

우리나라 신대체 요법의 현황

– 인산 민병석 교수 기념 말기 신부전 환자 등록사업 2006 –

Current Renal Replacement Therapy in Korea
-Insan Memorial Dialysis Registry 2006-
ESRD Registry Committee, Korean Society of Nephrology



대한신장학회 등록위원회

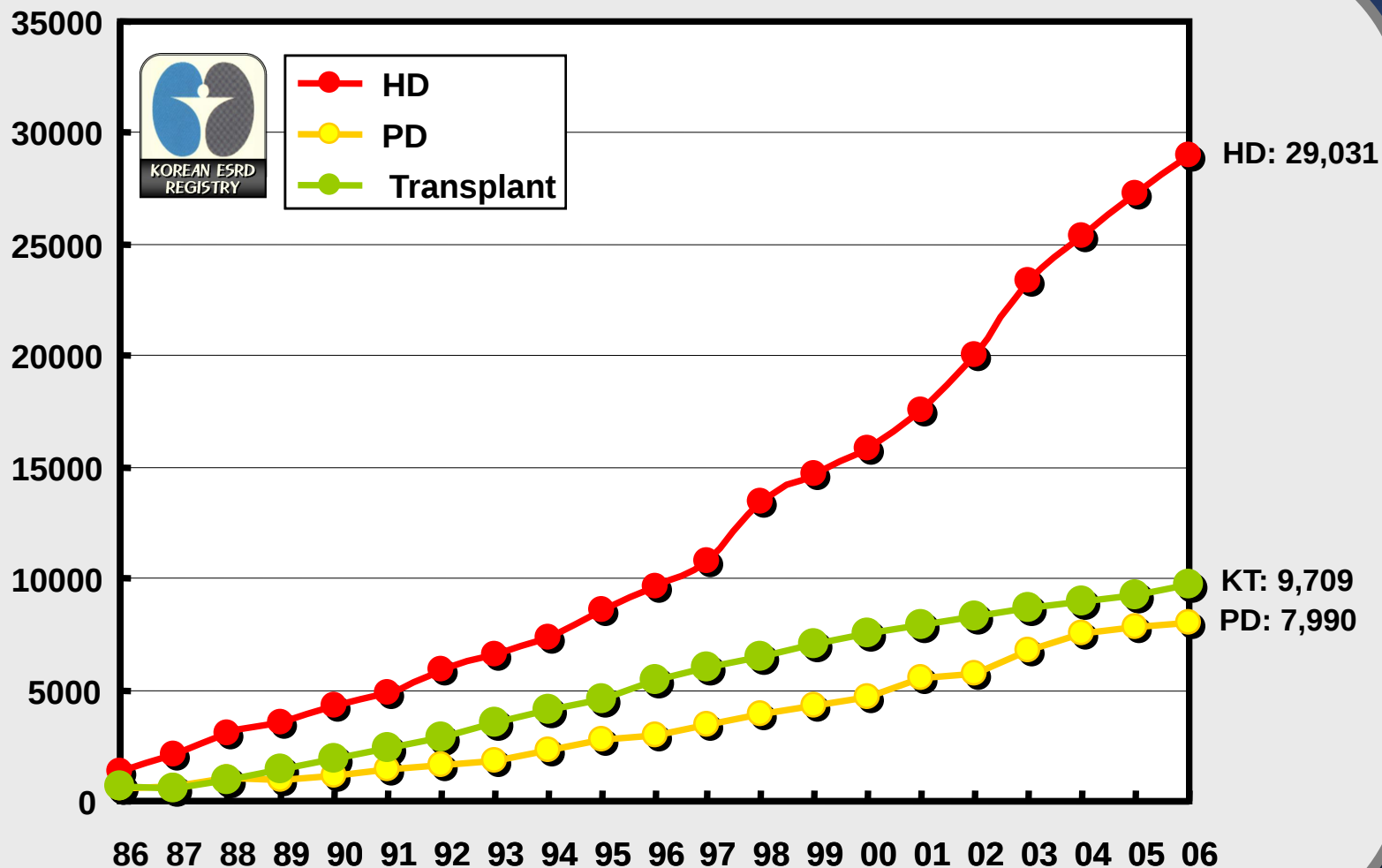
Prevalence of Renal Replacement Therapy

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)

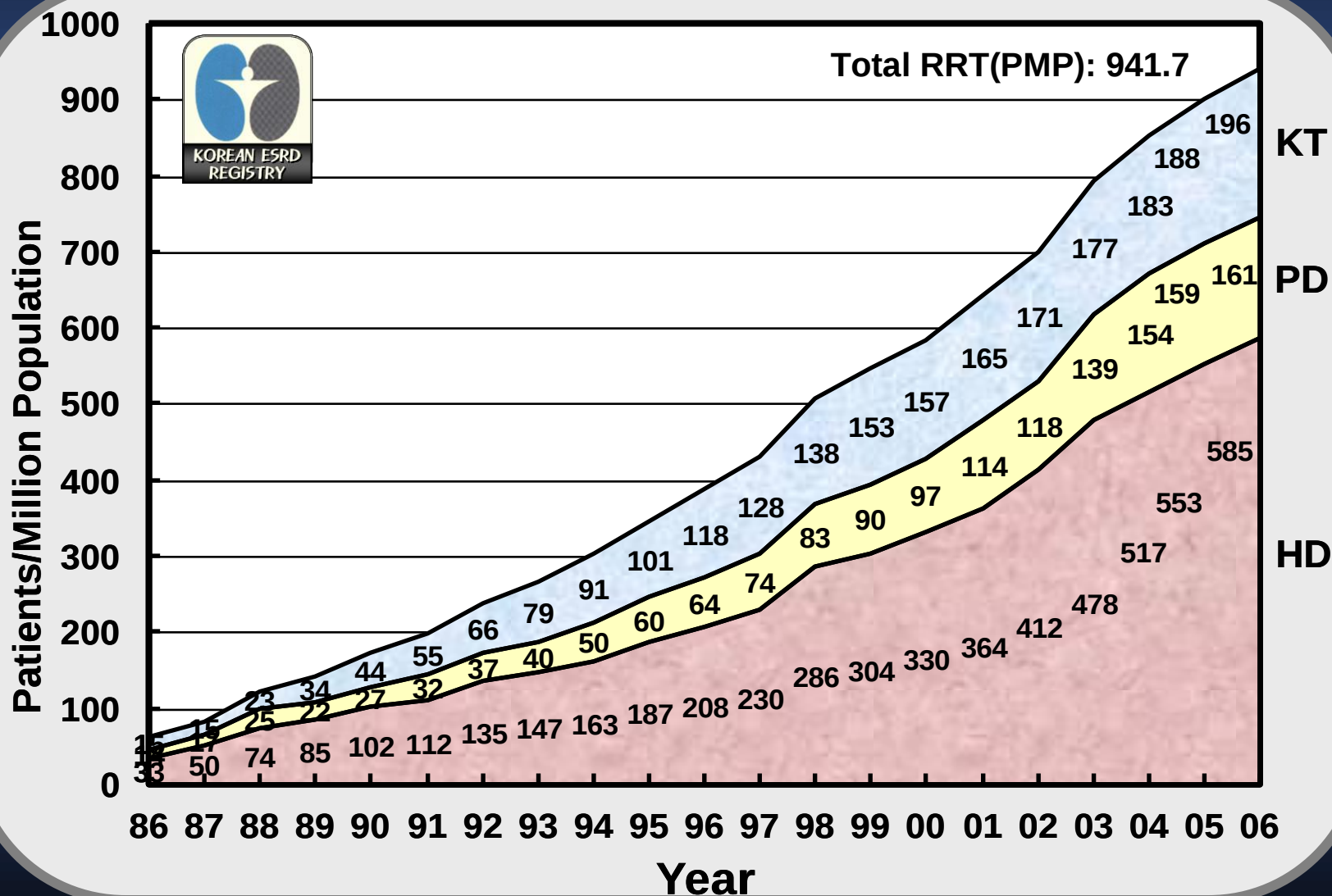
(): number of patients per million population



Patient Number of RRT

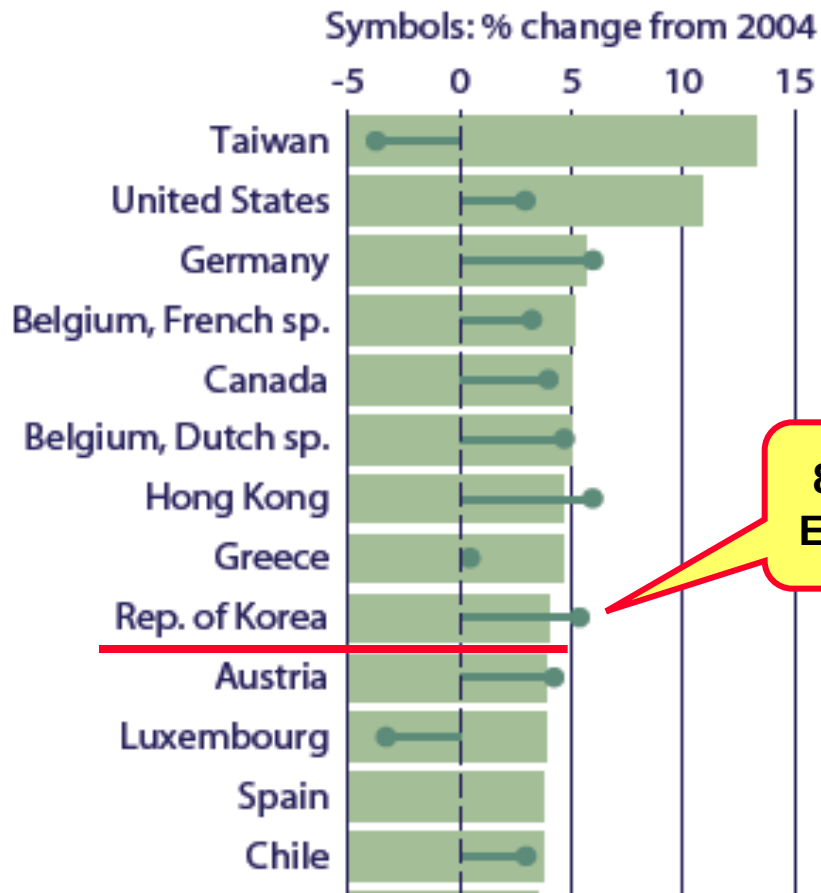


Point Prevalence of RRT

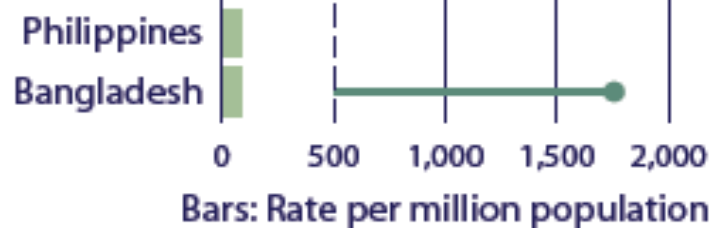


Prevalence of ESRD

International
Comparison,
2005
(except Japan)



899.8 PMP
End of 2005



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12.5

Prevalence
of ESRD, 2005



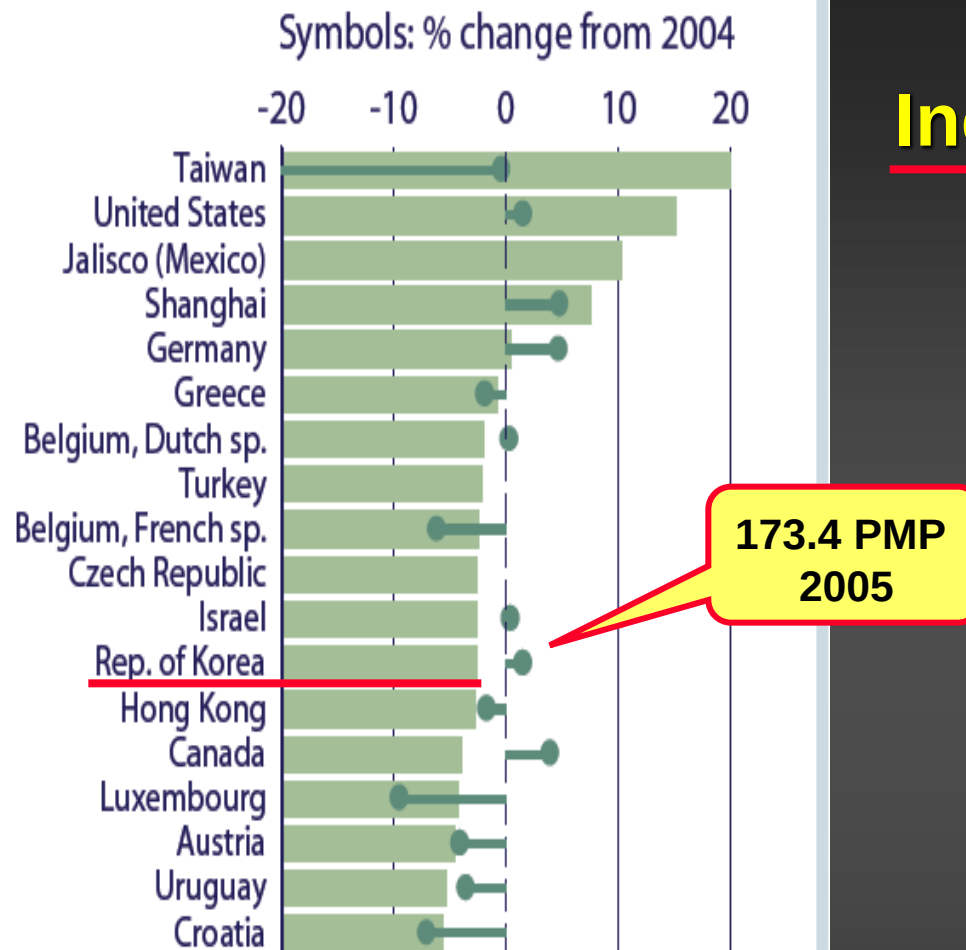
Number of New RRT Pts

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)

): number of patients per million population

Incidence of ESRD

International
Comparison,
2005
(except Japan)



0 100 200 300 400
Bars: Rate per million population

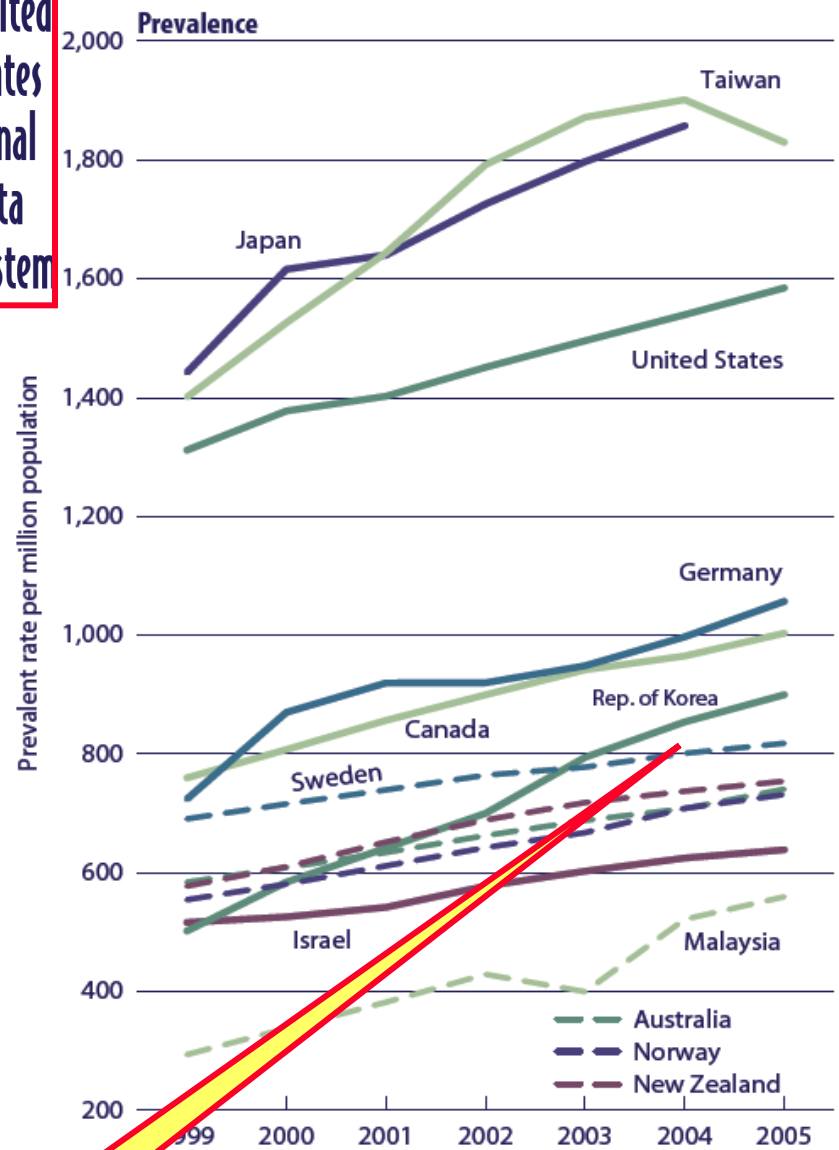
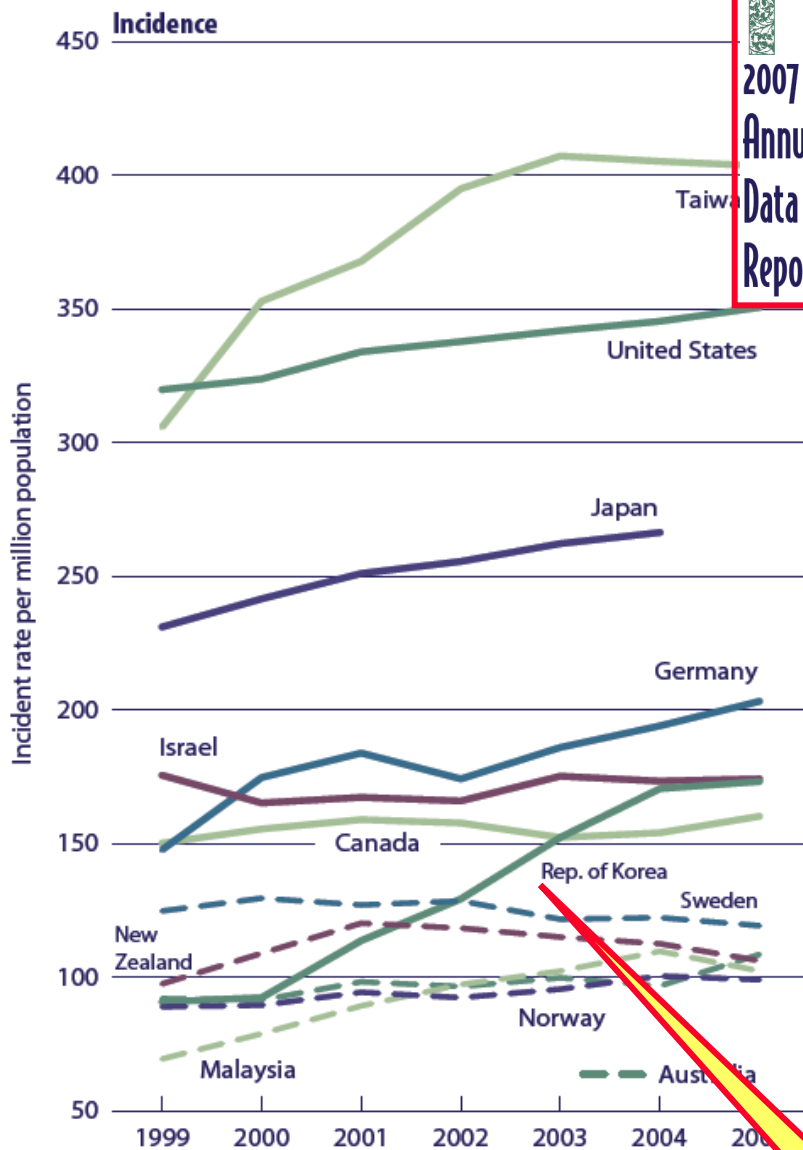
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Incidence
of ESRD, 2005



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12.1

Comparison of ESRD incidence & prevalence worldwide

KOREA



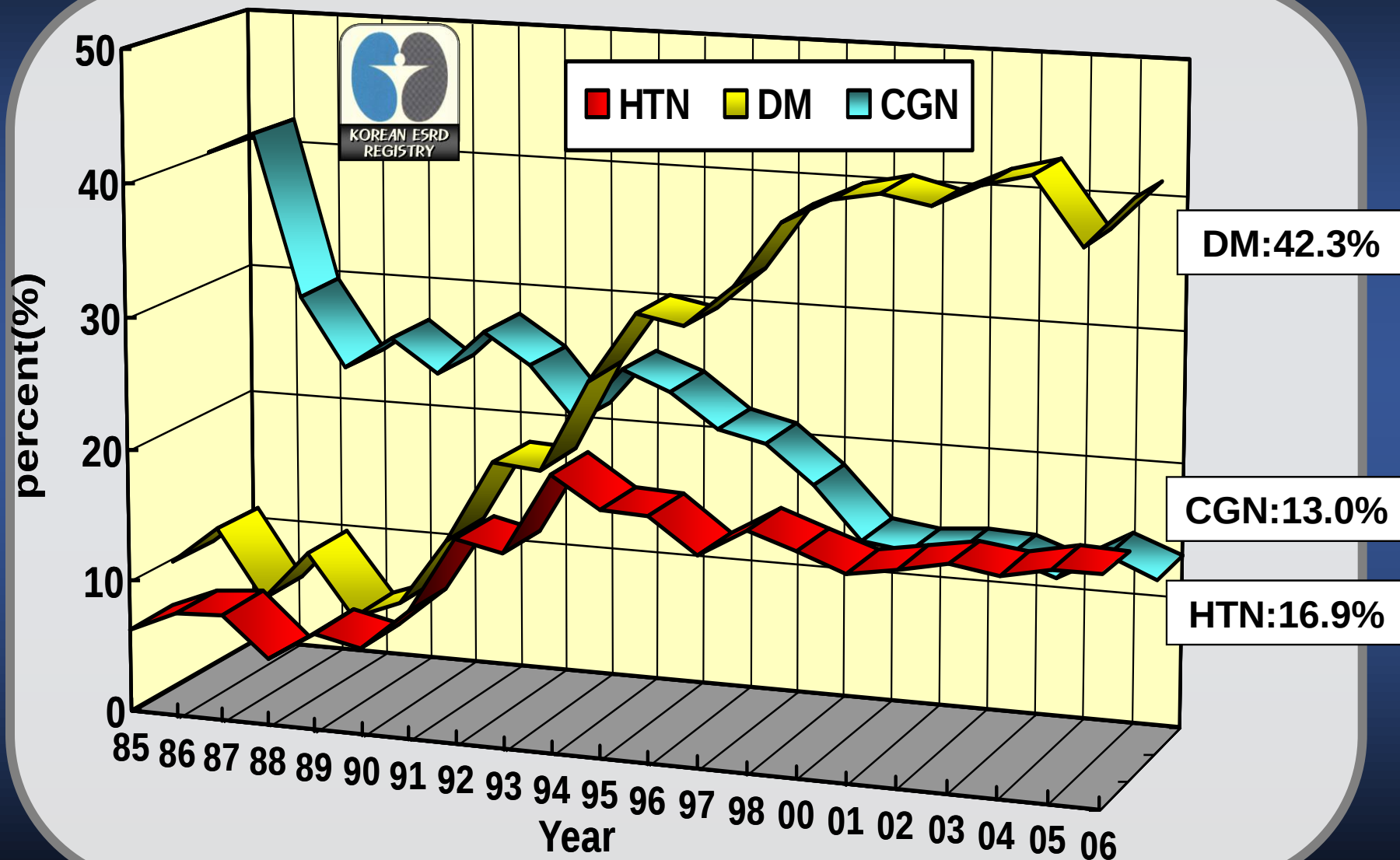
Causes of ESRD in New Pts

Causes	Percent (%)								
	1992	1994	1996	1998	2000	2002	2004	2005	2006*
Chronic Glomerulonephritis	25.3	25.5	21.6	17.9	14.0	13.9	12.5	14.5	13.0
Not Histologically confirmed	19.7	20.4	16.7	13.6	10.6	10.0	8.6	10.1	9.0
Histologically confirmed	5.6	5.0	4.9	4.3	3.4	3.9	3.9	4.4	3.9
Diabetic nephropathy	19.5	26.1	30.8	38.9	40.7	40.7	43.4	38.5	42.3
Hypertensive nephrosclerosis	15.4	20.8	18.3	17.8	16.6	16.0	16.2	16.9	16.9
Cystic kidney disease	2.1	2.2	1.8	1.7	2.2	1.6	1.4	1.9	1.7
Renal tuberculosis	1.1	1.5	1.2	0.5	0.4	0.5	0.3	0.3	0.3
Pyelo/interstitial nephritis	1.3	1.1	0.7	1.0	0.8	0.6	0.6	0.5	0.6
Drugs or nephrotoxic agents	1.3	0.1	0.6	0.3	0.3	0.4	0.2	0.2	0.3
Lupus nephritis	0.8	0.7	1.0	0.5	0.9	0.8	0.6	0.7	0.6
Gouty nephropathy	0.7	0.7	0.6	0.5	0.7	0.4	0.5	0.5	0.3
Hereditary nephropathy	0.3	0.7	0.4	0.2	0.1	0.2	0.3	0.4	0.3
Kidney tumor	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.2
Other	4.1	2.7	2.8	3.9	3.0	5.6	5.9	7.5	6.0
Uncertain	28.6	17.8	15.9	16.6	20.2	19.0	17.8	17.8	17.5

* * n = 6,926



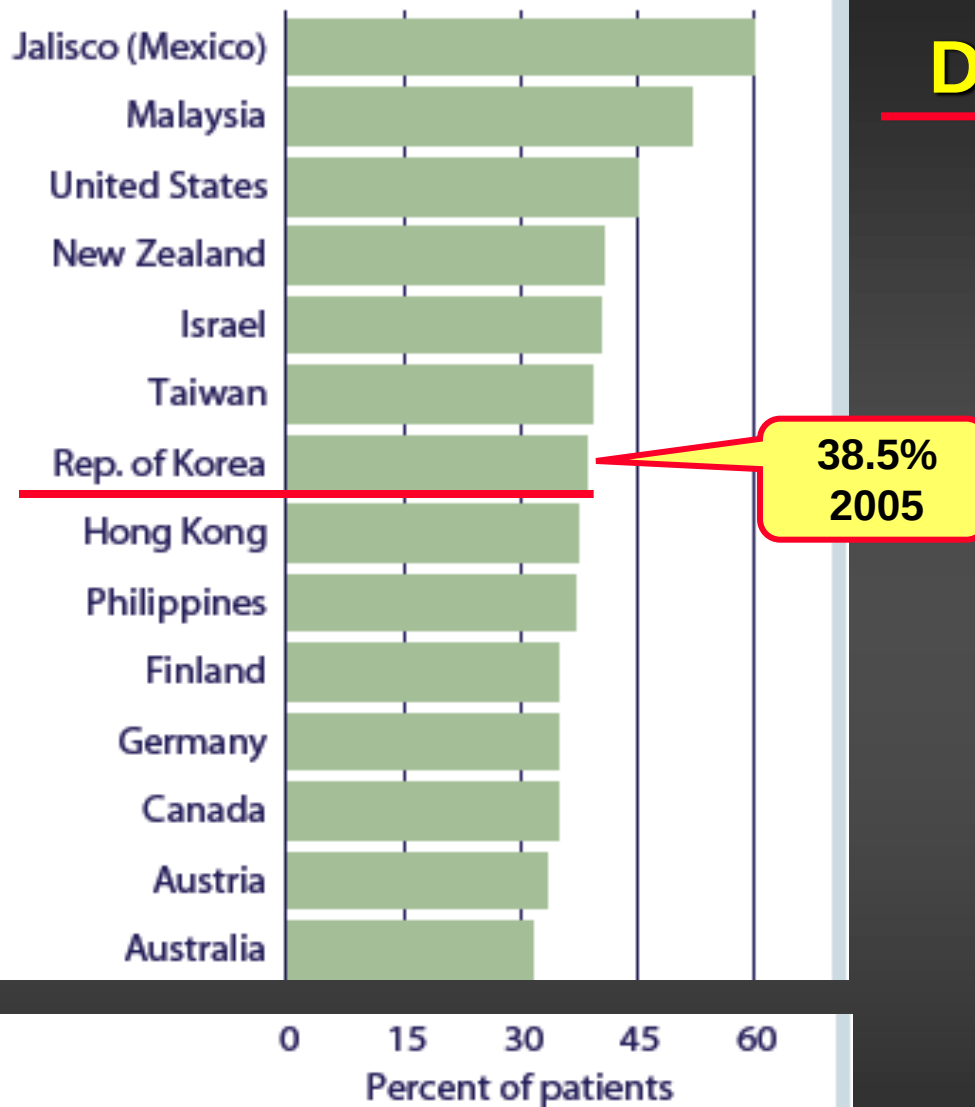
Three Major Causes of ESRD





Diabetic ESRD

International
Comparison,
2005



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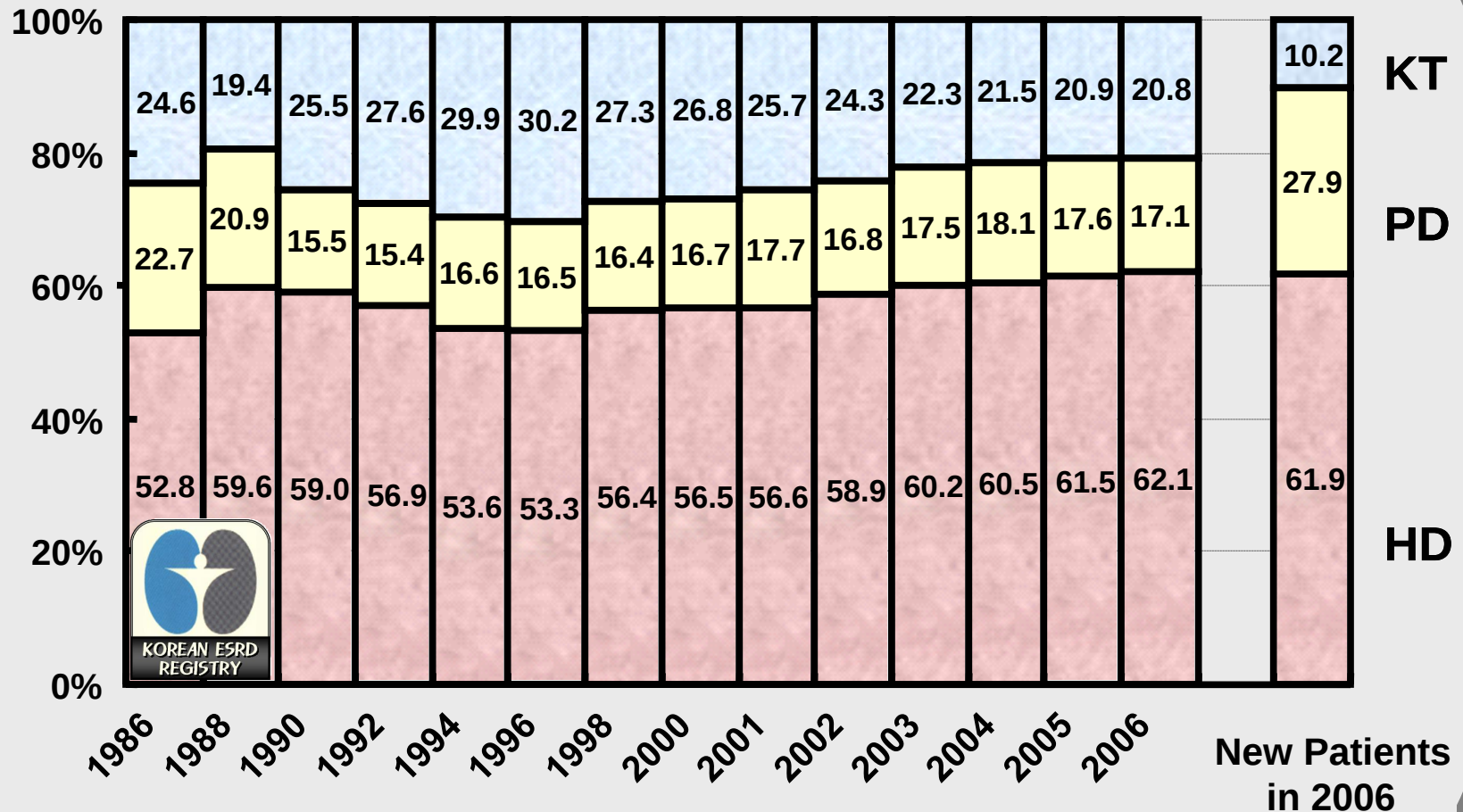
12.4

**Percentage of incident patients
with ESRD due to diabetes, 2005**



Proportion of RRT Modalities

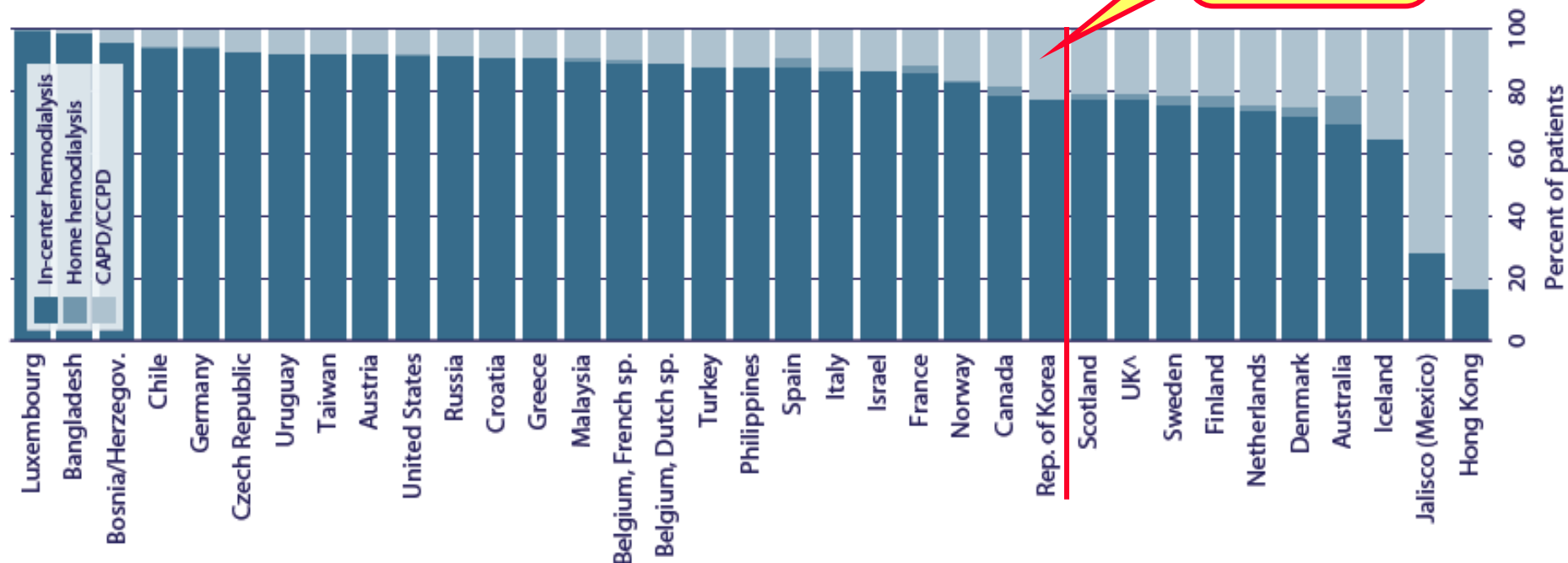
- Annual Prevalence & Incidence -



Percent Distribution of Dialysis Modalities

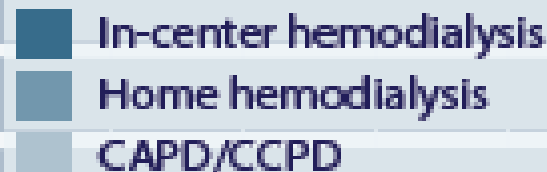
International Comparison, 2005

HD : PD
78.4 : 21.6
End of 2005



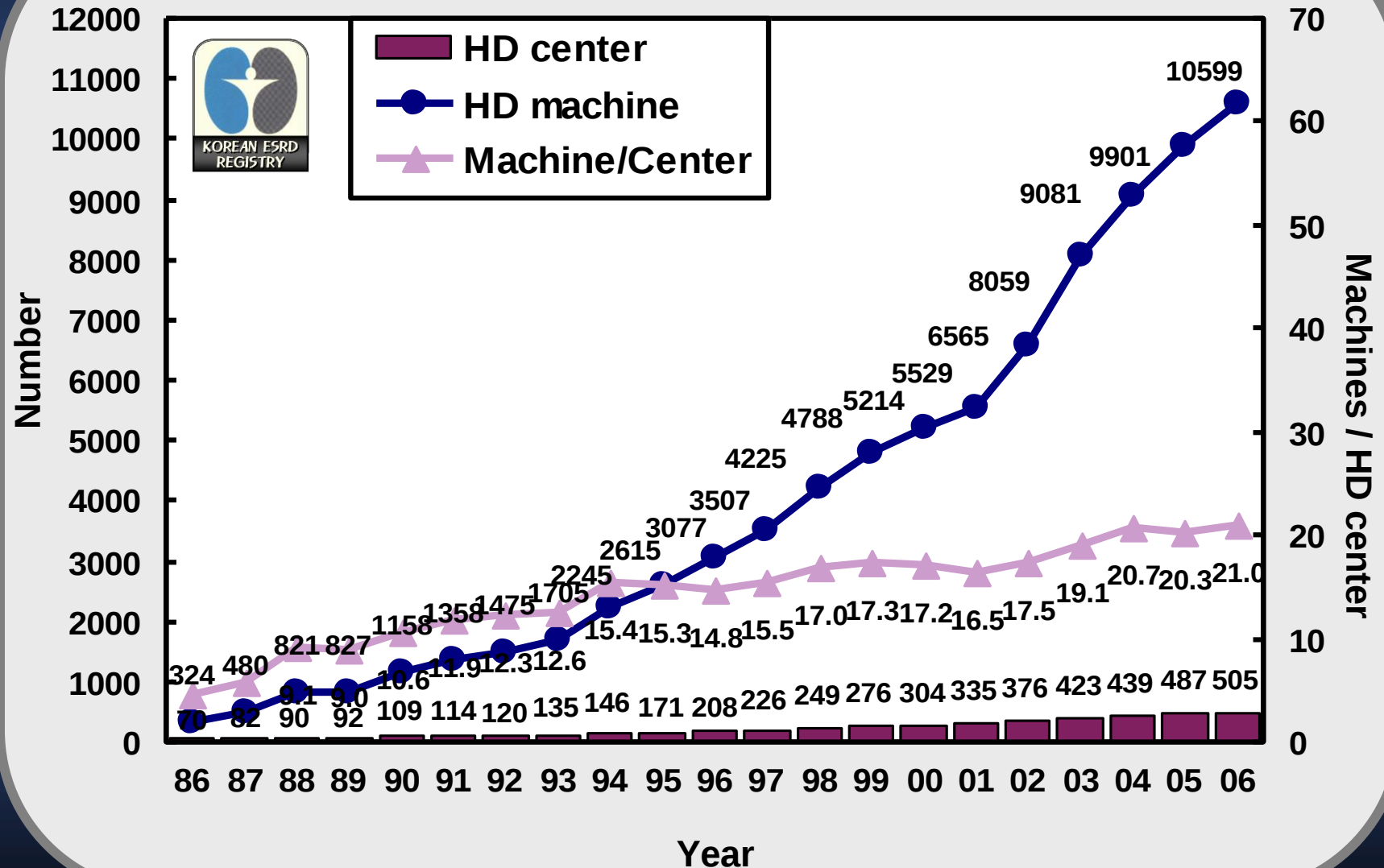
12.7

Percent distribution of prevalent dialysis patients, by modality, 2005

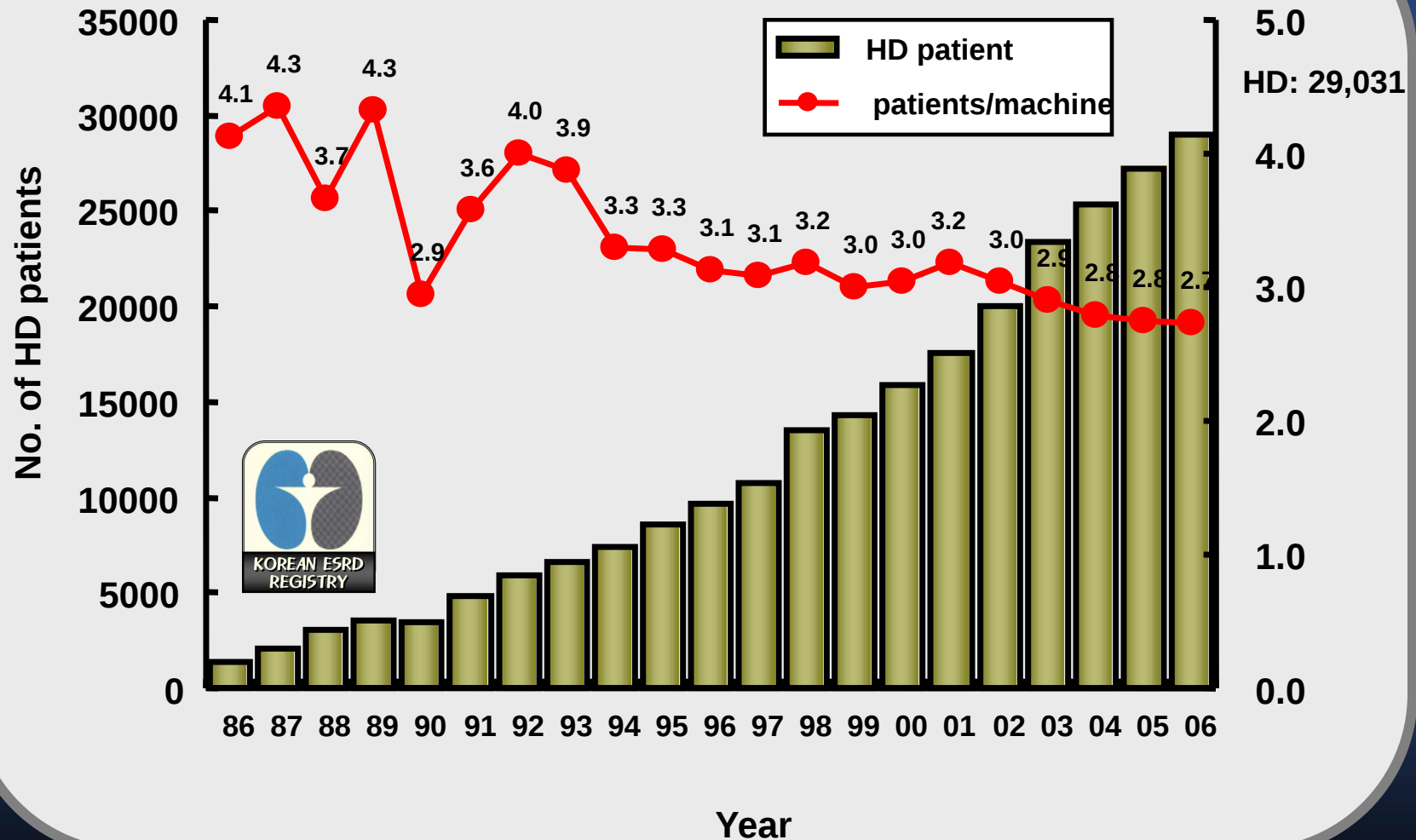



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Number of HD Centers & HD Machines

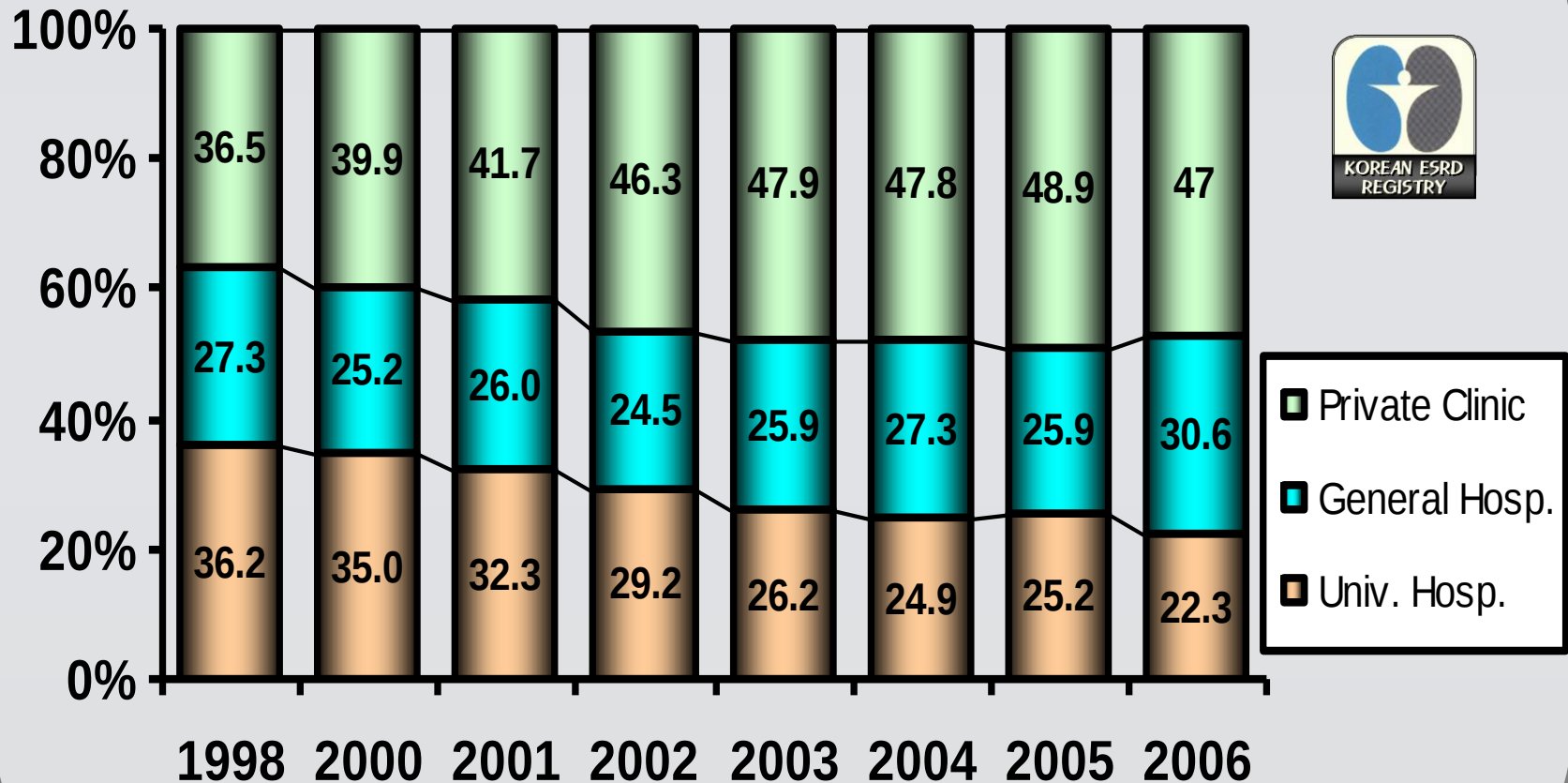


Ratio of HD Machine & HD Pts





Percent of HD Pts, Dialysis center



행정구역별 투석환자 및 혈액투석기 분포

(2006년 12월 말 기준)

	HD pts	PD pts	Total Dialysis pts	Dialysis pts. / Million pop.	Dialysis Centers	HD machines	HD pts./ HD machine
서울 Seoul	7,142	2,516	9,658	933	112	2,491	2.9
부산 Busan	2,469	1,034	3,503	964	35	864	2.9
대구 Daegu	1,587	930	2,517	1,002	28	558	2.8
인천 Incheon	1,564	415	1,979	743	19	476	3.3
광주 Gwangju	1,092	221	1,313	927	24	469	2.3
대전 Daejeon	1,012	249	1,261	854	18	434	2.3
울산 Ulsan	909	85	994	901	9	357	2.5
경기 Gyeonggi	5,704	1,190	6,894	621	99	2,144	2.7
강원 Gangwon	967	304	1,271	839	20	367	2.6
충북 Chungbuk	512	71	583	386	20	213	2.4
충남 Chungnam	910	130	1,040	520	20	357	2.5
전북 Jeonbuk	931	187	1,118	594	13	325	2.9
전남 Jeonnam	985	89	1,074	549	21	400	2.5
경북 Gyeongbuk	1,187	213	1,400	515	28	428	2.8
경남 Gyeongnam	1,611	256	1,867	582	31	572	2.8
제주 Jeju	449	100	549	977	8	144	3.1
Total	29,031	7,990	37,021	746	505	10,599	2.7

생활권역별 투석기 및 투석환자 분포

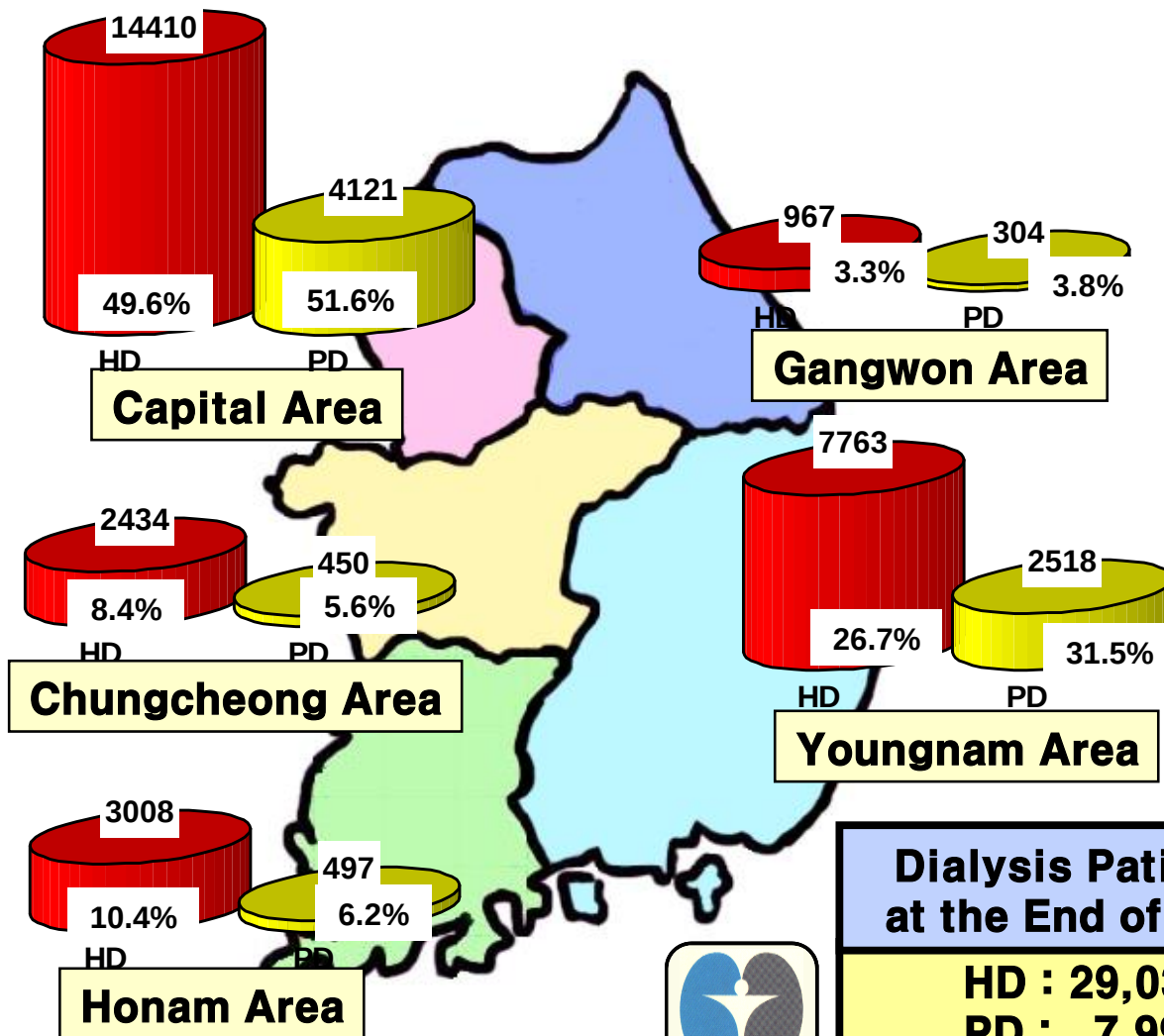
(2006년 12월 말 기준)

	Population (%)	HD patients	PD patients	Total Dialysis patients	Dialysis pts / Million pop.	Dialysis centers	Dialysis machine	HD pts / HD machine
수도권 (Capital area)	24,126,887	14,410	4,121	18,531	768	230	5,111	2.8
(Seoul, Incheon, Gyeonggi)	48.6%	49.6%	51.6%	50.1%		45.5%	48.2%	
충청권 (Chungchung)	4,988,690	2,434	450	2,884	578	58	1,004	2.4
(Daejeon, Chungnam, Chungbuk)	10.1%	8.4%	5.6%	7.8%		11.5%	9.5%	
호남권 (Honam)	5,252,621	3,008	497	3,505	667	58	1,194	2.5
(Gwangju, Jeonnam, Jeonbuk)	10.6%	10.4%	6.2%	9.5%		11.5%	11.3%	
영남권 (Youngnam)	13,178,704	7,763	2,518	10,281	780	131	2,779	2.8
(Busan, Daegu, Gyeongnam, Gyeongbuk, Ulsan)	26.6%	26.7%	31.5%	27.8%		25.9%	26.2%	
강원권 (Gangwon)	1,515,672	967	304	1,271	839	20	367	2.6
	3.1%	3.3%	3.8%	3.4%		4.0%	3.5%	
Total	49,624,269	29,031	7,990	37,021	746	505	10,599	2.7

생활권역별 투석환자 분포

Part 3. Regional Dist

(전국 비율 %, 2006년 12월 말 기준)



**Dialysis Patients
at the End of 2006**

HD : 29,031

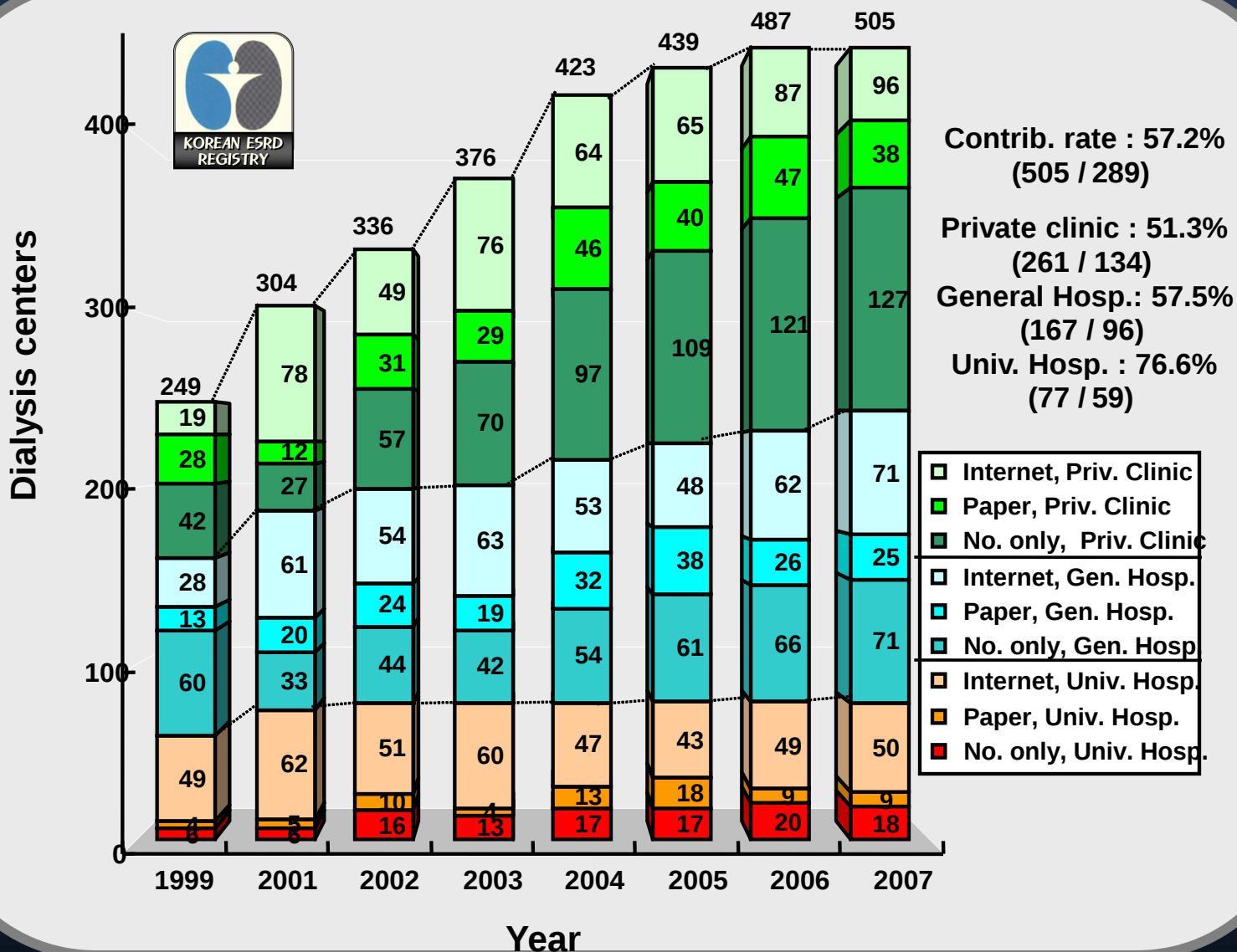
PD : 7,990

Total : 37,021

등록사업에 참여한 의료기관 수 및 응답률

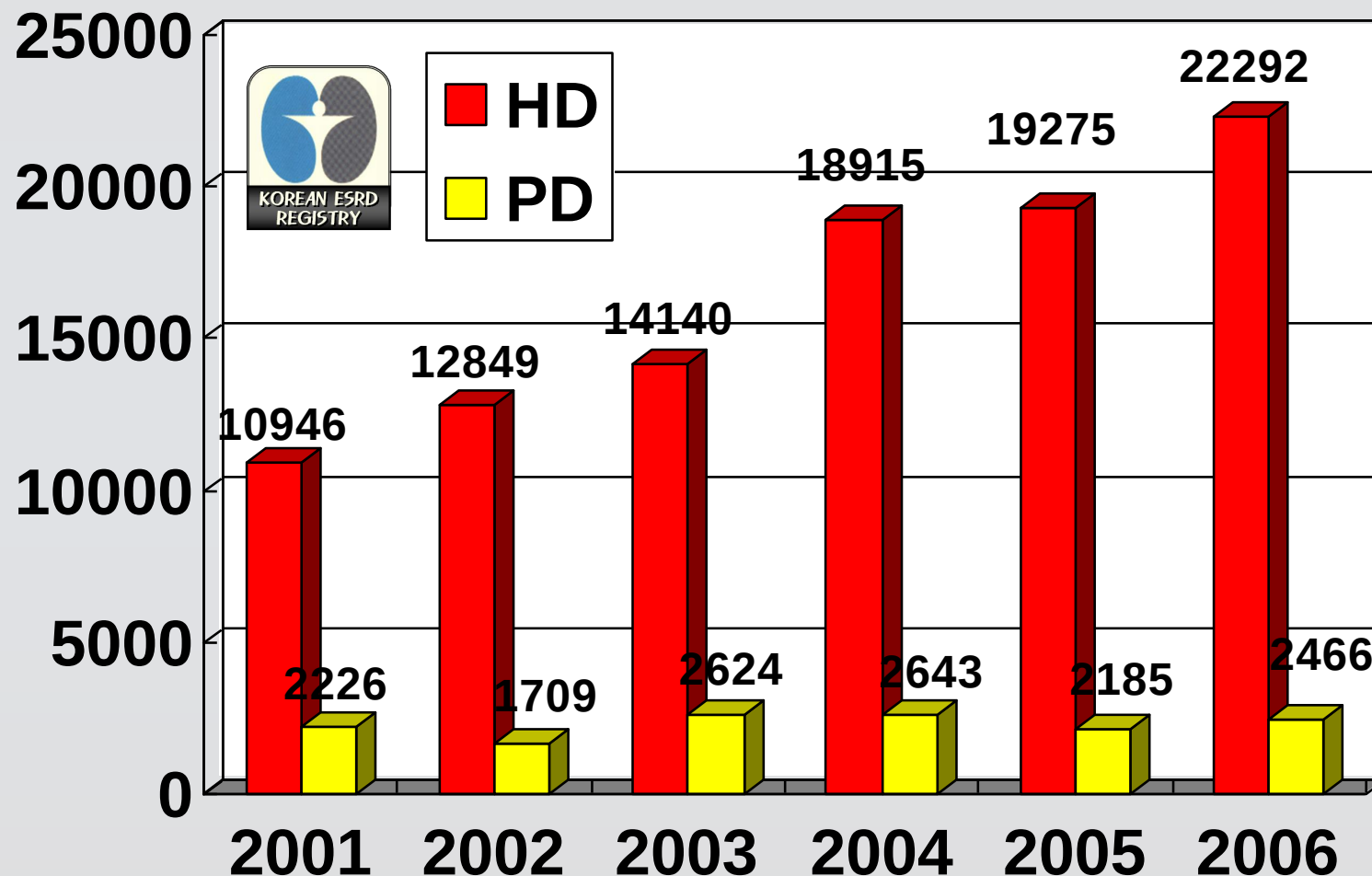
	Dialysis centers	Internet Input	Paper data	Total contributed center	Contributing rate (%)
서울 Seoul	112	46	17	63	56.3
부산 Busan	35	17	5	22	62.9
대구 Daegu	28	14	2	16	57.1
인천 Incheon	19	8	1	9	47.4
광주 Gwangju	24	11	3	14	58.3
대전 Daejeon	18	10	1	11	61.1
울산 Ulsan	9	4	2	6	66.7
경기 Gyeonggi	99	38	16	54	54.5
강원 Gangwon	20	10	3	13	65.0
충북 Chungbuk	20	7	7	14	70.0
충남 Chungnam	20	5	2	7	35.0
전북 Jeonbuk	13	8	1	9	69.2
전남 Jeonnam	21	11	2	13	61.9
경북 Gyeongbuk	28	13	7	20	71.4
경남 Gyeongnam	31	11	2	13	41.9
제주 Jeju	8	4	1	5	62.5
Total	505	217	72	289	57.2

의료기관 증가와 의료기관별 등록률 추이



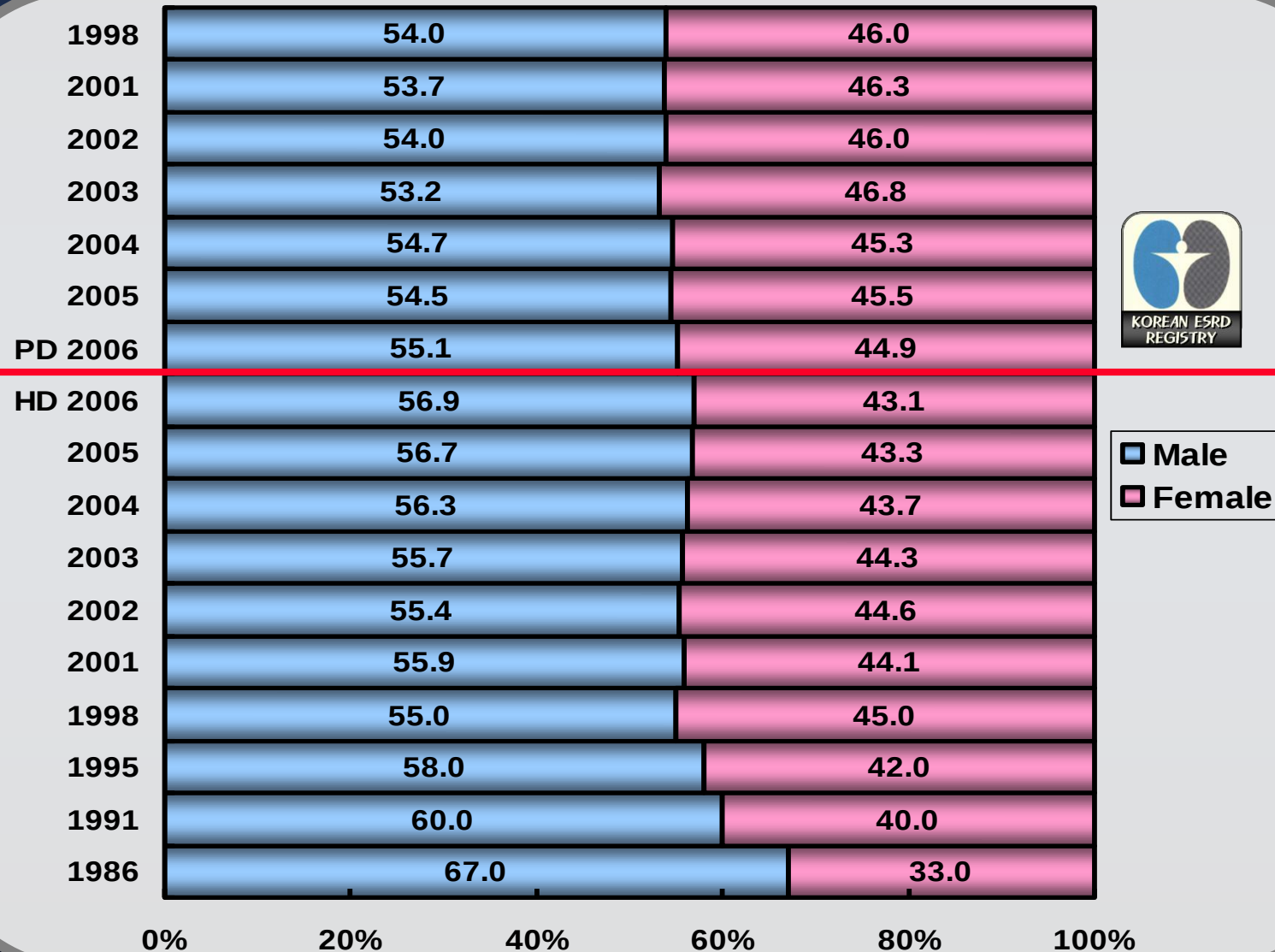


Registered Record Number to Database

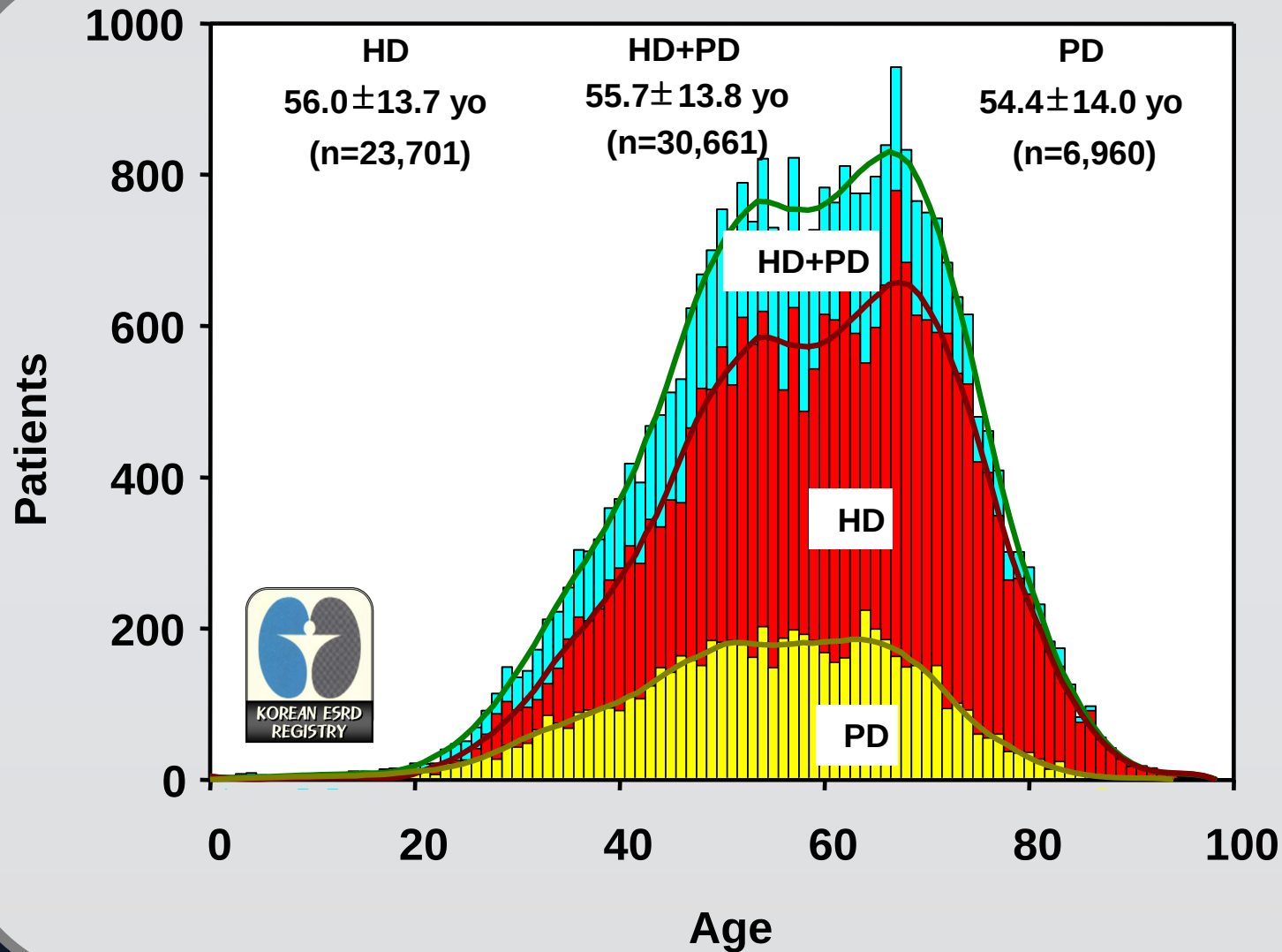




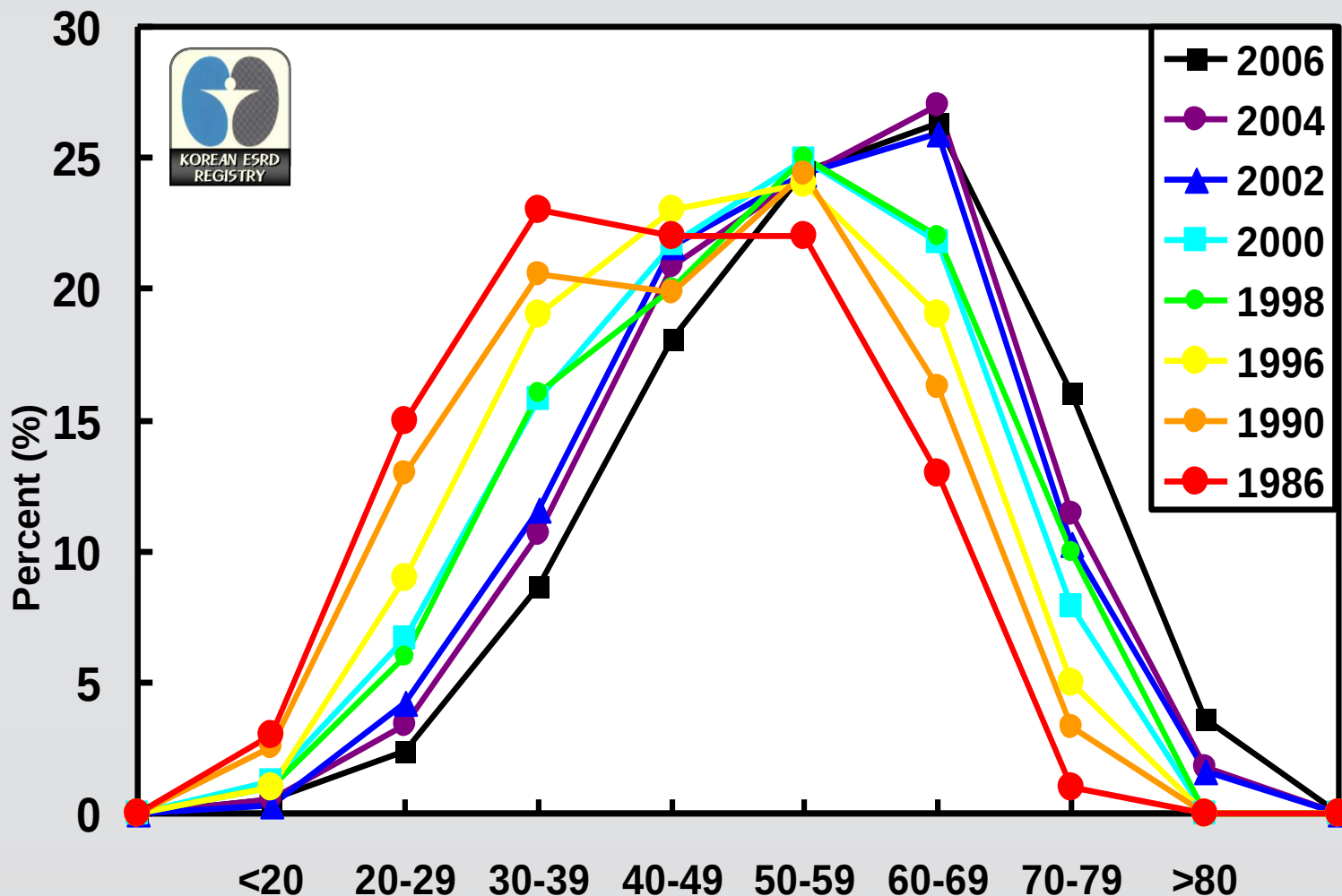
Sex Ratio of HD & PD Pts



Age Distribution of Dialysis Pts

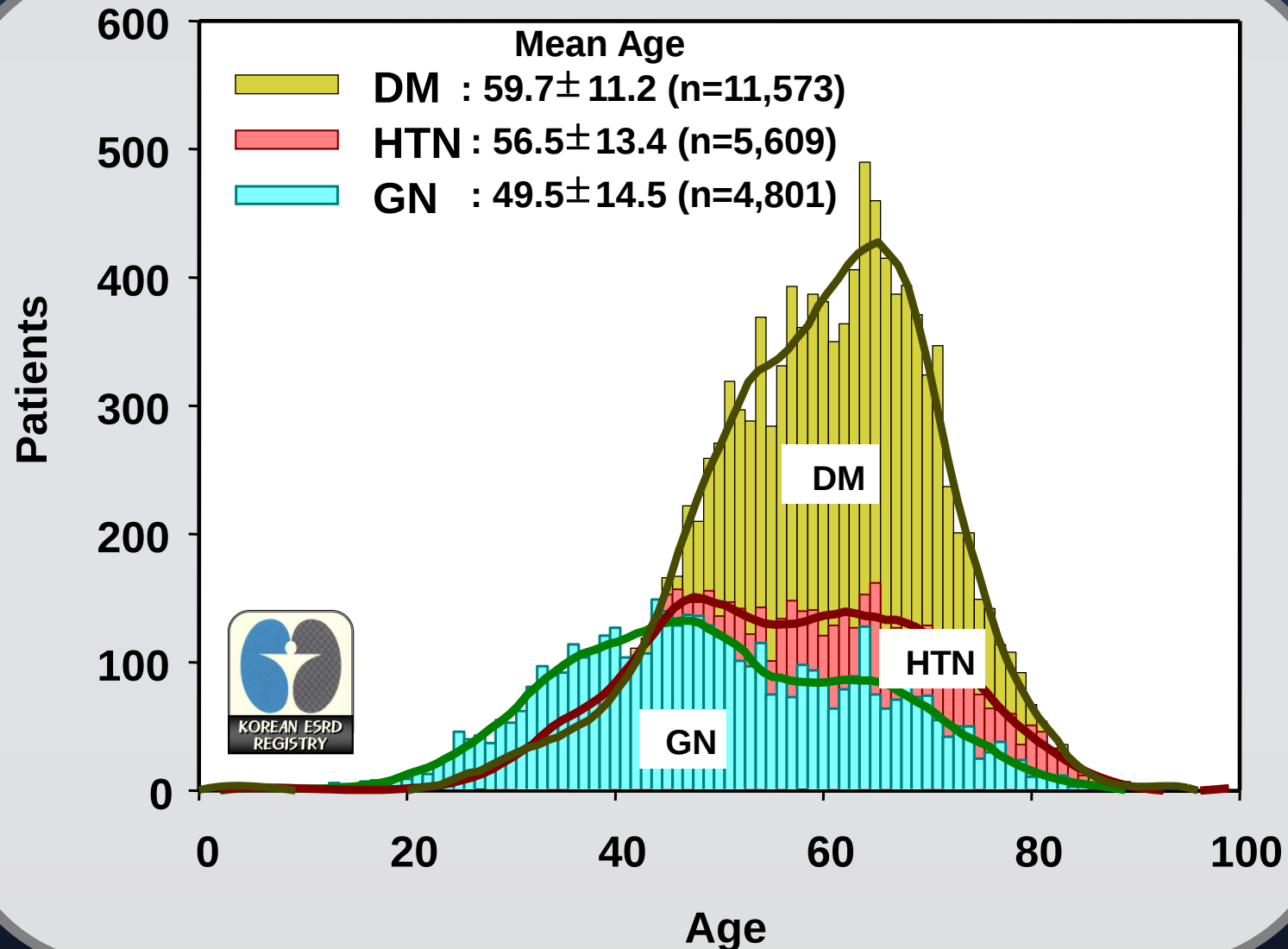


Age Distribution (%) of HD Pts According to Years

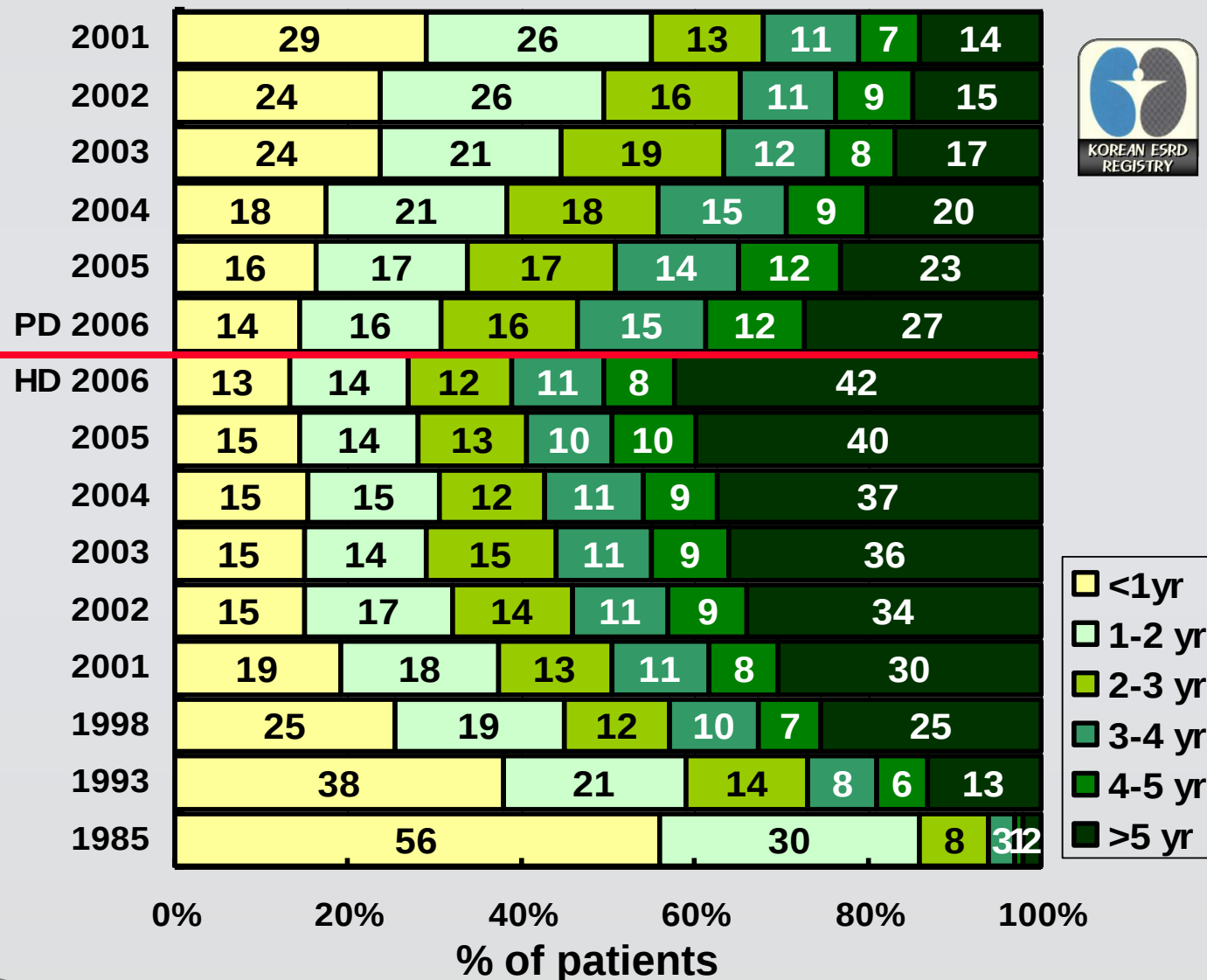




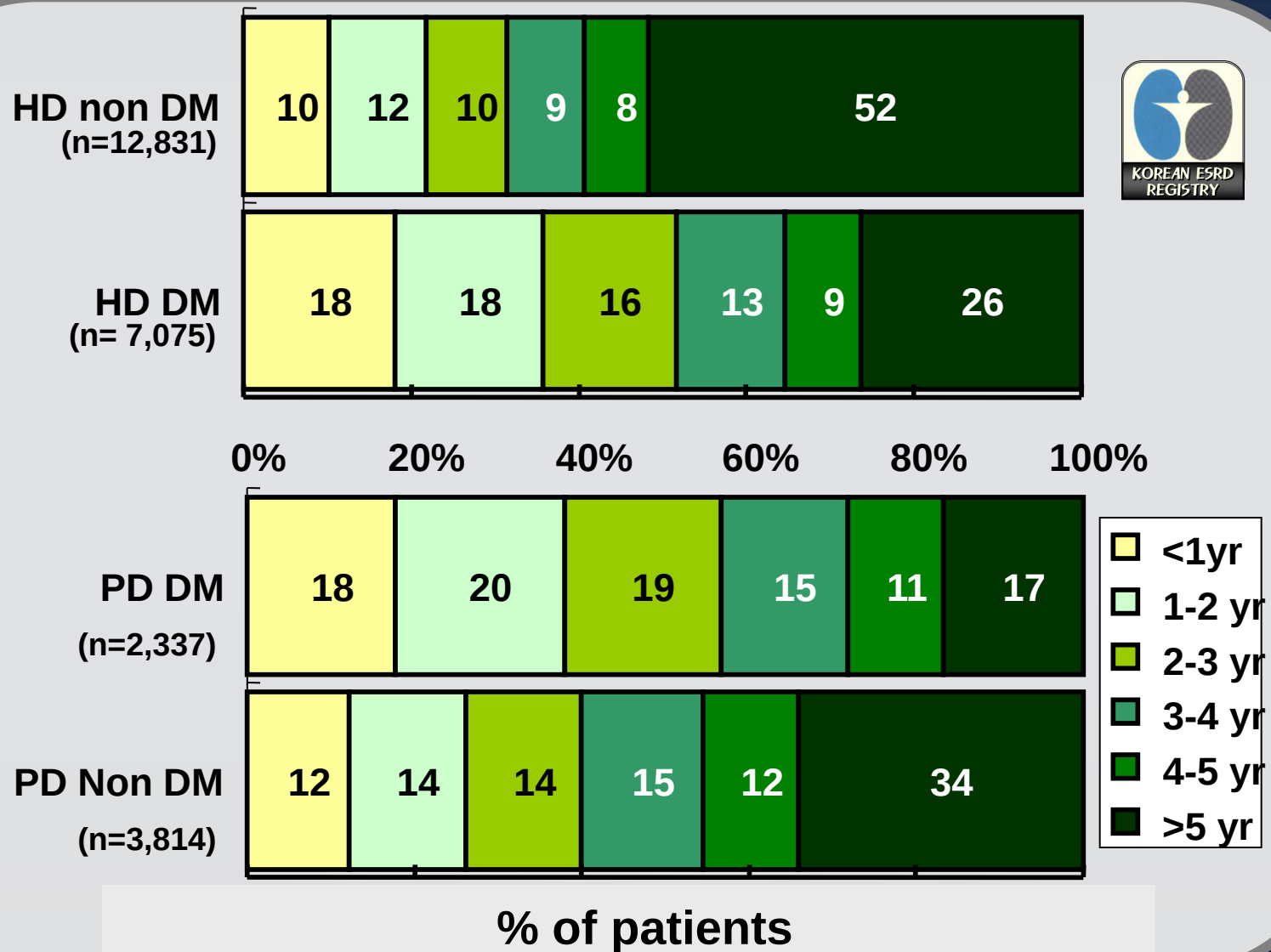
Age Distribution According to ESRD Causes



Duration of Dialysis Maintenance

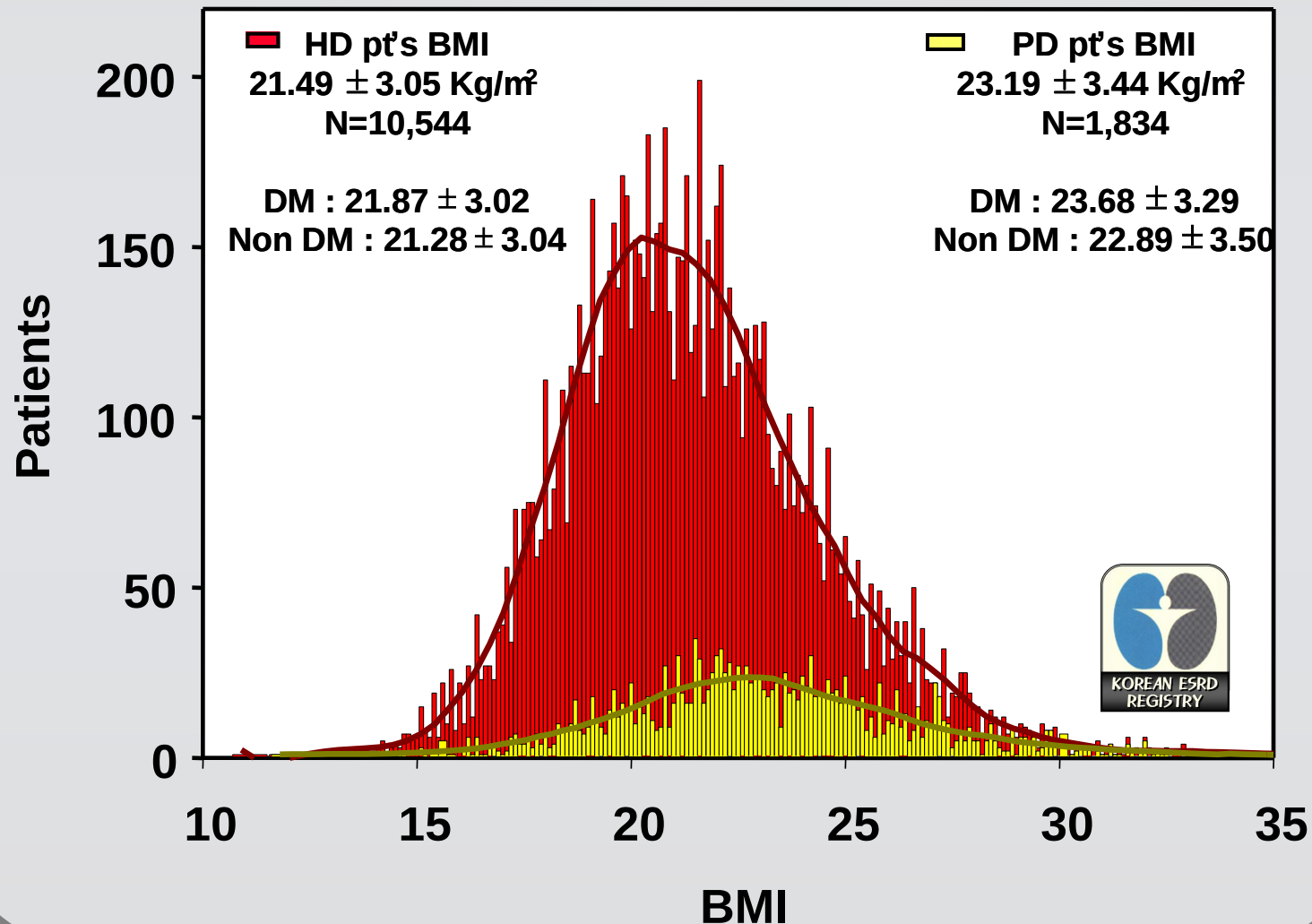


Duration of Dialysis : DM vs Non-DM

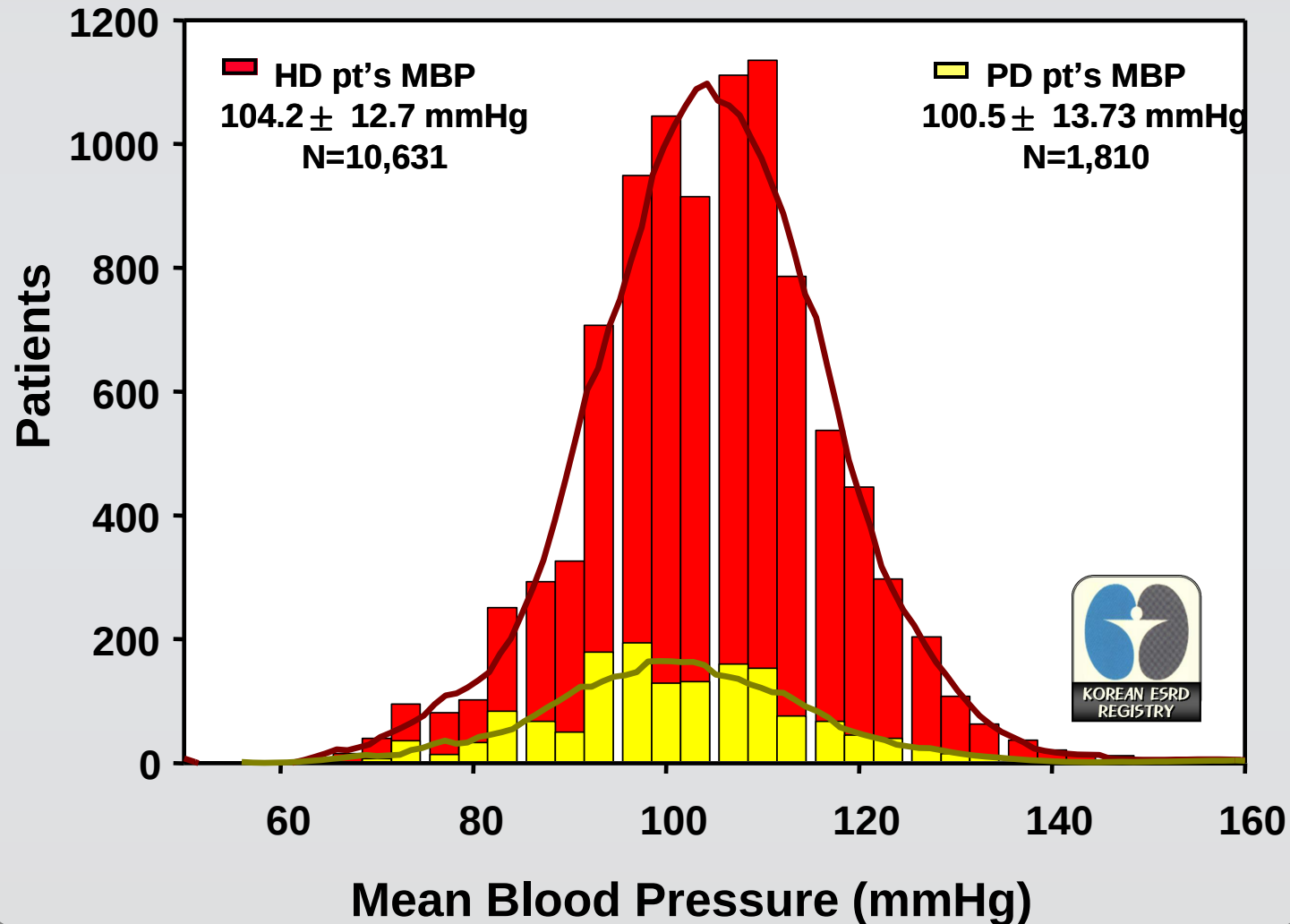




Body Mass Index

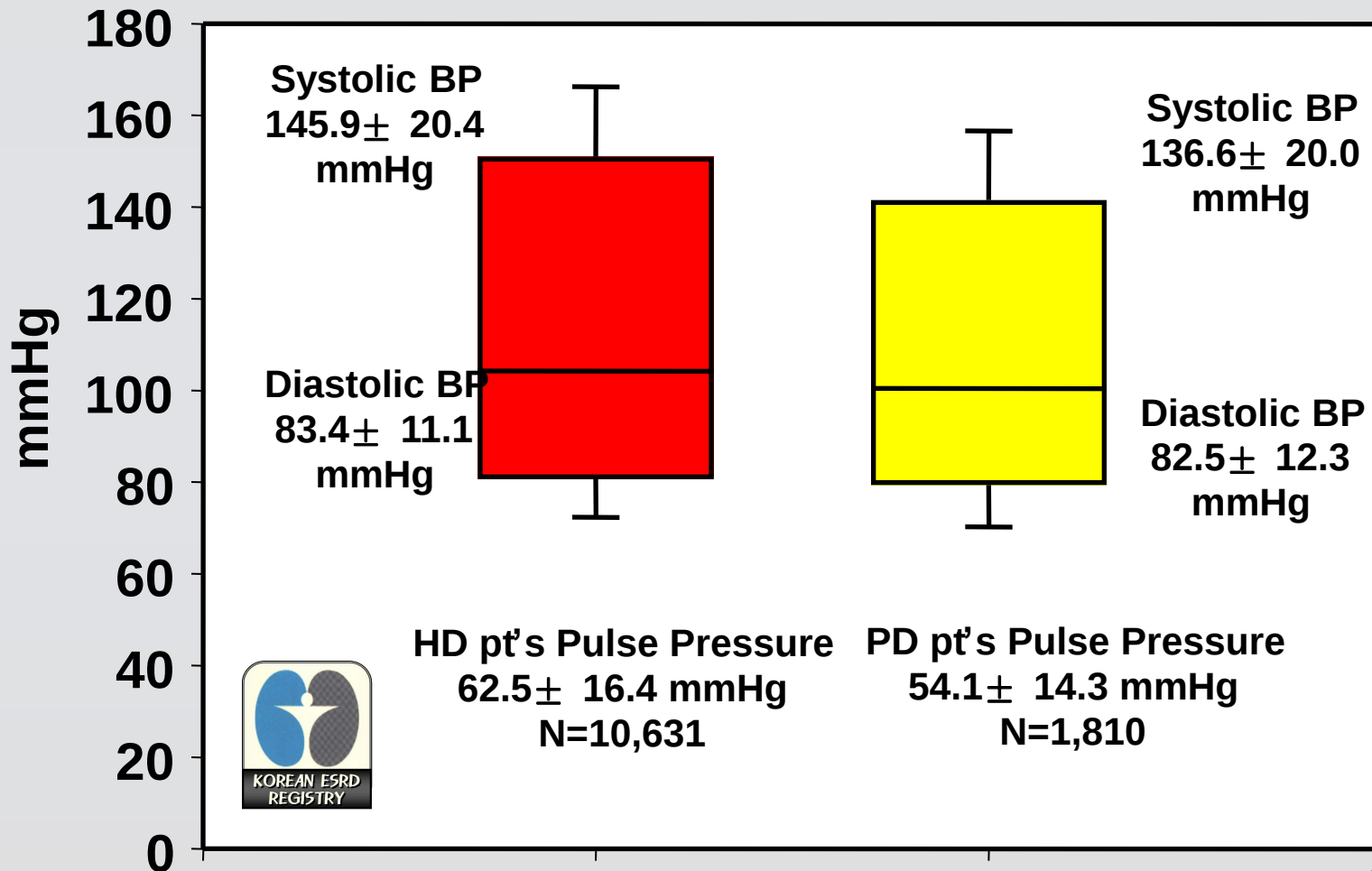


Mean Blood Pressure



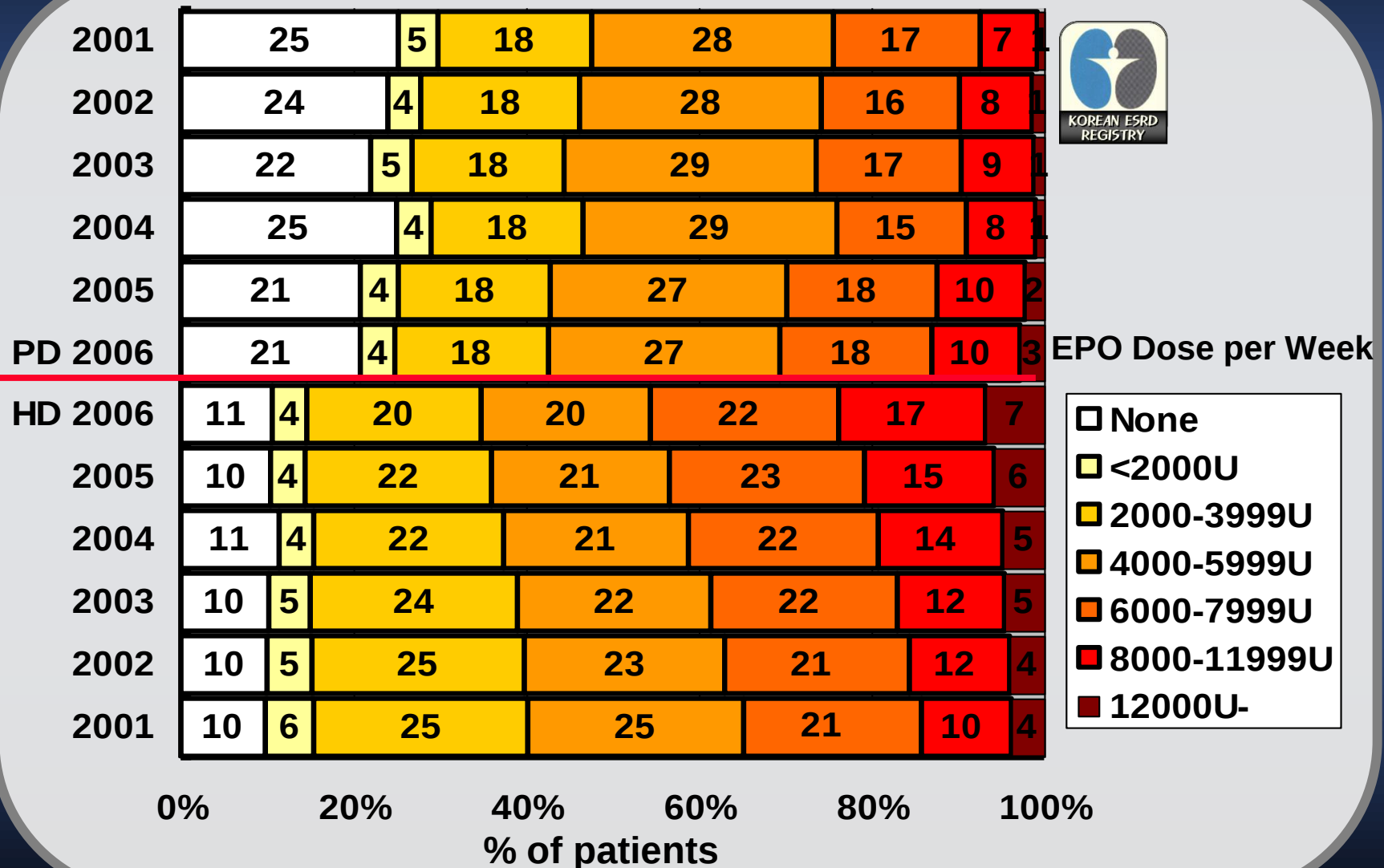


Pulse Pressure

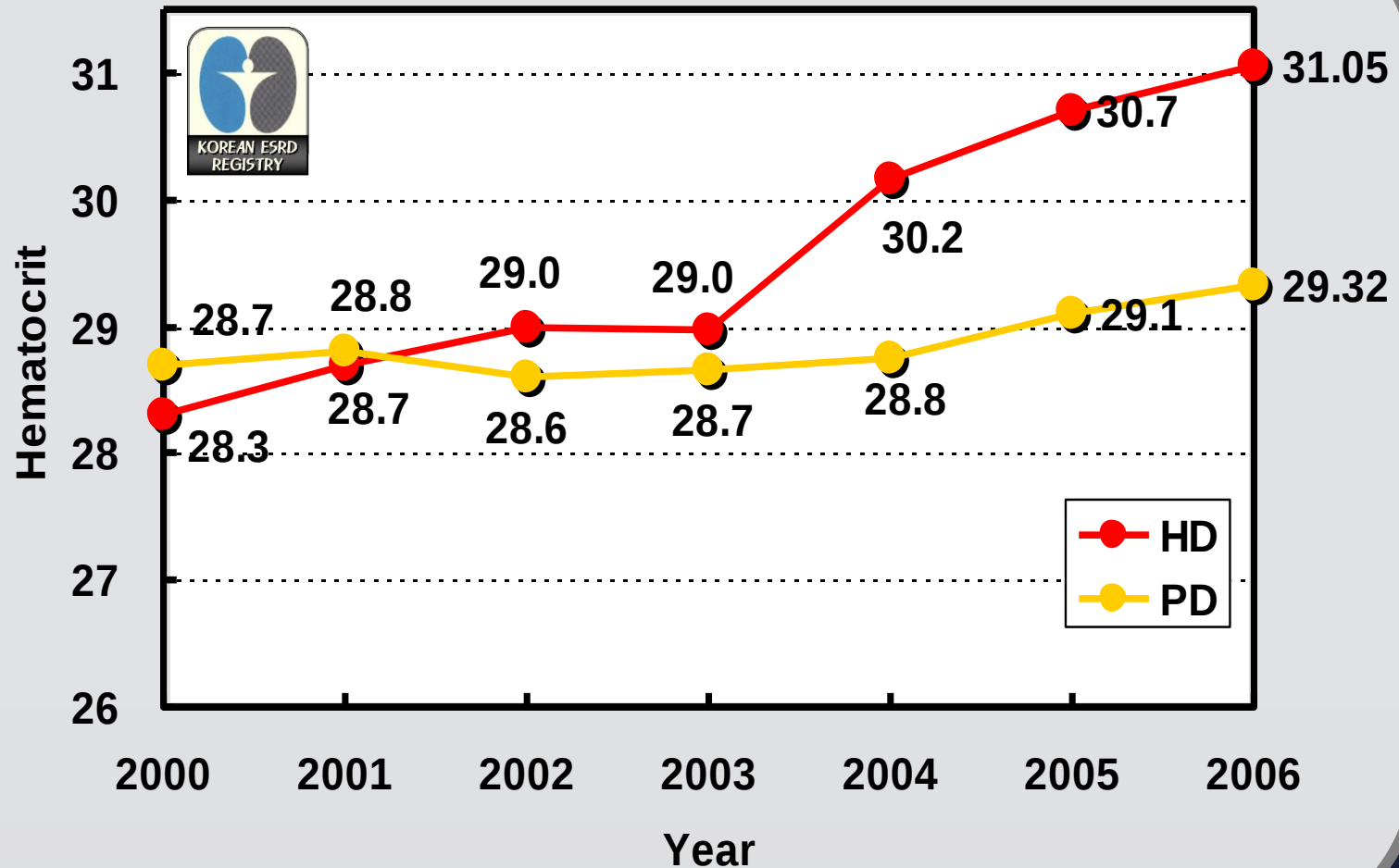




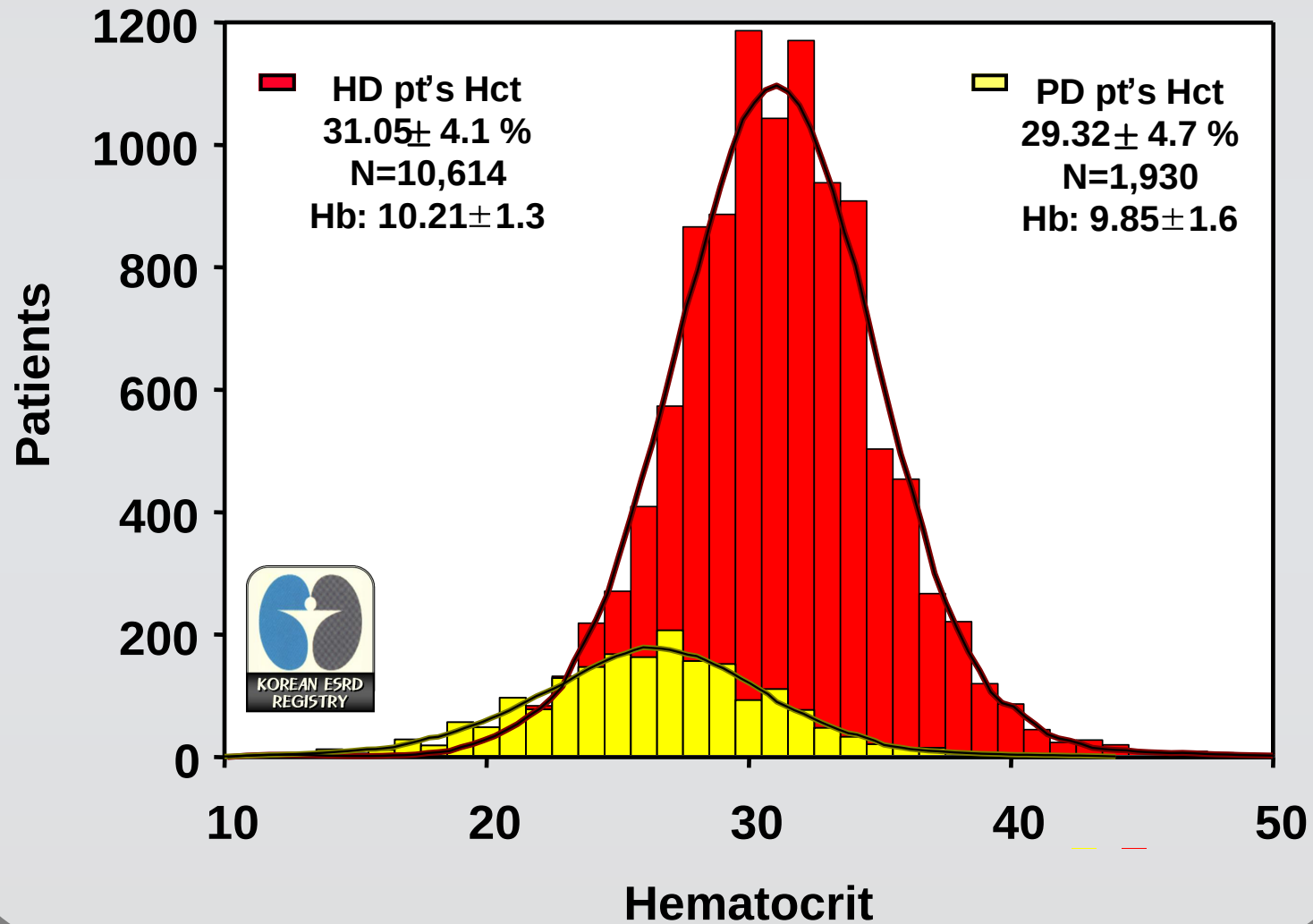
Erythropoietin Doses



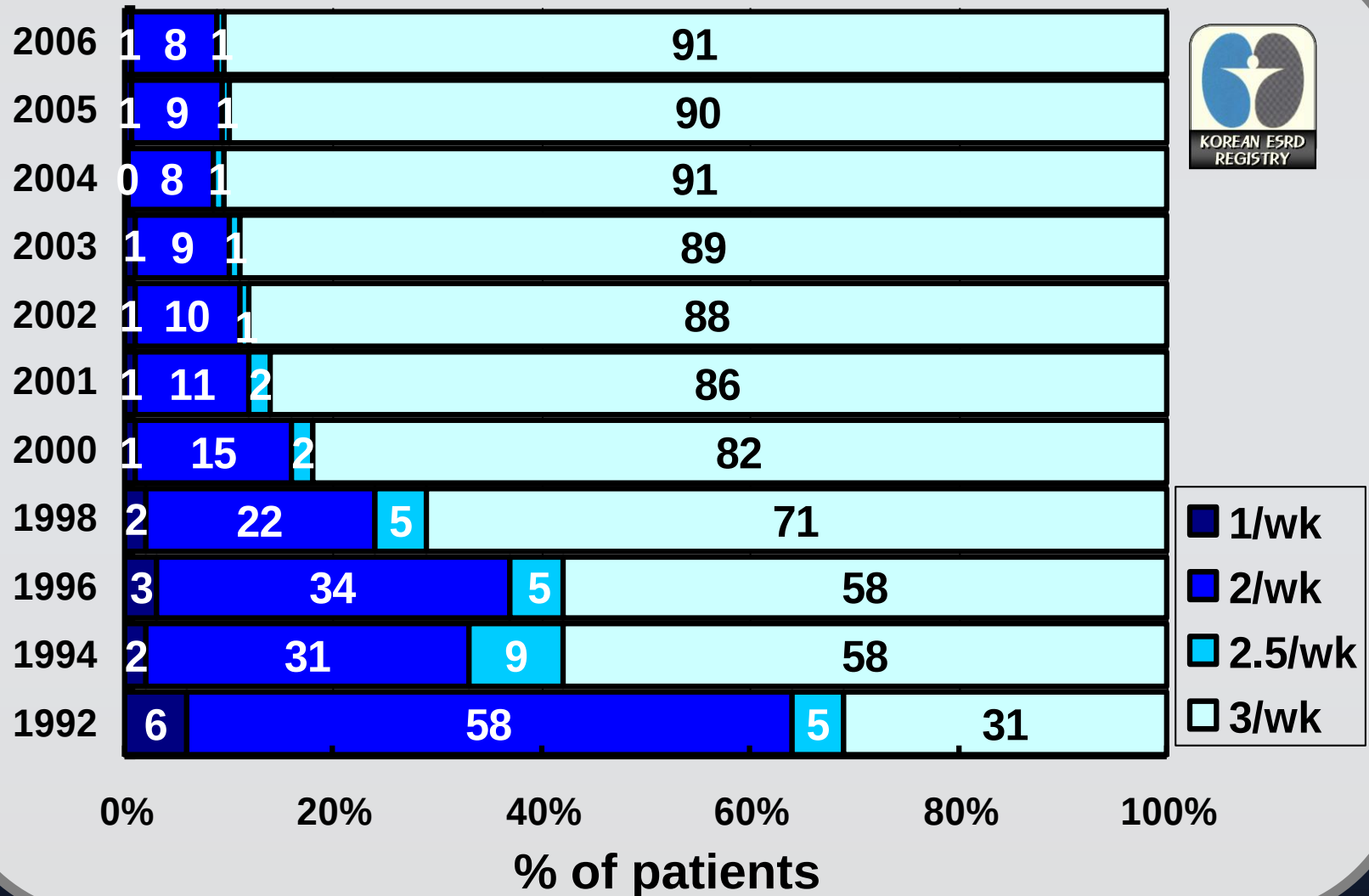
Changes of Hematocrit



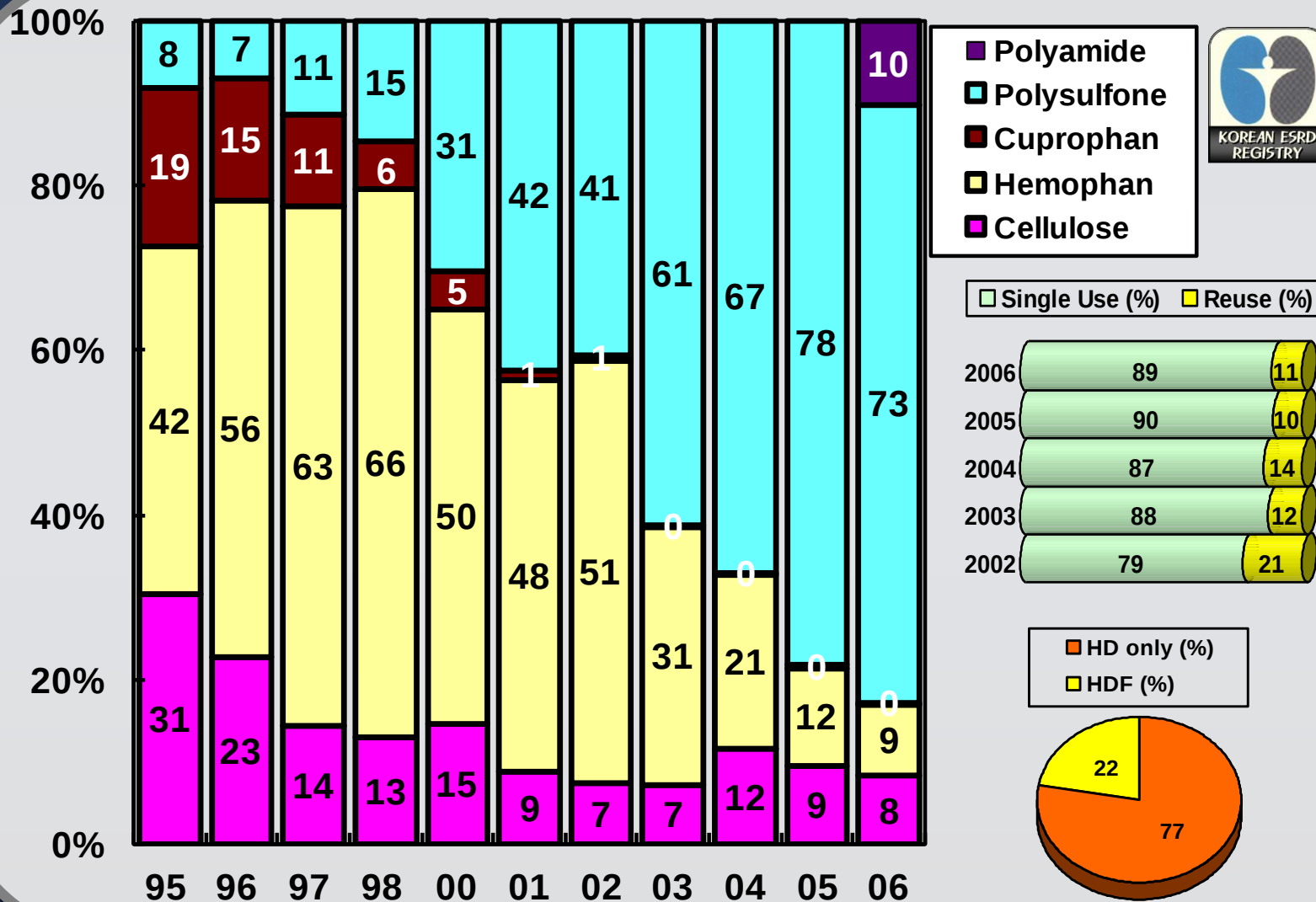
Hematocrit



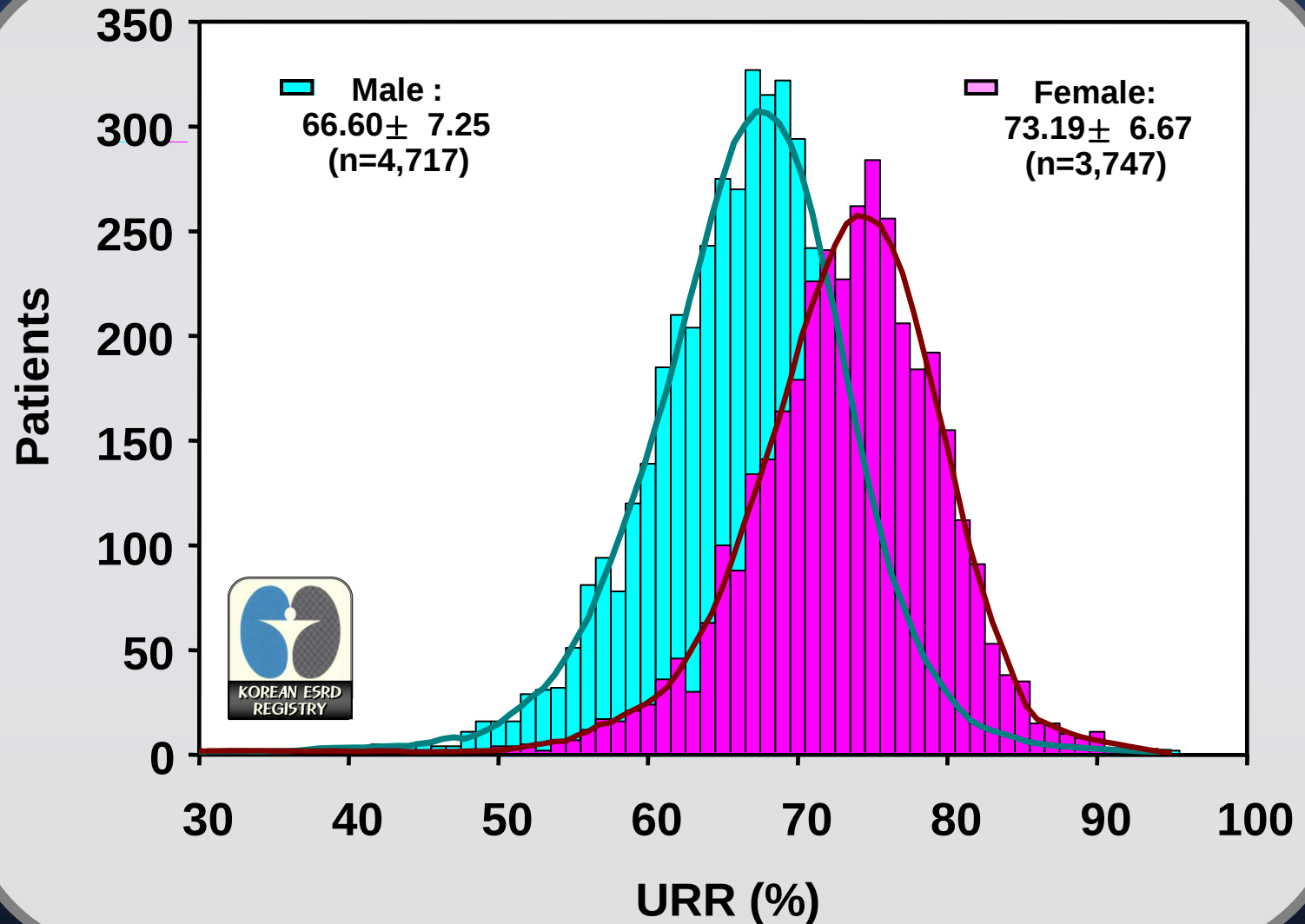
Frequency of HD per Week



HD Membranes

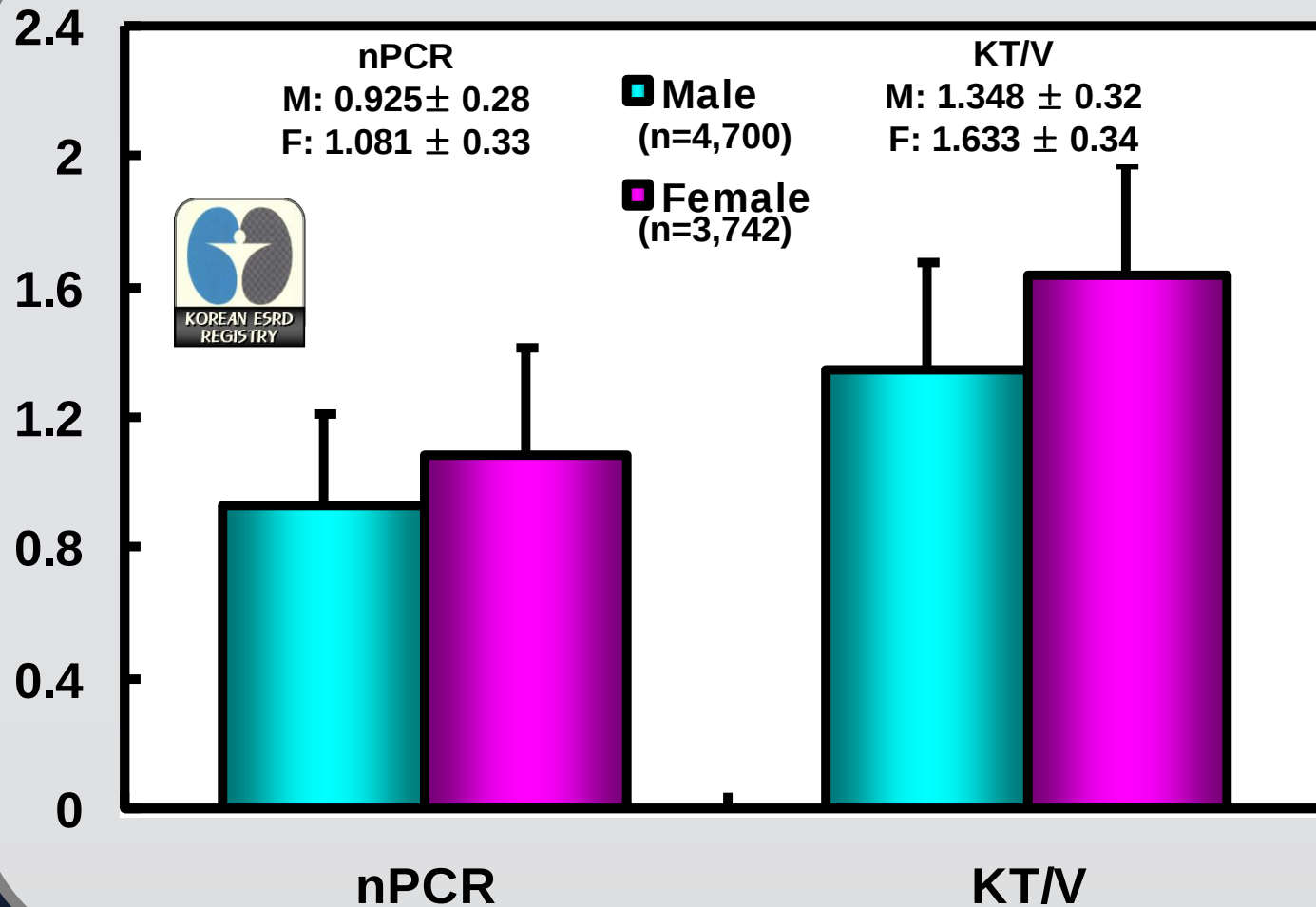


Urea Reduction Ratio of HD Pts



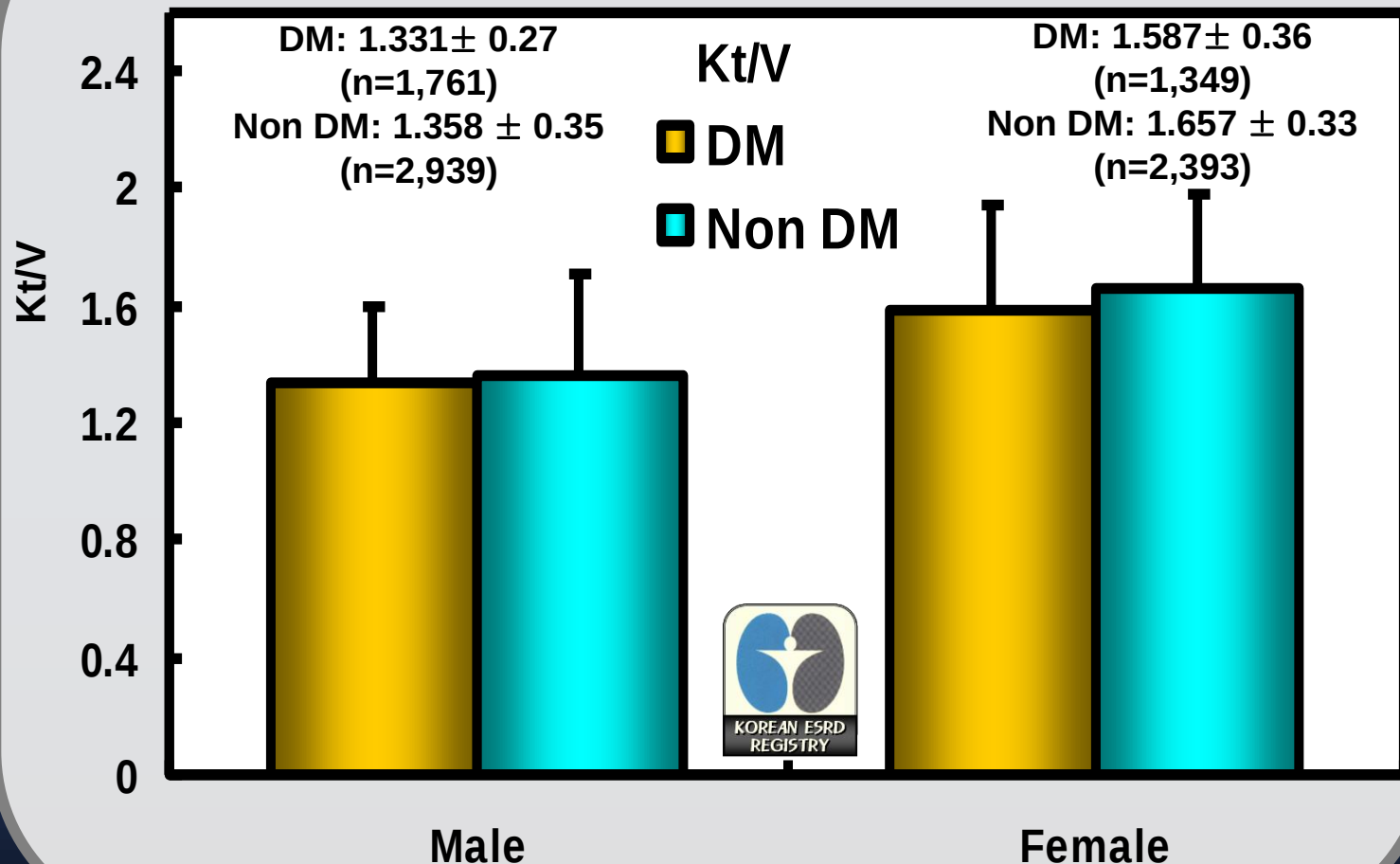


HD Adequacy

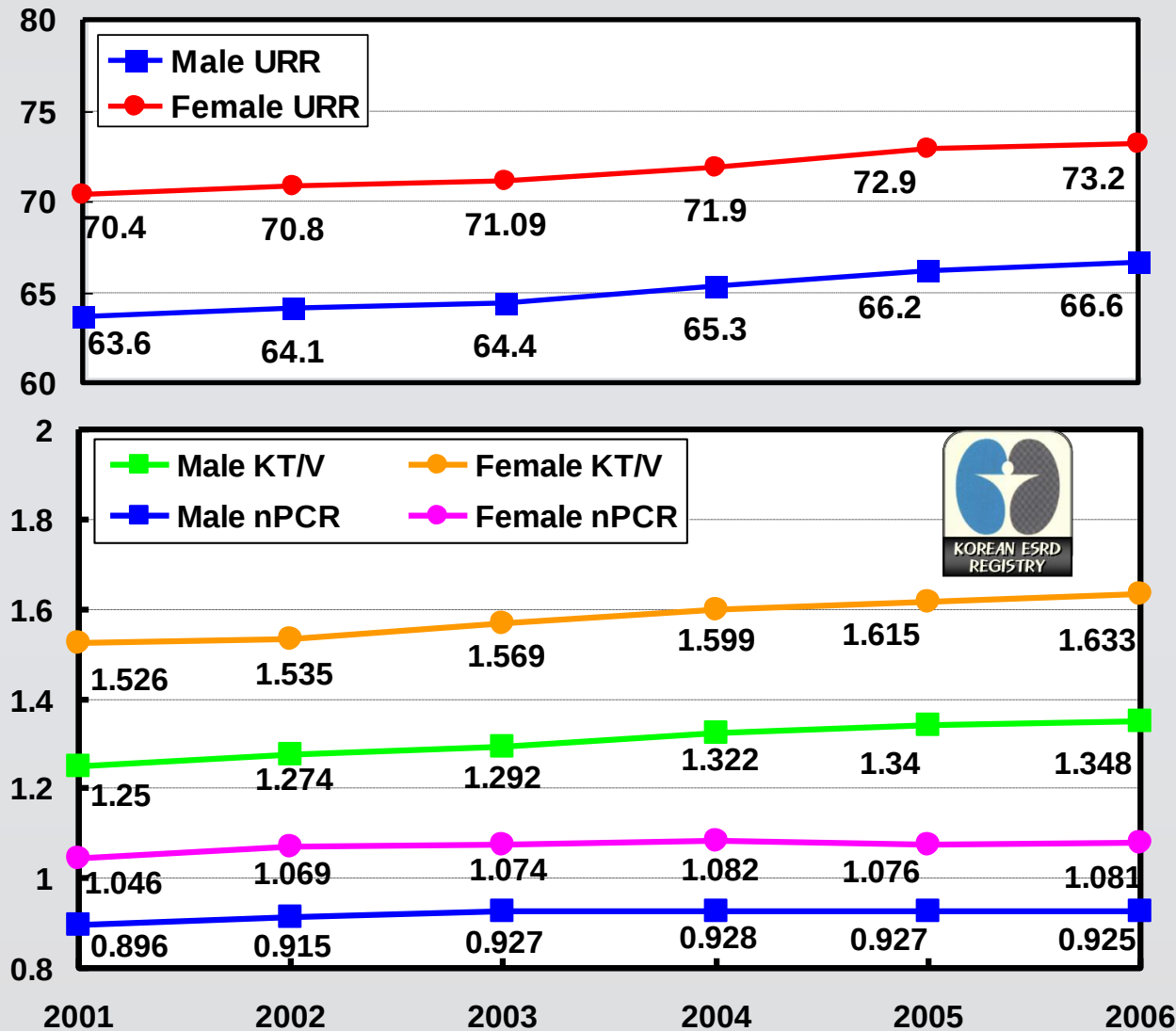




HD Adequacy : DM vs Non-DM

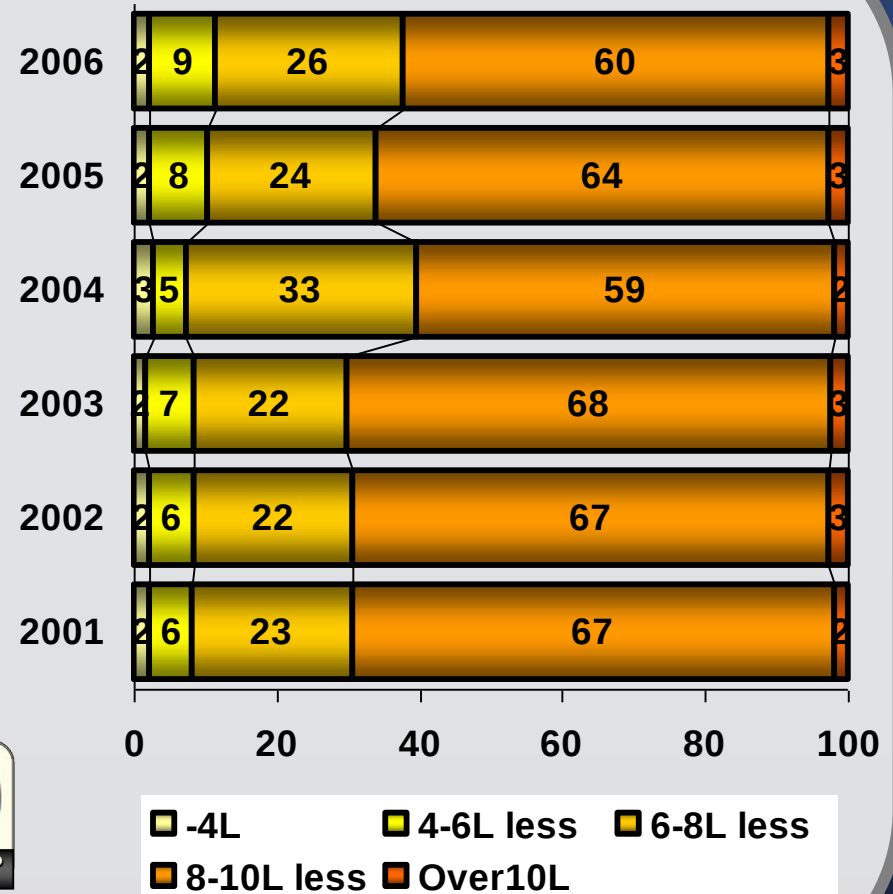
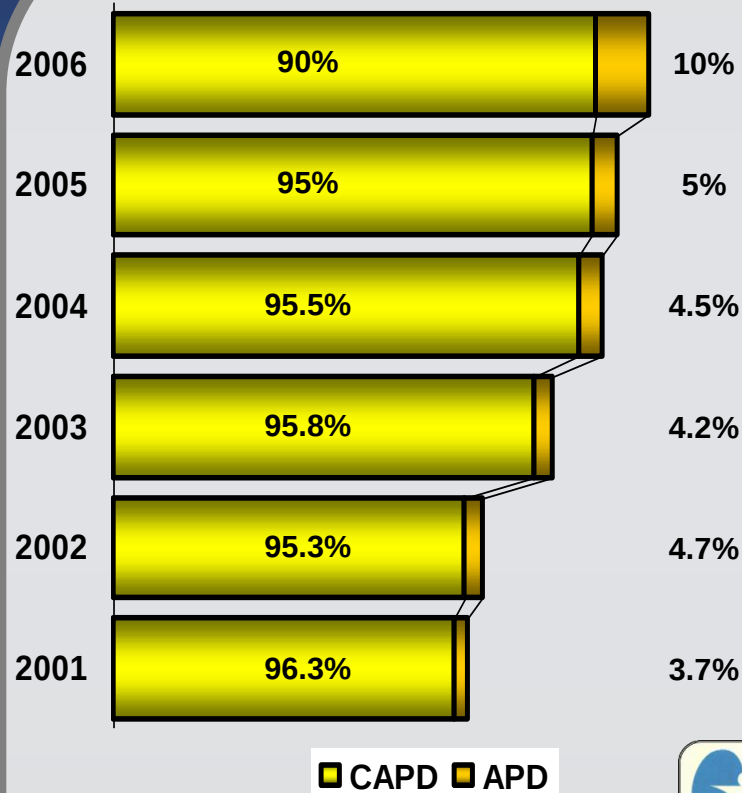


Changes of HD Adequacy





PD Type & Doses





Complications of Dialysis Pts

Complications		HD (%)	PD (%)
Cardiac	Coronary Artery Disease Congestive Heart Failure Pericardial Effusion Arrhythmia	15.6	16.3
Vascular	Cerebrovascular accident Hypertension Other vascular disease	47.3	51.5
Infection	Pneumonia Tuberculosis Peritonitis Herpes zoster Other Infection	5.5	11.6
Liver disease	Hepatitis B Hepatitis C Congestive Liver Hemochromatosis Other liver diseases	9.7	4.6
Gastrointestinal	Gastric Ulcer Duodenal Ulcer Other Gastrointestinal Diseases	9.6	5.7
Miscellaneous	Malnutrition (Alb<2.5g/dl) Malignancy Hypertensive Retinopathy Uremic Dermatitis Uremic Neuritis Uremic Dementia Uremic Ascites / Pleural Effusion Osteodystrophy	12.4	10.2

* Number of patients: Hemodialysis =7,008, Peritoneal dialysis=1,582.

Causes of death (%), 1994-2006

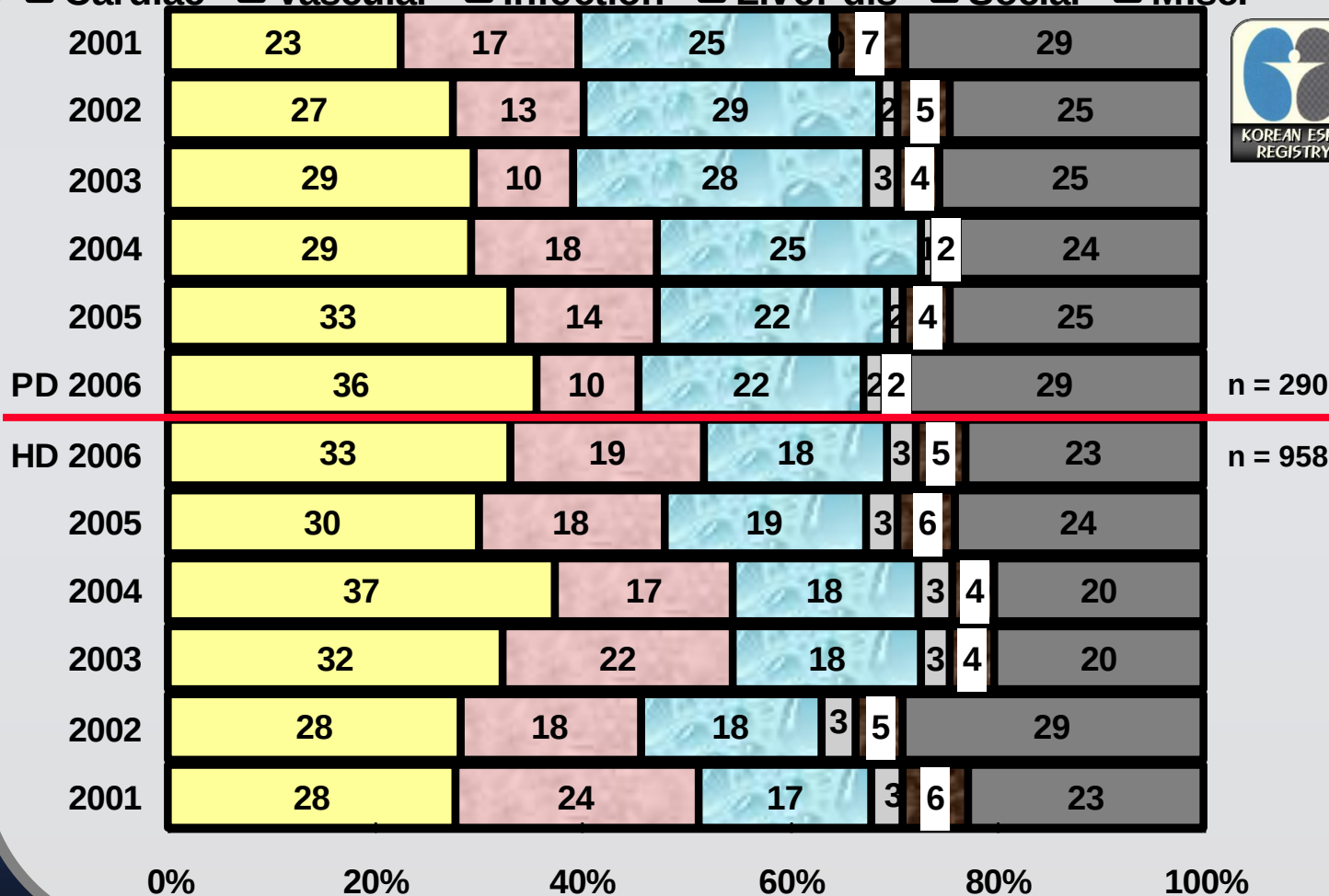


Causes	1994-1996	1997	1998	1999-2000	2001	2002	2003	2004	2005	2006
Cardiac	27.4	31.8	33.3	38.0	26.9	27.9	31.7	35.5	30.7	33.7
Myocardial infarction	6.4	4.7	6.6	7.8	7.7	5.5	7.4	8.3	8.0	9.1
Hyperkalemia	13.7	15.3	17.5	19.0	11.2	10.6	11.7	13.6	10.4	11.1
Cardiac arrest, other cause	7.2	11.8	8.1	11.2	8.1	11.8	12.5	13.6	12.4	13.5
Vascular	17.2	23.5	18.5	15.6	22.7	15.7	19.5	17.5	17.0	16.5
Cerebrovascular accident	14.3	18.8	16.6	11.5	15.1	11.6	14.5	12.8	12.3	11.5
Pulmonary embolus	0.2	0.0	0.1	0.7	0.5	0.4	0.1	0.2	0.6	0.7
Gastrointestinal hemorrhage	1.7	4.7	2.1	1.4	2.7	1.9	3.2	2.0	1.7	1.8
Gastrointestinal embolism	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.4	0.5	0.5
Other vascular disease	0.9	0.0	0.9	2.0	4.3	1.7	1.6	2.1	1.9	2.0
Infection	13.5	14.2	18.1	17.3	17.8	21.6	20.5	19.5	20.1	18.8
Pulmonary infection	2.5	2.4	3.4	2.0	4.5	4.9	3.6	3.7	4.5	4.2
Septicemia	6.6	4.7	10.8	8.1	6.9	9.2	9.7	9.4	9.6	8.9
Tuberculosis	0.3	1.2	0.8	0.7	0.8	0.5	0.2	0.1	0.3	0.1
Peritonitis	2.1	3.5	2.5	1.4	1.1	2.5	2.0	1.5	1.4	1.1
Other Infection	2.0	2.4	1.8	5.1	4.5	4.5	4.9	4.8	4.3	4.5
Liver disease	3.4	1.2	3.4	3.4	2.6	2.8	2.8	2.9	2.7	2.6
Liver failure due to hepatitis B	1.8	1.2	2.3	2.7	1.6	1.2	1.8	2.1	1.5	1.4
Liver failure due to other cause	1.6	0.0	1.3	0.7	1.0	1.6	1.0	0.9	1.2	1.1
Social	6.2	5.9	4.2	6.1	6.3	4.7	4.4	3.6	5.4	4.2
Patient refused further treatment	2.9	1.2	1.8	1.4	2.1	1.8	1.0	1.1	1.1	0.6
Suicide	2.5	3.5	0.9	0.3	3.3	1.9	2.3	2.0	3.3	3.0
Therapy ceased for other reason	0.8	1.2	1.9	4.4	0.9	1.0	1.0	0.5	1.0	0.6
Miscellaneous	32.0	23.5	19.7	19.7	23.7	27.4	21.3	21.0	24.0	24.2
Cachexia	2.9	7.1	3.3	8.1	8.1	6.8	6.6	6.1	4.0	3.9
Malignant disease	2.1	4.7	4.1	3.1	4.4	4.8	3.5	3.6	6.4	5.4
Accident	1.2	1.2	1.0	1.0	0.9	0.5	1.1	0.9	1.4	1.6
Uncertain	25.8	10.6	12.5	7.5	10.3	15.3	10.1	10.3	12.3	13.2

Number of patients : 1994-1996=981, 1997=81, 1998=911, 1999=911, 2000=306, 2001=761, 2002=1,256, 2003=894, 2004=1,162, 2005=1,280, 2006=1,248.

Death Causes, HD & PD

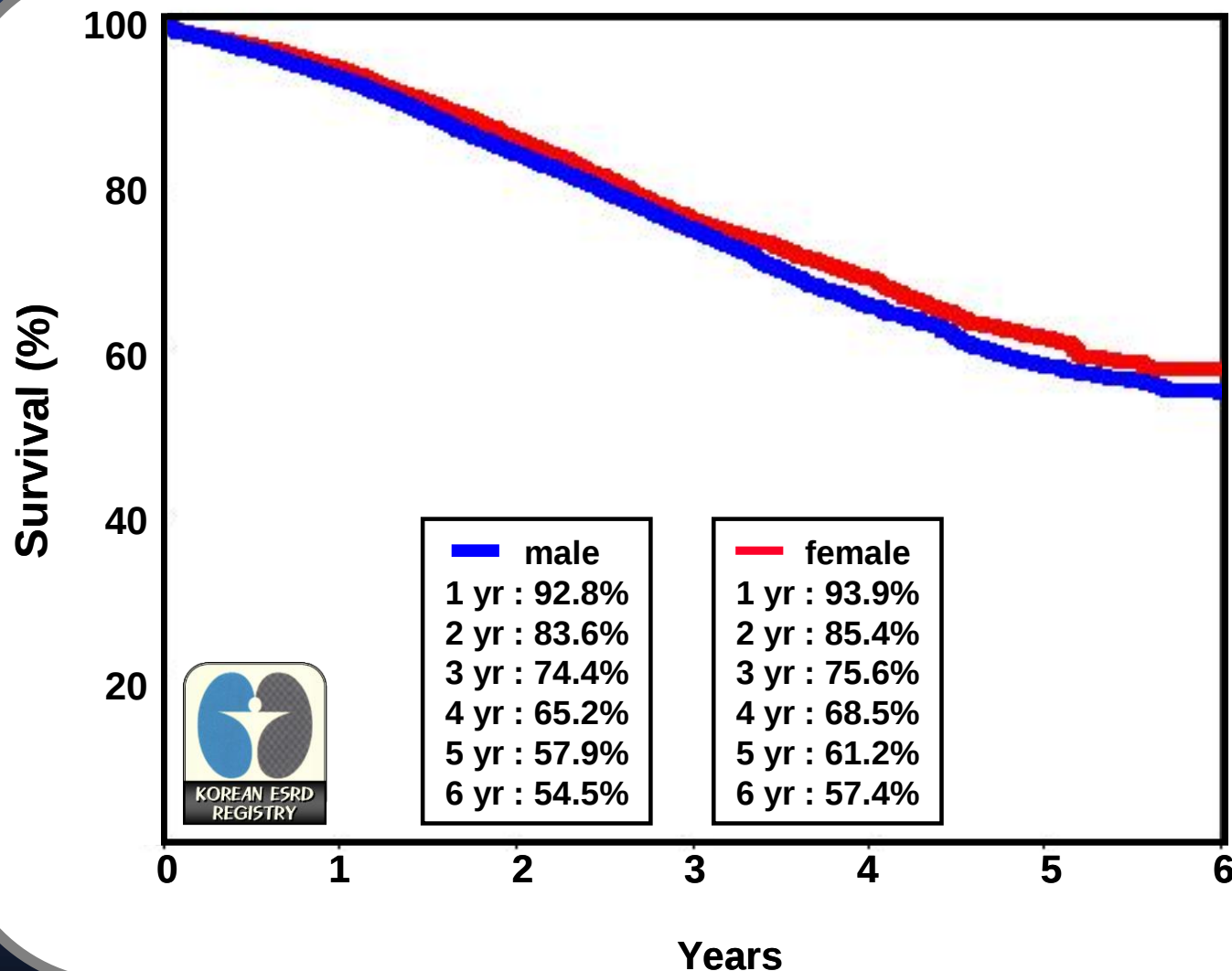
■ Cardiac ■ Vascular ■ Infection ■ Liver dis ■ Social ■ Misc.





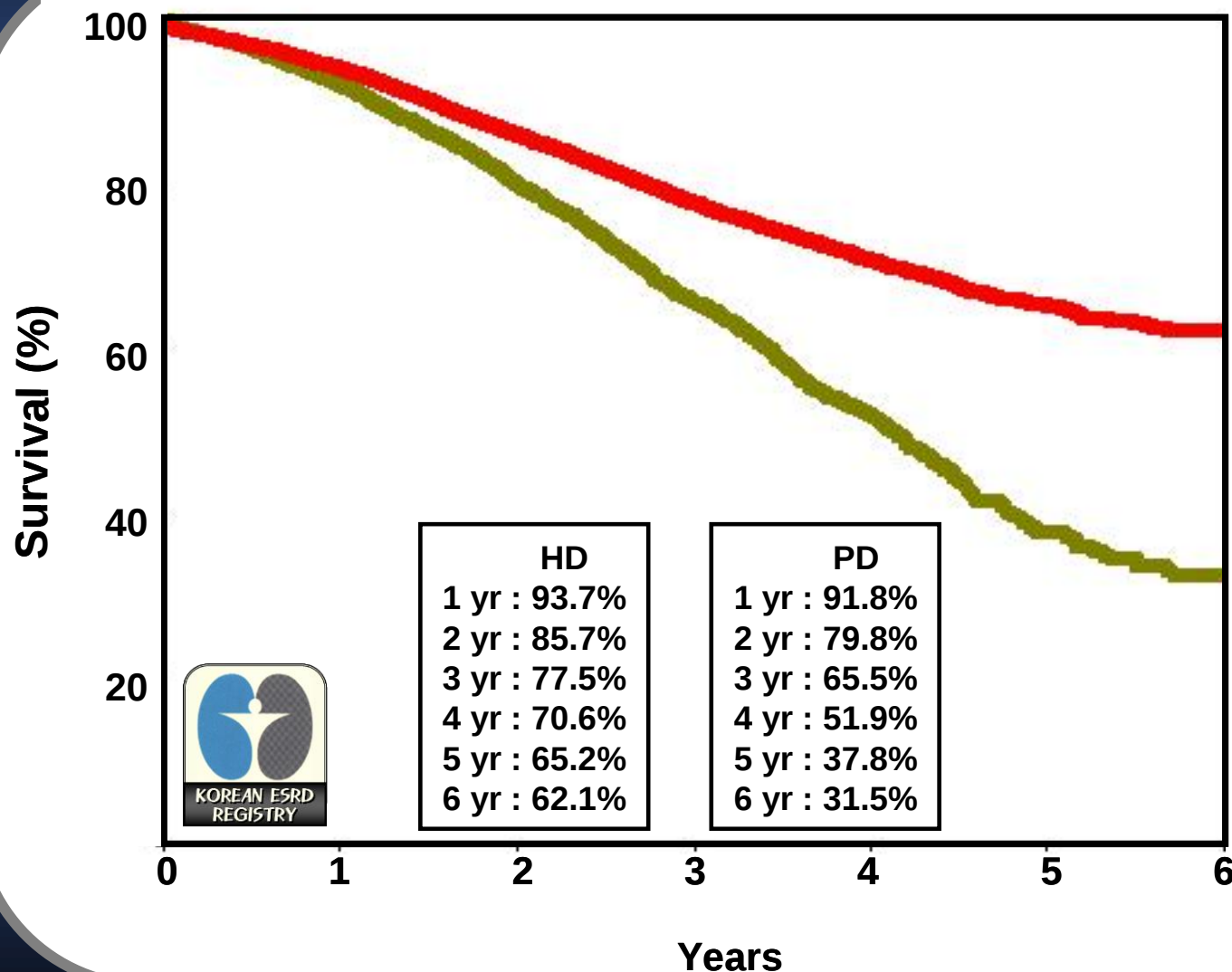
Overall Patient Survival

Registered dialysis patients since 2001



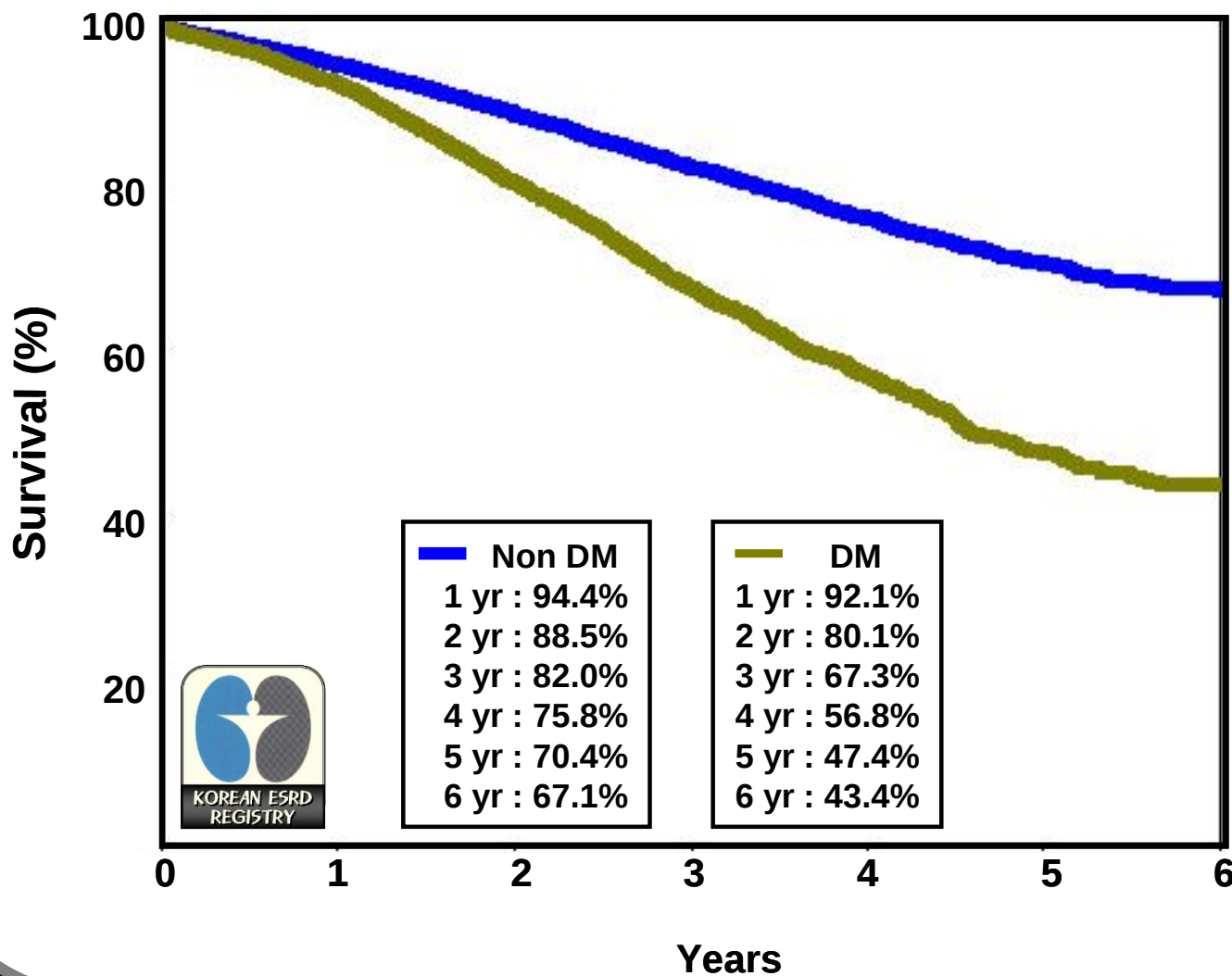
Patient Survival : HD vs PD

Registered dialysis patients since 2001



Patient Survival : DM vs Non-DM

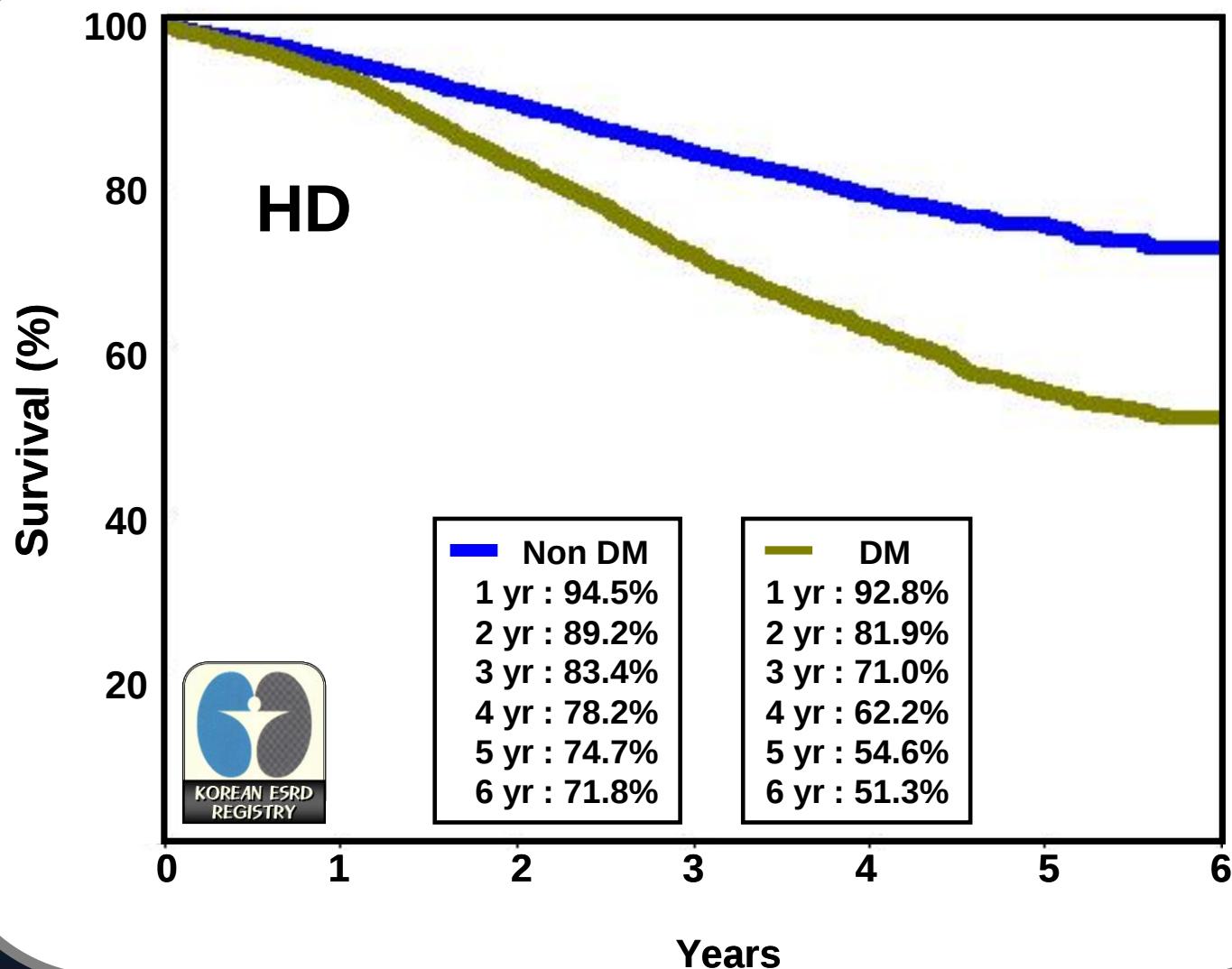
Registered dialysis patients since 2001





HD Pts Survival : DM vs Non-DM

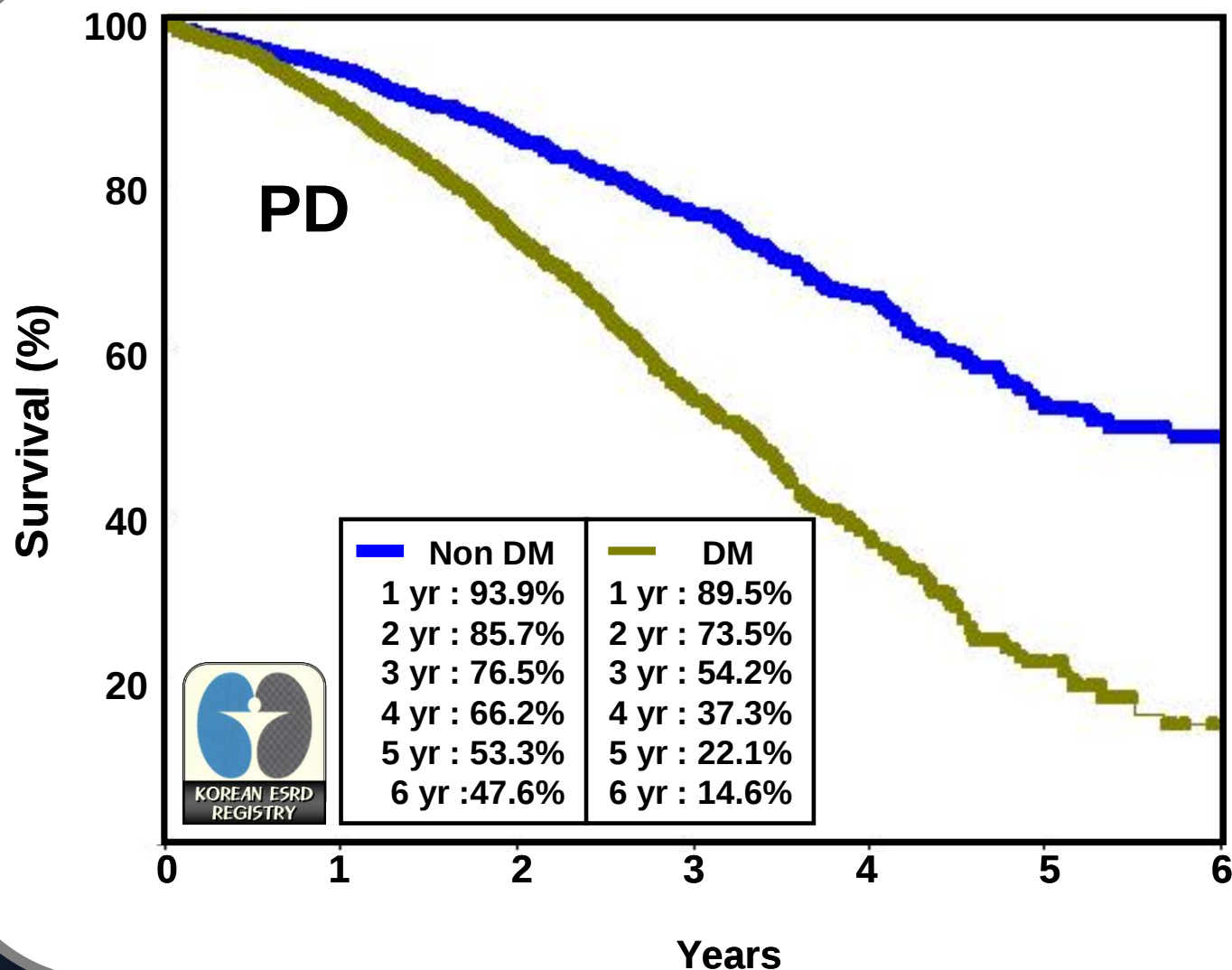
Registered dialysis patients since 2001





PD Pts Survival : DM vs Non-DM

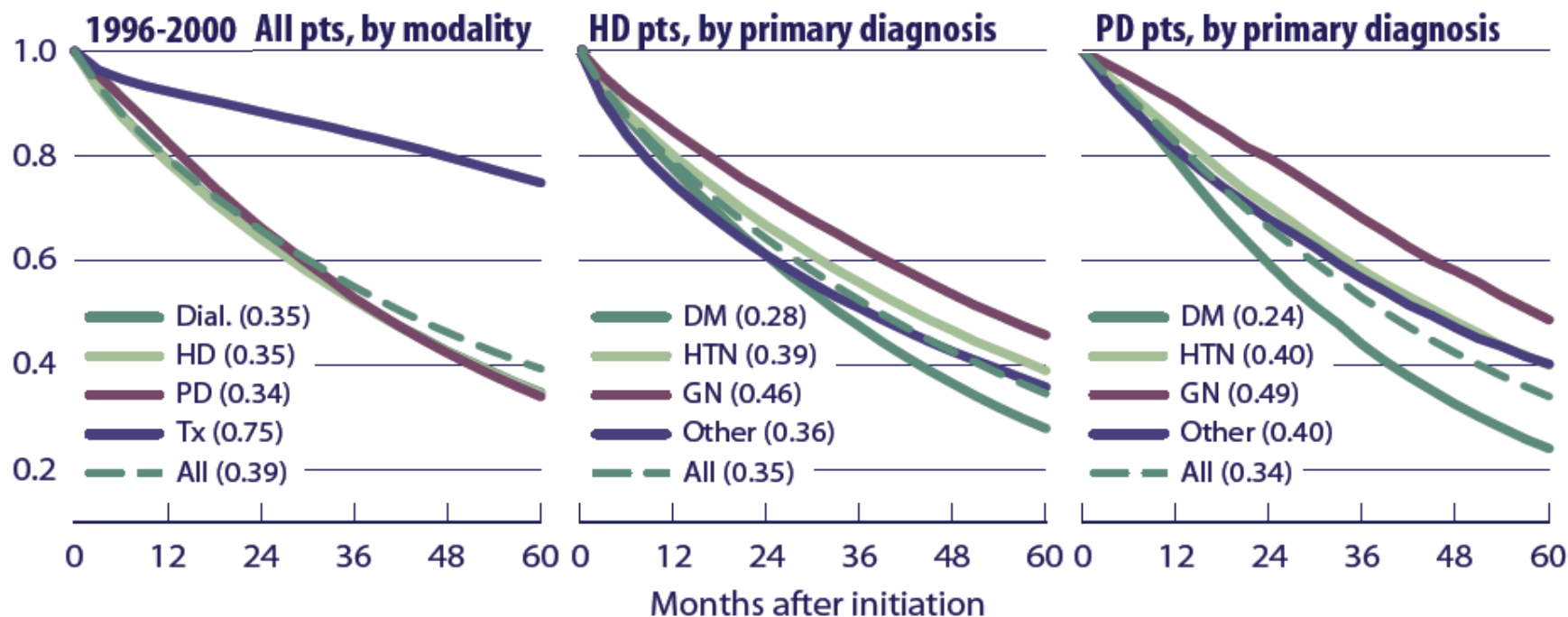
Registered dialysis patients since 2001





Survival of ESRD Pts, USRDS

United States
2007 Annual Renal
Data Data
Report System



6.16

Adjusted five-year survival, by modality & primary diagnosis incident dialysis patients & patients receiving a first transplant in the calendar year



Survival : EDTA data



EUROPEAN RENAL ASSOCIATION

EUROPEAN DIALYSIS AND TRANSPLANT ASSOCIATION

Figure A.5.1
Adjusted survival (cohort 1996-2000):
Incident dialysis patients and patients receiving
a first transplant in the calendar year
from day 91, by modality,
adjusted for age, gender and primary diagnosis

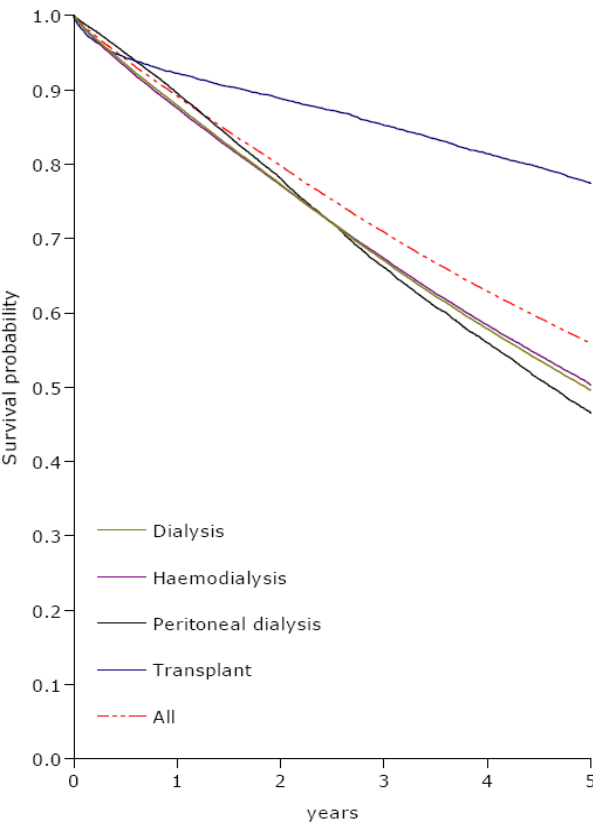


Figure A.5.2
Adjusted survival (cohort 1996-2000):
Incident haemodialysis patients
from day 91, by primary diagnosis,
adjusted for age and gender

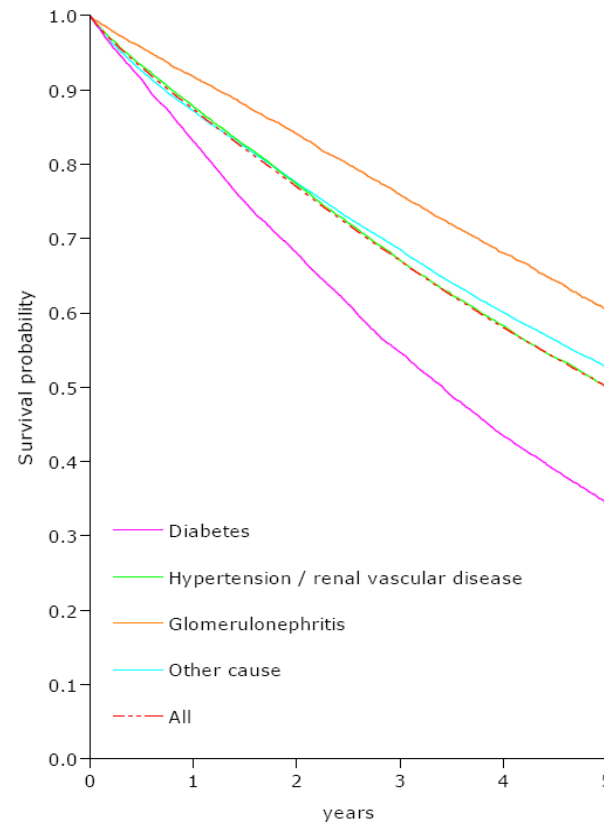
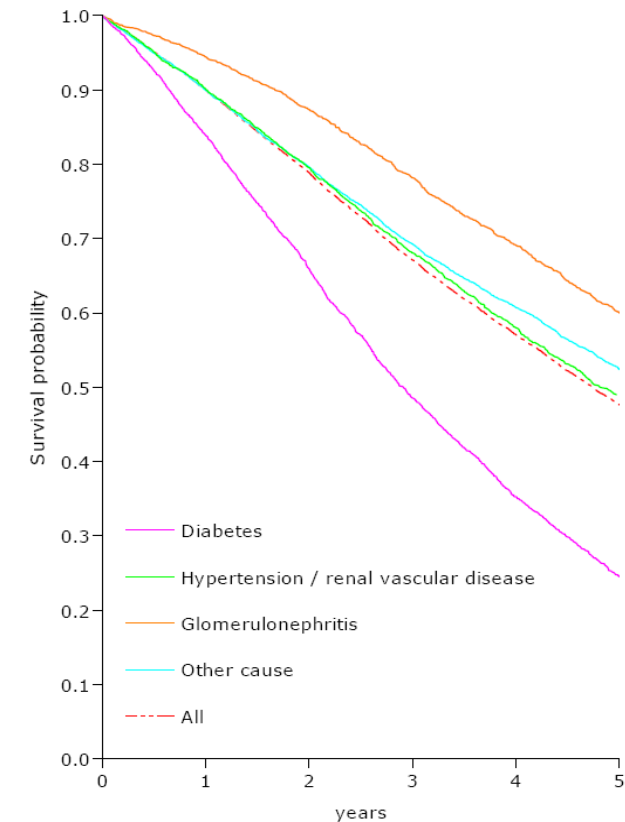


Figure A.5.3
Adjusted survival (cohort 1996-2000):
Incident peritoneal dialysis patients
from day 91, by primary diagnosis,
adjusted for age and gender

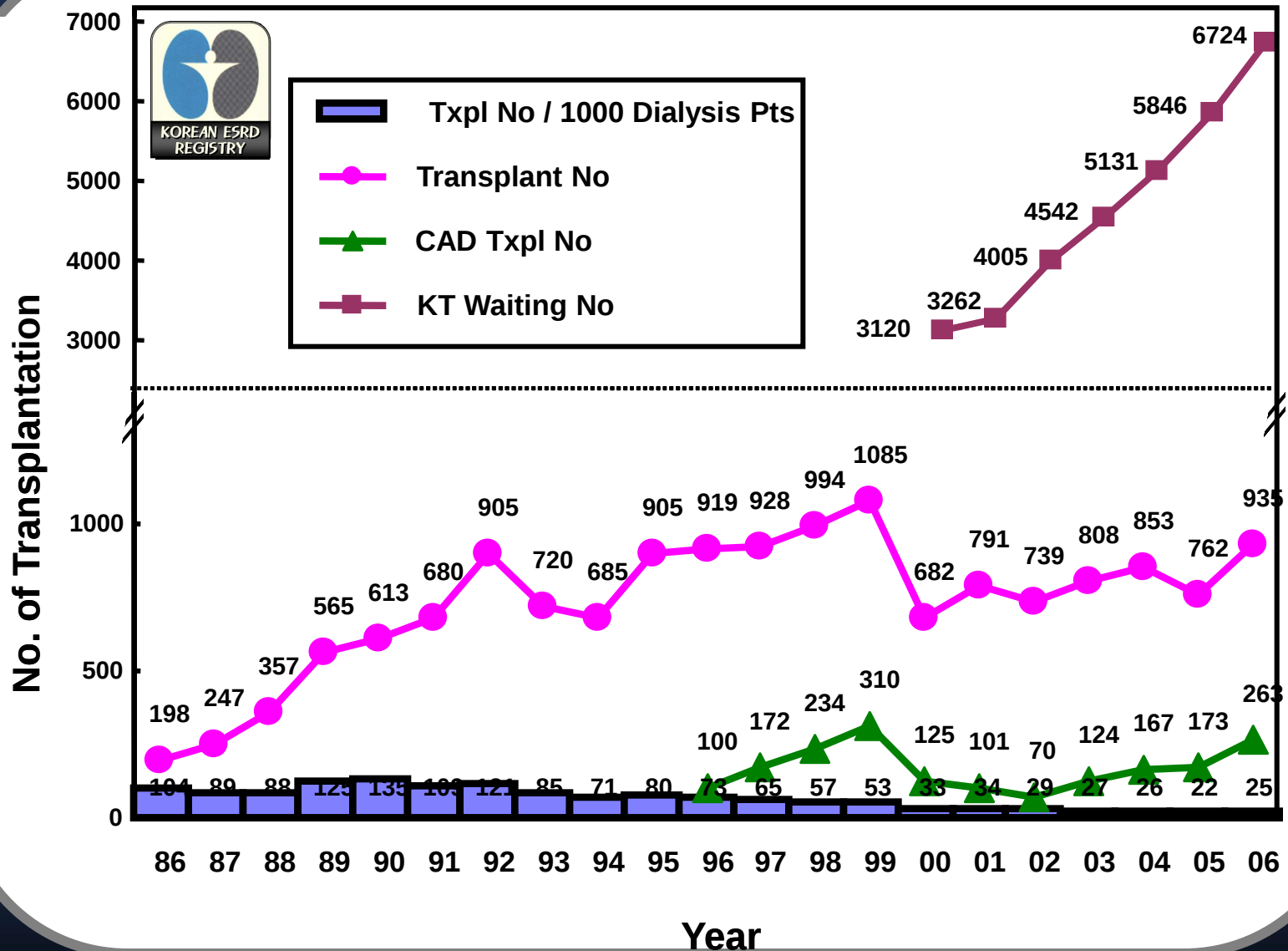


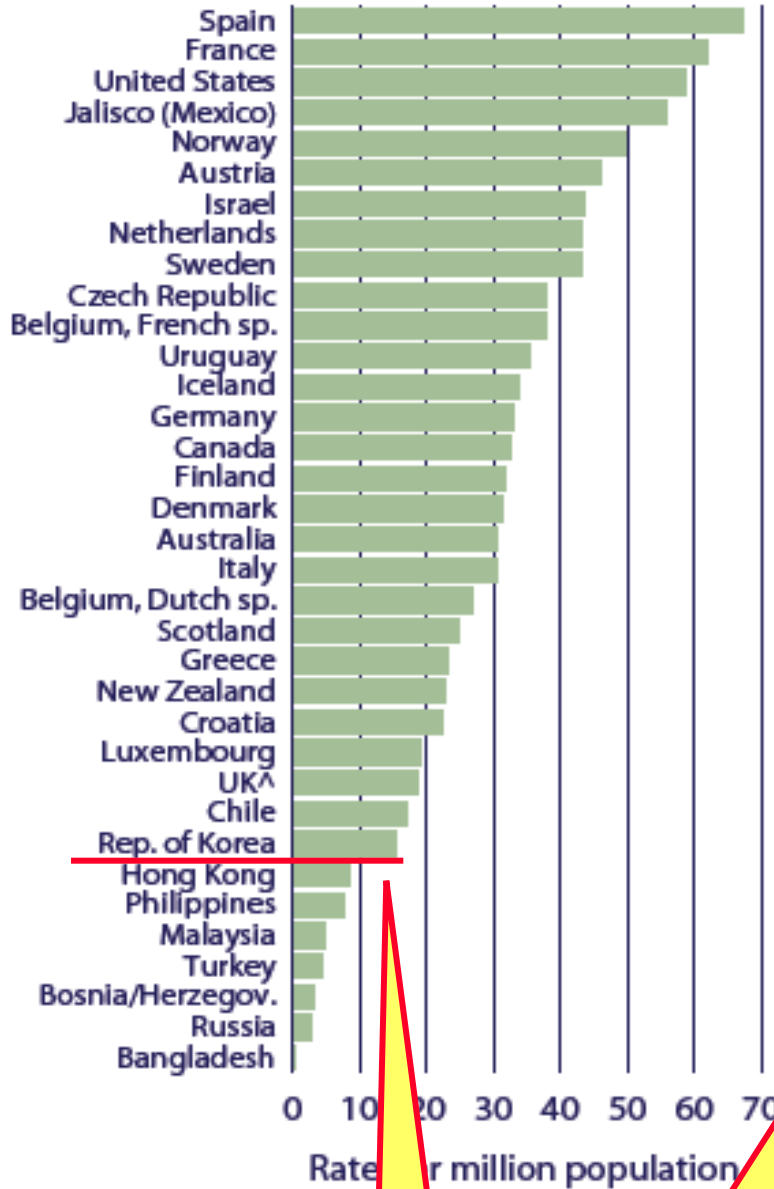
(2) 導入後1年・5年・10年・15年・20年生存率の推移 (図表21)





Kidney Transplantation





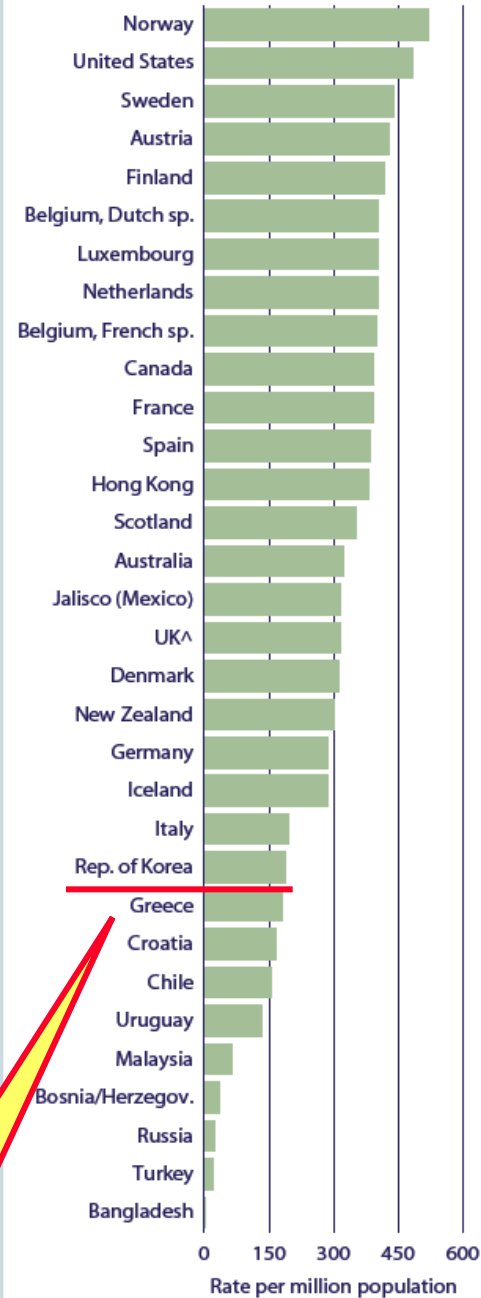
12.10

Transplant rates, 2005

15.5 PMP
2005

188.2 PMP
2005

12.9

Prevalent rates of
functioning grafts, 2005


Kidney Transplantation

International Comparison, 2005


United States
2007 Annual Renal Data Report System

감사의 글

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