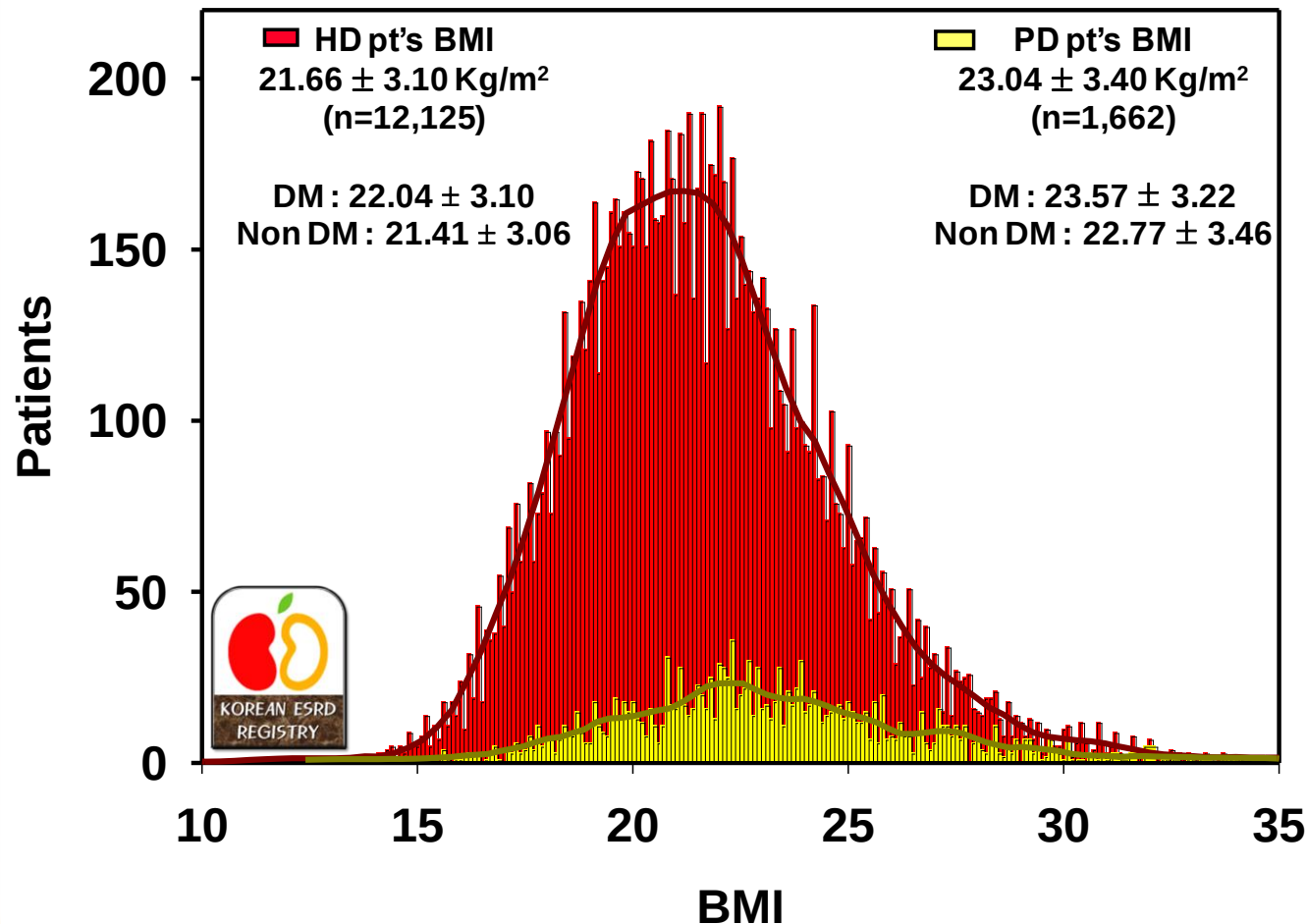
Duration of Dialysis Maintenance



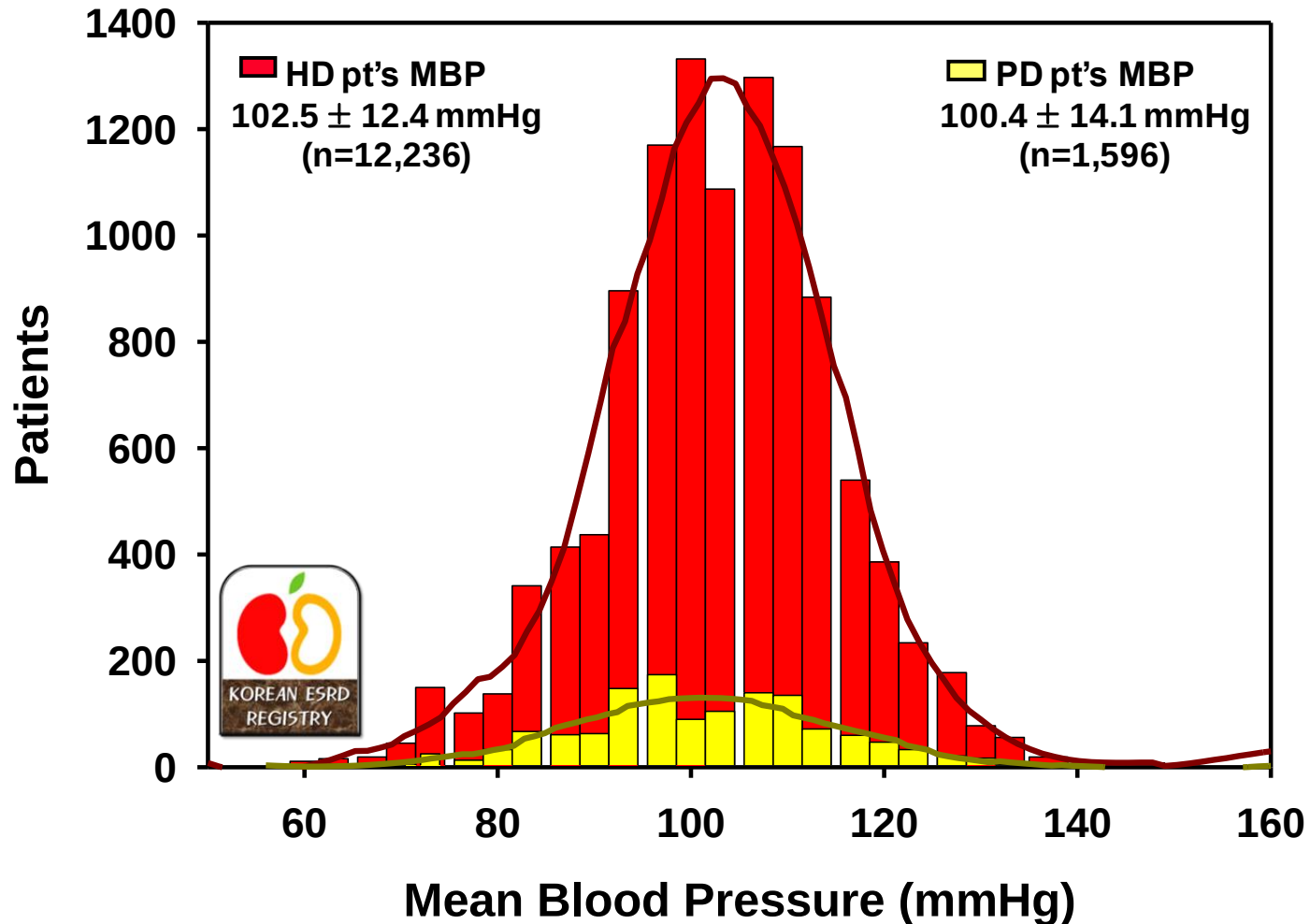
Duration of Dialysis : DM vs Non-DM



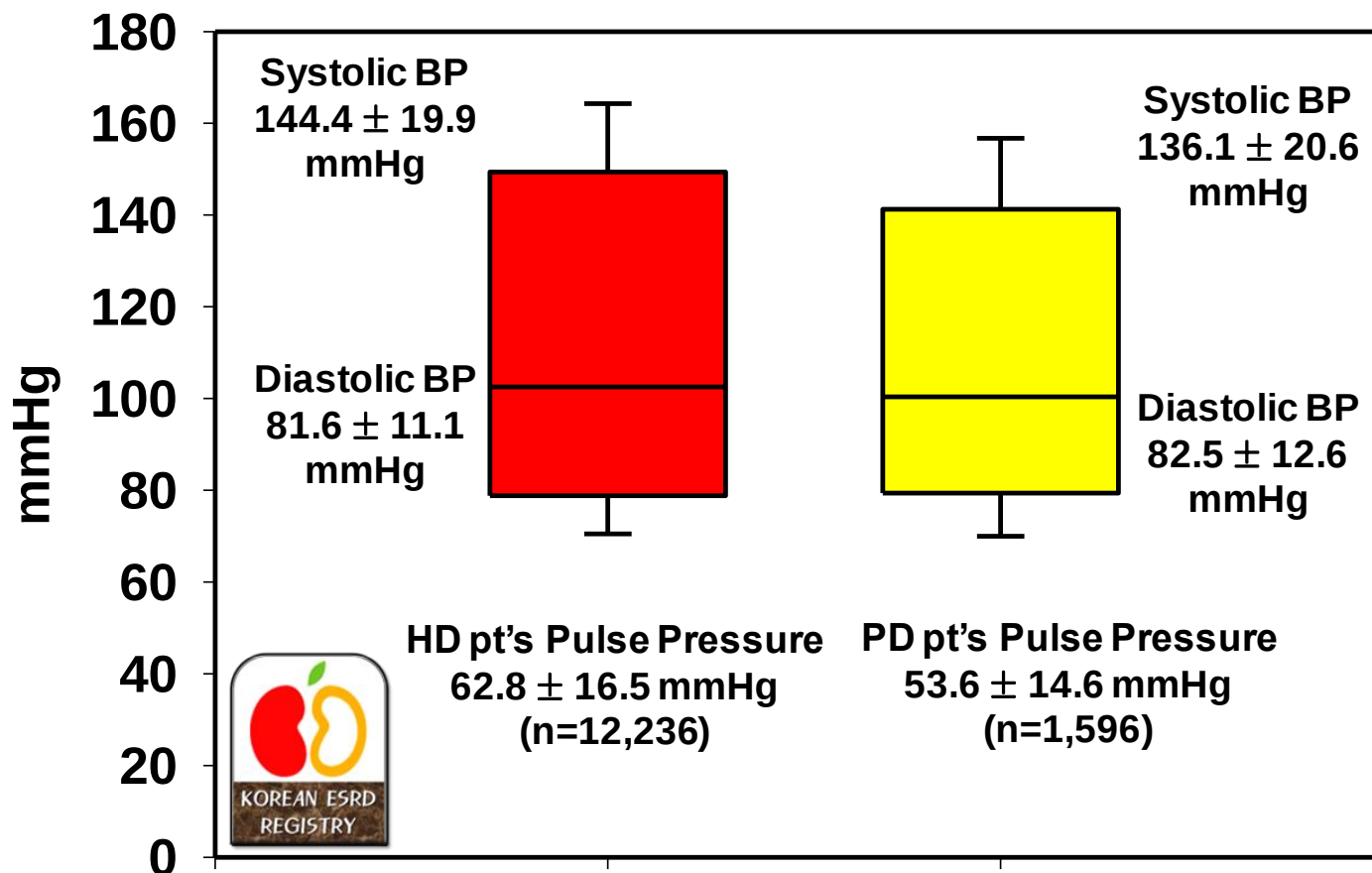
Body Mass Index



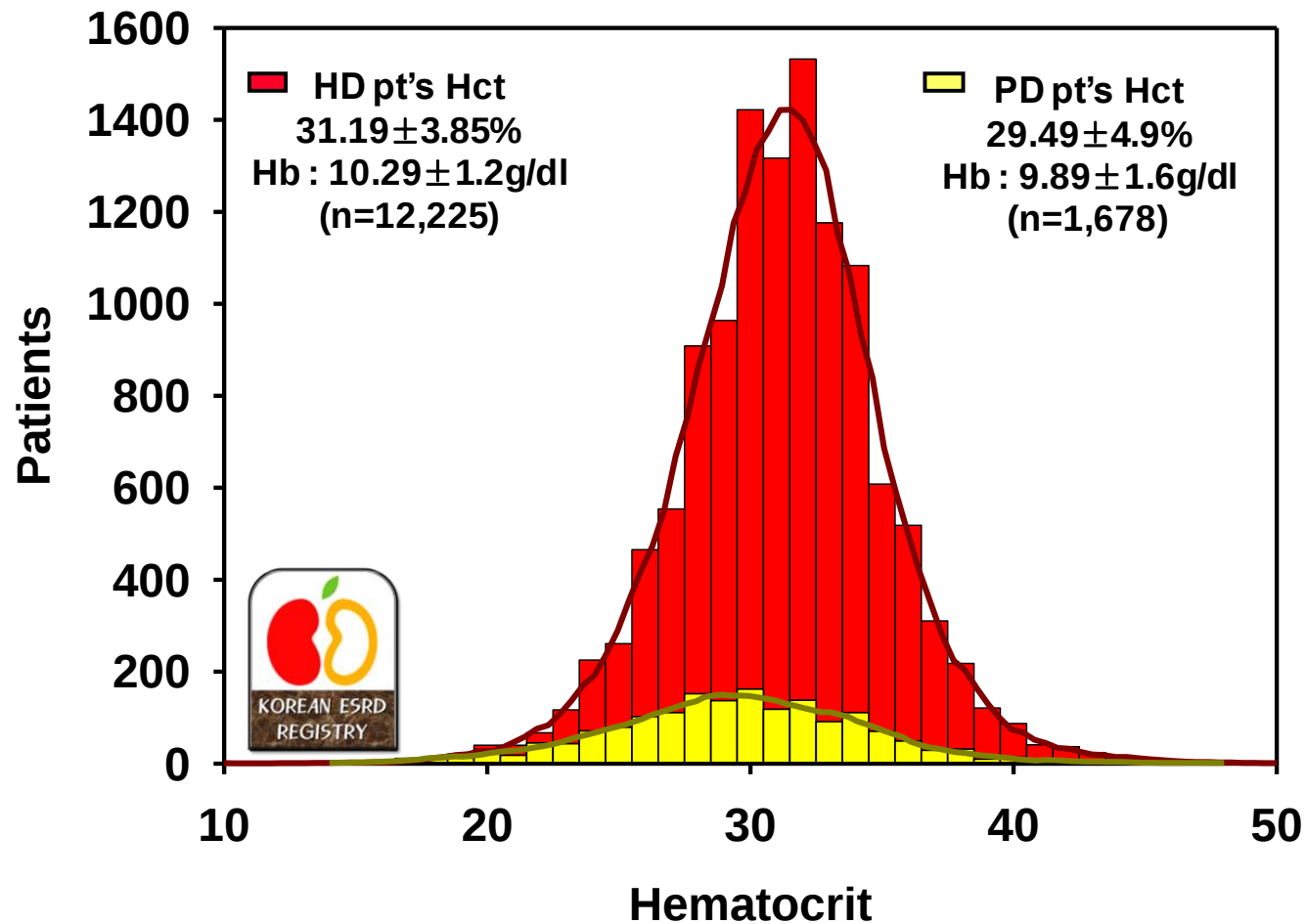
Mean Blood Pressure



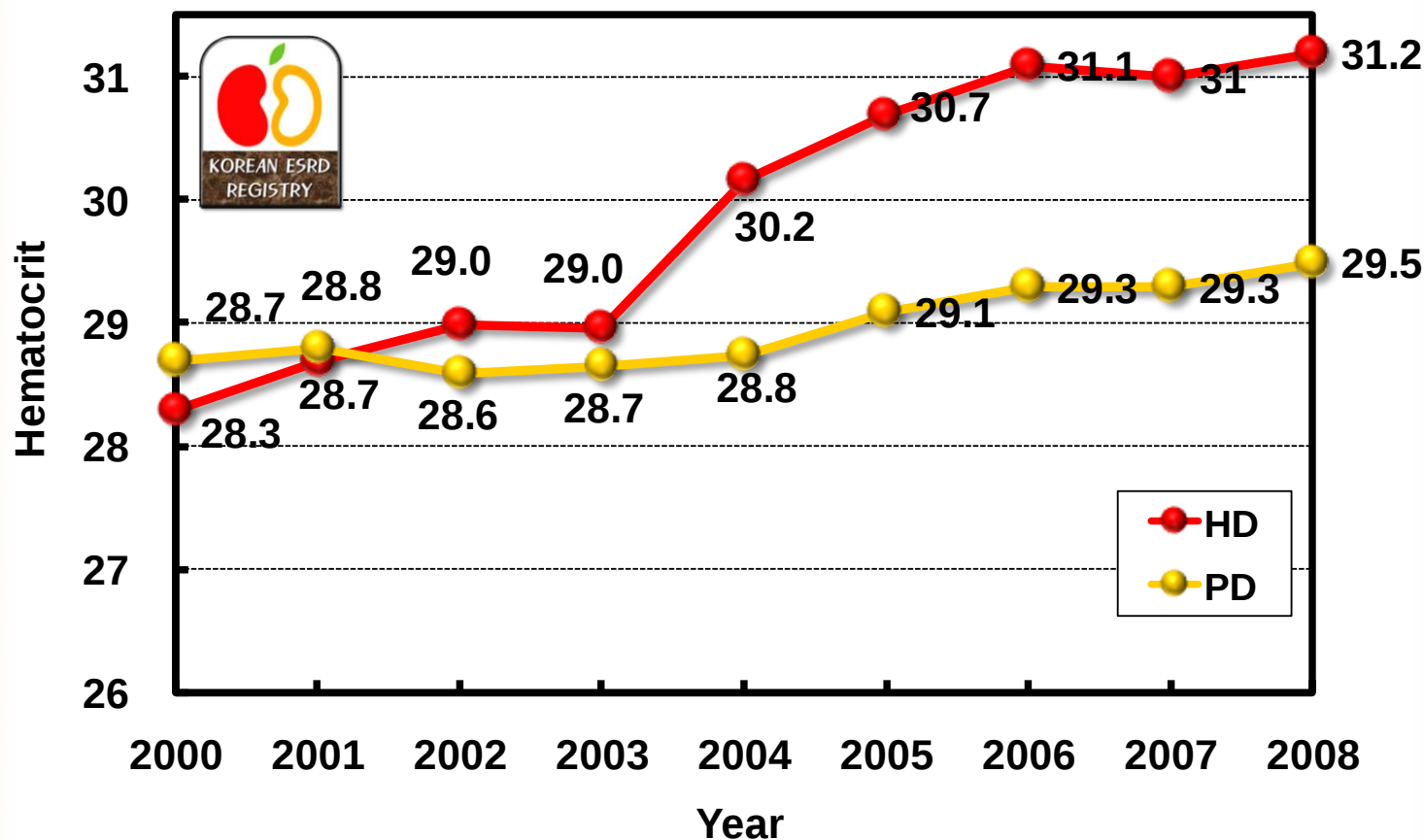
Pulse Pressure



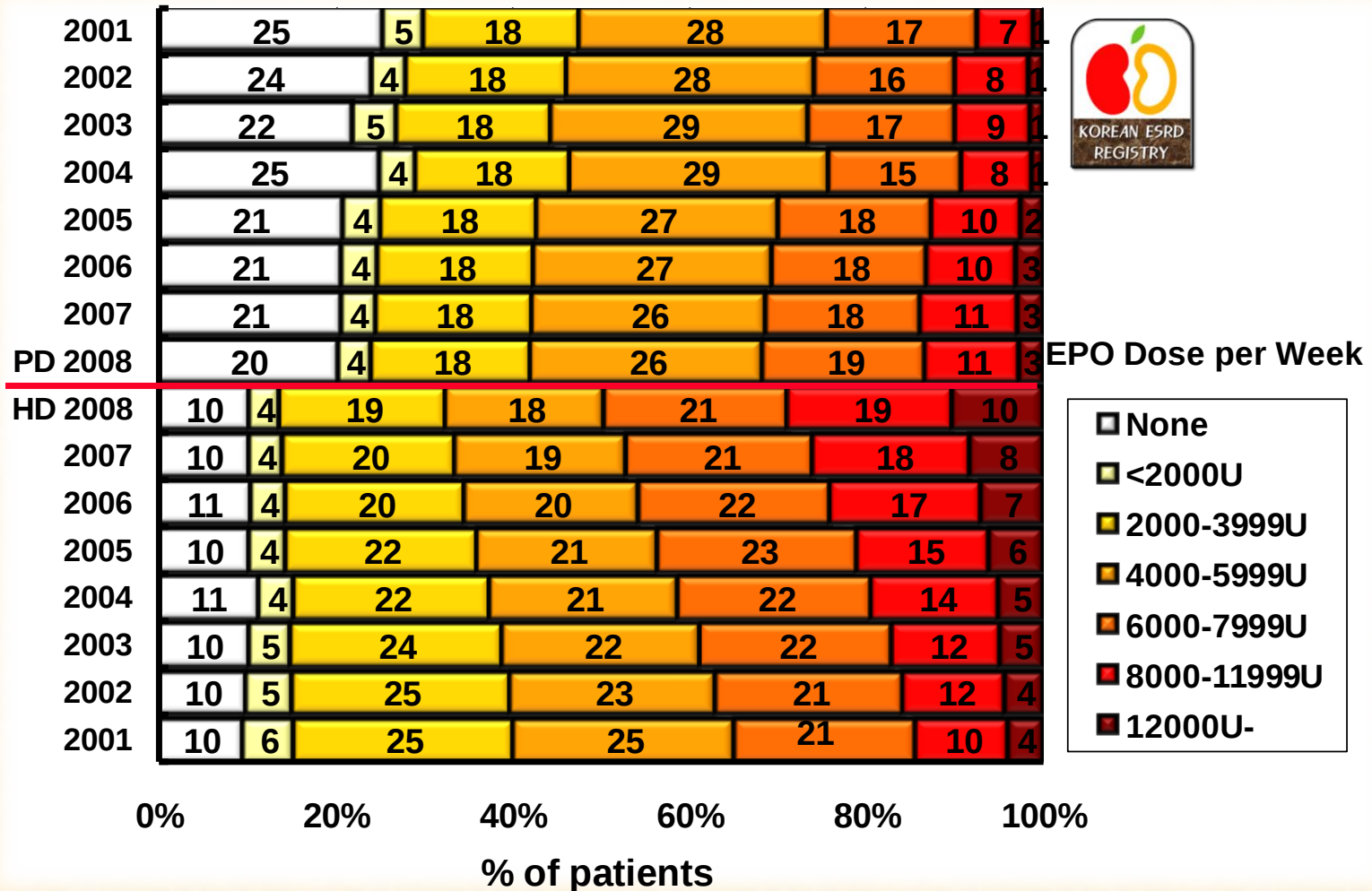
Hematocrit : HD vs PD



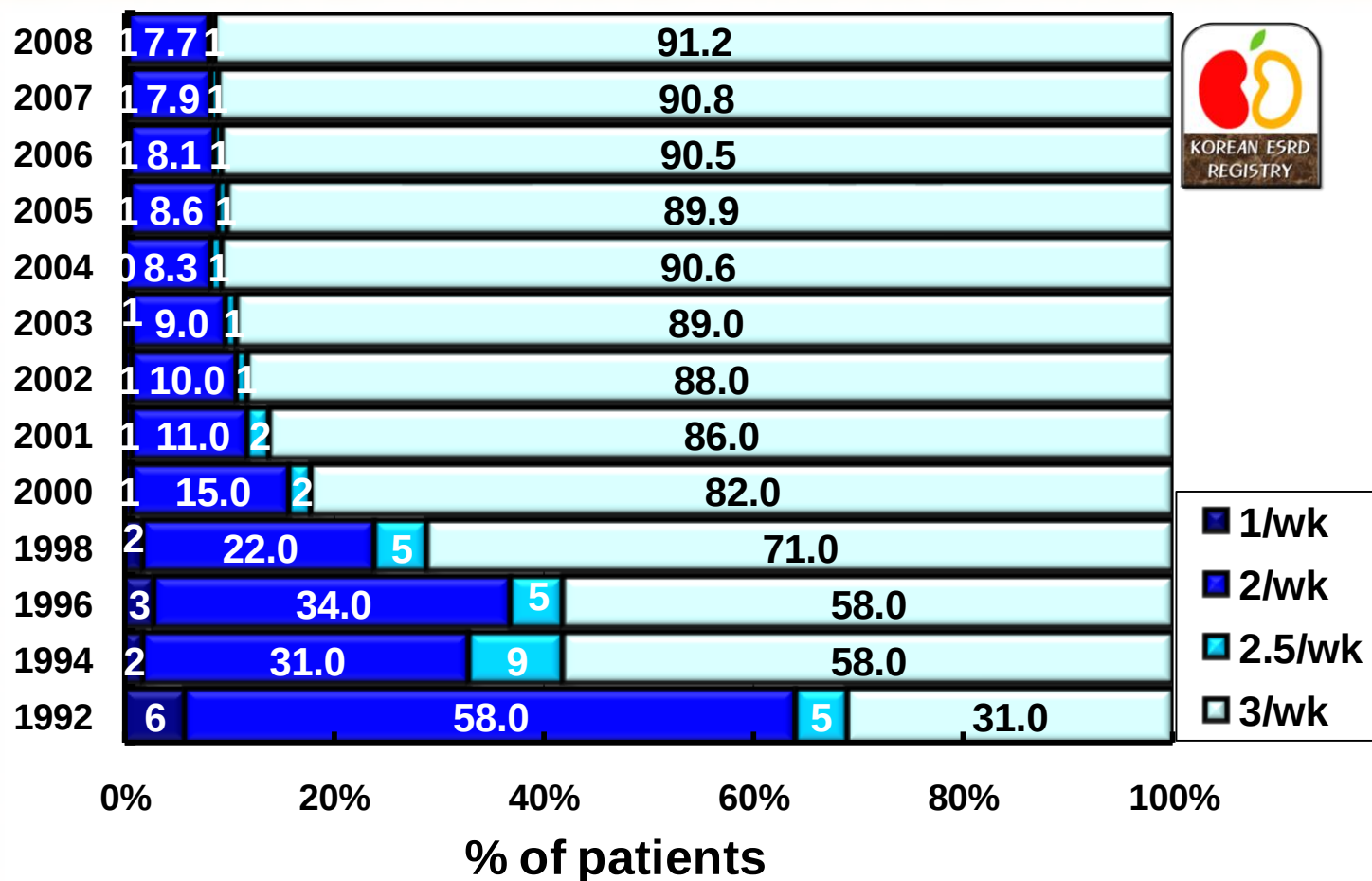
Changes of Hematocrit



Erythropoietin Doses

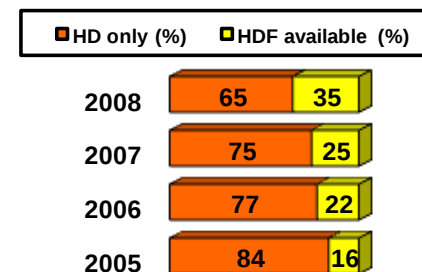
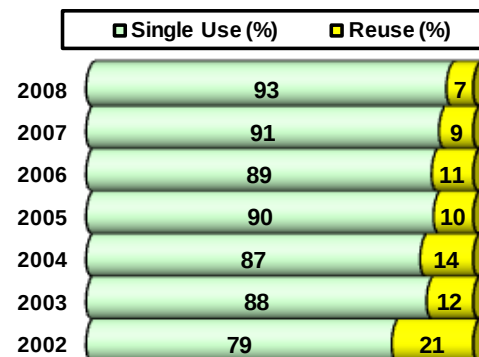
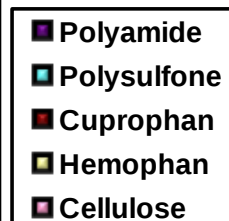
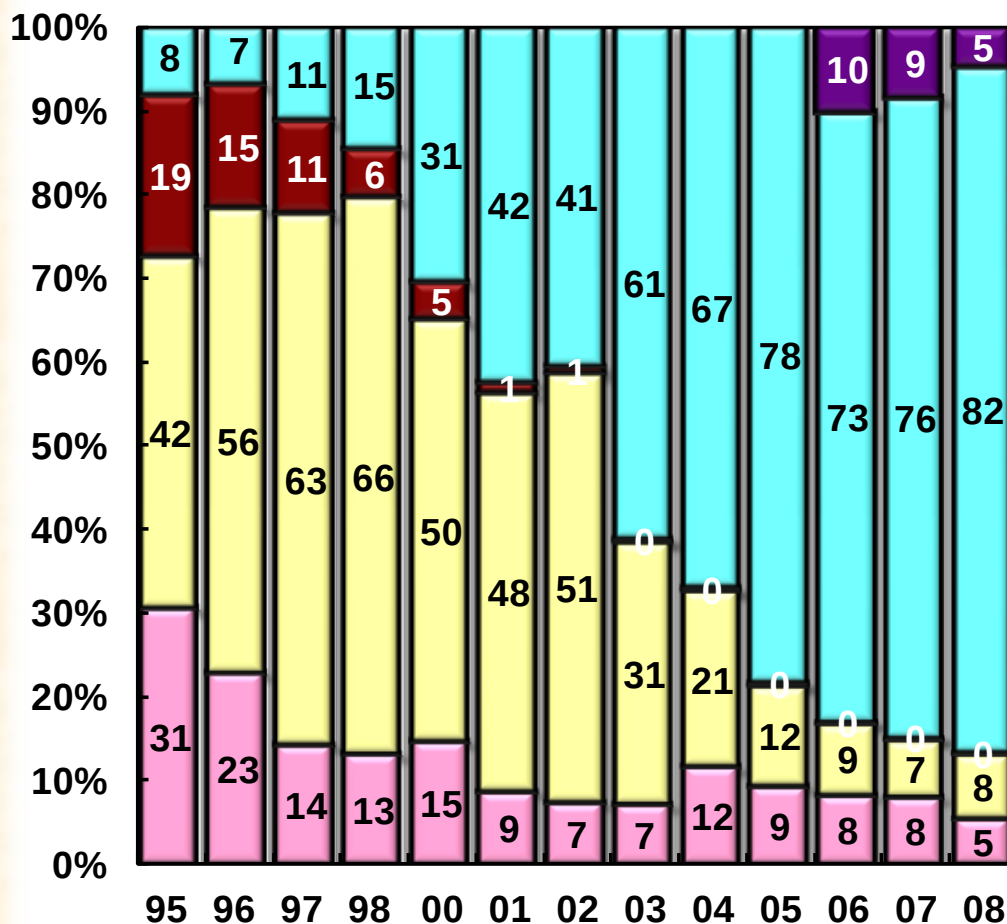


Frequency of HD per Week

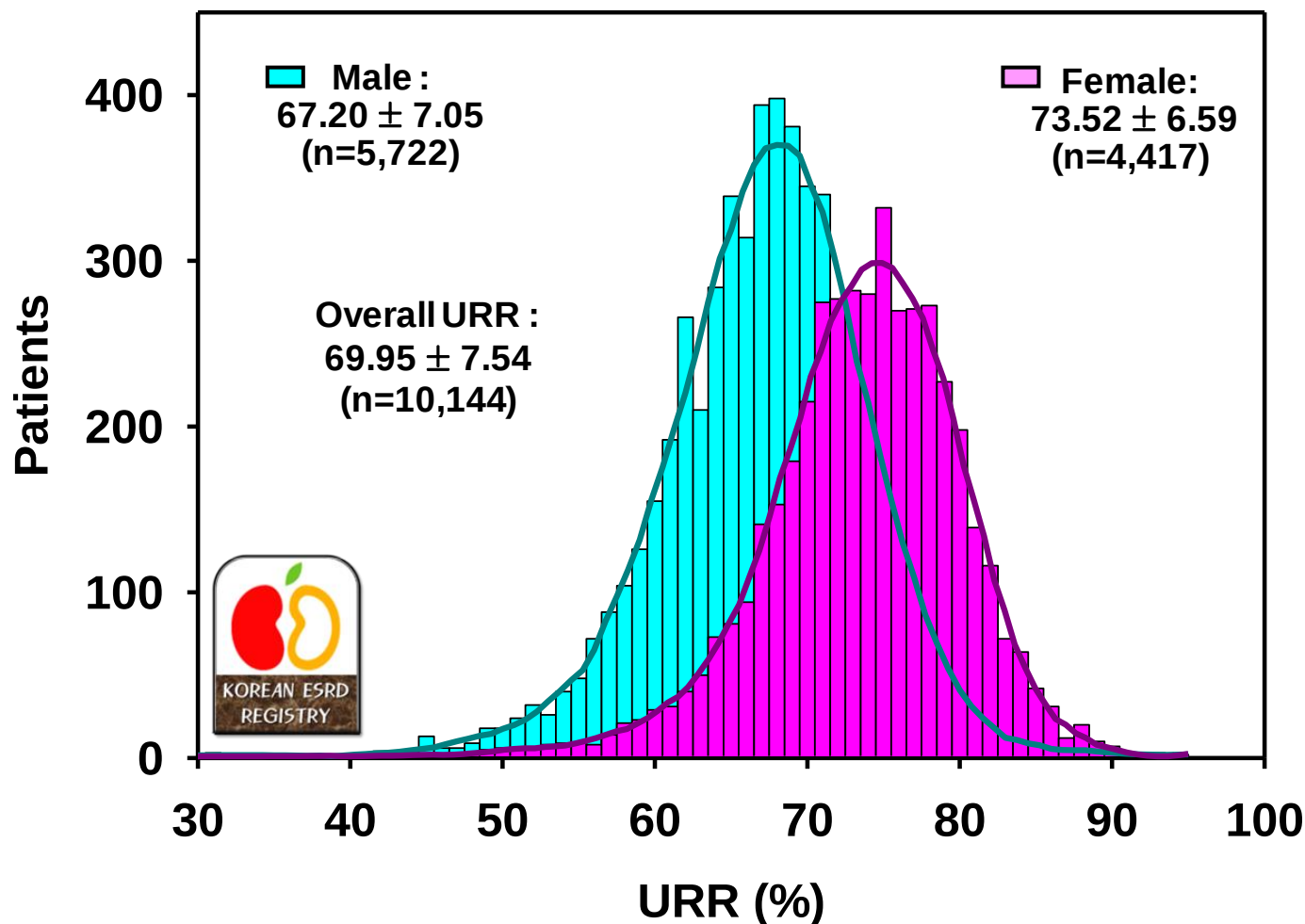


HD Membranes

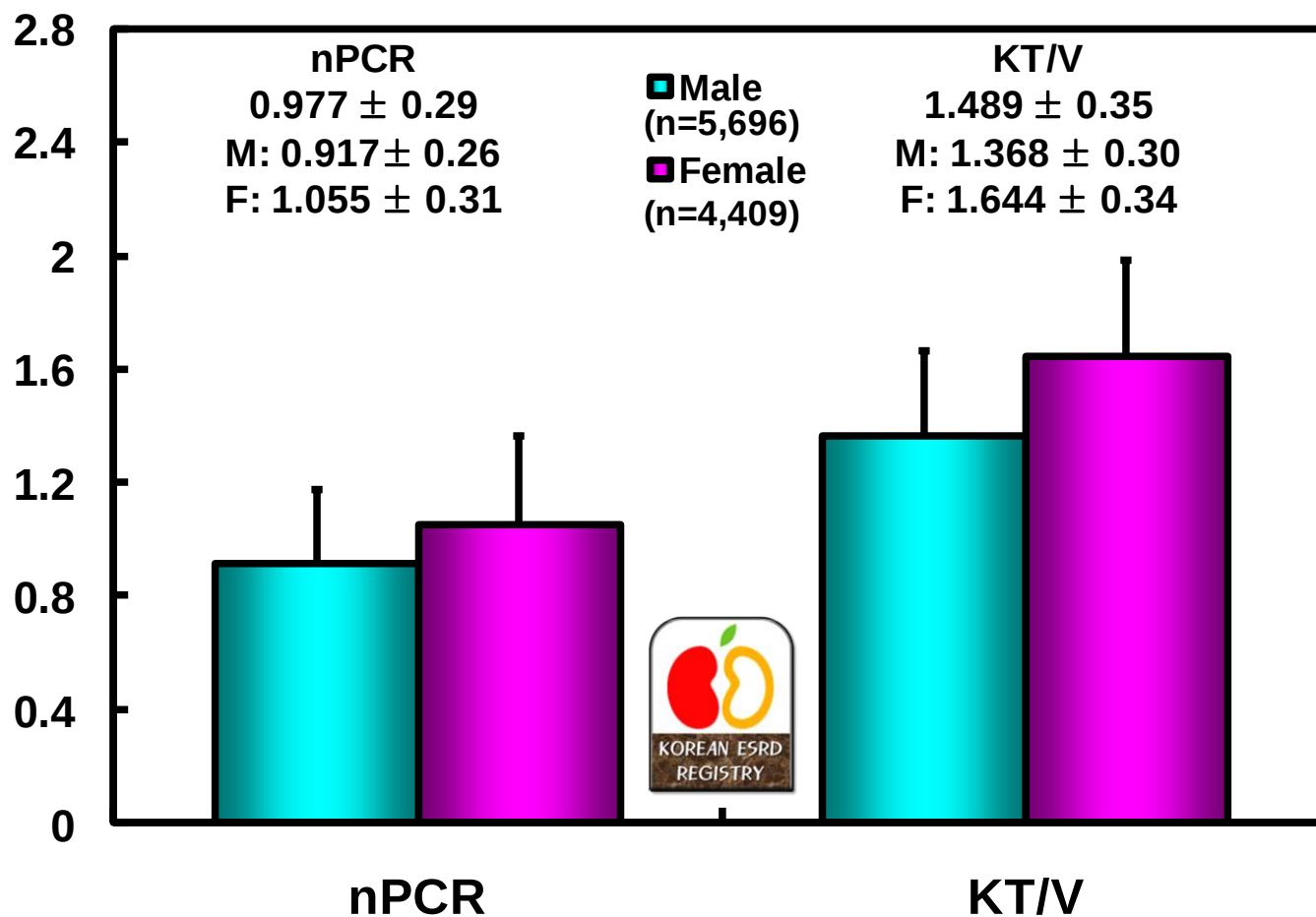
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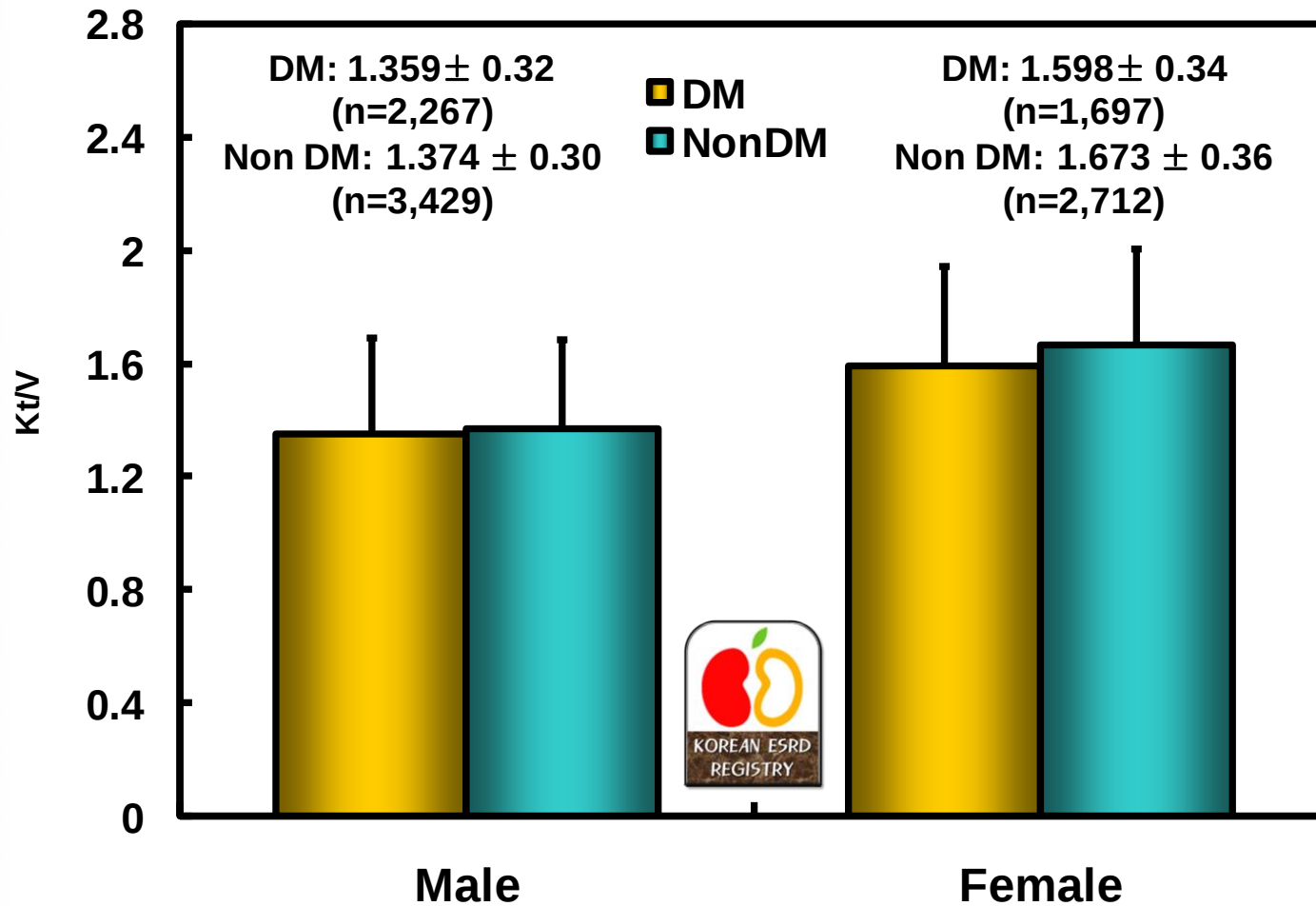
Urea Reduction Ratio of HD Pts



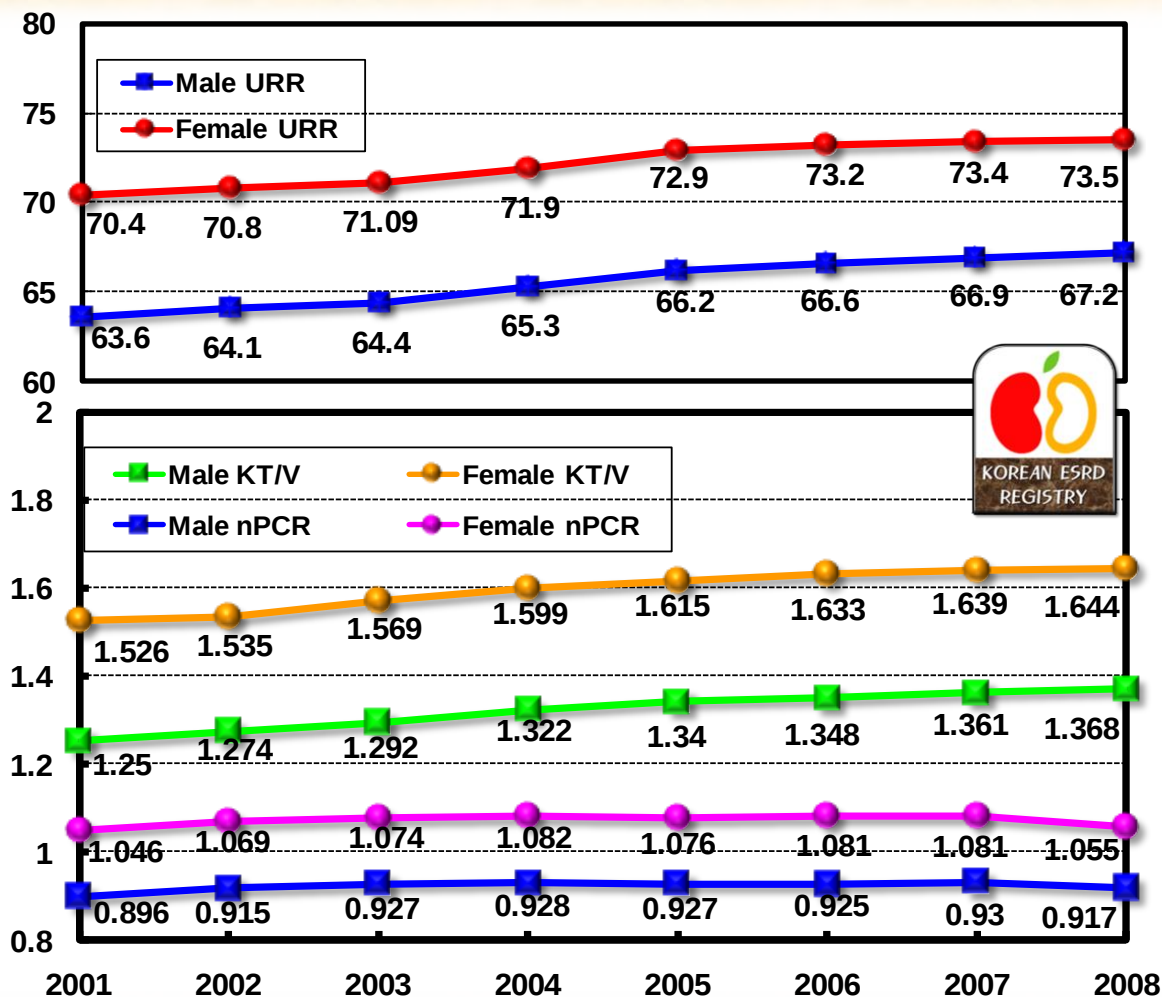
HD Adequacy



HD Adequacy : DM vs Non-DM

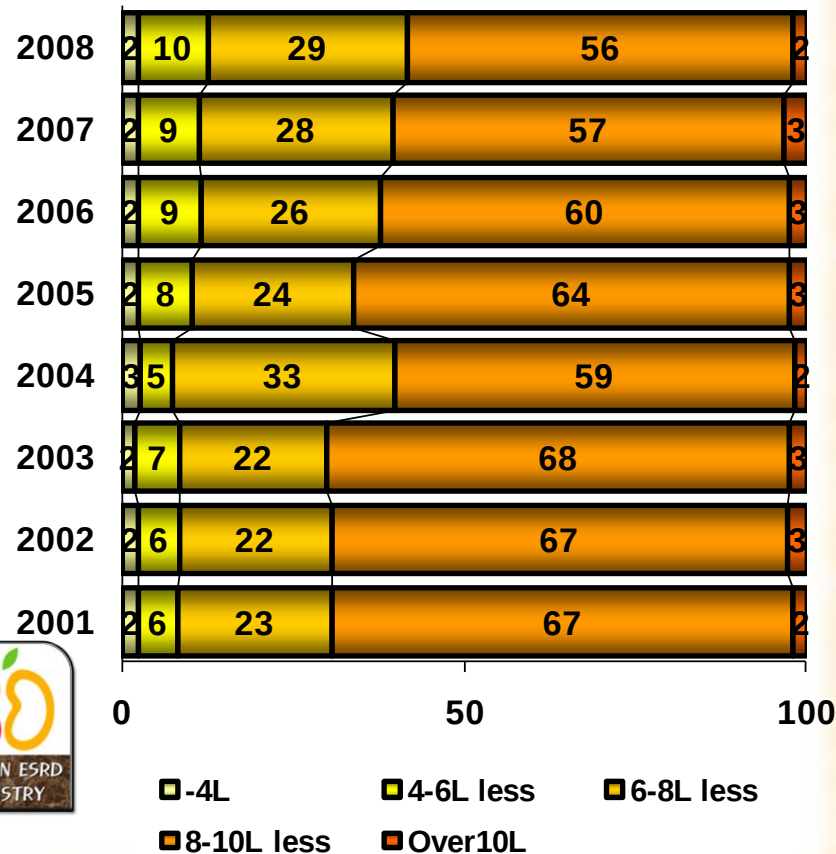
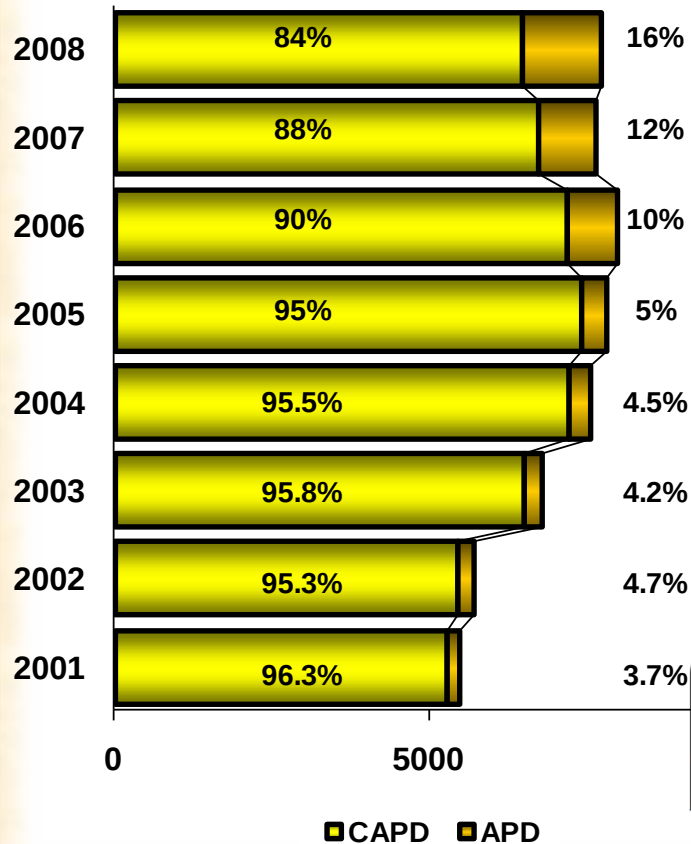


Changes of HD Adequacy



PD Type & Doses

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Co-Morbidity of Dialysis Pts

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Complications		HD (%)	PD (%)
Cardiac	Coronary Artery Disease	16.1	15.4
	Congestive Heart Failure		
	Pericardial Effusion		
	Arrhythmia		
Vascular	Cerebrovascular accident	45.1	57.8
	Hypertension		
	Other vascular disease		
Infection	Pneumonia	5.8	12.2
	Tuberculosis		
	Peritonitis		
	Herpes zoster		
	Other Infection		
Liver disease	Hepatitis B	7.3	5.2
	Hepatitis C		
	Congestive Liver		
	Hemochromatosis		
	Other liver diseases		
Gastrointestinal	Gastric Ulcer	9.5	3.8
	Duodenal Ulcer		
	Other Gastrointestinal Diseases		
	Malnutrition (Alb<2.5g/dl)		
Miscellaneous	Malignancy	16.2	5.5
	Hypertensive Retinopathy		
	Uremic Dermatitis		
	Uremic Neuritis		
	Uremic Dementia		
	Uremic Ascites / Pleural Effusion		
	Osteodystrophy		

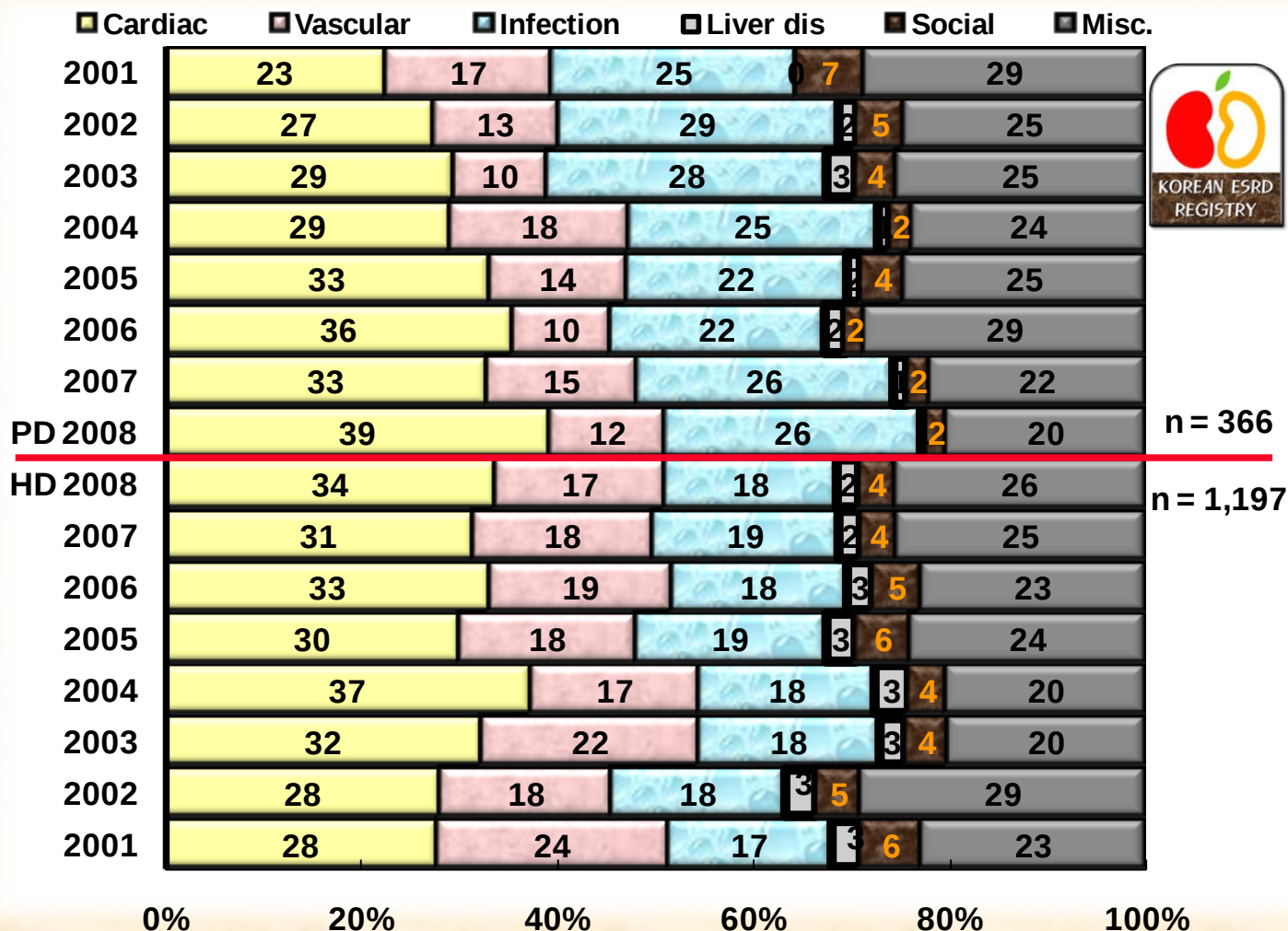
*Reported patients number: Hemodialysis =1,912, Peritoneal dialysis=344.

Causes of Death (%), 1994-2008

Causes	1994-1996	1998	2001	2002	2003	2004	2005	2006	2007	2008
Cardiac	27.4	33.3	26.9	27.9	31.7	35.5	30.7	33.7	31.7	35.1
Myocardial infarction	6.4	6.6	7.7	5.5	7.4	8.3	8.0	9.1	7.5	9.7
Cardiac arrest, uremia associated	13.7	17.5	11.2	10.6	11.7	13.6	10.4	11.1	10.8	11.0
Cardiac arrest, other cause	7.2	8.1	8.1	11.8	12.5	13.6	12.4	13.5	13.3	14.4
Vascular	17.2	18.5	22.7	15.7	19.5	17.5	17.0	16.5	17.8	16.0
Cerebrovascular accident	14.3	16.6	15.1	11.6	14.5	12.8	12.3	11.5	13.0	12.2
Pulmonary embolus	0.2	0.1	0.5	0.4	0.1	0.2	0.6	0.7	0.5	0.1
Gastrointestinal hemorrhage	1.7	2.1	2.7	1.9	3.2	2.0	1.7	1.8	2.7	1.9
Gastrointestinal embolism	0.1	0.0	0.1	0.1	0.0	0.4	0.5	0.5	0.1	0.1
Other vascular disease	0.9	0.9	4.3	1.7	1.6	2.1	1.9	2.0	1.6	1.7
Infection	13.5	18.1	17.8	21.6	20.5	19.5	20.1	18.8	20.2	19.5
Pulmonary infection	2.5	3.4	4.5	4.9	3.6	3.7	4.5	4.2	4.4	4.4
Septicemia	6.6	10.8	6.9	9.2	9.7	9.4	9.6	8.9	11.7	9.0
Tuberculosis	0.3	0.8	0.8	0.5	0.2	0.1	0.3	0.1	0.2	0.1
Peritonitis	2.1	2.5	1.1	2.5	2.0	1.5	1.4	1.1	1.1	2.0
Other Infection	2.0	1.8	4.5	4.5	4.9	4.8	4.3	4.5	2.9	4.0
Liver disease	3.4	3.4	2.6	2.8	2.8	2.9	2.7	2.6	2.2	1.9
Liver failure due to hepatitis B	1.8	2.3	1.6	1.2	1.8	2.1	1.5	1.4	1.3	1.0
Liver failure due to other cause	1.6	1.3	1.0	1.6	1.0	0.9	1.2	1.1	0.8	0.8
Social	6.2	4.2	6.3	4.7	4.4	3.6	5.4	4.2	3.3	3.3
Patient refused further treatment	2.9	1.8	2.1	1.8	1.0	1.1	1.1	0.6	1.1	0.6
Suicide	2.5	0.9	3.3	1.9	2.3	2.0	3.3	3.0	1.5	1.6
Therapy ceased for other reason	0.8	1.9	0.9	1.0	1.0	0.5	1.0	0.6	0.7	1.0
Miscellaneous	32.0	19.7	23.7	27.4	21.3	21.0	24.0	24.2	24.8	24.3
Cachexia	2.9	3.3	8.1	6.8	6.6	6.1	4.0	3.9	4.4	3.8
Malignant disease	2.1	4.1	4.4	4.8	3.5	3.6	6.4	5.4	5.7	4.6
Accident	1.2	1.0	0.9	0.5	1.1	0.9	1.4	1.6	1.2	1.0
Uncertain	25.8	12.5	10.3	15.3	10.1	10.3	12.3	13.2	13.4	14.9

Number of patients :1994-1996=981, 1998=911, 2001=761, 2002=1,256, 2003=894, 2004=1,162, 2005=1,256, 2006=1,248, 2007=1,531, 2008=1,563.

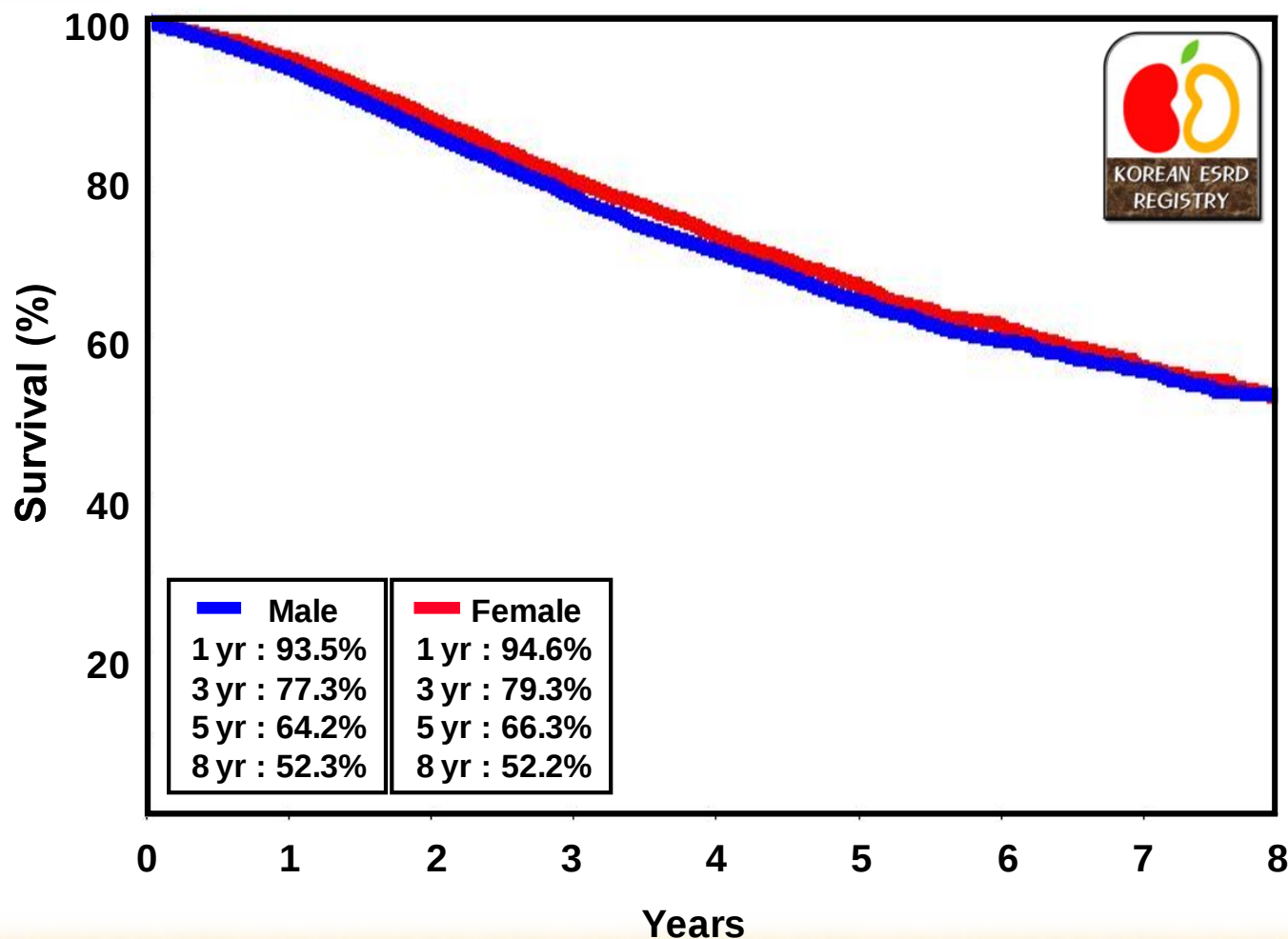
Death Causes, HD & PD





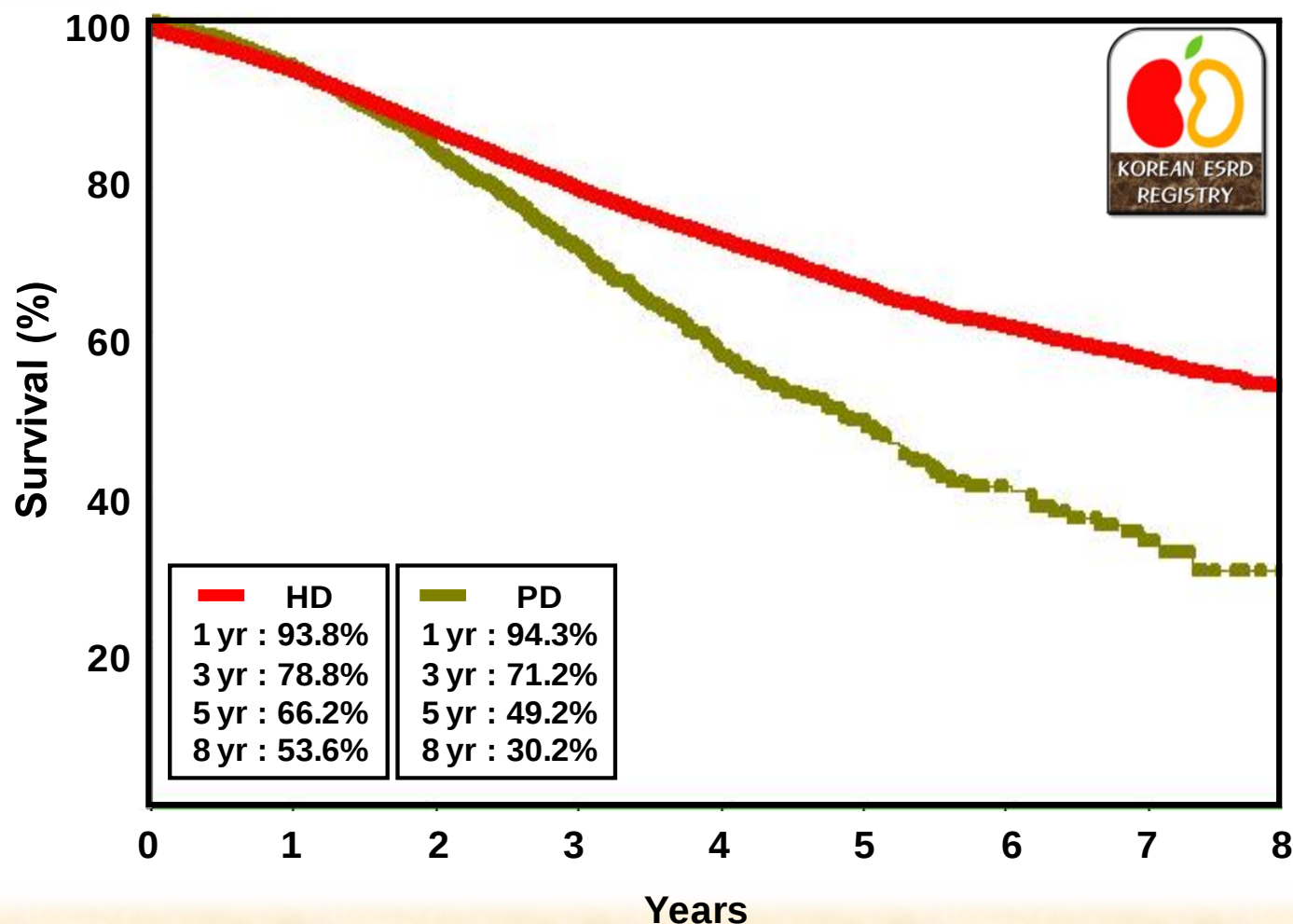
Overall Patient Survival

Registered dialysis patients since 2001



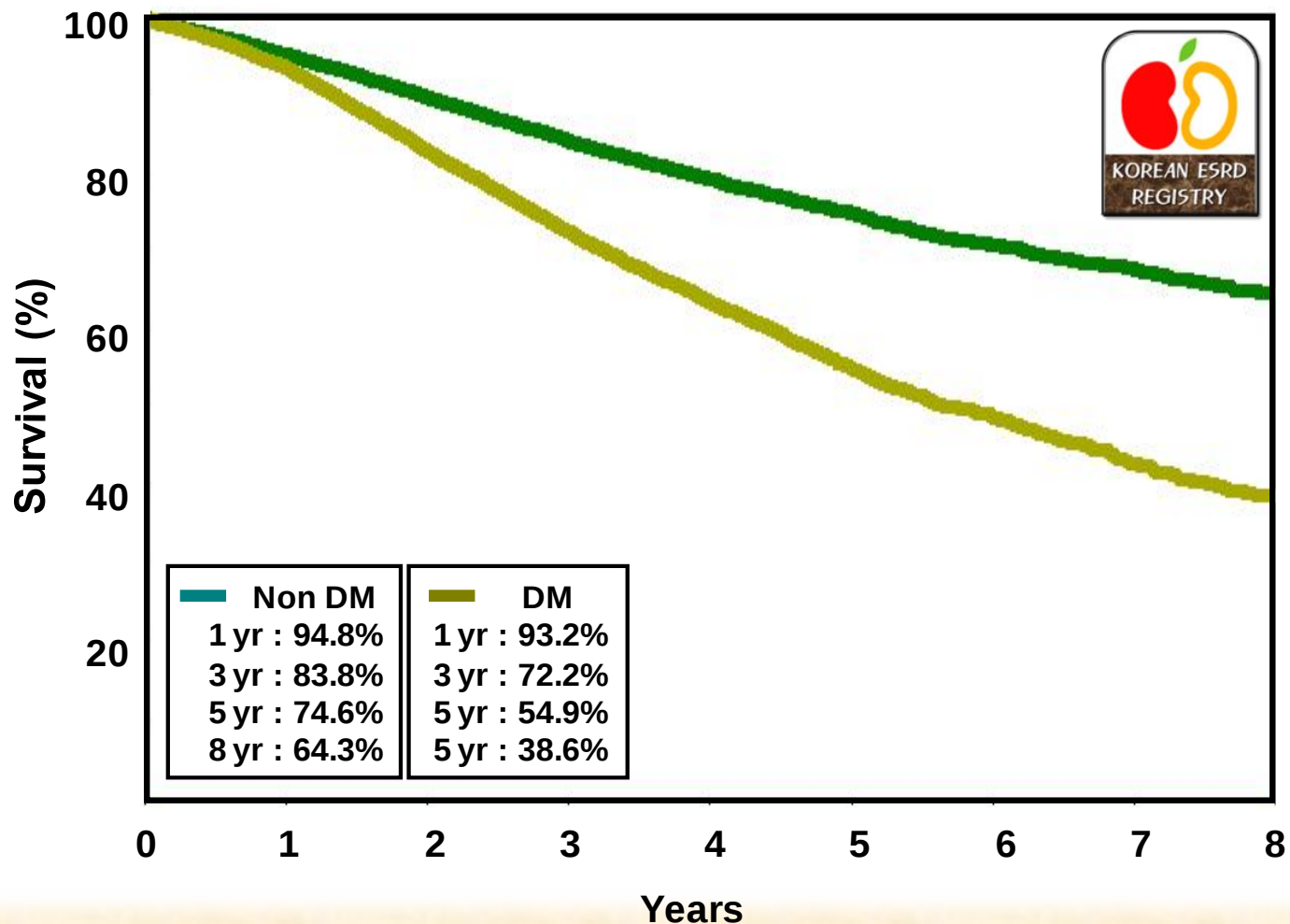
Patient Survival : HD vs PD

Registered dialysis patients since 2001



Patient Survival : DM vs Non-DM

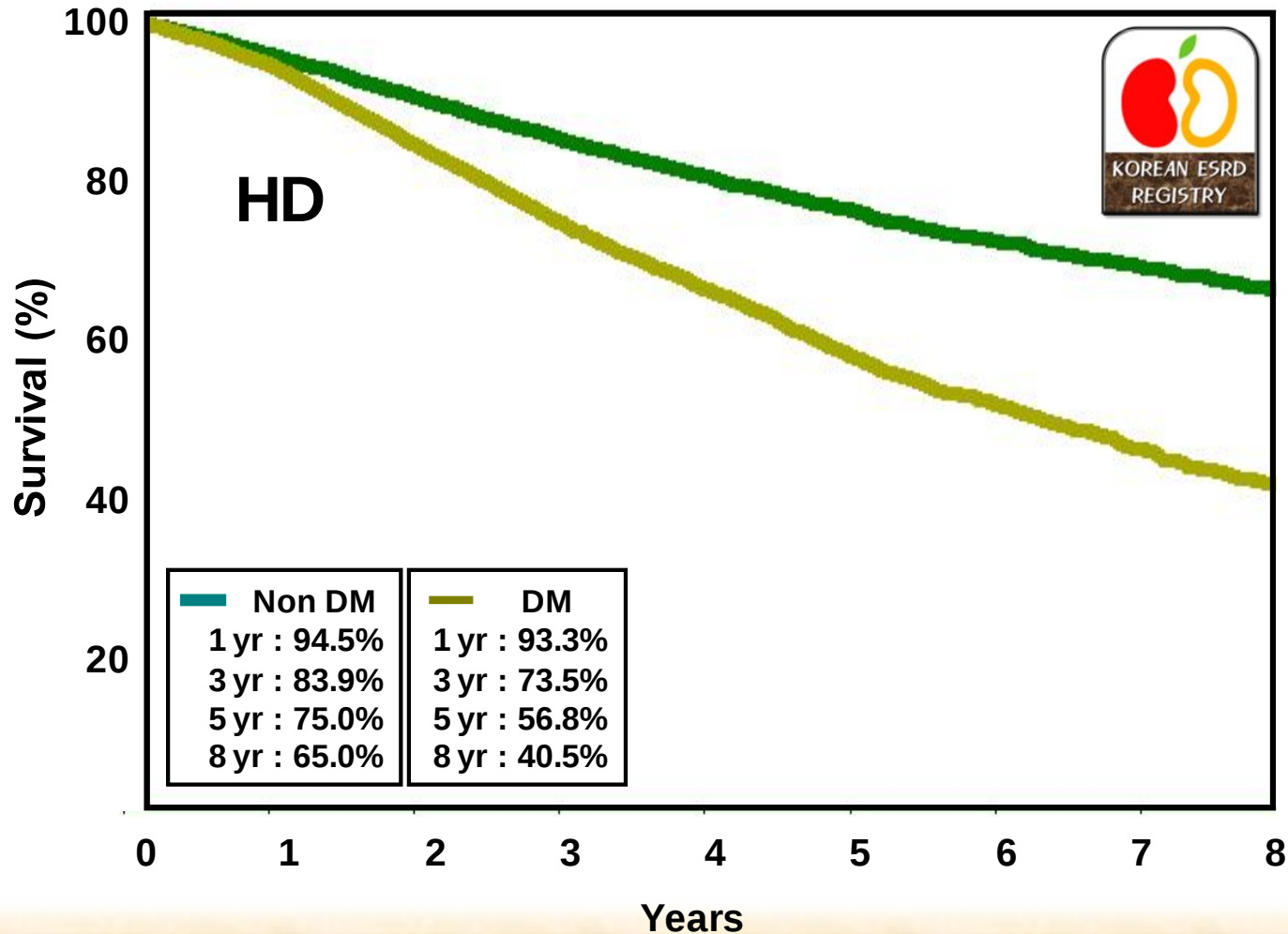
Registered dialysis patients since 2001





HD Pts Survival : DM vs Non-DM

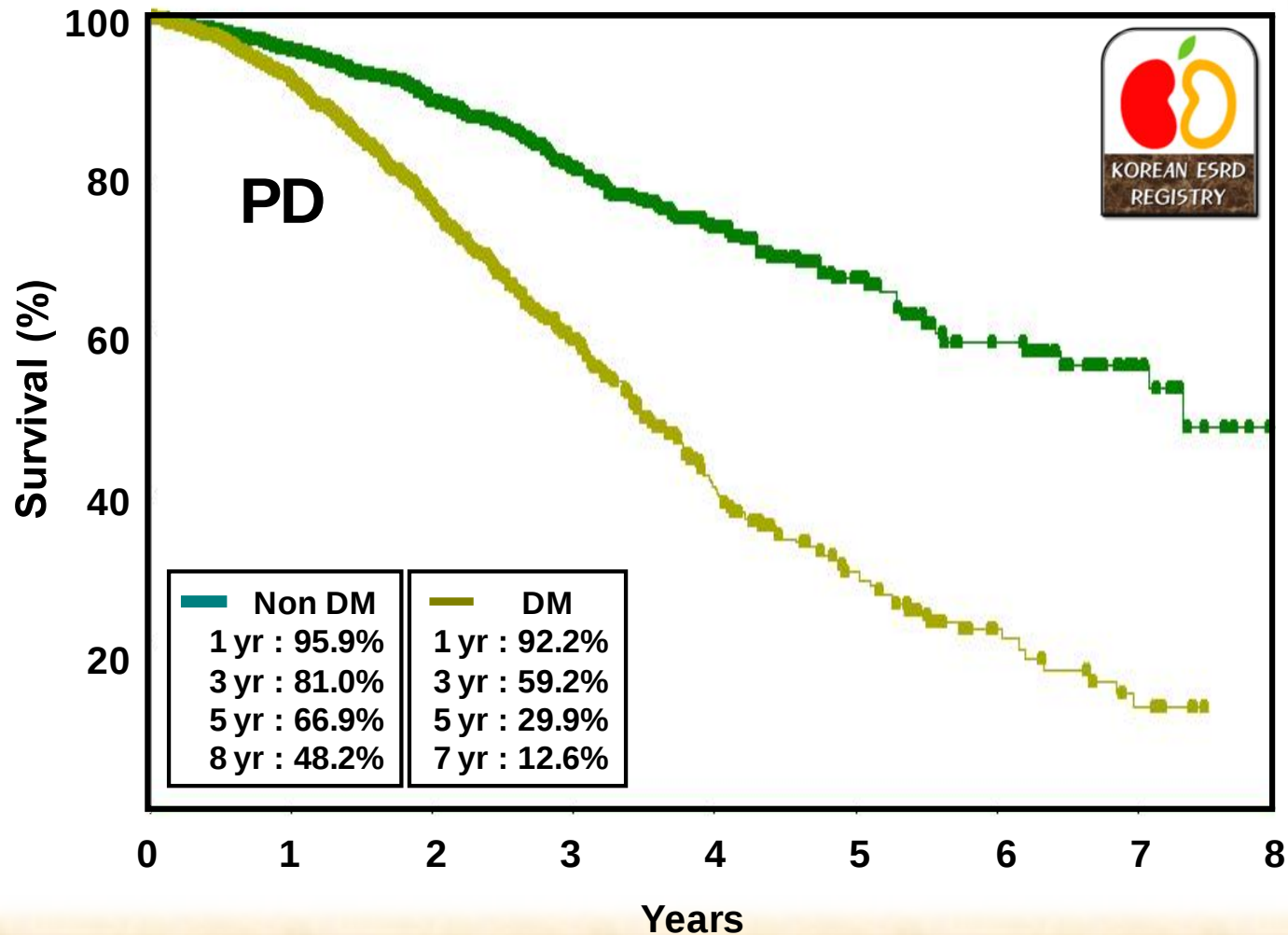
Registered dialysis patients since 2001





PD Pts Survival : DM vs Non-DM

Registered dialysis patients since 2001



Survival of ESRD Pts, USRDS

United
States
Renal
Data
System

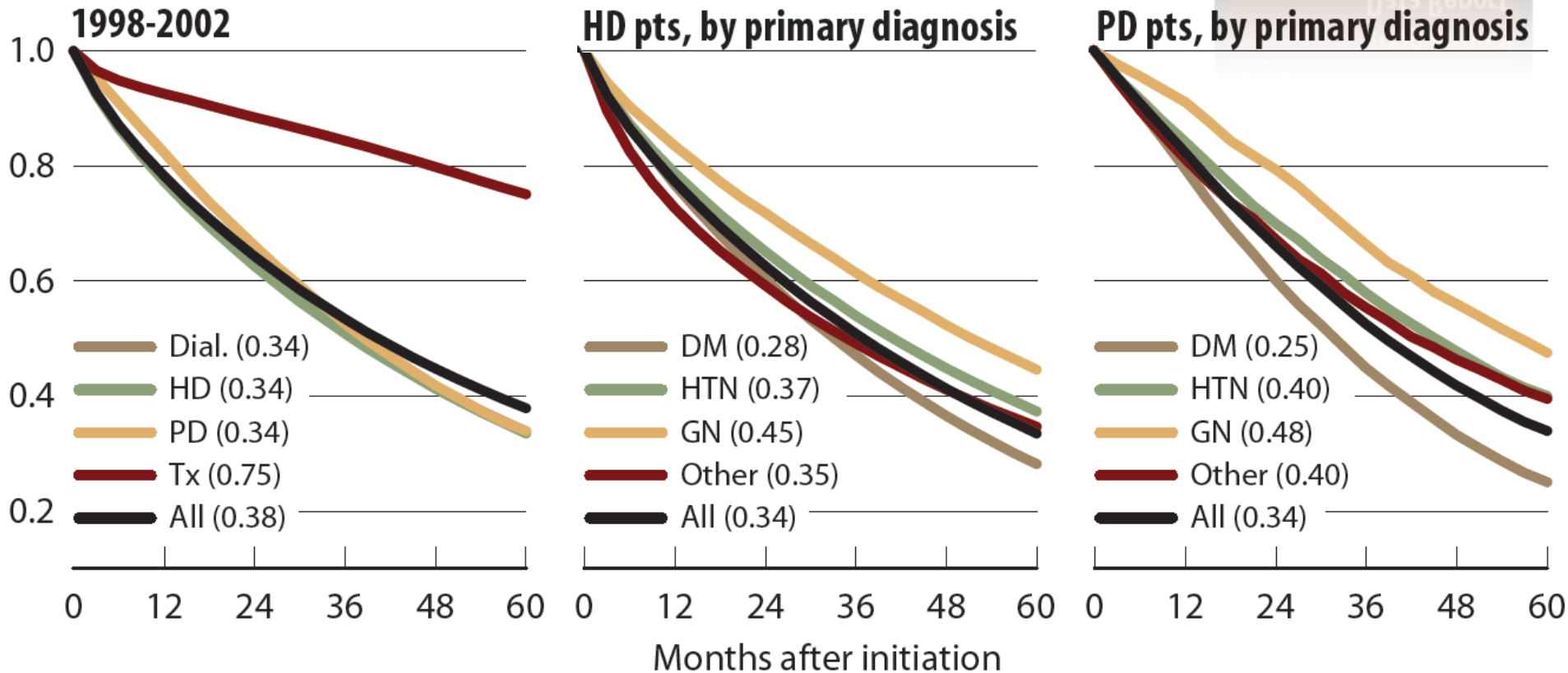
2009 Annual
Data Report

2007년말 투석 환자수 : 368,544명

(이식포함 514,642명, 1,698 PMP)

혈액투석 환자수 : 34만 1천명 (Home HD : 약 3천명)

복막투석 환자수 : 2만6천명



Survival of ESRD Pts, Japan



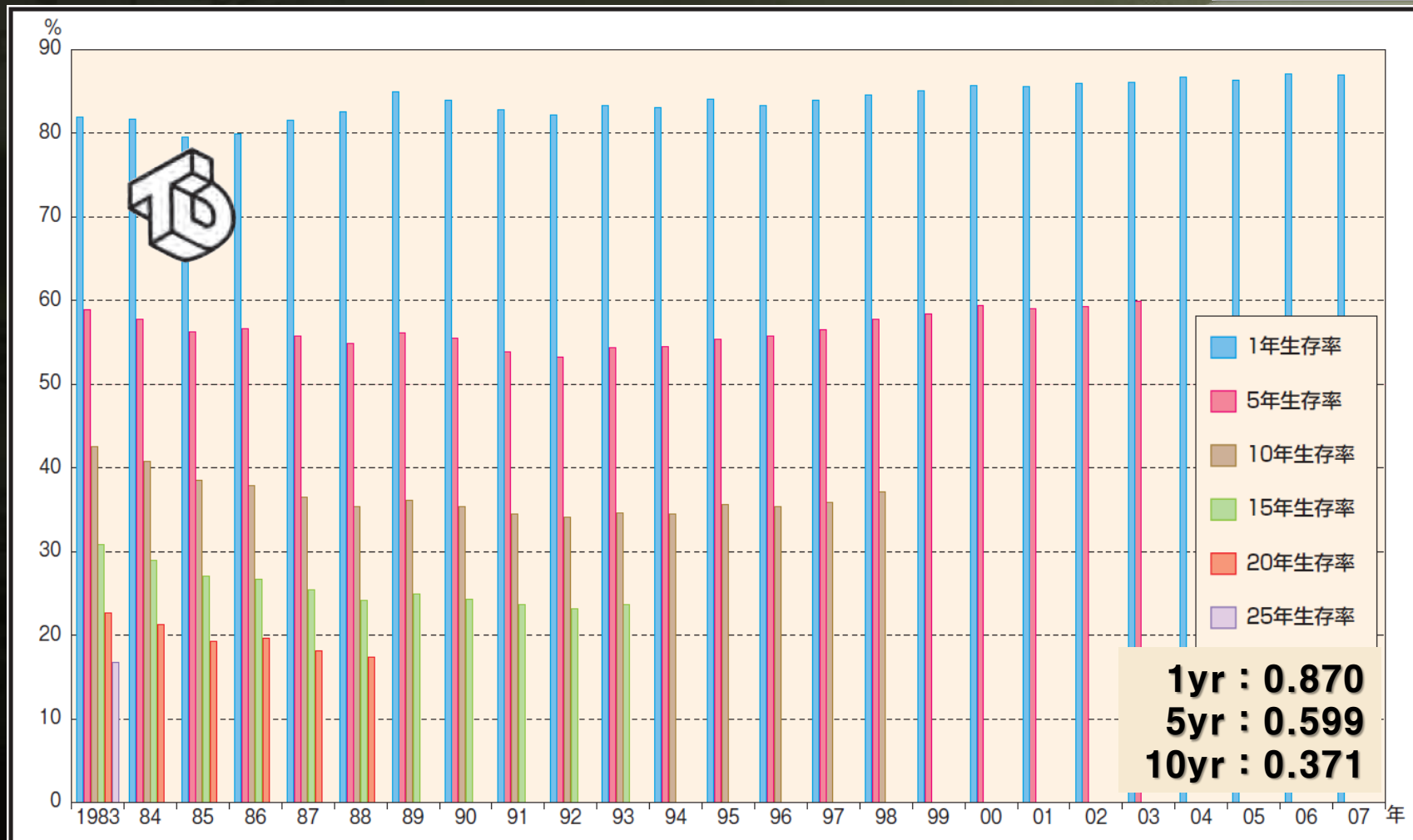
日本透析医学会

Japanese Society for Dialysis Therapy

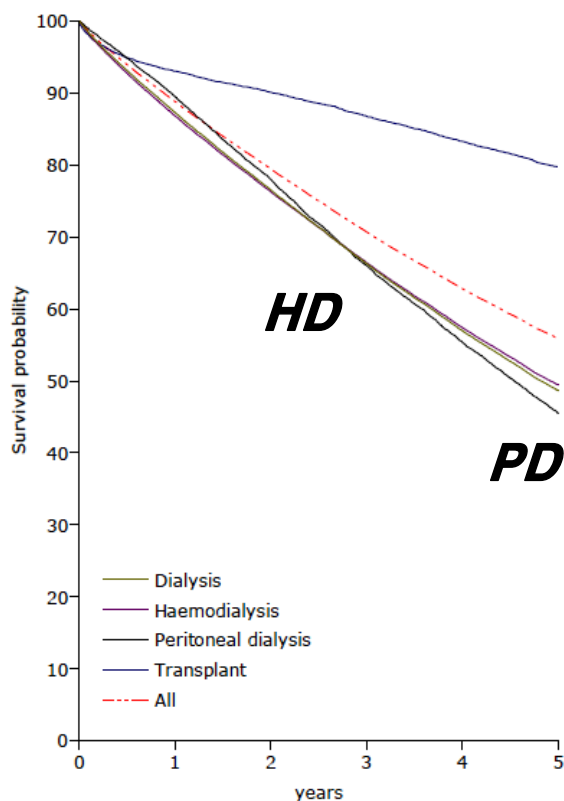
일본 투석의학회 (2008년말 현황)

투석 센터 : 4,072, 투석기: 11만2천대,

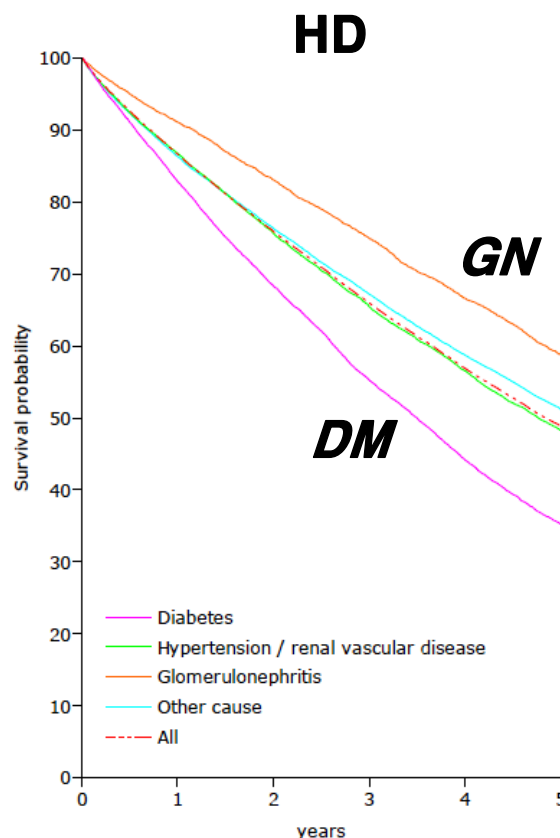
투석환자: 28만3천명 (2,213 pmp, 복막 투석 3.2%)



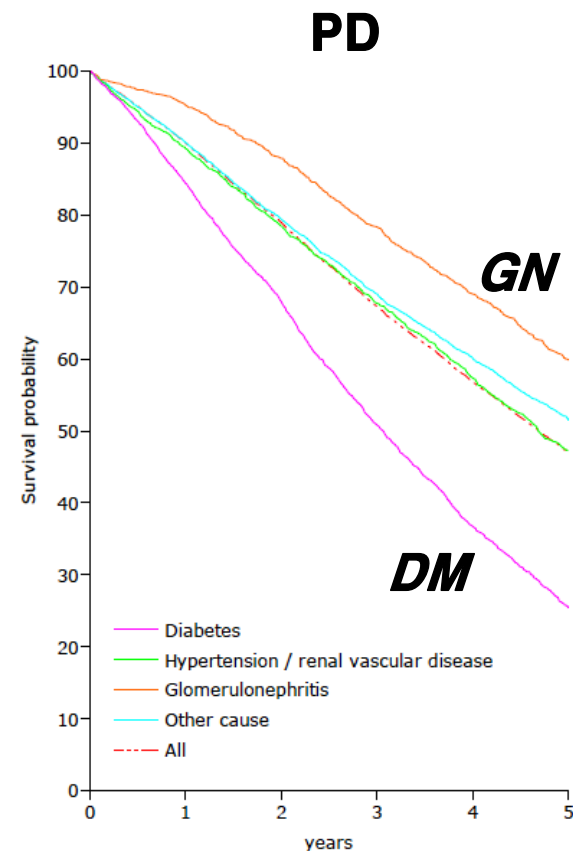
**Adjusted survival (cohort 1998-2002):
Incident dialysis patients and patients receiving
a first transplant (between 1998 and 2002)**
*from day 91, by modality,
adjusted for age, gender, and primary diagnosis*



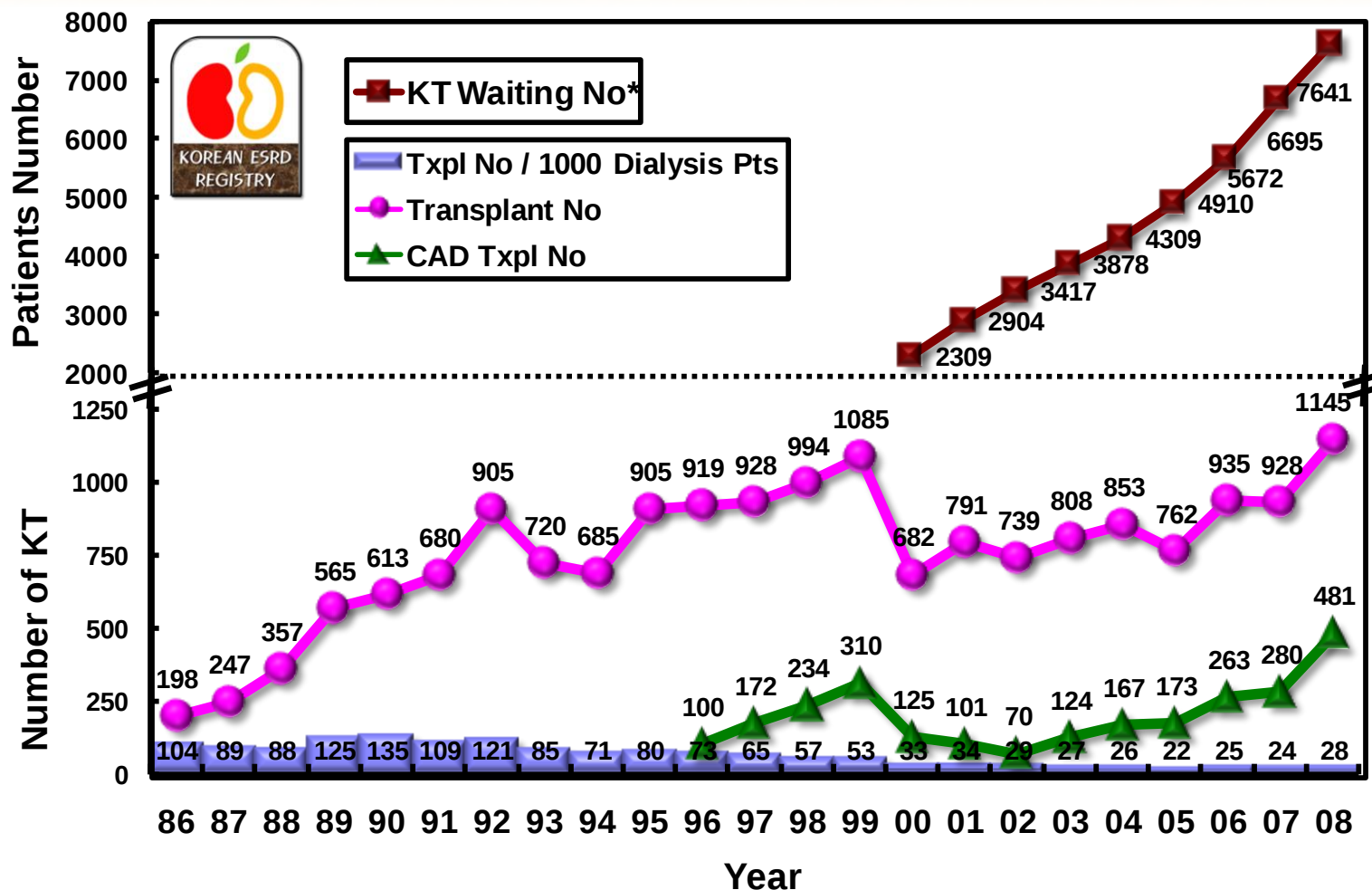
**Adjusted survival (cohort 1998-2002):
Incident haemodialysis patients**
*from day 91, by primary diagnosis,
adjusted for age and gender*

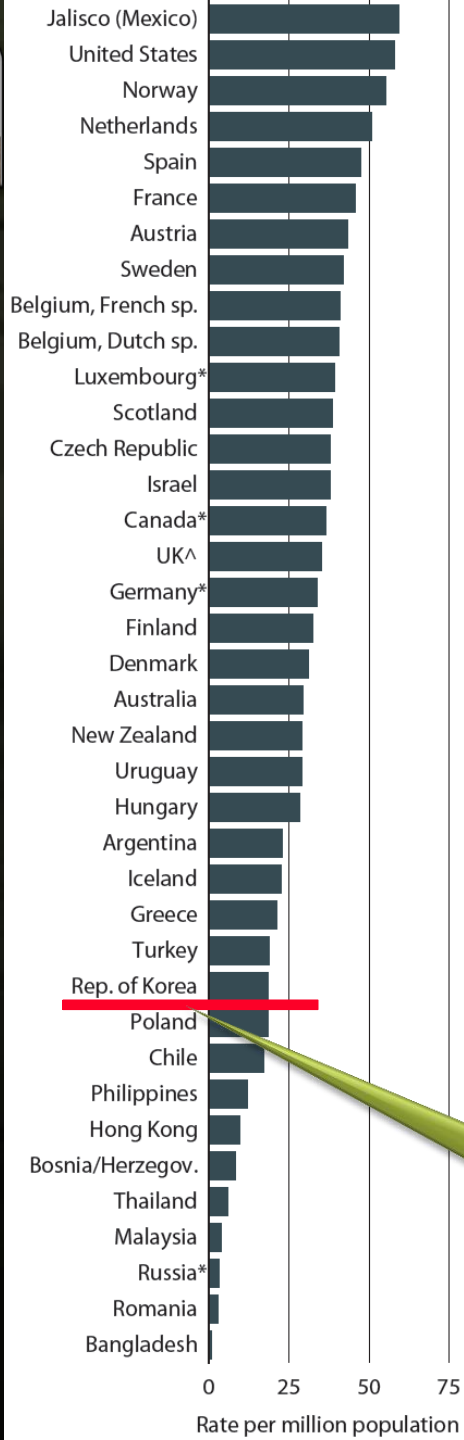


**Adjusted survival (cohort 1998-2002):
Incident peritoneal dialysis patients**
*from day 91, by primary diagnosis,
adjusted for age and gender*



Kidney Transplantation





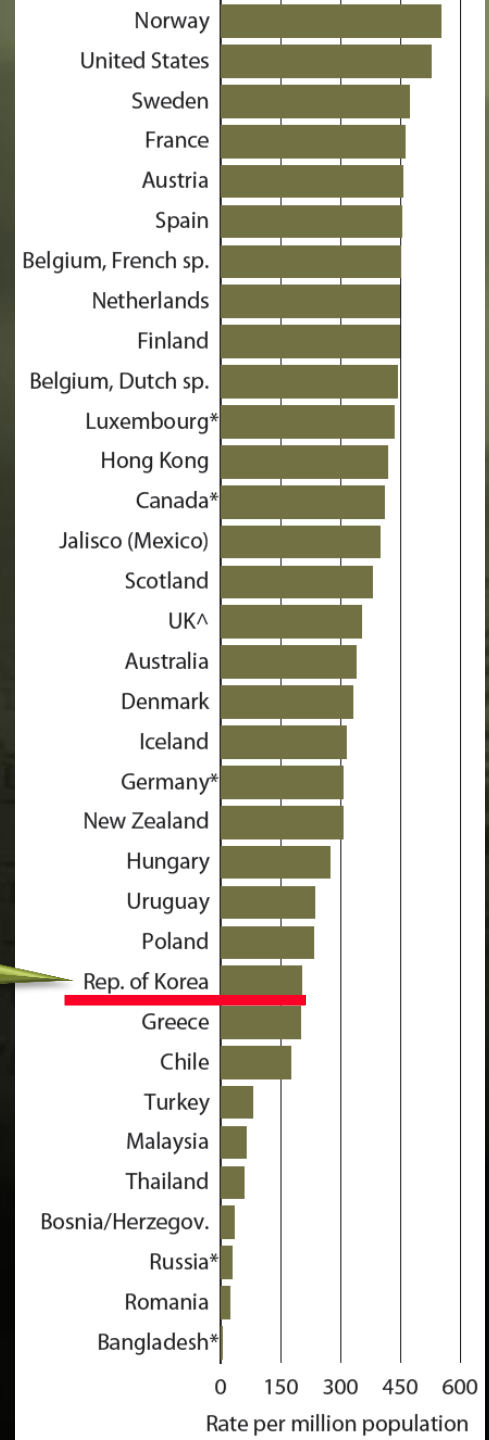
Kidney Transplantation

United
States
Renal
Data
System

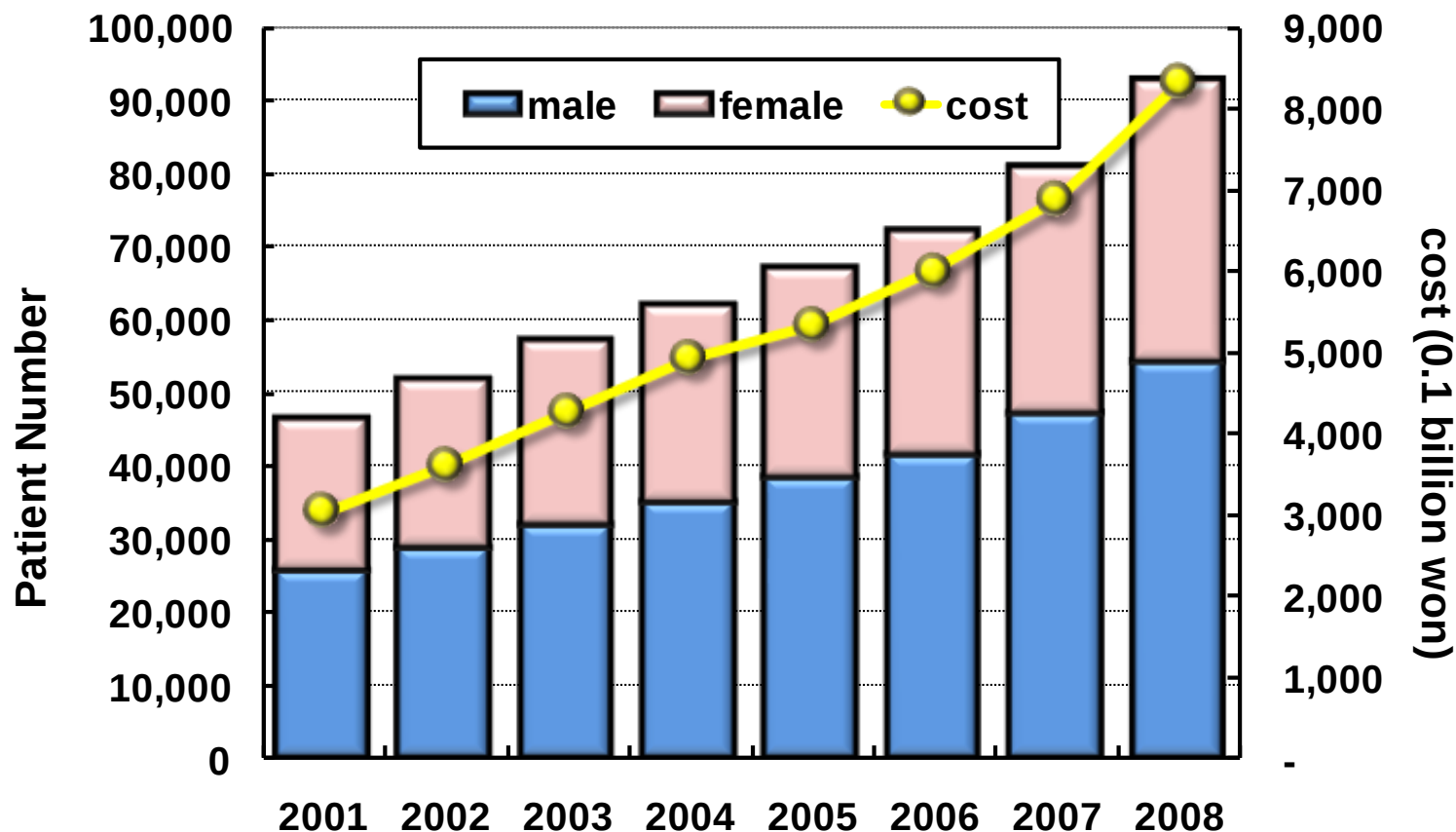
2009 Annual
Data Report

Prevalence
202.2 PMP
2007

Incidence
18.5 PMP
2006



Medical Cost for CKD



감사의 글

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