

CKD Registry from Korea

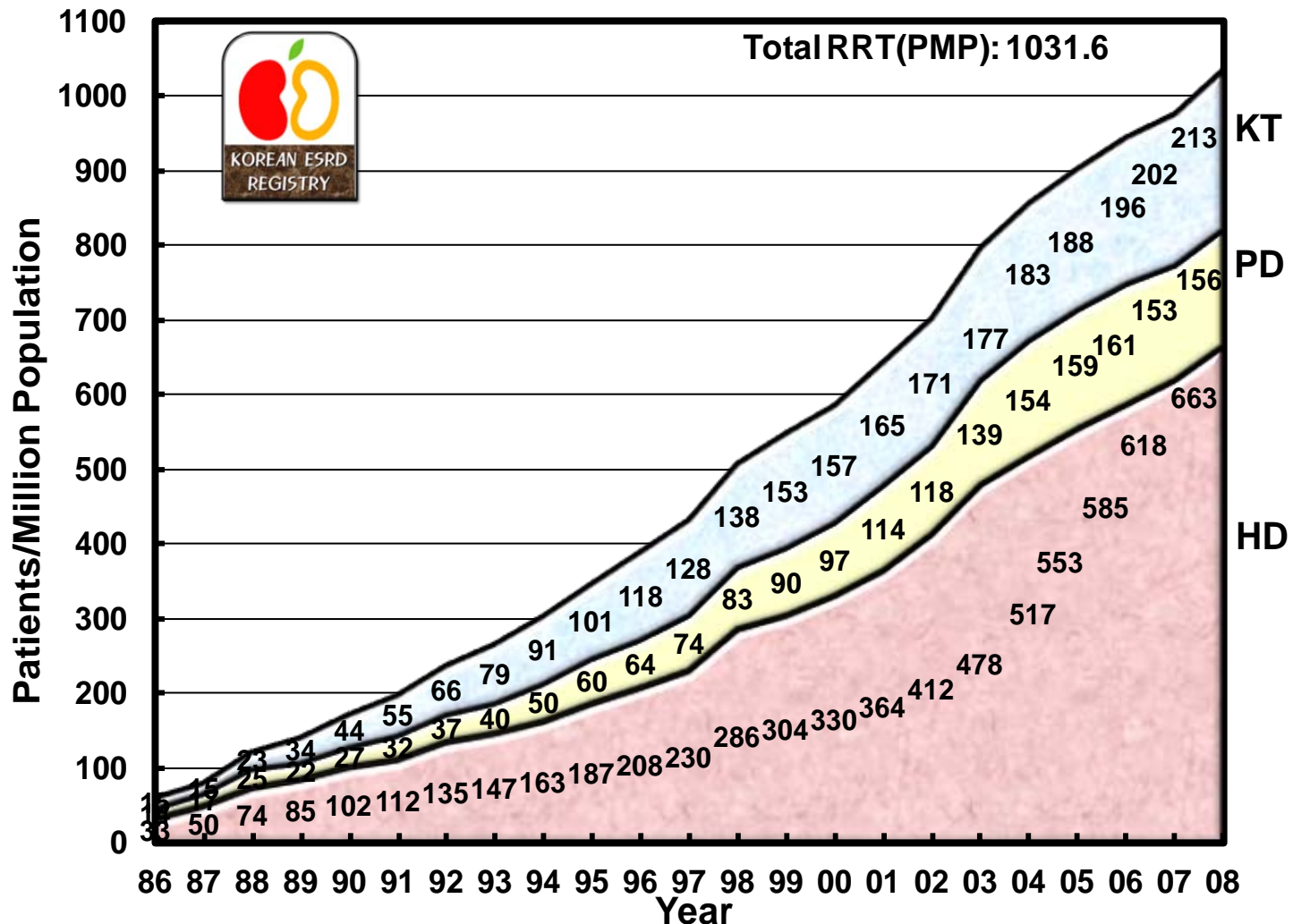
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Shuhnggwon Kim MD, PhD

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Seoul National University Bundang Hospital

Prevalence of ESRD in Korea

<http://www.ksn.or.kr/journal/2009/index.html>

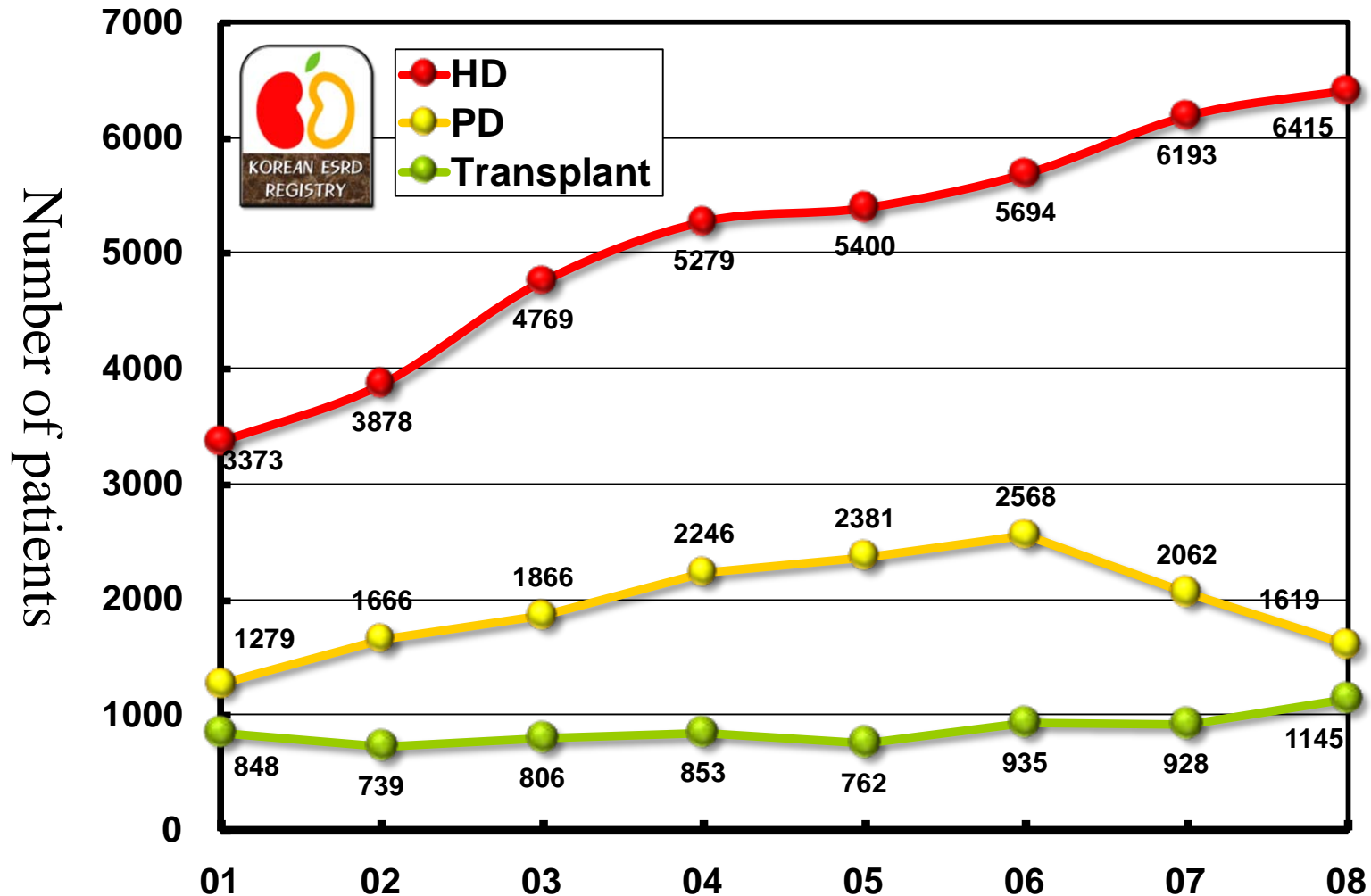
Total Prevalence of RRT(PMP): 1,031.6



Incidence of ESRD in Korea

<http://www.ksn.or.kr/journal/2009/index.html>

Total Incidence of RRT(PMP): 182.1



Possible data sources of CKD in Korea

A. Representative database for whole population

1. Korea National Health and Nutrition Examination Survey (KNHANES)
2. Health check-up data sponsored by National Health Insurance Corporation
3. Urinalysis for students: Elementary, Middle and High school
: Cross-sectional data

B. Regional database by epidemiologic survey

1. CKD survey by the Korean Society of Nephrology in 7 Major Korean cities (KSN CKD survey)
: Cross-sectional data
2. Elderly cohort in Seong-Nam city
: The Korean Longitudinal Study on Health and Aging (KLoSHA)
: Prospective cohort data

Possible data sources of CKD in Korea

C. Institution-based database

1. Health Promotion Center in each hospital

: Consumer-driven examination

: Cross-sectional > Prospective

2. Disease-focused data

: Glomerulonephritis Registry (PREMIER) by KSN

: Cancer registry by Korean National Cancer Center

: Clinical Research Center for ESRD by government

: Diabetes cohort in SNUBH

.....

: Longitudinal cohort

KNHANES

- A cross-sectional and **nationally representative survey** on the health and nutritional status of the non-institutionalized Korean population
- The survey has been conducted four times:
 - 1st KNHANES 1998,
 - 2nd KNHANES 2001,
 - 3rd KNHANES 2005 and
 - 4th KNHANES 2007-2009
- Survey:
 - Health-questionnaires survey
 - Health examination
 - Nutrition survey

KNHANES

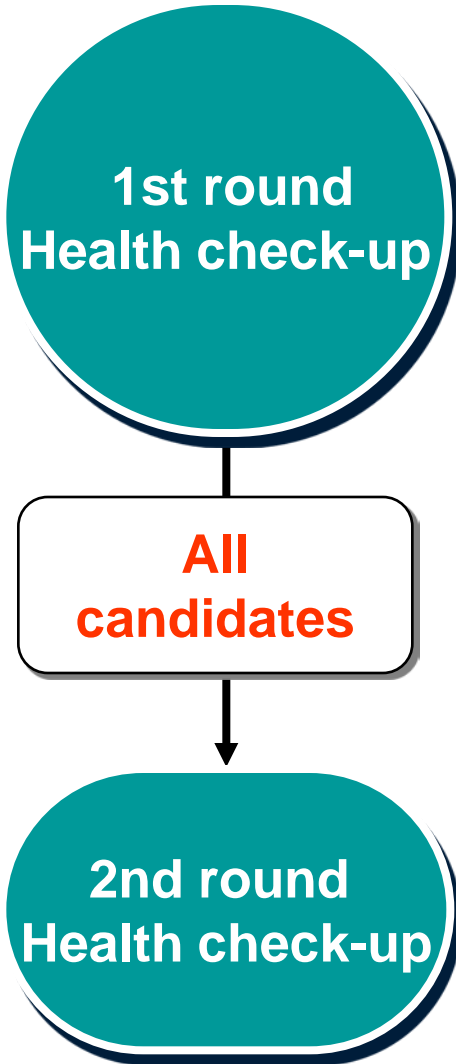
- Eligible candidates selected by using proportional allocation-systematic sampling with multi-stage stratification from the whole nation
- The former three surveys were performed every three or four years for 10 weeks
The 4th KNHANES has been performed from 2007 to 2009 with year-round manner, which is similar way of data collection in NHANES of United States
- The central laboratory had not been changed since 2005 and the data from the 4th survey were limited to 2007-2008
==> Analysis with data of 2005, 2007, and 2008 survey

National Health Insurance Co.

- Candidates for health check-up:
 - General exam: all population
who joined National Health Insurance every 2 years
 - Cancer screening:
 - 40 year-old population for stomach, liver, and breast cancer,
 - 50 year-old population for colon cancer
 - 30 or more years females for cervical cancer
 - Special exam: 40 and 66 year old population
 - Dental care for 4 mo, 9 mo, and 2-5 year old children
- **In aspect of CKD, before 2009**
 - 1st round check-up: Urinalysis for albuminuria and hemoglobin
by dipstick test
↓ **Population with abnormal results**
 - 2nd round check-up: serum creatinine

National Health Insurance Co.

- **Since 2009**



1. Health Questionnaires and interview
 - Body weight, Height, BMI, WC
 - Blood pressure, Visual and auditory acuity
2. Chest x-ray
3. **Urinary albuminuria by dipstick test**
4. Blood test
 - Hemoglobin, Fast Blood Glucose, TC, HDL-C, TG, LDL-C, AST, ALT, γ -GTP, **Creatinine**
5. Oral and dental exam
6. Reporting

1. Counseling about results
2. Education for hypertension and diabetes
3. Check FBS for DM, again

Regional Epidemiologic Survey

- KSN CKD survey

Korean aged 35 years or more in proportion to age, gender, and city in 7 Major cities where 48% of the age group in Korea live in.

-Seoul, Busan, Incheon, Deagu, Gwangju, Daejeon, Ulsan

Survey:

-Habit of smoking, drinking, and self-reported salt intake

-Family history of diseases

-Past medical history for

CVD, hypertension, DM, renal disease, liver disease

-Body measurement: Weight, Height, BPs

-Lab. test: Urinalysis, UACR, serum creatinine, total cholesterol, LDL, HDL-cholesterol, TG

Regional Epidemiologic Survey

- KLoSHA: Elderly cohort in a city
 - Population-based prospective cohort study, started in 2006
 - Random selection (1,000) of subjects (61,447) aged more than 65 years in proportion to the age composition of general population in Seong-nam city (931,019)
 - Second survey under going in 2010

Contents

1. CKD Prevalence and trend in Korea

- 1) KNHANES 2005, 2007-2008: 14,947 subjects
- 2) KSN CKD survey: 2,356 subjects

2. CKD awareness and WKD campaign

- 1) Health check-up in SNUHs: 57,718 subjects

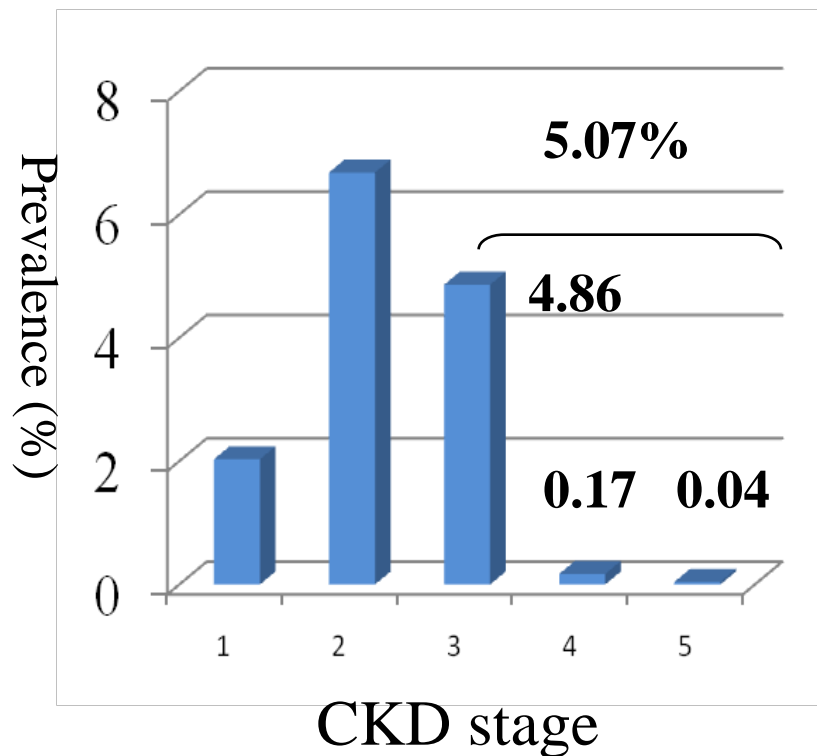
3. *Adherence to CKD practice guideline in Diabetes care*

- 1) *Diabetes patients in SNUBH: 5,623 patients*

Prevalence of CKD

• KSN CKD survey

Korean aged 35 years or more
in proportion to
age, gender, and city
in 7 Major cities

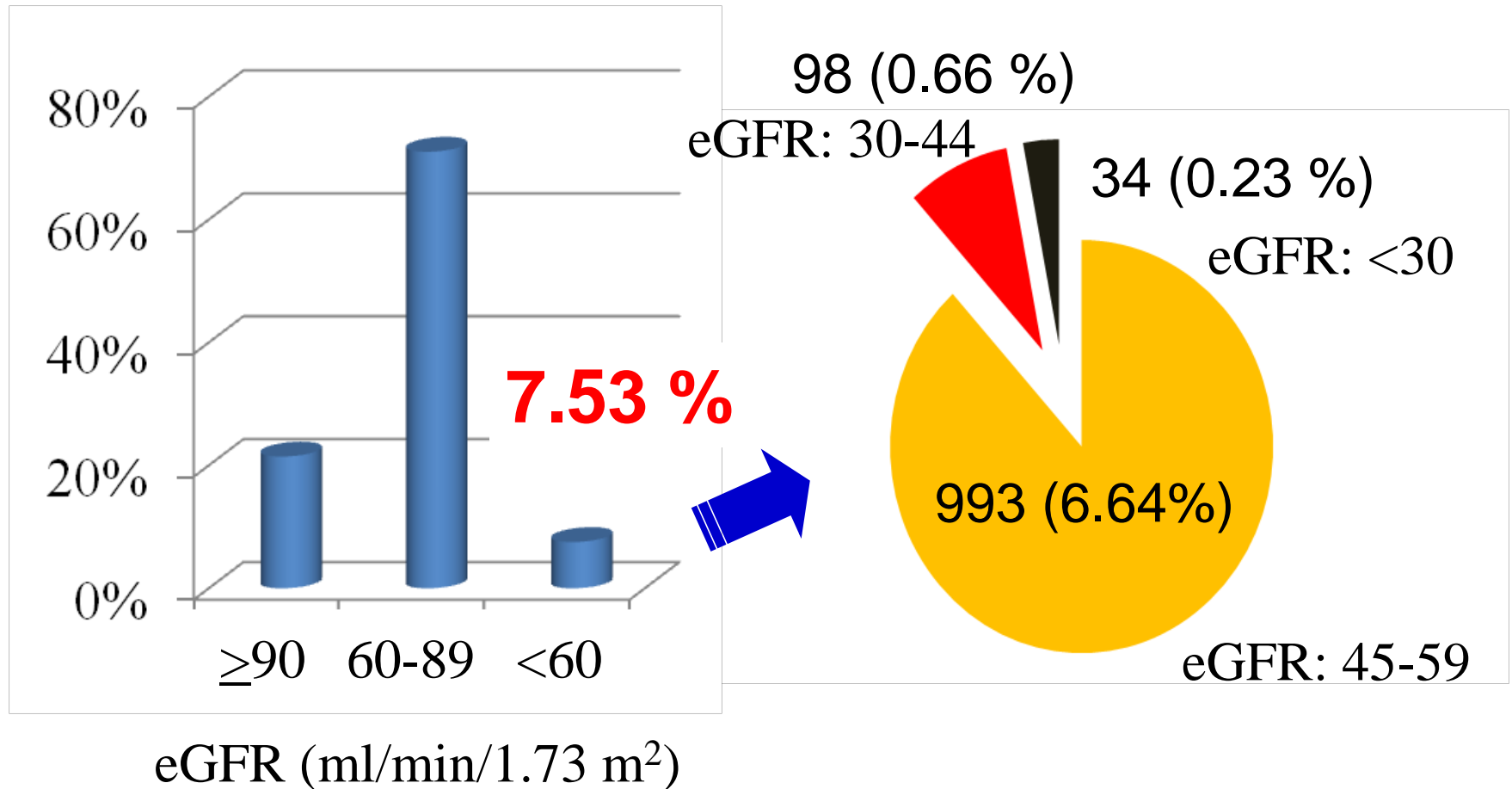


Characteristics	Study population		2006 population in 7 cities	
	No. of participants	%	No. of participants	%
Total	2,356	100	11,298,320	100
Age in 2006 (yr)				
35-44	833	35.4	4,077,457	36.1
45-54	768	32.6	3,648,794	32.3
55-64	432	18.3	2,061,663	18.2
65 or more	257	13.7	1,510,406	13.4
Gender				
Male	1,151	48.9	5,504,445	48.7
Female	1,205	51.1	5,793,875	51.3
City				
Seoul	1,055	44.8	5,023,194	44.5
Incheon	263	11.2	1,279,035	11.3
Daejeon	142	6.0	687,389	6.1
Gwangju	133	5.6	642,447	5.7
Daegu	265	11.2	1,246,987	11.0
Ulsan	107	4.5	521,744	4.6
Busan	391	16.6	1,897,524	16.8

Prevalence of CKD

• KNHANES III-IV

CKD <60 ml/min/1.73 m²

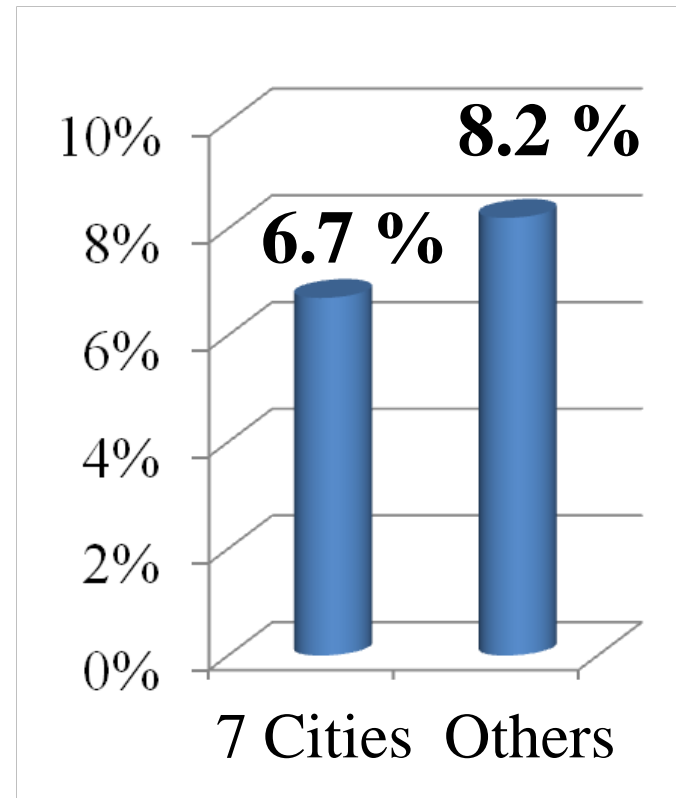


Prevalence of CKD

- KNHANES III-IV



CKD <60 ml/min/1.73 m²

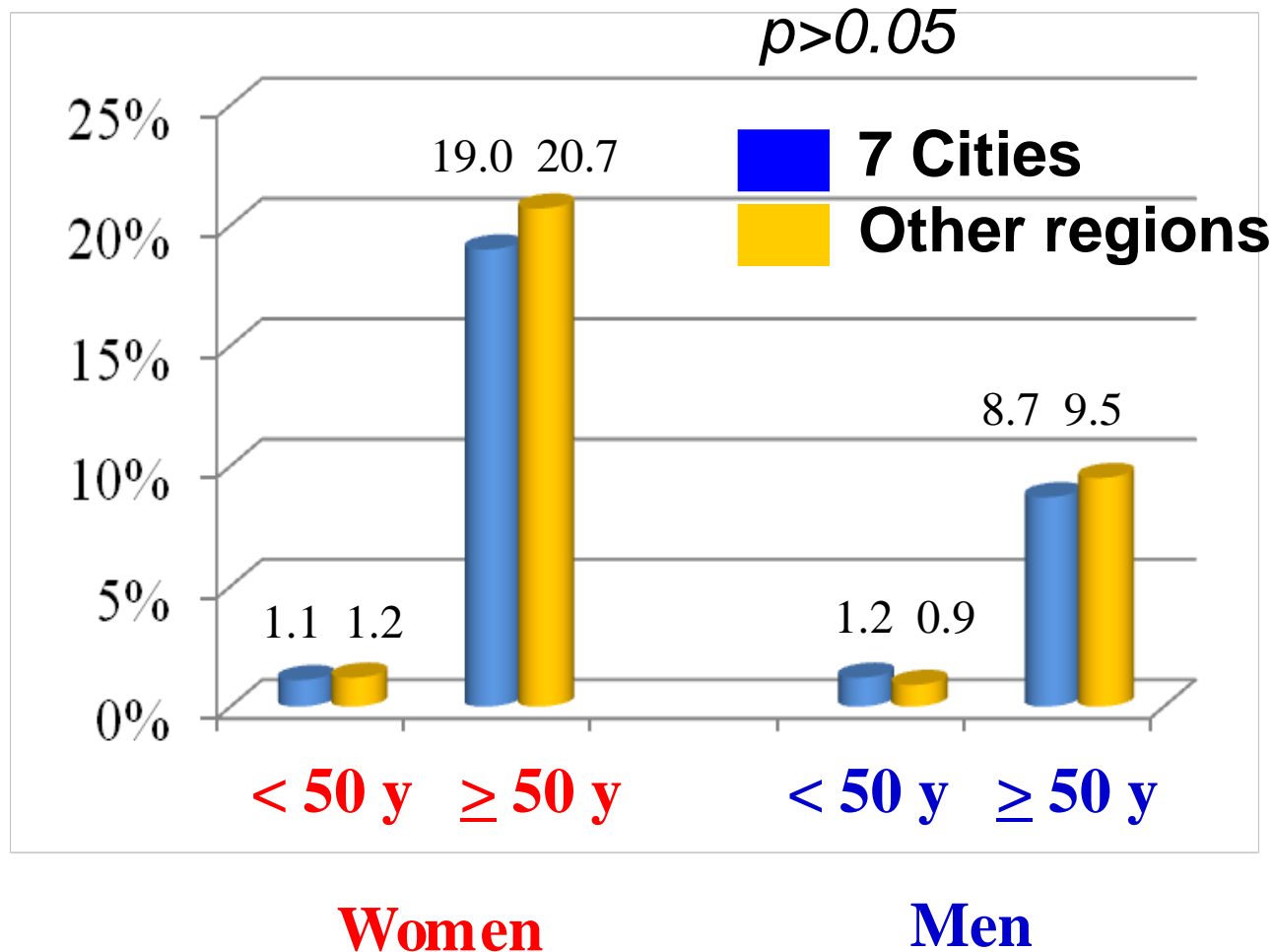


Region: 7 cities vs others

Prevalence of CKD

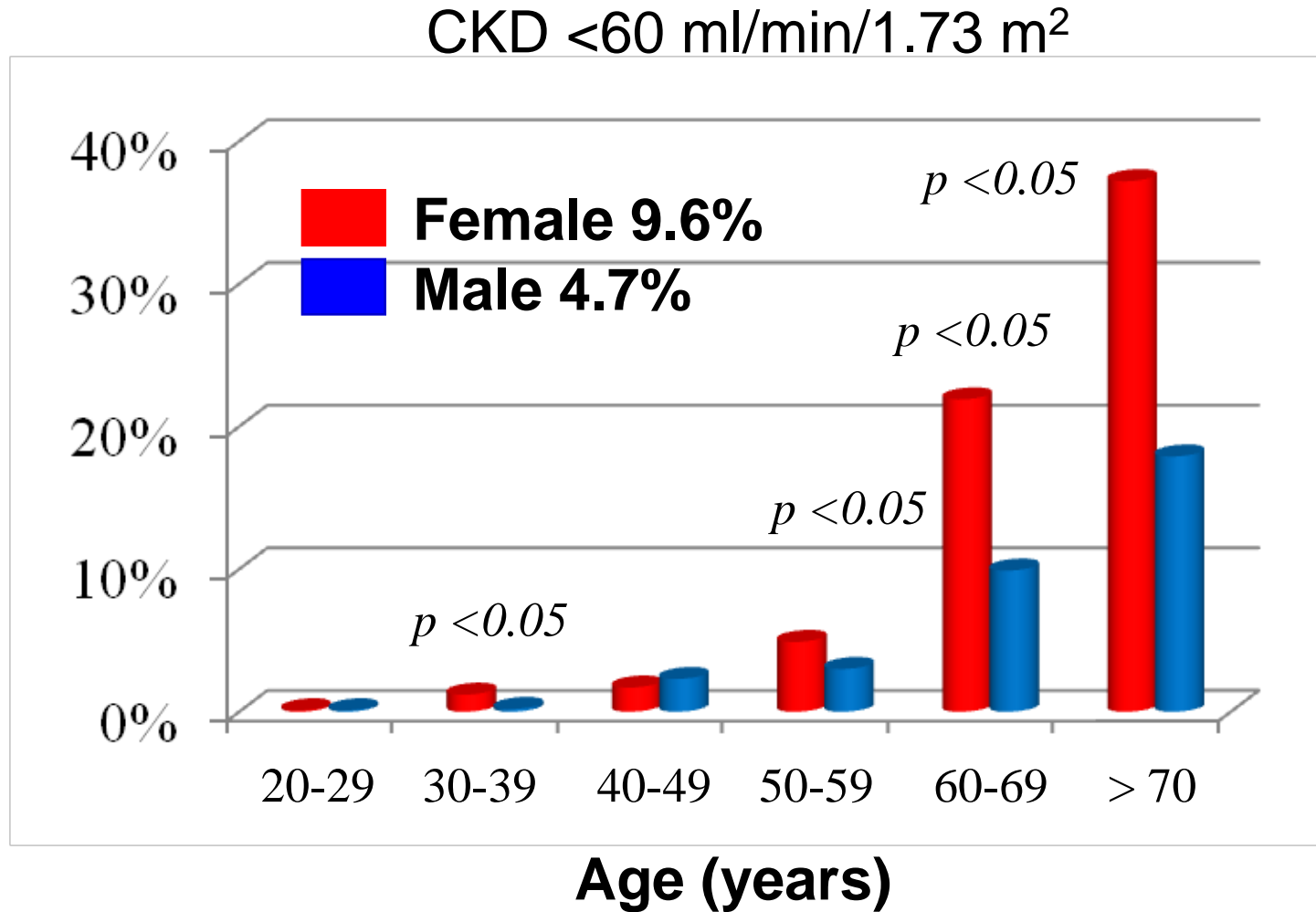
• KNHANES III-IV

- Region: 7 cities vs others
CKD <60 ml/min/1.73 m²



Prevalence of CKD

• KNHANES III-IV

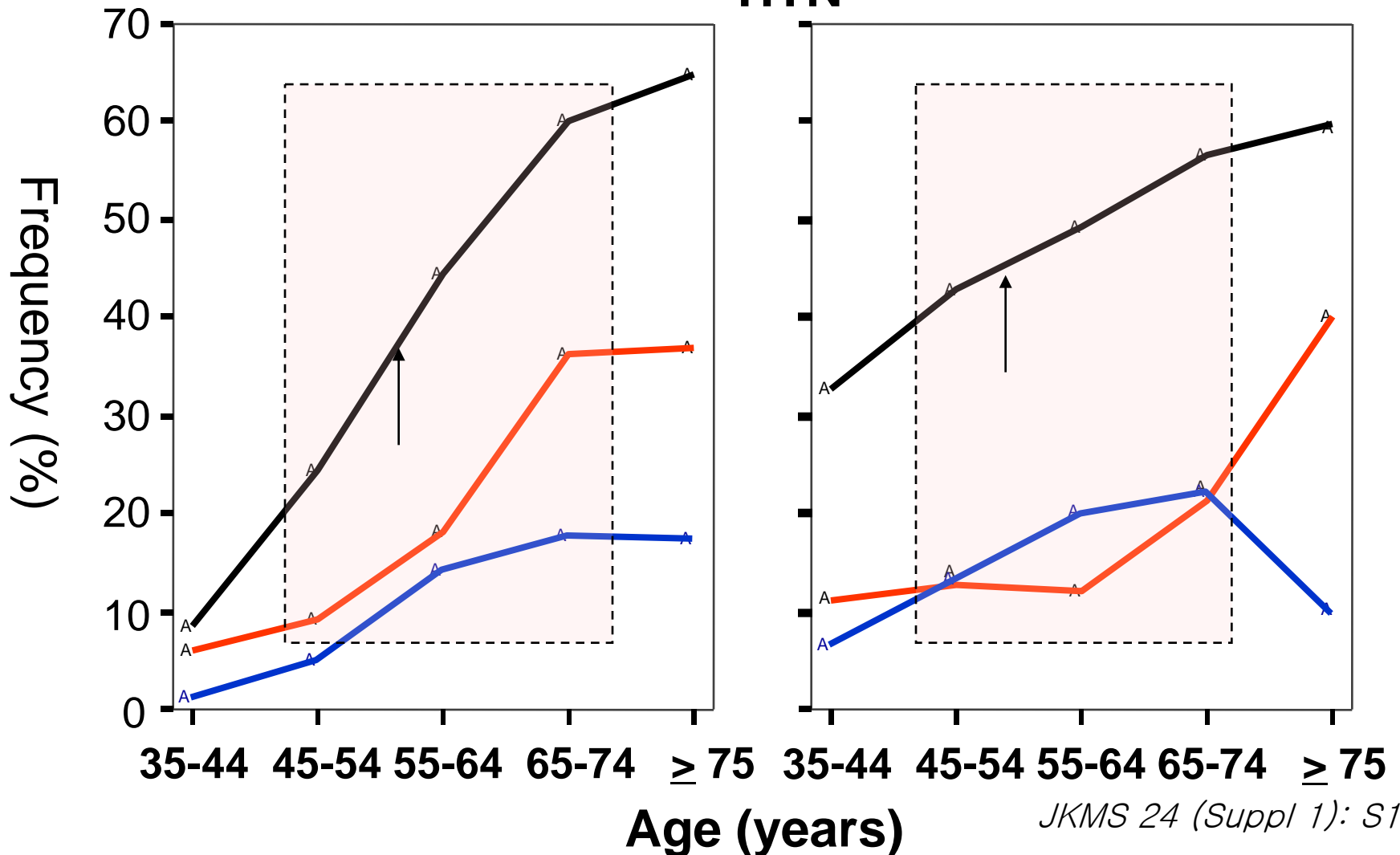


The prevalence of CKD in both genders

Female

Male

— CKD
— DM
— HTN



Factors related to CKD

• KNHANES III-IV

	B	Wald	p-value	OR	95 % C.I.	
Age	0.094	557.828	0.000	1.099	1.090	1.107
Gender (male)	-0.764	68.693	0.000	0.466	0.389	0.558
Diabetes	0.459	20.715	0.000	1.582	1.298	1.928
Hypertension	0.261	7.094	0.008	1.298	1.071	1.572
BMI	0.044	11.786	0.001	1.045	1.019	1.071
Proteinuria*		56.561	0.000			
1+	0.404	6.07	0.014	1.498	1.086	2.065
2+	0.589	4.605	0.032	1.802	1.052	3.085
≥3+	1.916	49.489	0.000	6.795	3.984	11.588
Exercise	-0.159	4.112	0.043	0.853	0.731	0.995

* Proteinuria by dipstick test

* Adjusted with age, gender, BMI, hypertension, diabetes, SBP, DBP, urine protein, urine hemoglobin, Na intake, protein intake, Exercise, weight change compared to last year

The trend of CKD Prevalence • KNHANES III-IV

• KNHANES

➤ Aged 20 years or older who had sCr test

- ✓ 14,947 participants
 - 5,400 persons in 2005,
 - 2,960 persons in 2007
 - 6,547 persons in 2008



국민건강영양조사
<http://knhanes.cdc.go.kr>

국민건강영양조사란?
국가보건정책의 수립 및 평가에 필요한 국민의 건강 및 영양상태에 관한 기초자료를 생산하기 위한 조사입니다.

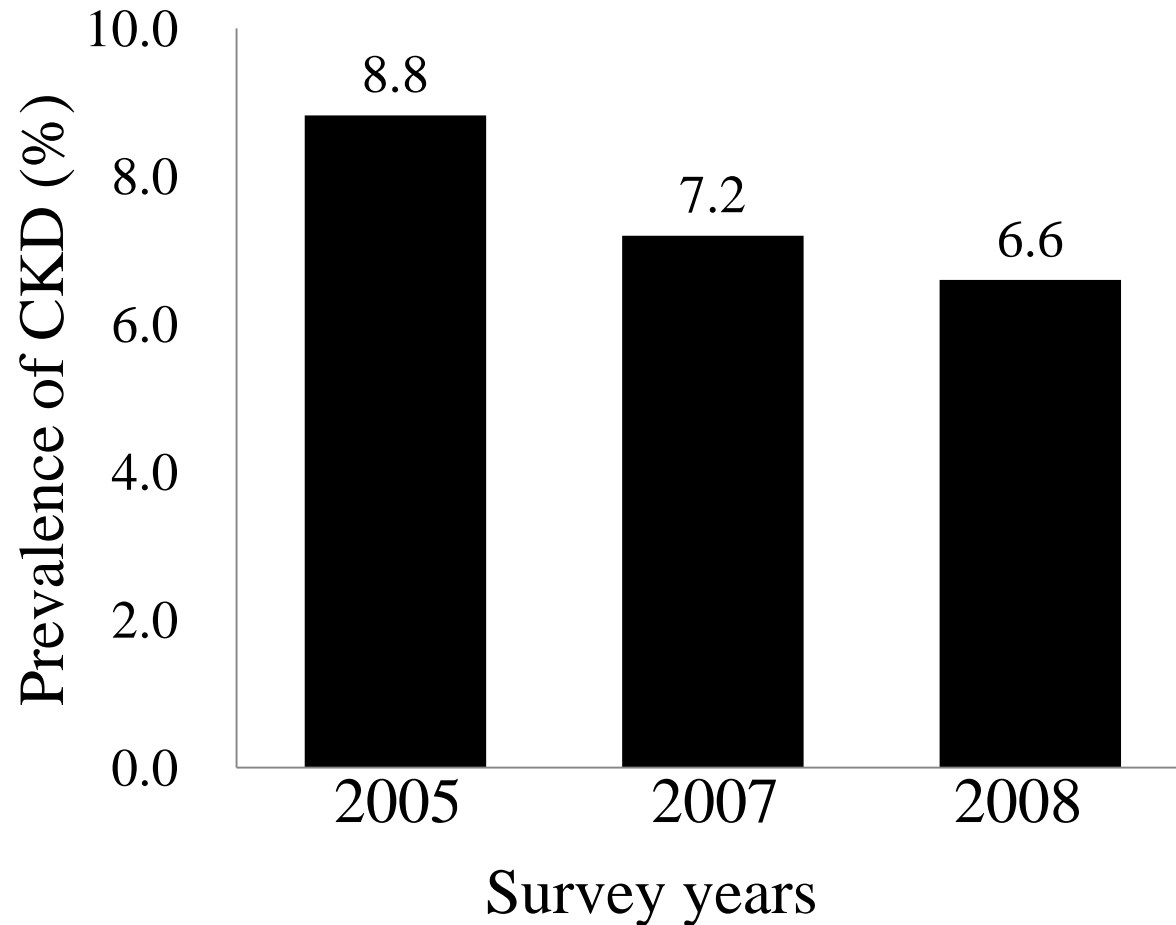
건강한 대한민국 국민건강영양조사가 그 시작입니다.

- 조사기간 : 2007년 7월부터 연중 실시
- 조사대상 : 매년 전국에서 선정된 4,600가구
- 조사내용 : 건강조사, 건강실태조사, 영양조사
- 조사기관 : 보건복지부, 질병관리본부

보건복지부 질병관리본부

The trend of CKD Prevalence • KNHANES III-IV

CKD <60 ml/min/1.73 m²



The trend of CKD Prevalence • KNHANES III-IV

	2005 (N=5440)	2007-2008 (N=9507)	p-value
Age	47.2(15.3)	49.3(16.3)	<0.001
Male	42.6%	42.0%	0.513
BMI	23.7(3.3)	23.7(3.3)	0.188
BMI \geq 25	32.8%	32.0%	0.325
Hypertension	25.7%	26.6%	0.202
Diabetes	8.9%	9.8%	0.094
CVA	2.3%	2.5%	0.434
CHD	2.3%	2.5%	0.319

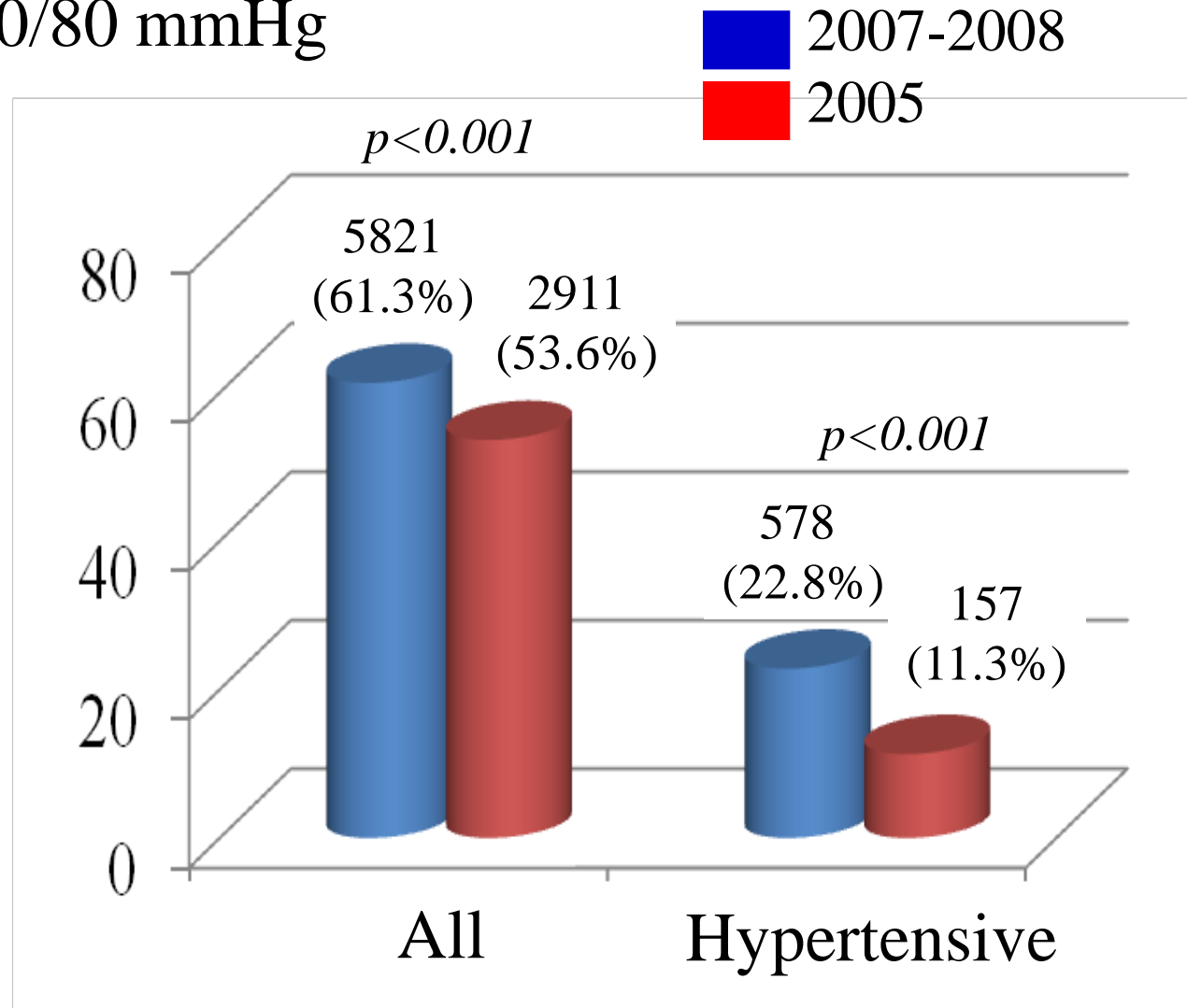
The trend of CKD Prevalence • KNHANES III-IV

	2005 (N=5440)	2007-2008 (N=9507)	p-value
SBP	119(18)	116(17)	<0.001
DBP	77(11)	75(11)	<0.001
FBS	95(23)	98(24)	<0.001
HbA1C*	7.4(1.7)	7.3(1.7)	0.202
Cholesterol	185(35)	188(36)	<0.001
TG	135(120)	134(102)	0.477
Hemoglobin	13.8(1.8)	13.8(1.8)	0.29
Creatinine	0.98(0.19)	0.93(0.26)	<0.001
eGFR	76(12)	82(17)	<0.001

* In DM subjects

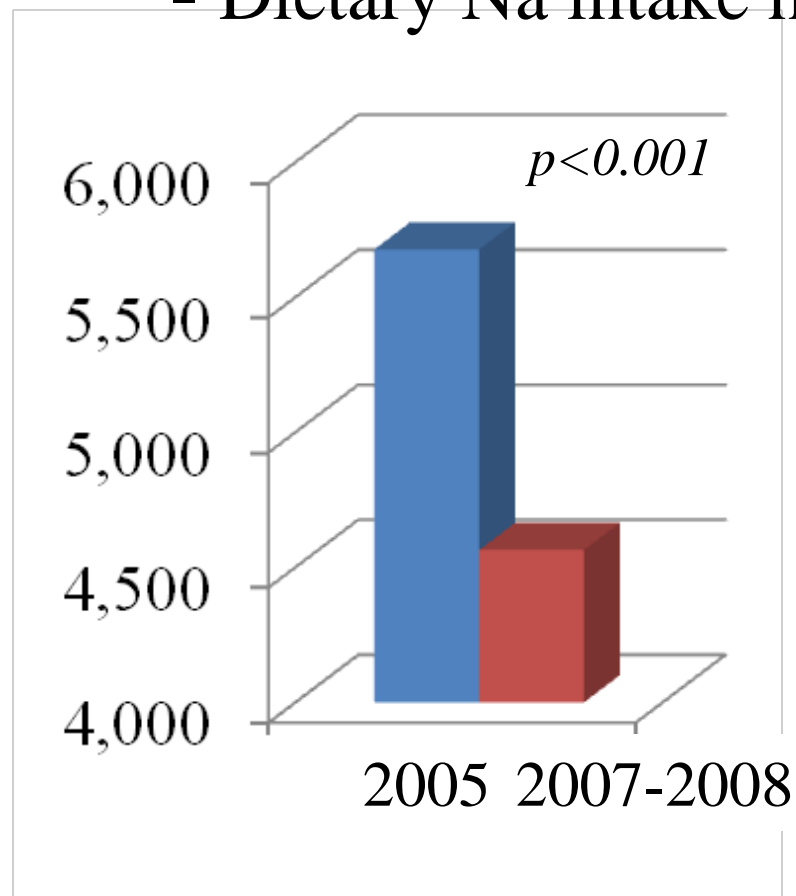
The trend of CKD Prevalence • KNHANES III-IV

- BP < 130/80 mmHg

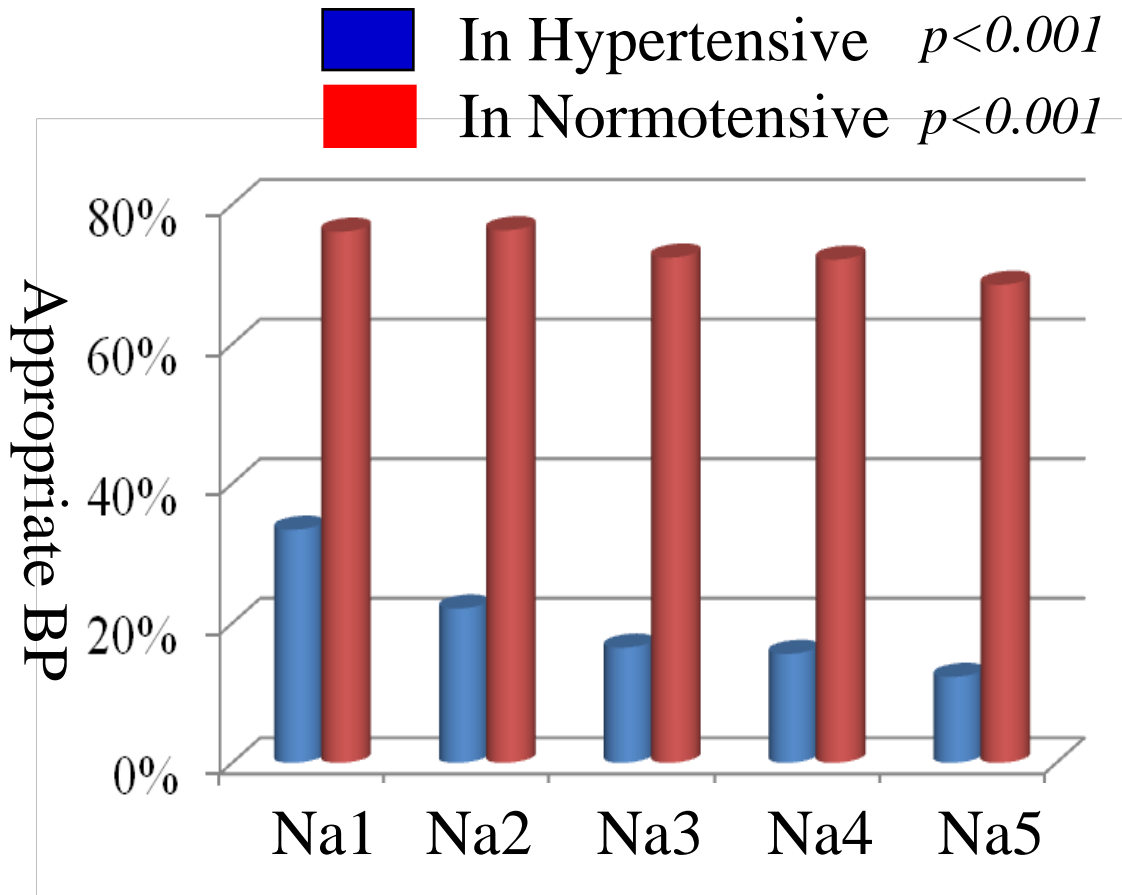


The trend of CKD Prevalence • KNHANES III-IV

■ Dietary Na intake mg/day



The trend of CKD Prevalence • KNHANES III-IV



Salt intake per group

Na1 1736(579) mg/day

Na2 3129(335) mg/day

Na3 4327(375) mg/day

Na4 5881(567) mg/day

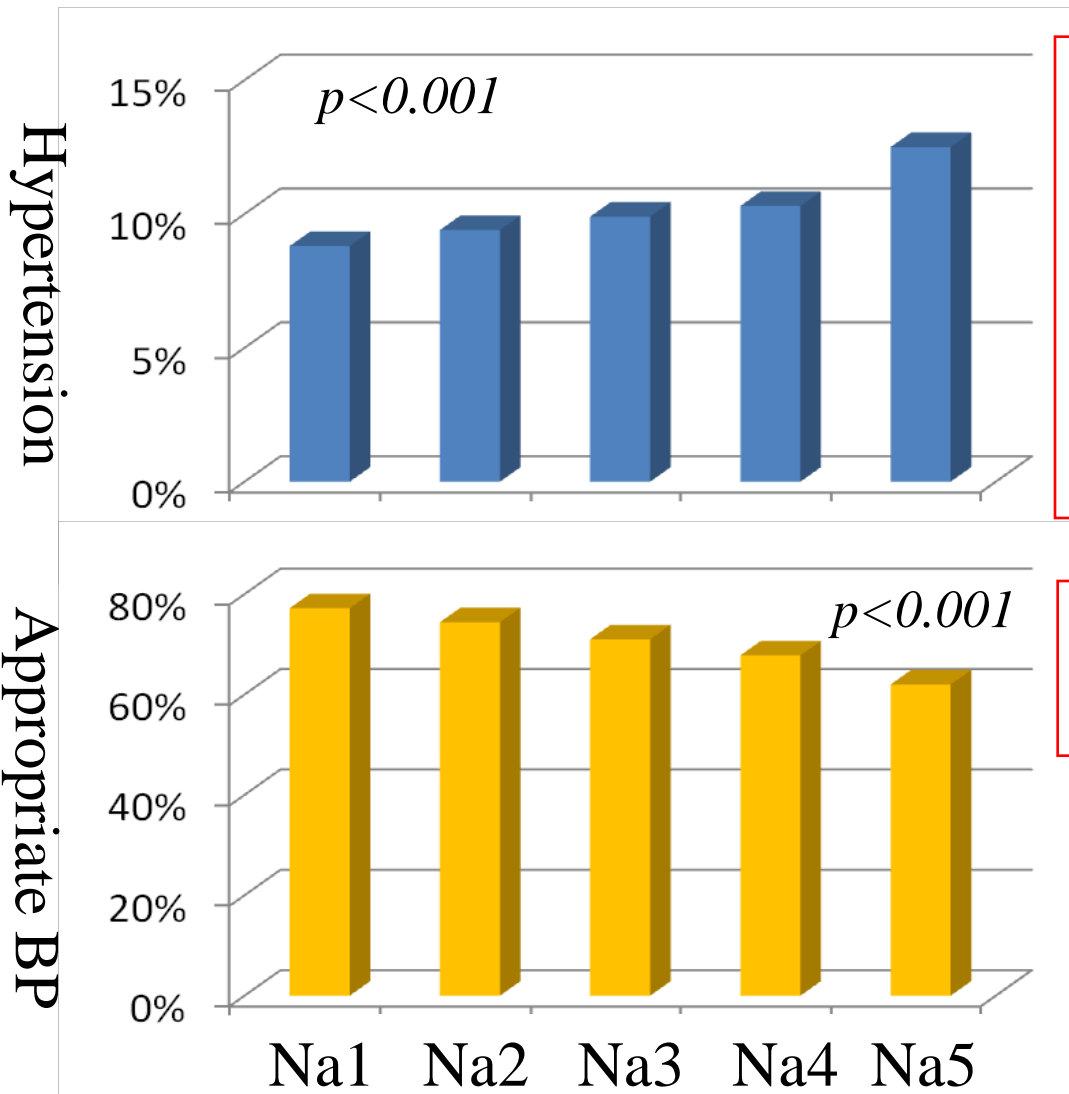
Na5 9781(3134) mg/day

Appropriate BP

<130/80

The trend of CKD Prevalence • KNHANES III-IV

Age <50 years

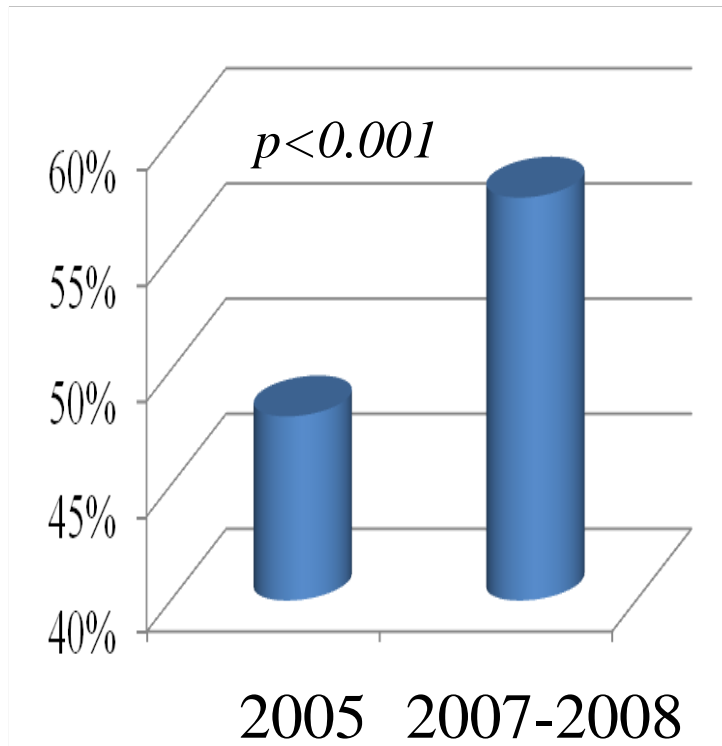


Salt intake per group
Na1 1736(579) mg/day
Na2 3129(335) mg/day
Na3 4327(375) mg/day
Na4 5881(567) mg/day
Na5 9781(3134) mg/day

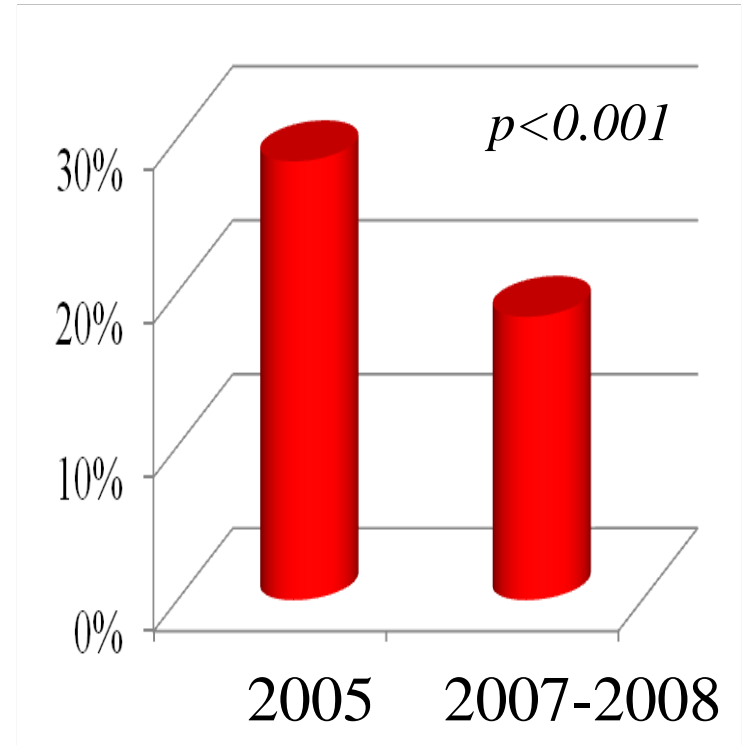
Appropriate BP
<130/80

The trend of CKD Prevalence • KNHANES III-IV

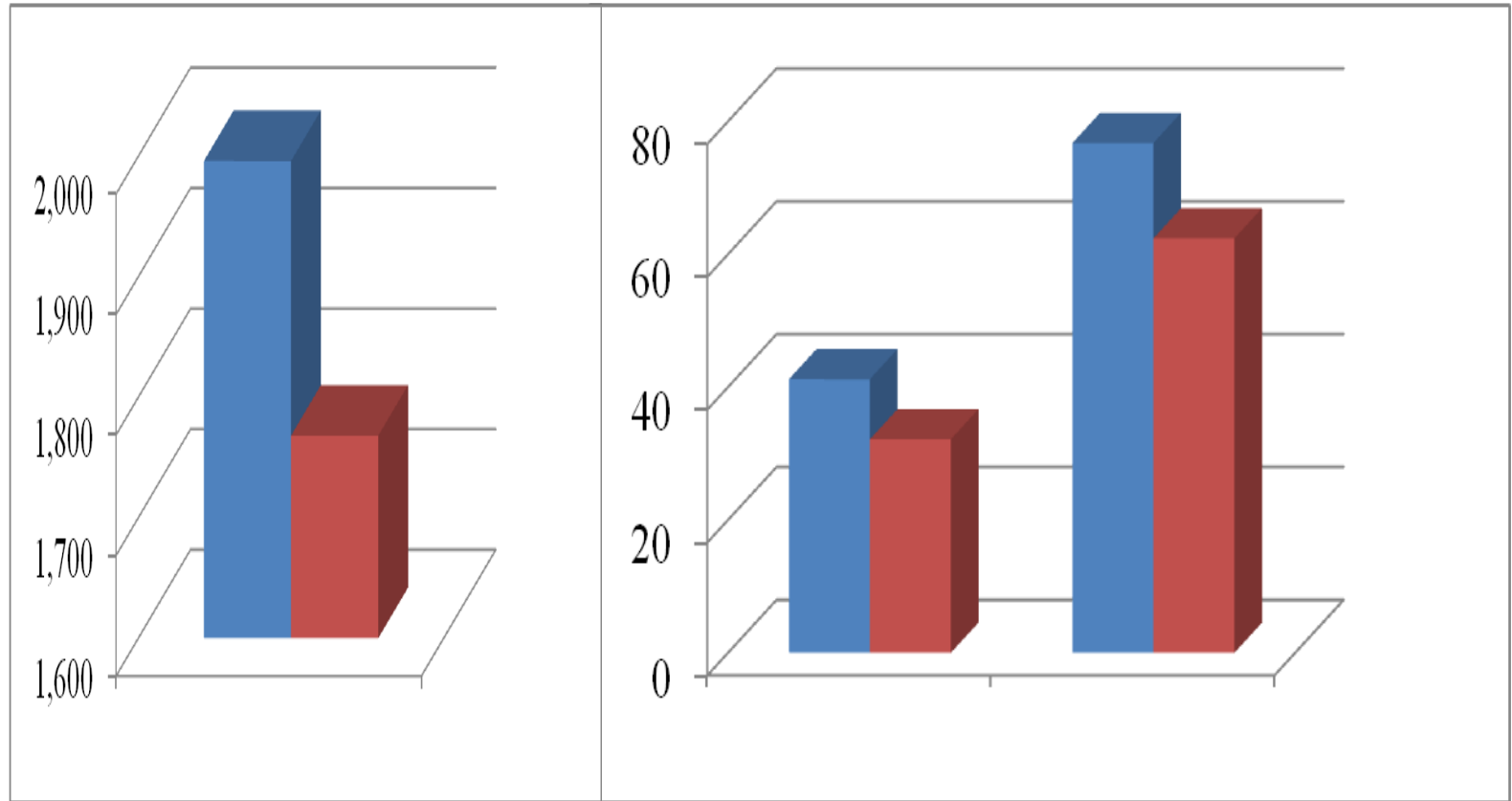
■ Exercise



■ Weight gain



The trend of CKD Prevalence • KNHANES III-IV



■ Energy Kcal/day

■ Fat g/day ■ Protein g/day

Summary of CKD prevalence

- In Korea, the prevalence of CKD (eGFR<60 ml/min/1.73 m²) was 7.53% according to KNHANES data.
- The main risk factors to CKD were age, female gender, BMI hypertension, diabetes, proteinuria, and habit of exercise.
- The prevalence of CKD seemed to be decreasing over 4 years with increase of appropriate maintenance of blood pressure, decrease of salt intake, and improvement of health related habit.
--> Those findings need to be confirmed in future study.

CKD awareness and Campaign

Nephrol Dial Transplant (2009) 1 of 7
doi: 10.1093/ndt/gfp512



Original Article

The effect of the World Kidney Day campaign on the awareness of chronic kidney disease and the status of risk factors for cardiovascular disease and renal progression

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Nam Joo Heo⁴ and Suhnggwon Kim^{1,3}

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CKD awareness and Campaign

- In Korea, the WKD campaign was commenced in November 2006.
 - During Renal Week in March 2007, the members of KSN held lectures about CKD and events to offer free testing to anyone in clinics and hospitals nationwide.
 - During Kidney Week in March 2008, KSN presented data on the CKD prevalence in urban Korean cities surveyed as a cross-sectional epidemiologic study.
- ==> Through this campaign, KSN estimated that ~90% of Koreans gained some information on CKD by March 2008.

CKD awareness and Campaign

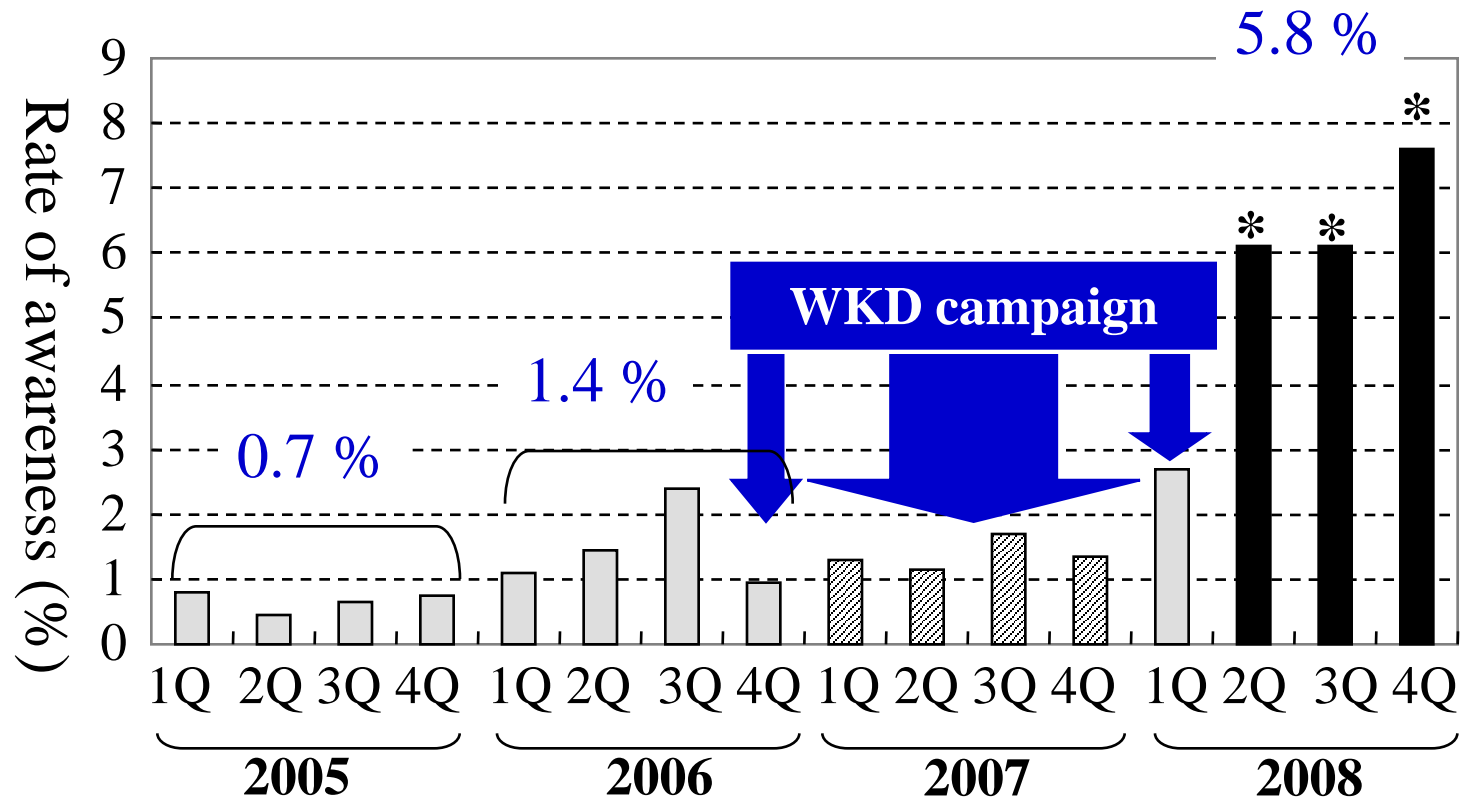
Candidates

57,718 subjects taking health check-ups in 2 SNUHs during 2005-2006 and 2008

We defined CKD awareness by a ‘yes’ response to the question (in Korean), ‘Have you ever been told by a doctor or health care professional that you have kidney disease or kidney problem?’.

Women	: 45.3%
Age	: 48.3 ± 11.7 years.
GFR	: 75.0 ± 12.0 ml/min/1.73 m ²
CKD	: 6.87% (GFR < 60)

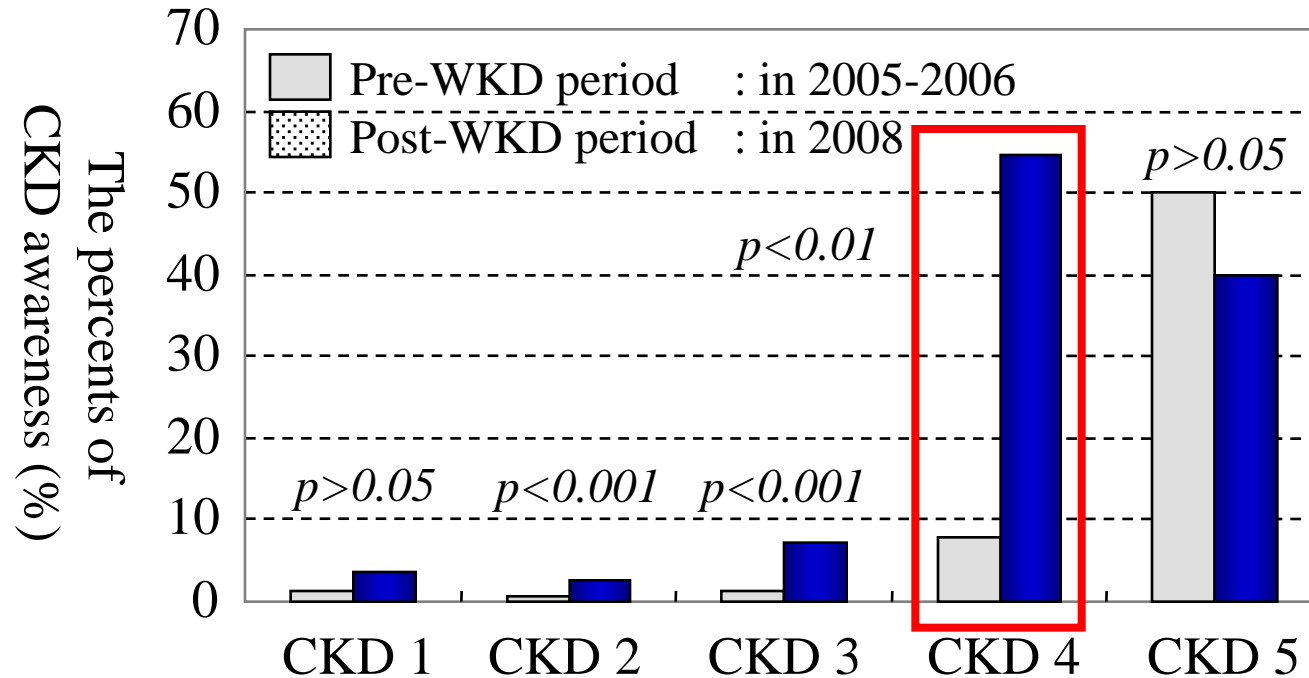
CKD awareness and Campaign



* $p < 0.05$ compared to the period of 1Q 2005, by multiple logistic regression showed on Table 3
1Q: January~March, 2Q: April~June, 3Q: July~August, 4Q: September~ December

The awareness of CKD in all subjects
according to the examined period

CKD awareness and Campaign



The changes of CKD awareness according to the examined period according to CKD stages.

CKD awareness and Campaign

Table 3. The status of clinical parameters according to the awareness of CKD in subjects with CKD

	Unaware ^a (<i>n</i> = 6308)	Aware ^a (<i>n</i> = 199)	<i>P</i> -value ^a
SBP	120.1 ± 0.2	116.9 ± 1.0	<0.01
DBP	75.9 ± 0.1	75.1 ± 0.7	>0.05
Glucose	102.0 ± 0.3	100.8 ± 1.4	>0.05
HbA1c	5.96 ± 0.01	5.93 ± 0.05	>0.05
Cholesterol	205.0 ± 0.5	198.3 ± 2.7	<0.05
Triglyceride	131.1 ± 1.1	125.9 ± 6.1	>0.05

^aAware: CKD subjects recognized their renal problem, Unaware: CKD subjects no idea of their renal problem.

CKD awareness and Campaign

	In subjects without hypertension		
	Unaware ^a (<i>n</i> = 4227)	Aware ^a (<i>n</i> = 81)	<i>P</i> -value ^a
SBP	113.3 ± 0.2	114.6 ± 1.3	>0.05
DBP	71.7 ± 0.1	74.1 ± 1.0	<0.05
Glucose	98.6 ± 0.3	96.7 ± 2.0	>0.05
HbA1c	5.85 ± 0.01	5.86 ± 0.01	>0.05
Cholesterol	203.6 ± 0.5	207.2 ± 4.0	>0.05
Triglyceride	121.2 ± 1.2	118.0 ± 8.8	>0.05
	In subjects with hypertension		
	Unaware (<i>n</i> = 2075)	Aware (<i>n</i> = 117)	<i>P</i> -value
SBP	133.6 ± 0.4	127.3 ± 1.6	<0.001
DBP	84.3 ± 0.3	81.3 ± 1.1	<0.05
Glucose	108.5 ± 0.5	108.1 ± 2.2	>0.05
HbA1c	6.18 ± 0.02	6.11 ± 0.07	>0.05
Cholesterol	207.7 ± 0.9	194.0 ± 3.8	<0.001
Triglyceride	150.5 ± 2.0	143.4 ± 8.7	>0.05

CKD awareness and Campaign

In subjects without diabetes mellitus			
	Unaware (<i>n</i> = 5443)	Aware (<i>n</i> = 159)	<i>P</i> -value
SBP	119.1 ± 0.2	116.9 ± 1.1	<0.05
DBP	75.5 ± 0.1	75.3 ± 0.8	>0.05
Glucose	94.2 ± 0.1	94.3 ± 0.9	>0.05
HbA1c	5.70 ± 0.01	5.71 ± 0.03	>0.05
Cholesterol	204.6 ± 0.5	201.0 ± 2.9	>0.05
Triglyceride	123.5 ± 1.0	122.8 ± 6.2	>0.05
In subjects with diabetes mellitus			
	Unaware (<i>n</i> = 864)	Aware (<i>n</i> = 40)	<i>P</i> -value
SBP	126.8 ± 0.5	119.6 ± 2.4	<0.01
DBP	79.0 ± 0.4	75.7 ± 1.7	>0.05
Glucose	150.2 ± 1.5	145.4 ± 7.3	>0.05
HbA1c	7.57 ± 0.05	7.39 ± 0.25	>0.05
Cholesterol	207.2 ± 1.4	188.2 ± 6.8	<0.01
Triglyceride	178.4 ± 4.0	153.7 ± 19.4	>0.05

is with no idea of their renal problem

CKD awareness and Campaign: suggestions

First of all,

the WKD campaign cost 551, 000 US dollars to announce the importance of CKD to 90 % of the 43.7 million Korean population.

It only costs ~ 1.2 US cents for one Korean.

In 2004, Korea spent 3.24% (0.37 billion US dollars) of medical expenditure on renal disease coded as N18.x and N19.x of ICD-10, that is, ~ 8 US dollars for each Korean.

So, Korea could afford to devote more resources to the campaign to get more benefits from improving quality of care for CKD patients.

CKD awareness and Campaign: suggestions

Secondly,
the campaign should have been carried out throughout the year with
planned issues.

The awareness was increased just after presenting the data of
the prevalence of CKD in March 2008 which the people WANT TO
KNOW.

We must find and deliver the information that the population wants
to know on a preferential basis.

CKD awareness and Campaign: suggestions

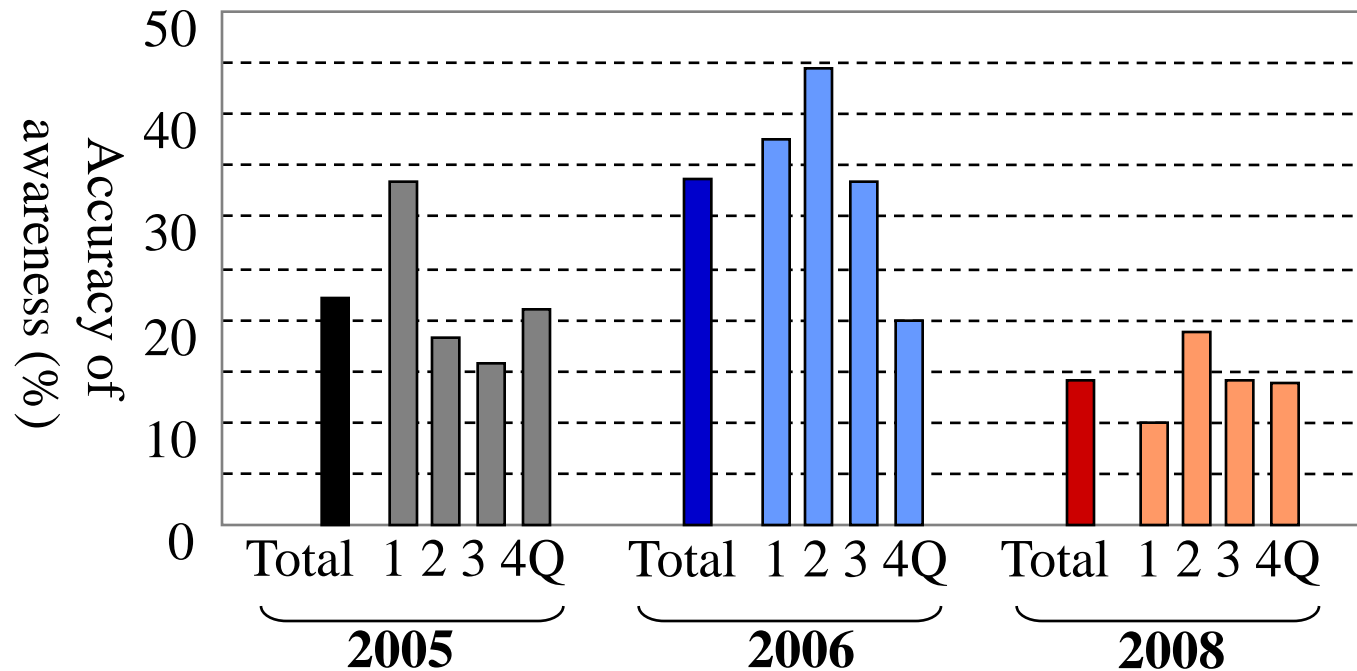
Thirdly,

we should encourage the health care providers

- to understand the importance of CKD,
- to give the information of medical status to their own patients,
- to evaluate the CKD appropriately,
- to be educated on guidelines for CKD, and
- to transfer the CKD patient to nephrologists
in appropriate time.

Thank you

CKD awareness and Campaign



Accuracy of awareness for CKD :

(Number of subjects who reported renal disease with CKD)/

(Number of subjects who reported renal disease with or without CKD)

1Q: January~March, 2Q: April~June, 3Q: July~August, 4Q: September~ December

The accuracy of awareness for CKD according to examined period

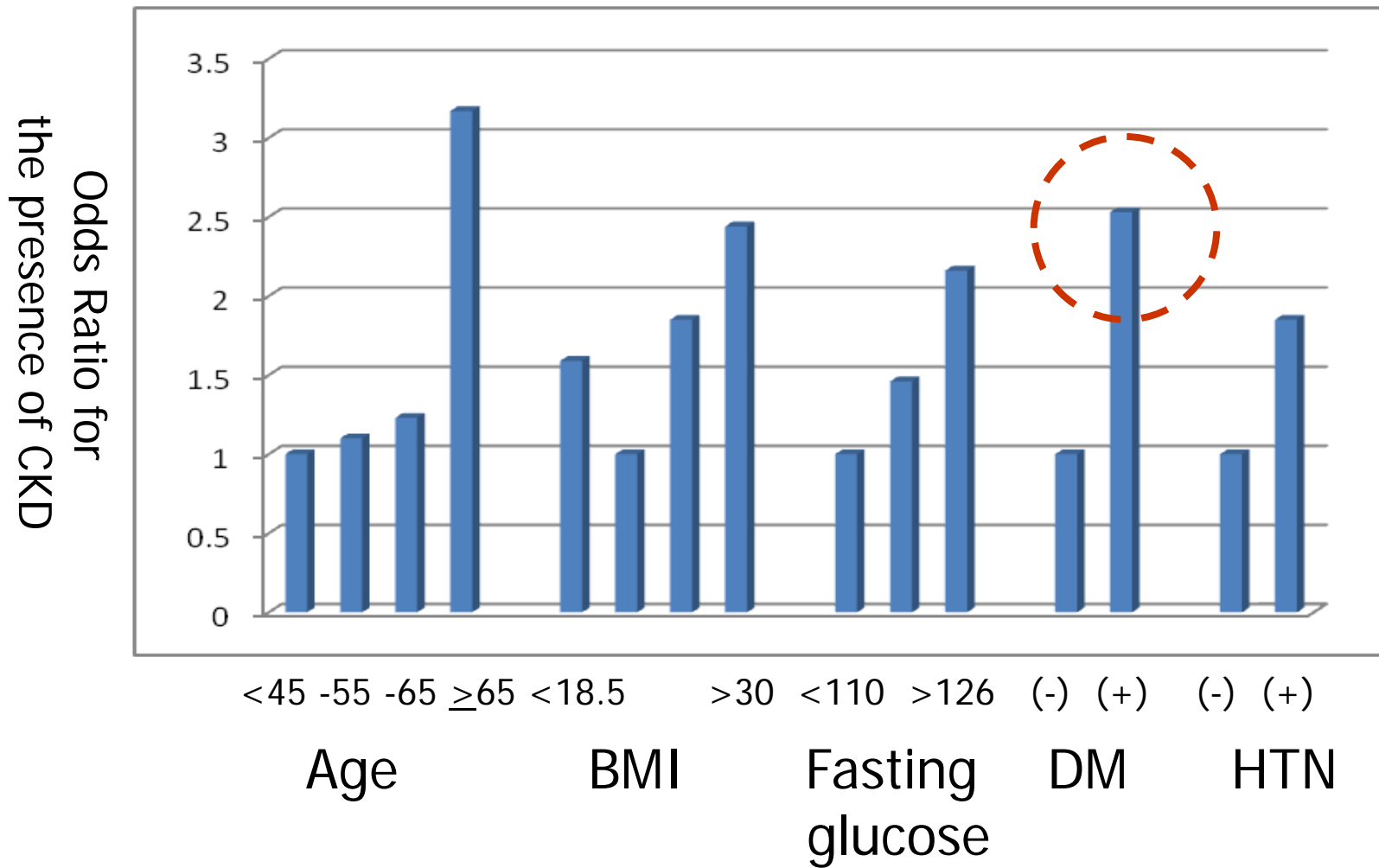
The pattern of clinical practice affects on the outcome in diabetes mellitus (DM)

Ho Jun Chin, Dong Chan Jin*,
Dong Ki Kim, Kook Hwan Oh, Ki Young Na,
Kwon Wook Ju, Chun Soo Lim, Yon Su Kim,
Dong-Wan Chae, Curie Ahn, Jin Suk Han, Suhnggwon Kim

Department of Internal Medicine,
Seoul National University College of Medicine
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Risk factor to CKD

• KSN CKD survey



* adjusted with age, sex, BMI, HTN, DM
J Korean Med Sci 2009; 24 (Suppl 1): S11-21

Clinical practice pattern vs Guideline

- 1. Although there are many guidelines, physicians inadequately recognize and apply them to clinical practice.**
2. The practice outcomes of DM patients should be improved further to satisfy guidelines.
- 3. We need studies to confirm that adherence to guidelines brings better outcomes for self-confidence.**

Methods

Data were collected by searching EMR and dataware house in SNUBH

Patients

Visited to SNUBH in 2004 one or more times.

Patients diagnosed E10-14 in ICD-10 diagnosis code,
or having OHA/insulin

Patients aged 18 years or more

Use ADA guidelines and KDOQI guidelines for appropriate practice

Methods

Patient group

According to

Checking

BP

Renal function : UACR, Cr

Lipid profile: chol, LDL, HDL, TG

HbA1c

Usage of

ACEI or ARB

Antiplatelet agents

Statin

Diagnosis by physician as ICD-10 code:

CVA, CAD, CVD, HTN, Cancer

* CVD: myocardial infarction, stroke, TIA, ppr.vascular disease, angina, vascular bypass surgery

Outcome

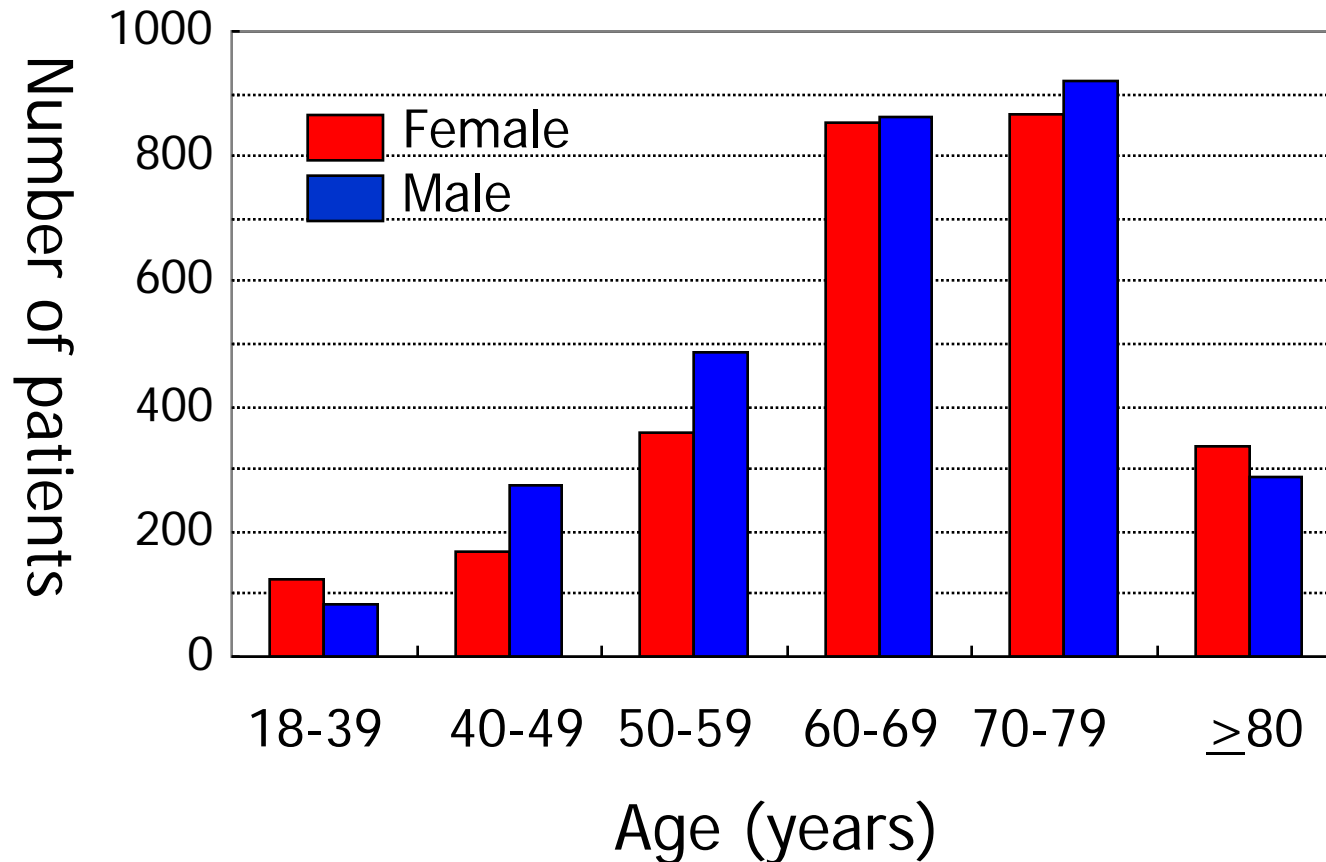
ESRD or death until 31/Dec/2008

Results

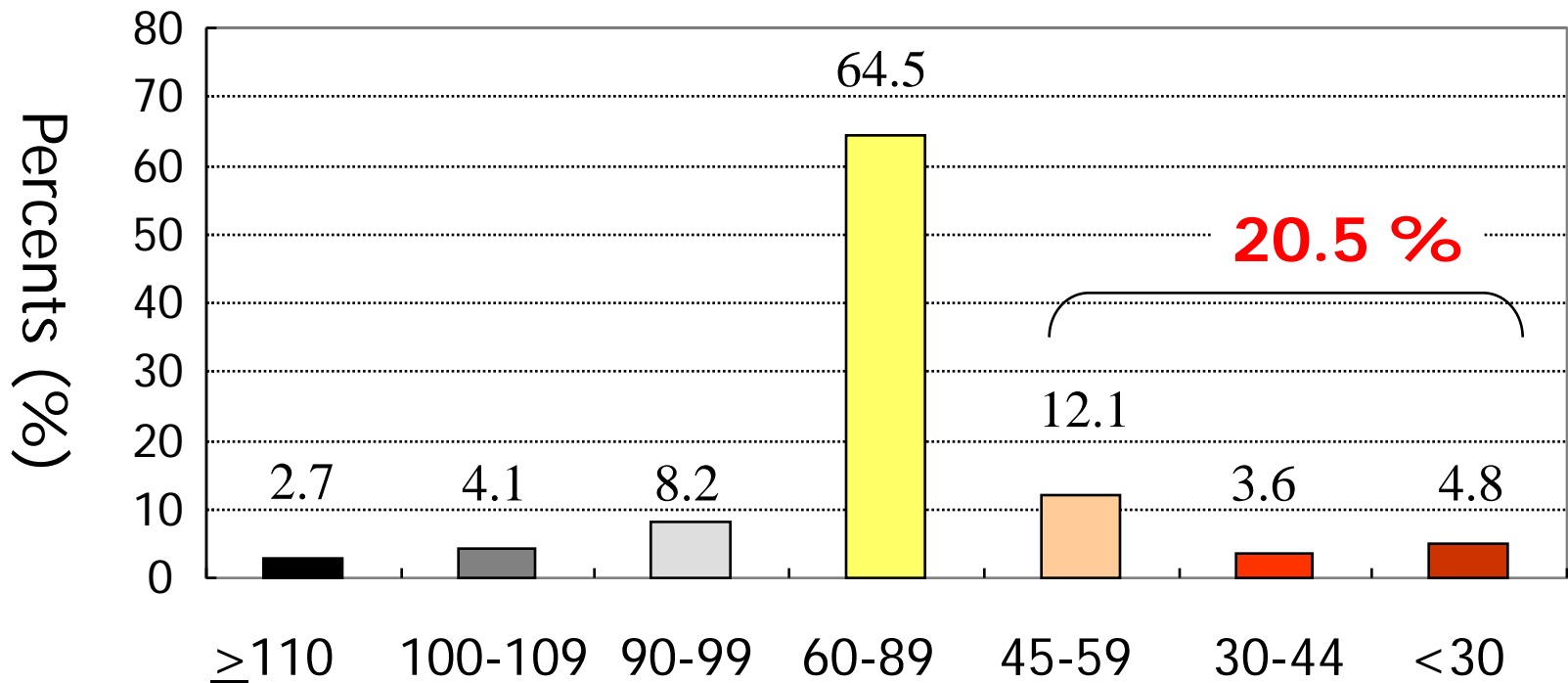
Number : 5,623 adult patients

Age : median 68 (18-99)

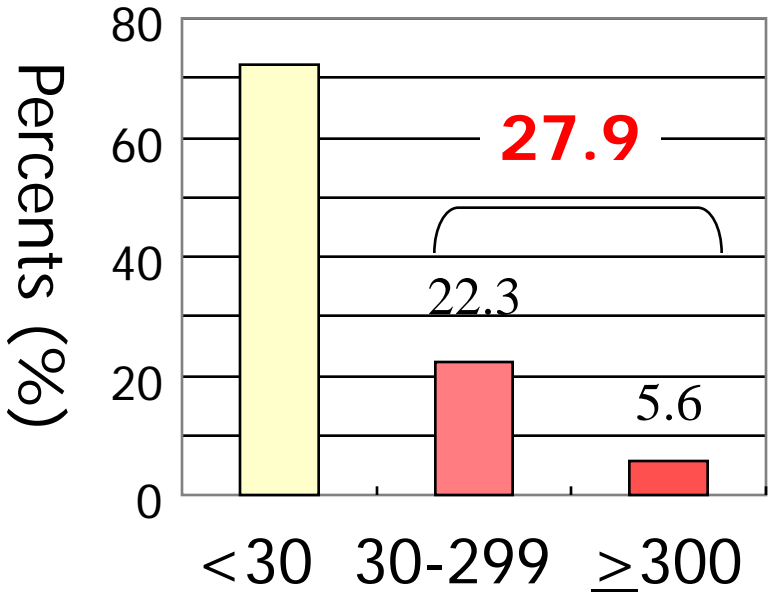
Female : Male = 2,708:2,915 (48.2%:51.8%)



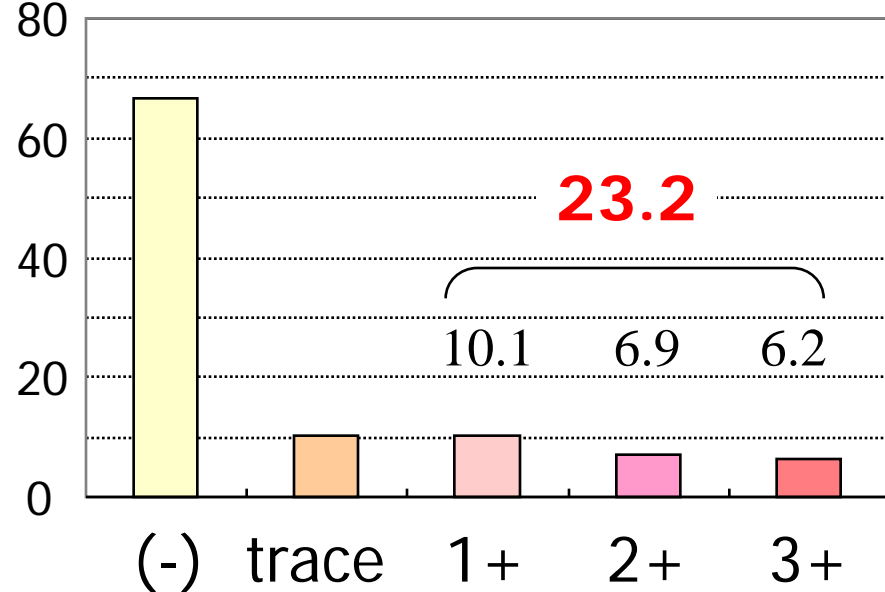
Results; Distribution of eGFR by MDRD among 4,453 pts with the results of serum creatinine in 2004



Results; Distribution of UACR and proteinuria by dipstick



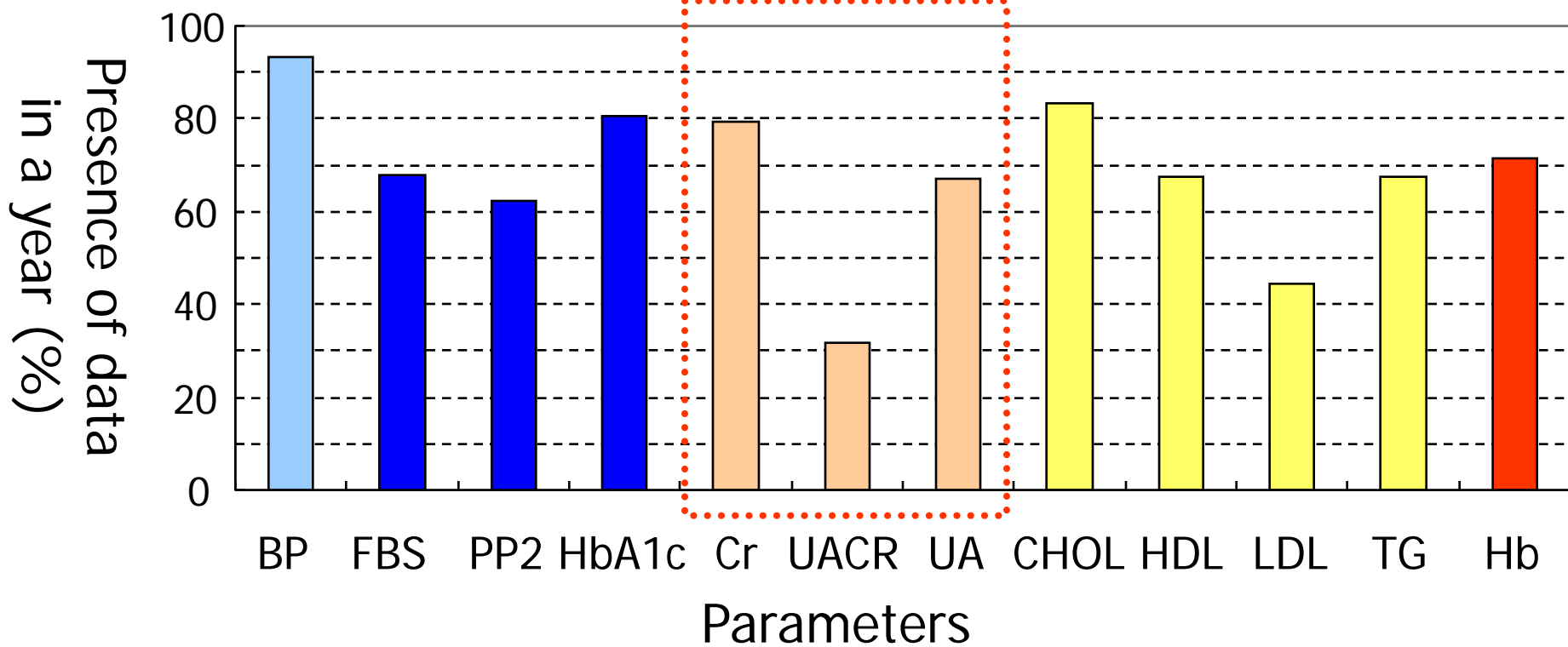
UACR (mg/g cr)
among 1,776 pts



Urine protein by dipstick
among 3,778 pts

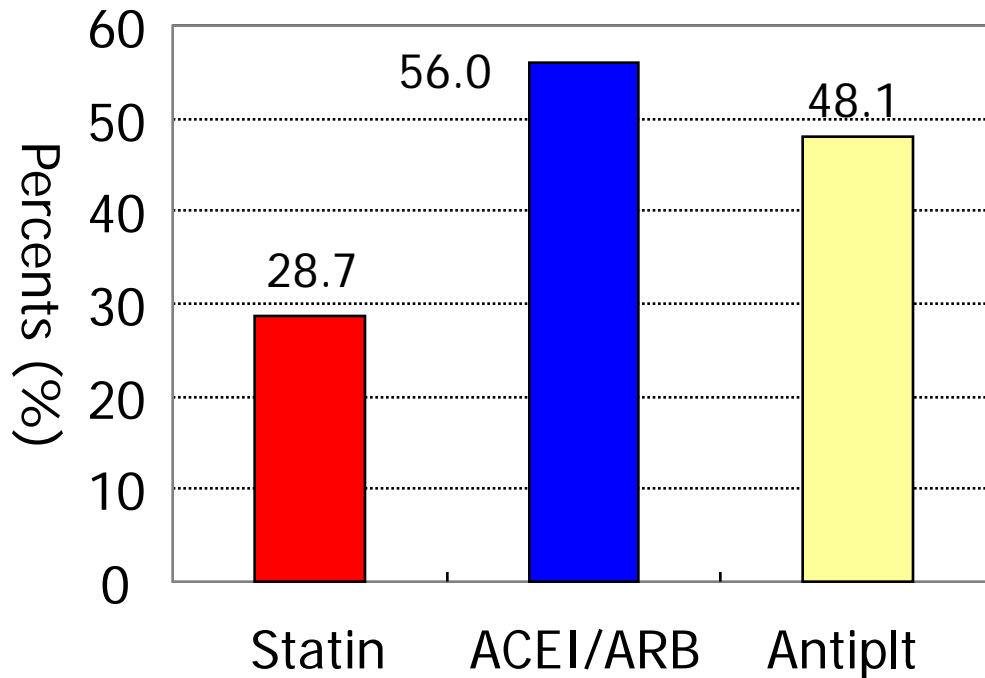
Results

Presence of data; at least one test in 2004



Results;

Prescription rate of medicine among patients who were recommended to take by guidelines



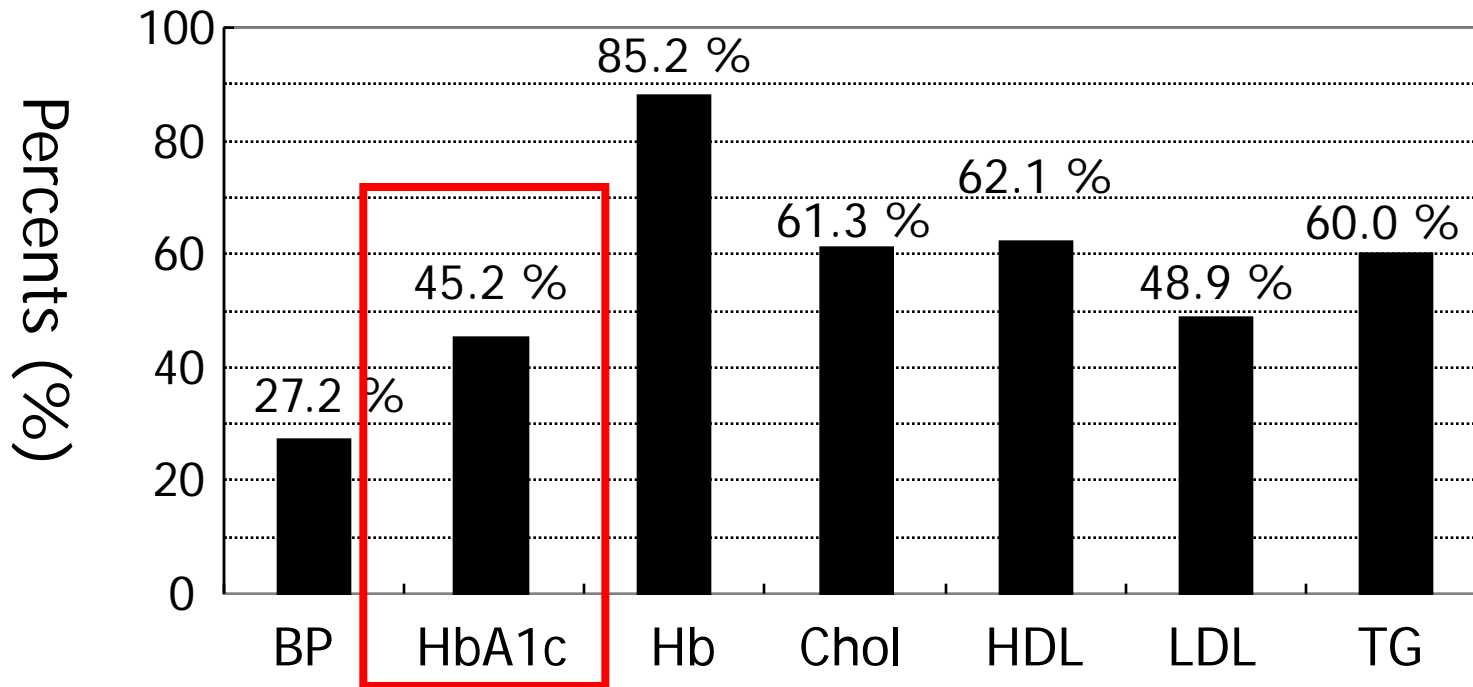
*Statin: Among patients with CVD, $LDL \geq 100$, or (Age >40 and Chol >135)

*ACEI/ARB: Among patients with HTN or albuminuria

*Antiplt: Among patients with CVD, CVD risk, or aged >40

Results;

Percents of appropriate level in lab. results in patients who had been tested.



*BP <130/80 mmHg, HbA1c <7%, Hb > 11g/dL, Chol <200 mg/dL,
HDL > 50 (F), > 40 mg/dL (M), LDL < 100 mg/dL, TG < 150 mg/dL

Results; Death and ESRD until Dec.2008

*Data of 19 patients were missing

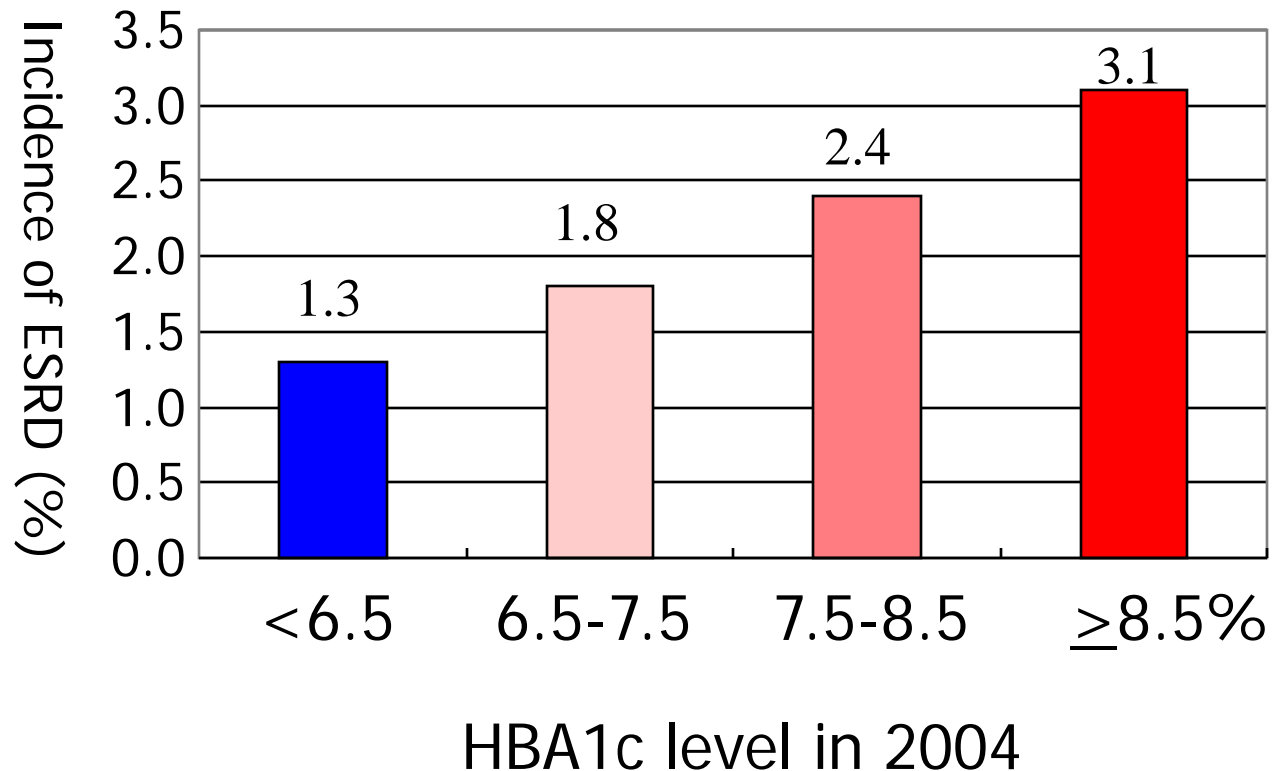
Composite outcome: 674/5567 (12.1%)
during 52.3_±12.0 months

	Alive	Dead	Sum	New ESRD
No ESRD	4912	562 (10.3%)	5474	} 1.7%
New ESRD	70	23 (24.7%)	93	
ESRD at 2004	20	17 (45.9%)	37	
Sum	5002	602 (10.2%)	5604	

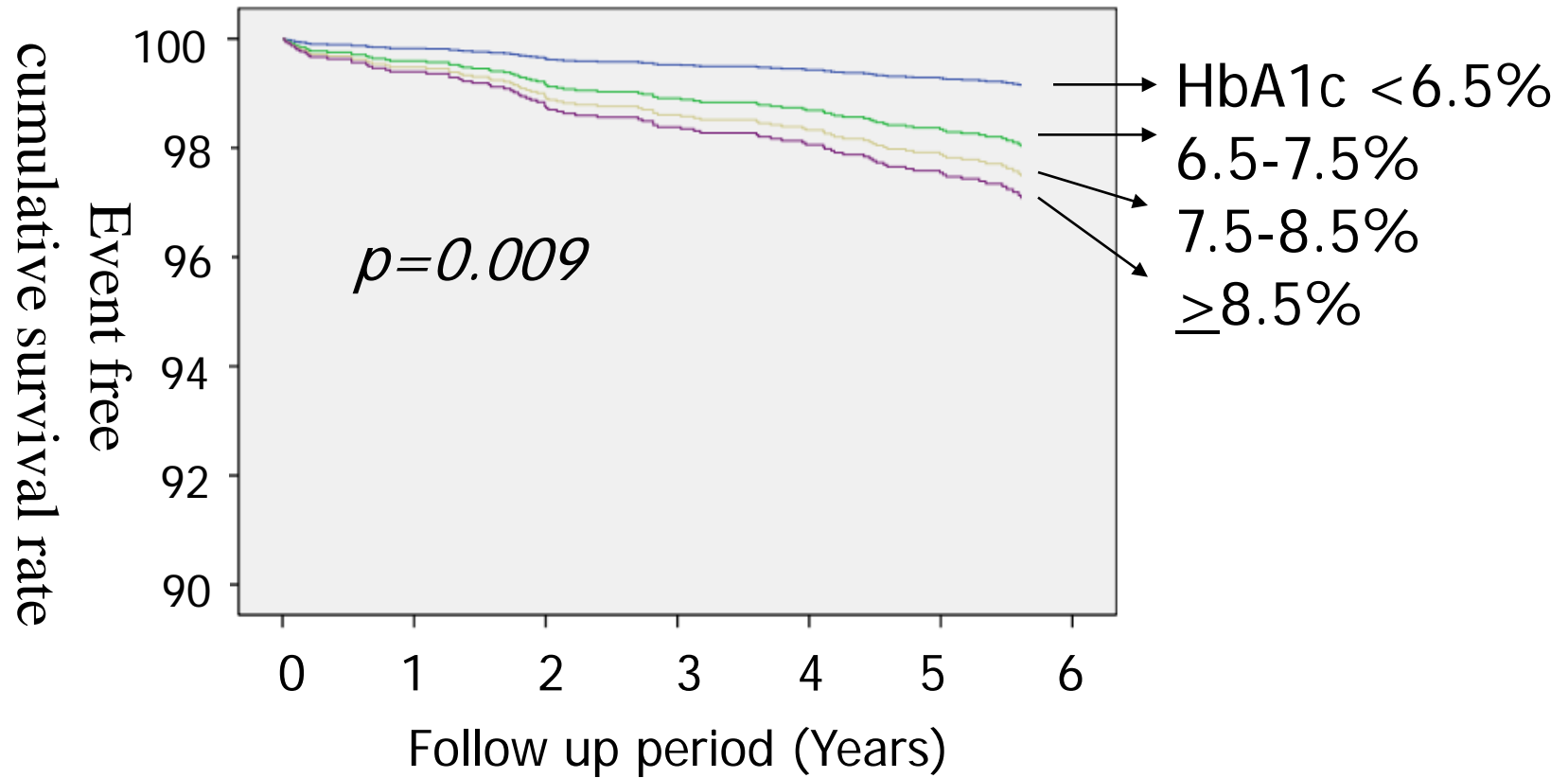
Death

(Death rate was 10.5% in 5567 patients)

Results; Incidence of ESRD according to HbA1c level in 2004



Results; Cumulative Survival for ESRD according to HbA1c level in 2004



Cox proportional hazard model for ESRD

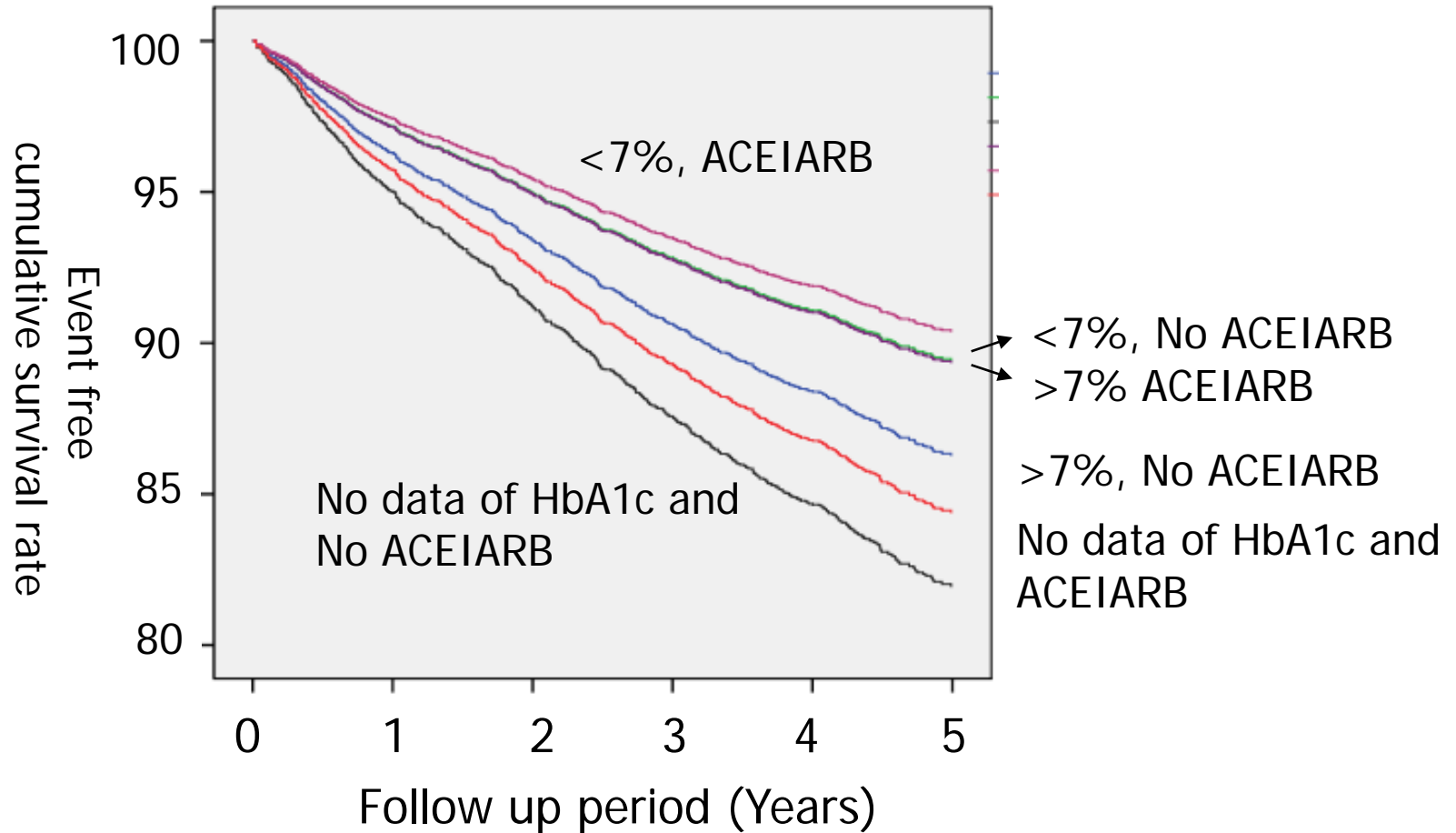
(adjusted for age, sex, cardiovascular risk factors)

	<i>P</i> value	Hazard Ratio	95%CI
Group 1 (HbA_{1c}<6.5)	0.006		
2 (6.5-7.5)	0.022	2.713	1.158-6.534
3 (7.5-8.5)	0.002	3.962	1.674-9.375
4 (>8.5)	0.001	4.182	1.777-9.842
Sex	0.010	1.943	1.172-3.220
eGFR<60	0.025	1.867	1.083-3.220
MBP	0.173	1.012	0.995-1.029
Age	0.719	0.996	0.974-1.018
cholesterol	0.462	1.002	0.997-1.007
CVD	0.278	0.751	0.447-1.261
cancer	0.220	0.529	0.191-1.462

MBP; mean blood pressure, CVD; CAD, atherosclerosis, HF, CVA

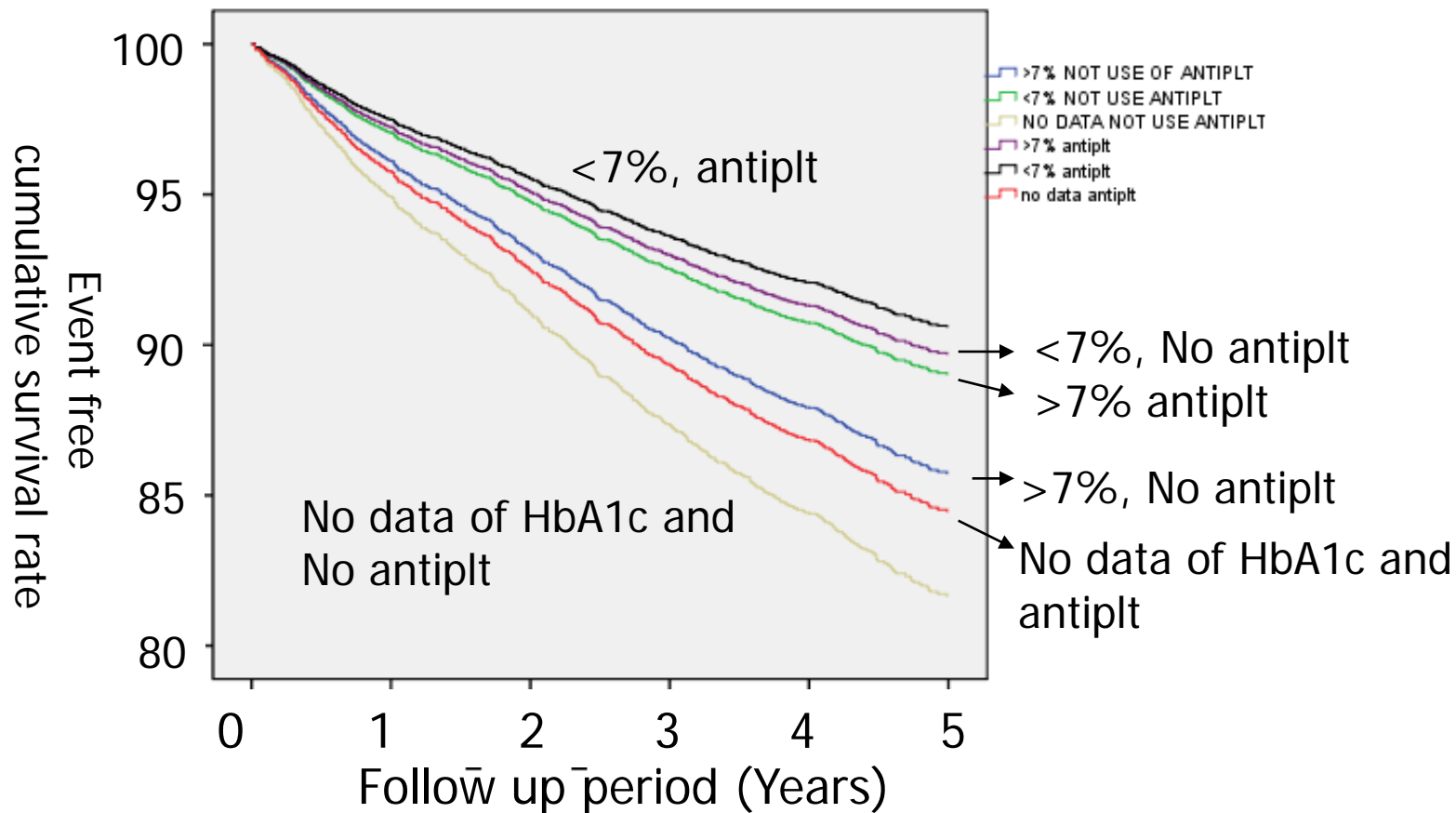
Results; Univariate factors to **composite outcome**

Group acc. to usage of ACEIARB and HbA1c



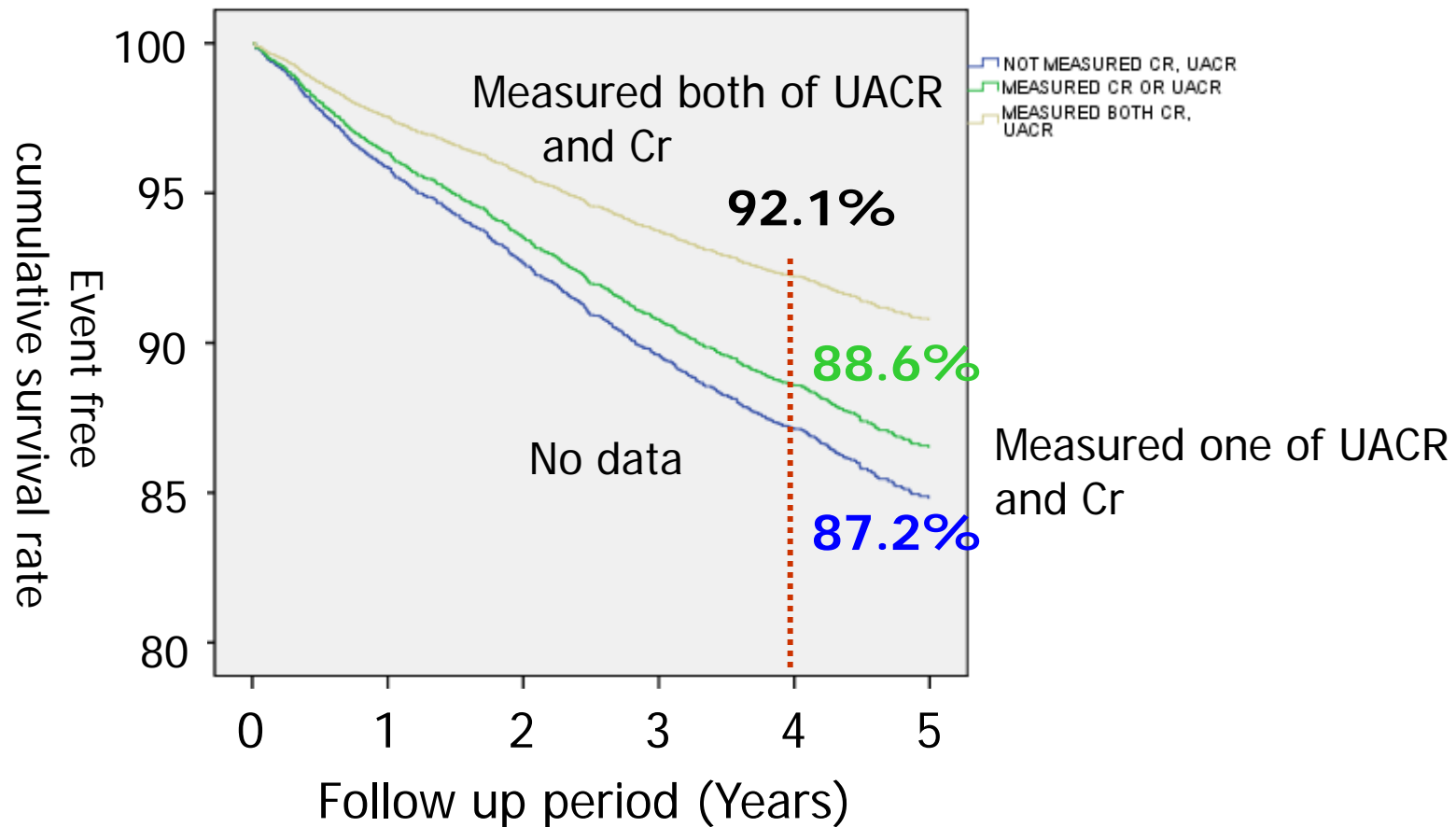
Results; Univariate factors to composite outcome

Group acc. to usage of antiplatelet agents and HbA1c



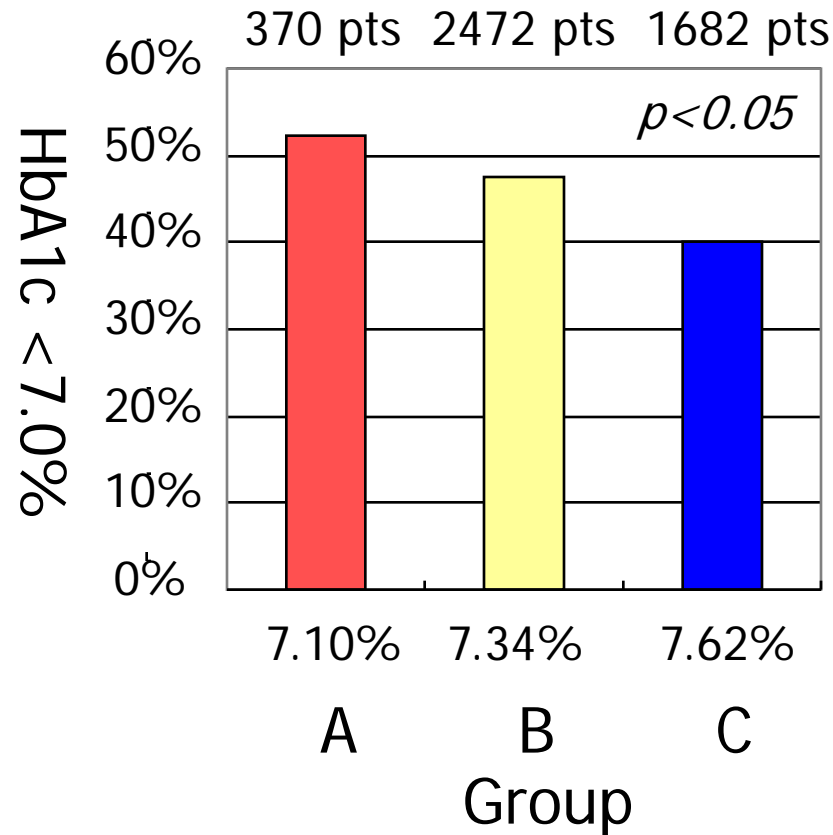
Results; Univariate factors to composite outcome

Group acc. to presence of renal functional data



Results;

Find the clue why the checking renal function was related to the outcome



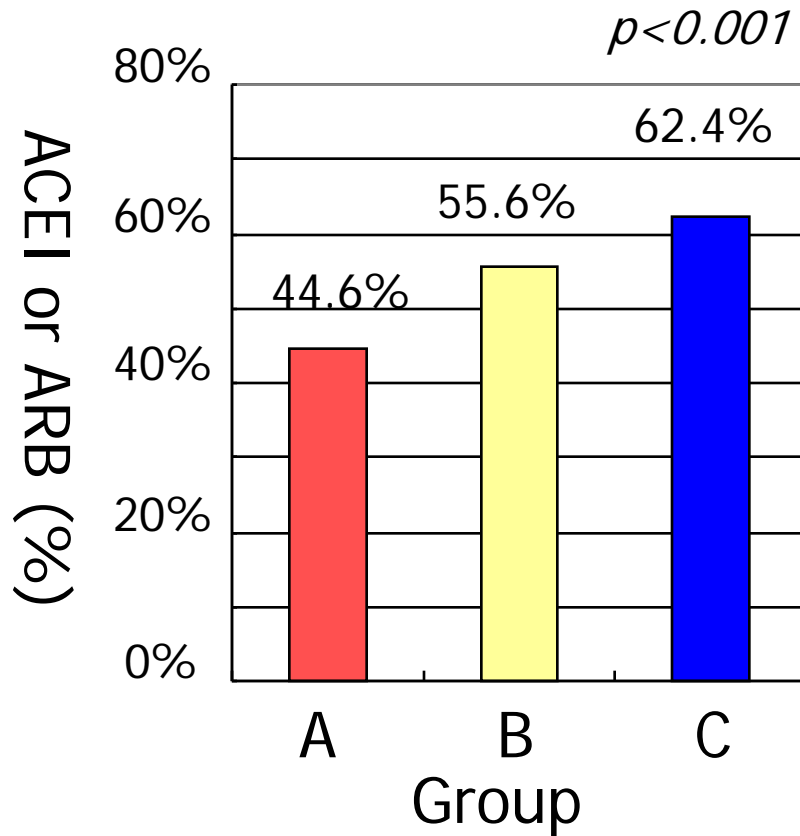
Group A: patients without the results of UACR and Cr (1056)

Group B: patients with one of the results of UACR or Cr (2875)

Group C: patients with both results of UACR and Cr (1692)

Results;

Usage of ACEI and/or ARB according to testing renal function



ACEI or ARB should be prescribed in patients with hypertension or albuminuria (urine dipstick $\geq 1+$)

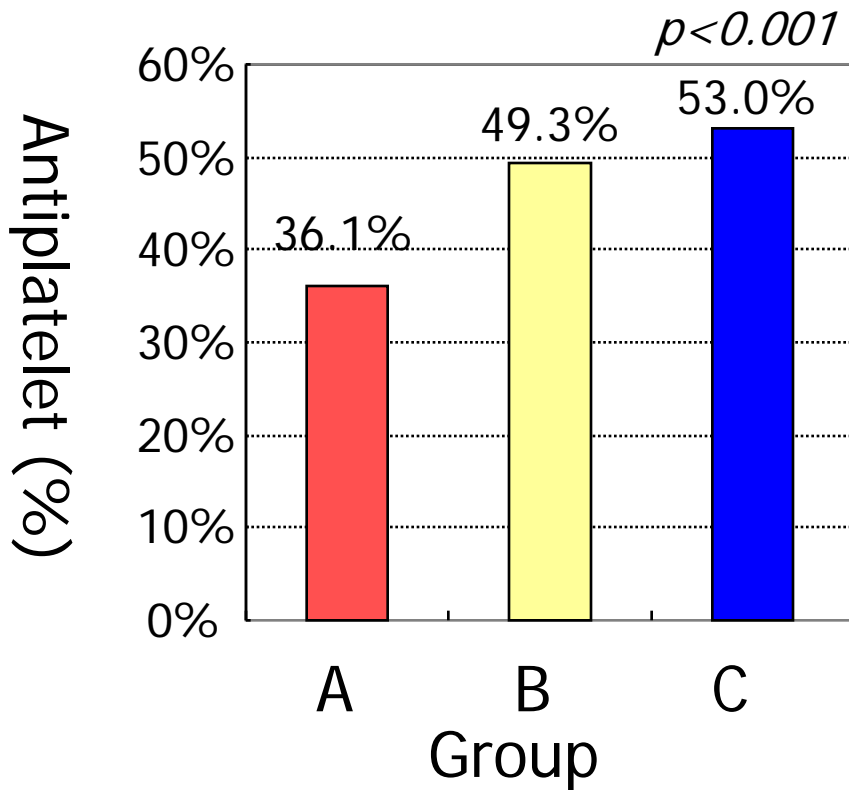
Group A: patients without the results of UACR and Cr (1056)

Group B: patients with one of the results of UACR or Cr (2875)

Group C: patients with both results of UACR and Cr (1692)

Results;

Usage of antiplatelet agents according to testing renal function



Antiplatelet agent should be prescribed in patients with CVD, CVD risk, or patients aged 40 years or more.

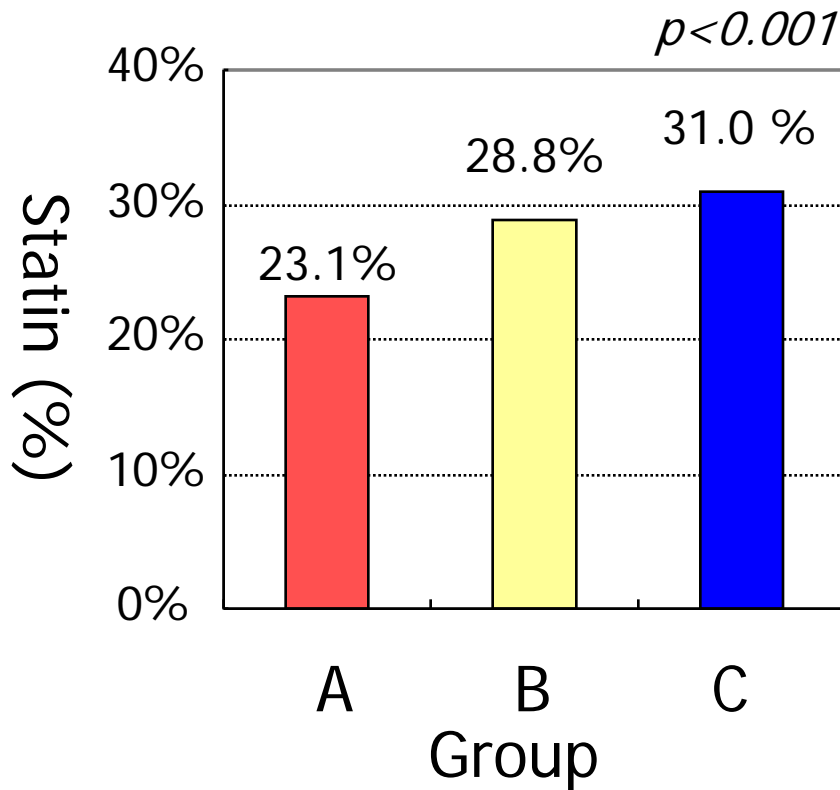
Group A: patients without the results of UACR and Cr (1056)

Group B: patients with one of the results of UACR or Cr (2875)

Group C: patients with both of the results of UACR and Cr (1692)

Results;

Usage of statin according to testing renal function



Statin should be prescribed in patients with CVD, LDL>100, or patients aged 40 years or more and Cholesterol \geq 135.

Group A: patients without the results of UACR and Cr (1056)

Group B: patients with one of the results of UACR or Cr (2875)

Group C: patients with both results of UACR and Cr(1692)

Results; Cox's hazard proportional analysis for composite outcome

	B	Sig.	RR	95% CI for RR	
Male	0.184	0.020	1.202	1.030	1.404
Age	-0.002	0.448	0.998	0.991	1.004
Cholesterol		0.065			
<200 mg/dL	-0.204	0.022	0.815	0.684	0.971
No data	-0.018	0.931	0.982	0.657	1.468
HbA1c		0.001			
< 7%	-0.212	0.023	0.809	0.674	0.971
No data	0.251	0.035	1.286	1.018	1.624
Renal fx data		0.002			
UACR or Cr	0.174	0.362	1.190	0.819	1.727
UACR and Cr	-0.175	0.395	0.840	0.562	1.256
Usage of ACEIARB	-0.088	0.340	0.916	0.765	1.097
Usage of Antiplt	-0.185	0.044	0.831	0.695	0.995

Summary

1. The prevalence of $eGFR < 60$ was 20.5% among DM patients with creatinine value.
2. The prevalence of albuminuria was around mid-20%.
3. Monitoring lab. test in DM patients was insufficient compared to recommended guidelines, especially in testing UACR, UA, and LDL-C.
4. Goals of management for DM patients were not well achieved based on guidelines.

Summary

5. Death rate was 10.2% and incidence of ESRD was 1.7%. The composite event was 12.1 % among patients without ESRD at 2004.

6. HbA1c level affects on the prognosis and that effect was influenced by usage of ACEIARB and antiplatelet agents.

7. The independent risk factors to prognosis of DM was gender, level of HbA1c, presence of HbA1c and renal functional data, and usage of antiplatelet agents.

Conclusion

Testing HbA1c and renal function in DM patients was related to better prognosis in aspects of death rate and ESRD rate

which reflects close monitoring and appropriate usage of medicine, such as **ACEI, ARB, and antiplatelet agents**, might be important to improve the prognosis of renal function and mortality.

So, we should properly **monitor the important parameters** of diabetes and renal functional status and prescribe the medicine, especially **ACEI, ARB and antiplatelet agents**.

Thank you