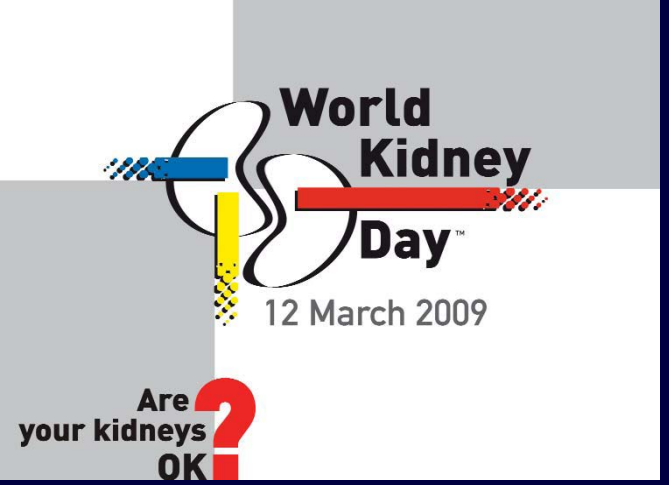
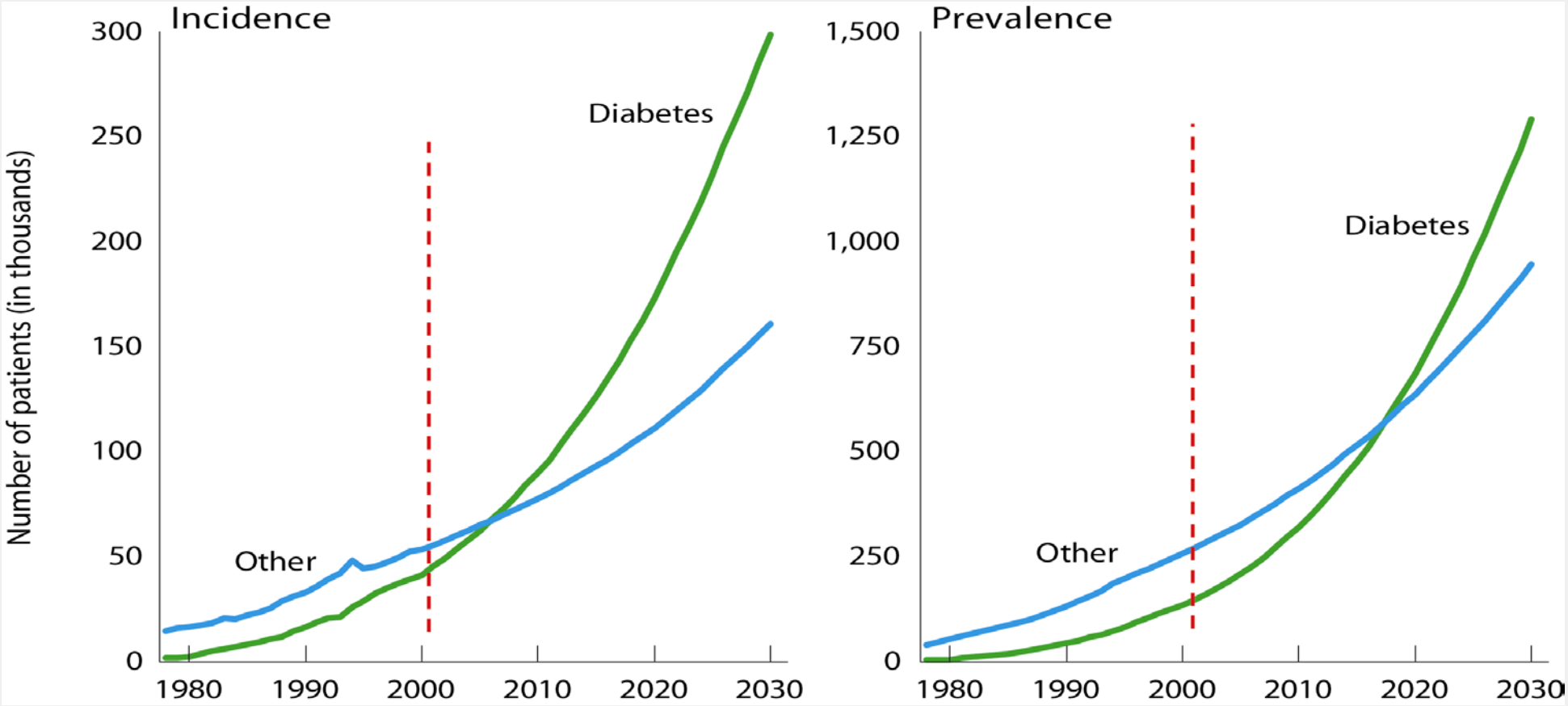


Hypertension and Chronic Kidney Disease

George Bakris, MD, F.A.S.N.
Professor of Medicine
Director, Hypertensive Diseases Unit
University of Chicago School of Medicine

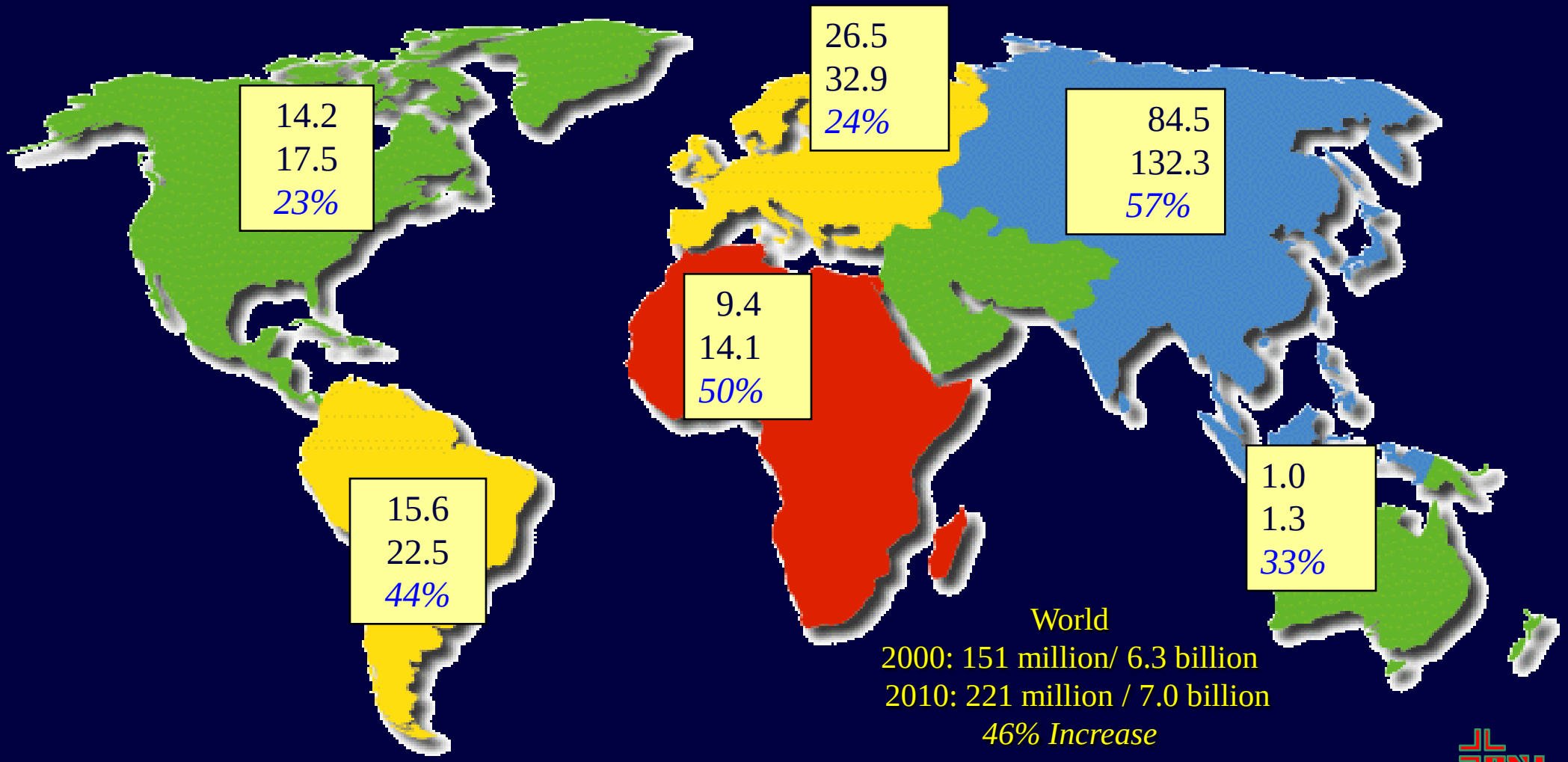
Projected growth of the incident & prevalent ESRD populations, by primary cause of renal failure: 1978-2030-USRDS 2003 Annual Data Report

Projections include US Census projection of minority populations and trends in diabetes

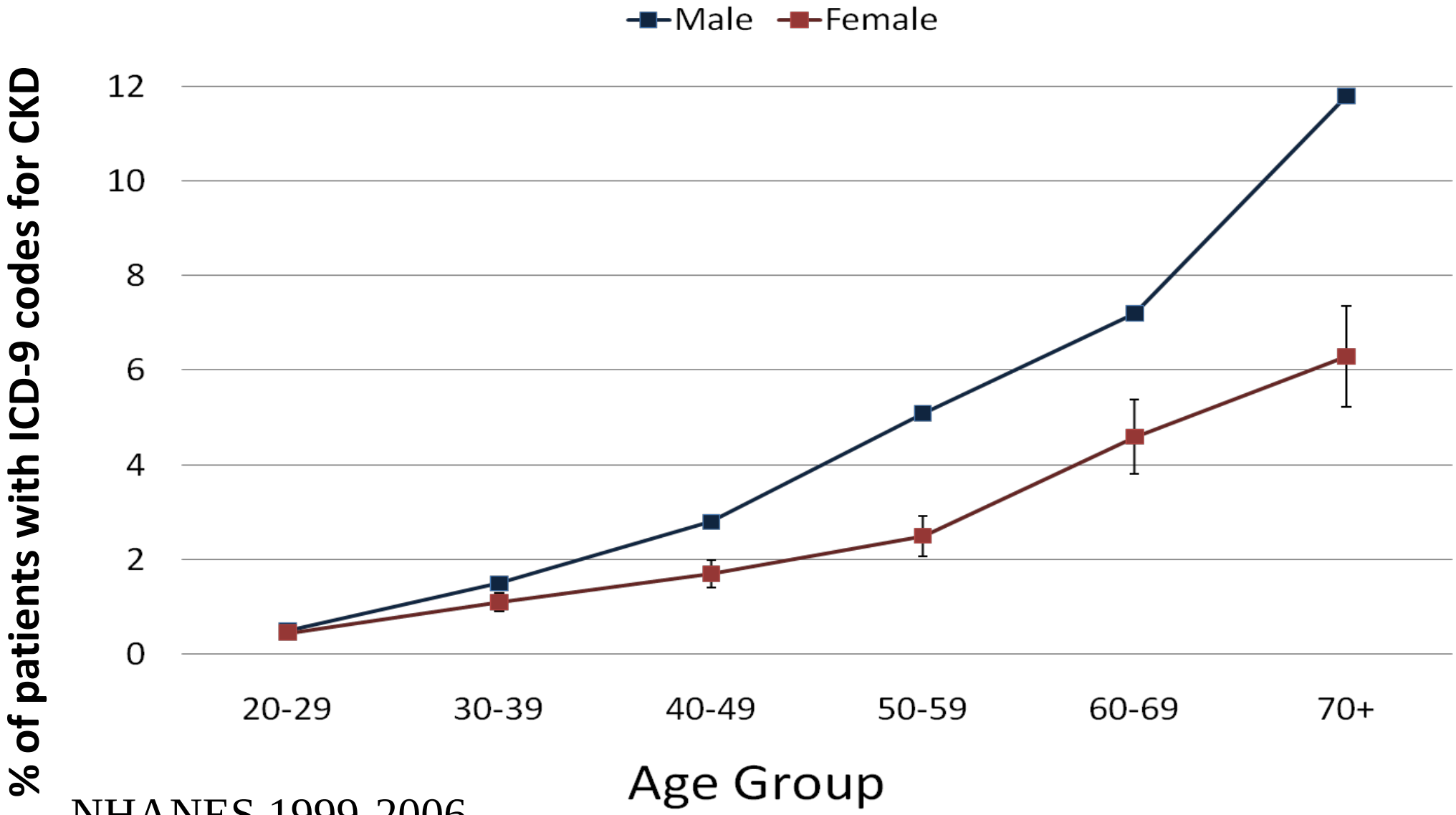


Calculated using a discrete time non-stationary Markov model.

Global Projections for the Diabetes Epidemic: 1995-2010

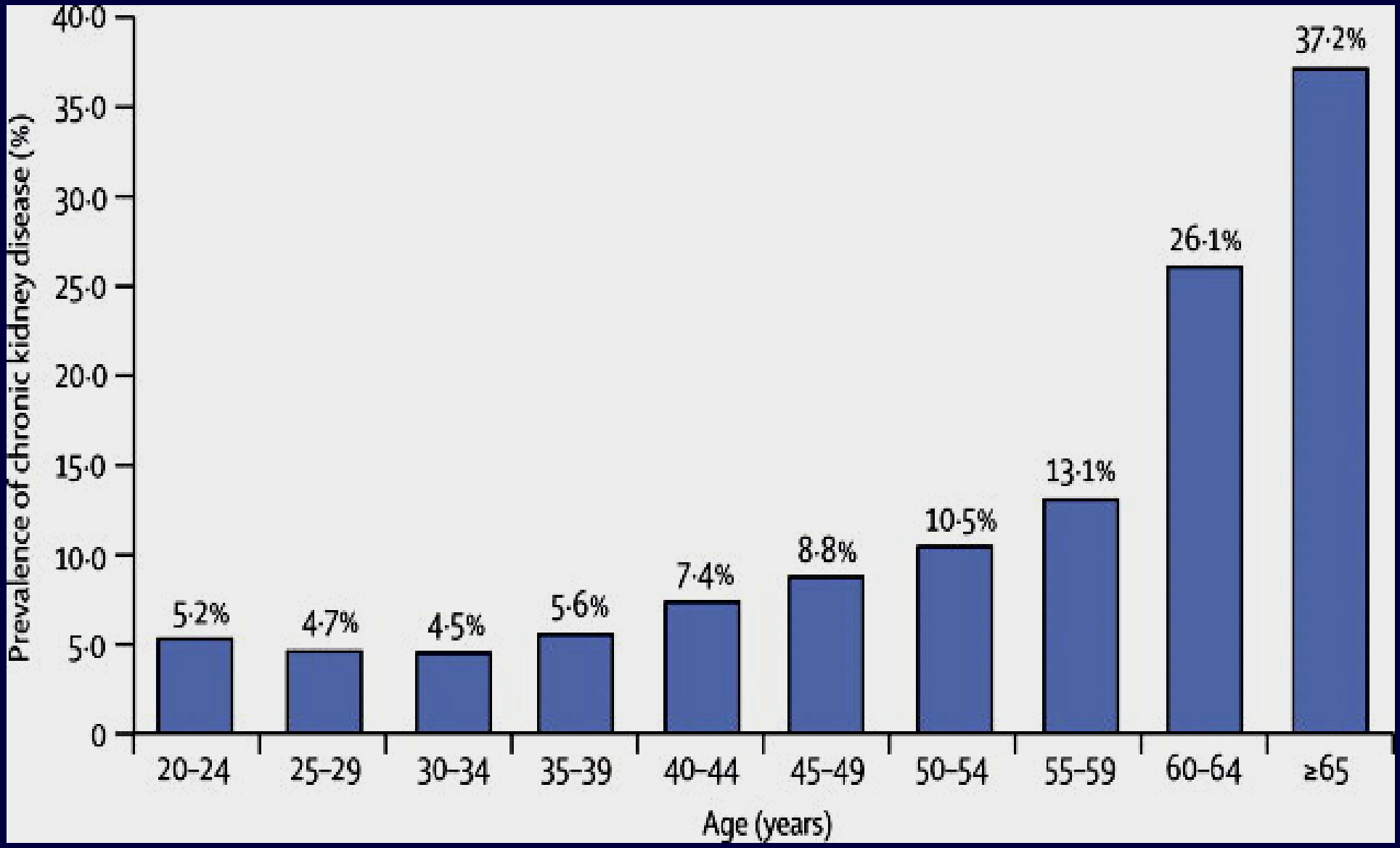


Percent of Males and Females with CKD by Decade



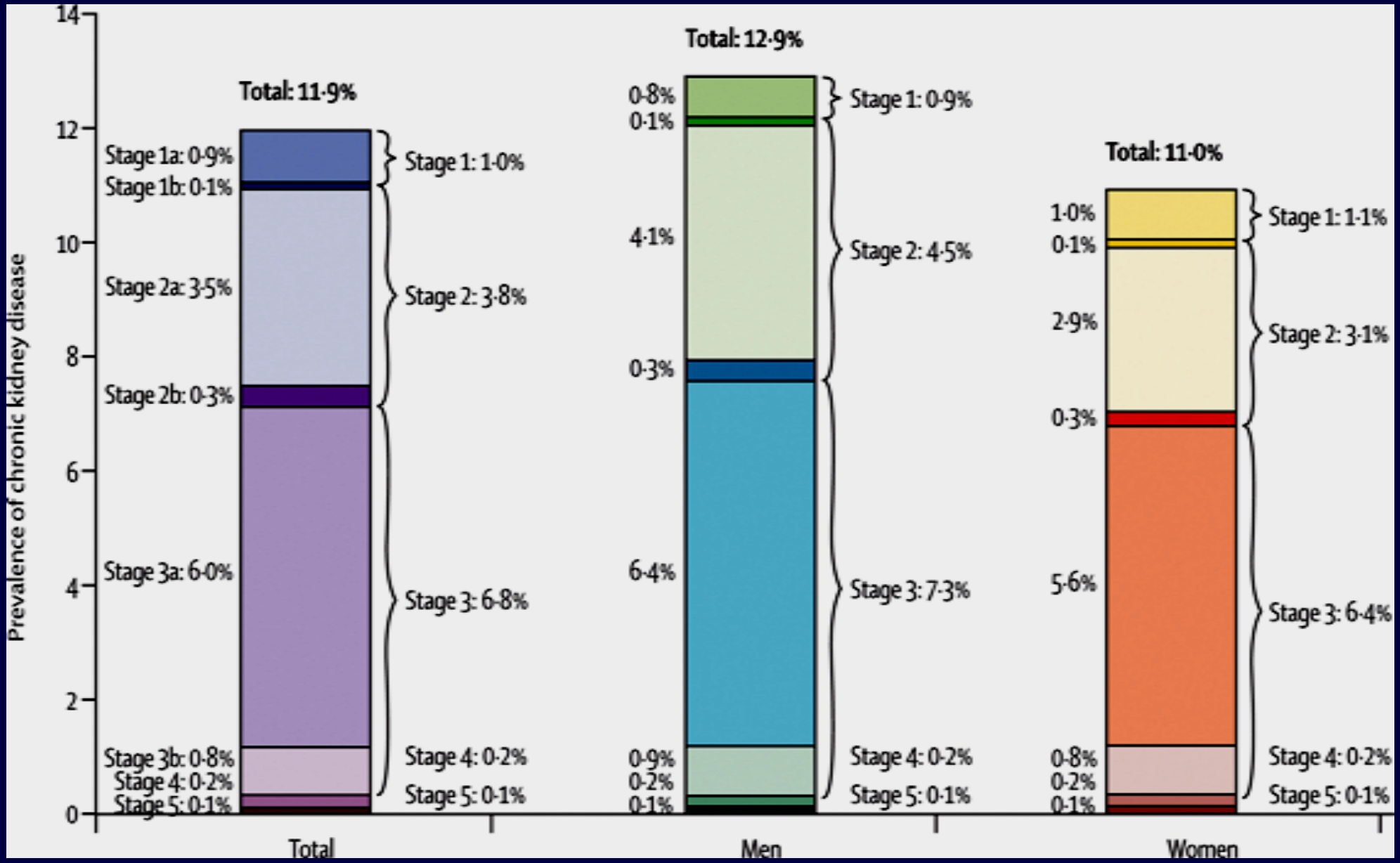
NHANES 1999-2006

Prevalence of CKD by 5-year age groups in Taiwan



Wen CP,Lancet , 2008

Prevalence of CKD in Taiwan



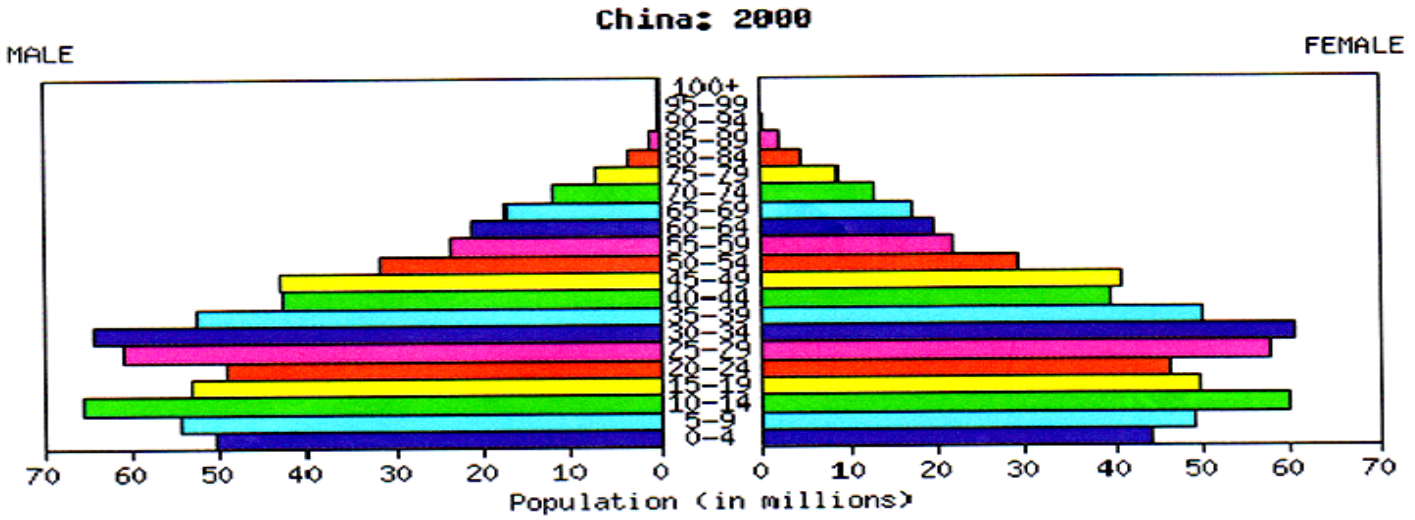
Wen CP, Lancet , 2008

Awareness of CKD 3.54%!

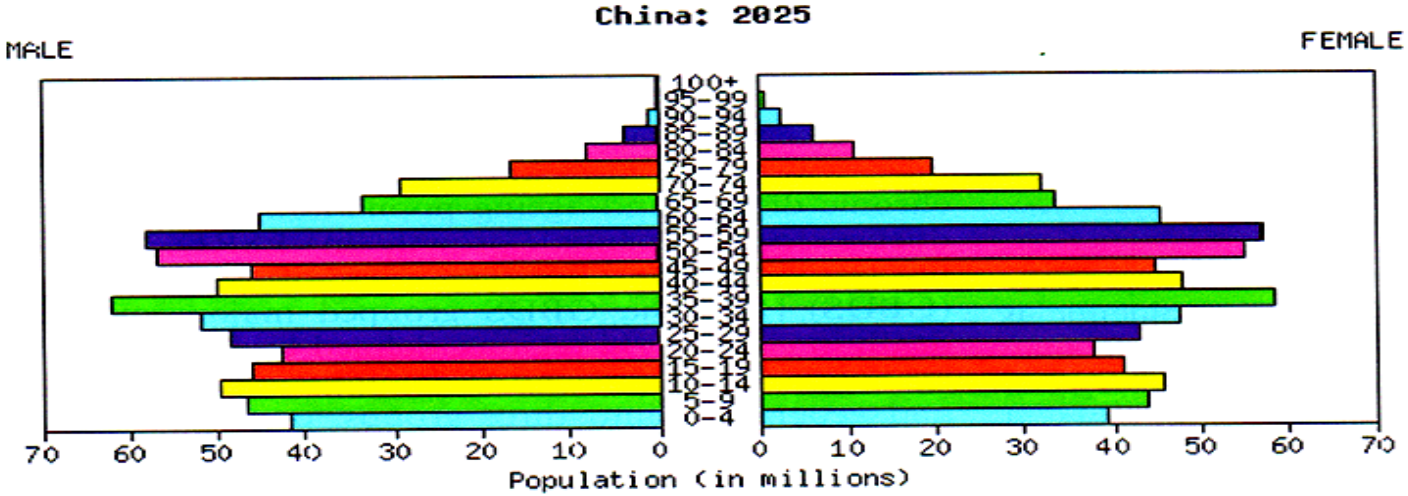
	All CKD	CKD stages				
		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Prevalence (95% CI)						
National population*	11·93% (11·66–12·20)	1·02% (0·98–1·05)	3·79% (3·73–3·85)	6·81% (6·73–6·89)	0·22% (0·21–0·23)	0·10% (0·09–0·10)
High SES†	7·33% (7·31–7·35)	1·07% (1·06–10·7)	3·10% (30·9–3·11)	3·06% (3·05–3·07)	0·06% (0·06–0·06)	0·04% (0·04–0·04)
Low SES‡	19·87% (19·84–19·91)	0·84% (0·83–0·85)	4·75% (4·74–4·77)	13·59% (13·56–13·61)	0·50% (0·50–0·51)	0·19% (0·19–0·19)
Study cohort	10·10% (9·83–10·37)§	1·04% (0·71–1·29)	3·31% (3·03–3·59)	5·53% (5·26–5·82)	0·17% (0–0·46)	0·08% (0–0·36)
High SES†	6·38% (6·30–6·50)	1·01% (0·96–1·04)	3·02% (2·55–3·45)	2·38% (2·34–2·46)	0·05% (0·04–0·06)	0·03% (0·02–0·04)
Low SES‡	17·89% (17·56–18·14)	0·95% (0·84–0·96)	4·79% (3·78–5·82)	12·04% (11·80–12·20)	0·42% (0·37–0·45)	0·19% (0·16–0·22)
Awareness (95% CI)						
Study cohort	3·54% (3·37–3·68)	2·66% (2·29–3·03)	2·68% (2·44–2·92)	4·10% (3·90–4·30)	23·67% (20·17–27·23)	51·40% (45·52–57·28)
High SES†	3·94% (3·68–4·15)	2·76% (2·41–3·19)	2·66% (2·36–2·97)	4·70% (4·11–5·29)	34·53% (26·35–42·64)	58·89% (48·71–69·09)
Low SES‡	3·32% (3·06–3·54)	2·35% (1·52–3·08)	2·71% (2·31–3·09)	3·76% (3·41–4·15)	20·32% (16·58–24·08)	47·96% (40·94–55·06)

Wen CP,Lancet , 2008

Assessment of the Epidemiologic status in elderly patients with Chronic disease in China in 2000 to 2025



Source: U.S. Census Bureau, International Data Base.

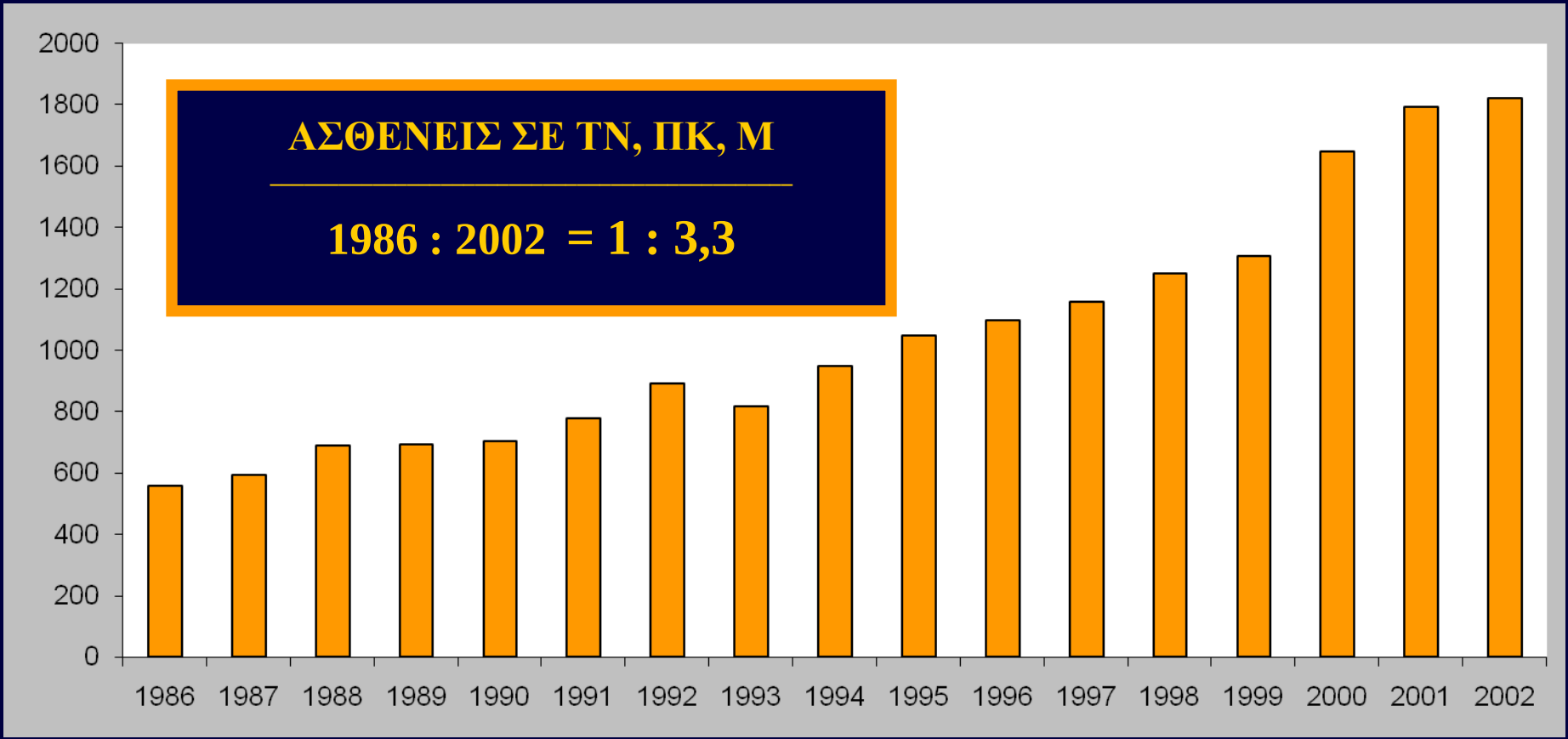


Source: U.S. Census Bureau, International Data Base.

http://www.census.gov/ipc/www/idbpyr.html

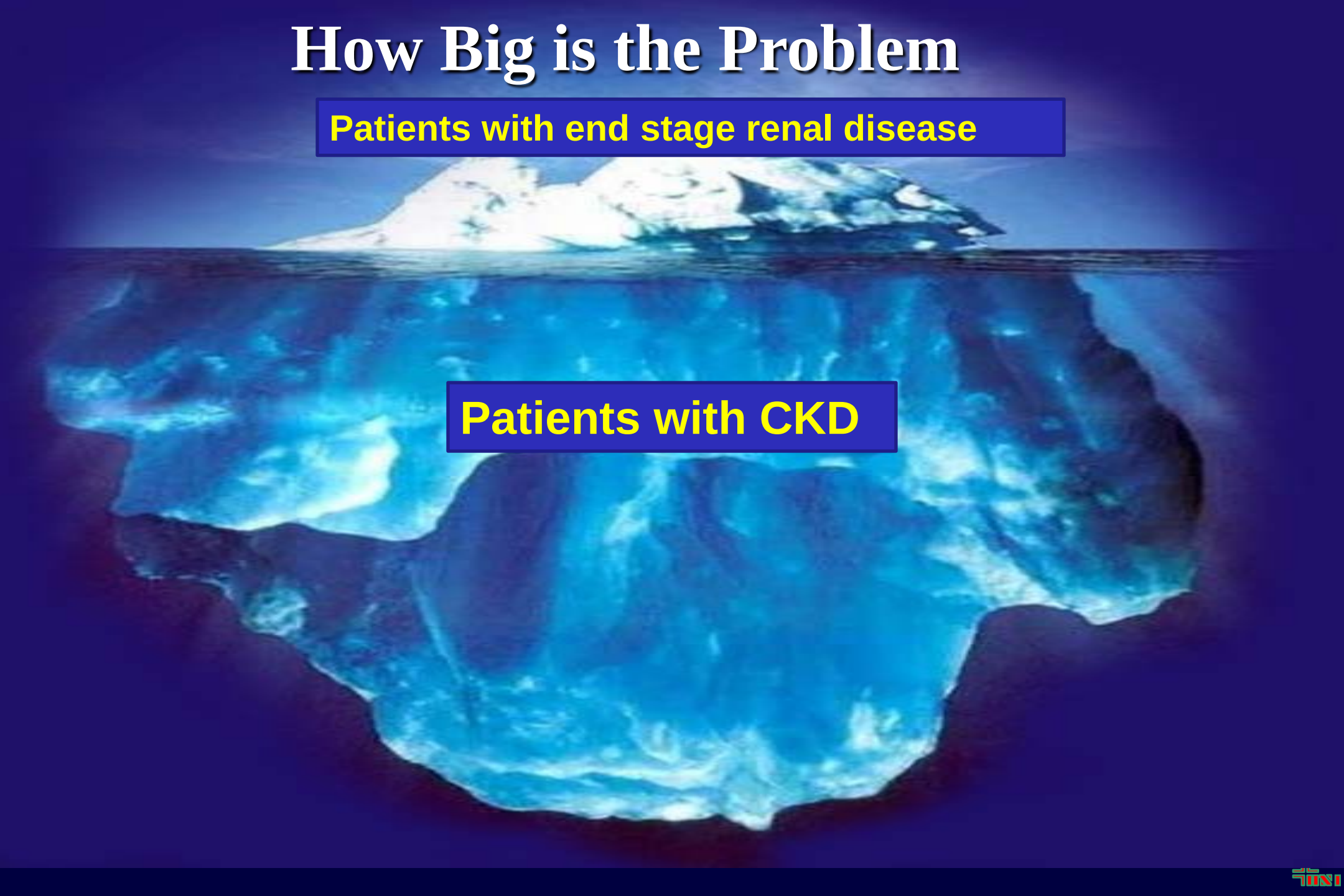
McClellan, NTD 2006;21:1461

ΕΞΕΛΙΞΗ ΑΡΙΘΜΟΥ ΝΕΩΝ ΑΣΘΕΝΩΝ ΚΑΤ' ΕΤΟΣ (ΕΠΙΠΤΩΣΗ) ΣΤΗΝ ΕΛΛΑΔΑ, 1986-2002

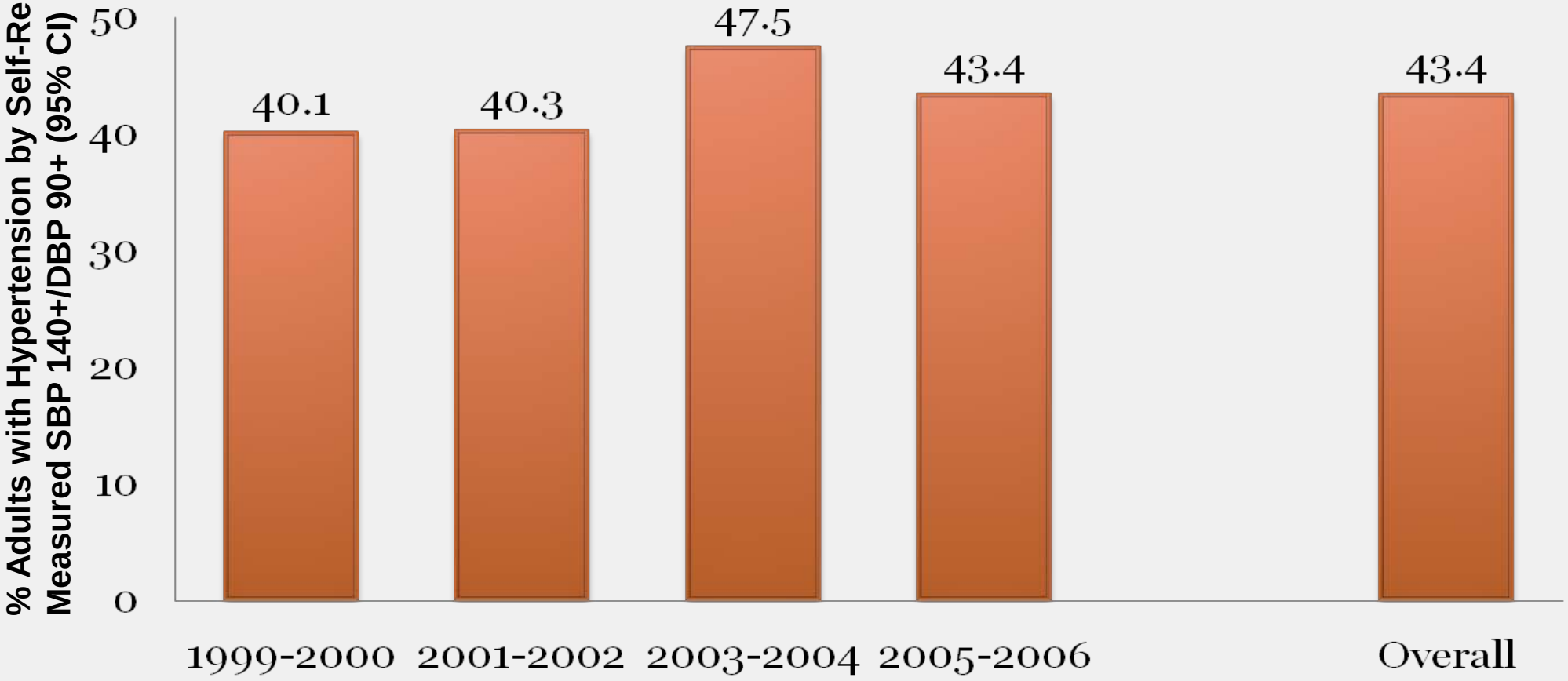


Πηγή: ΕΑΚΝ - ΥΣΕ

How Big is the Problem

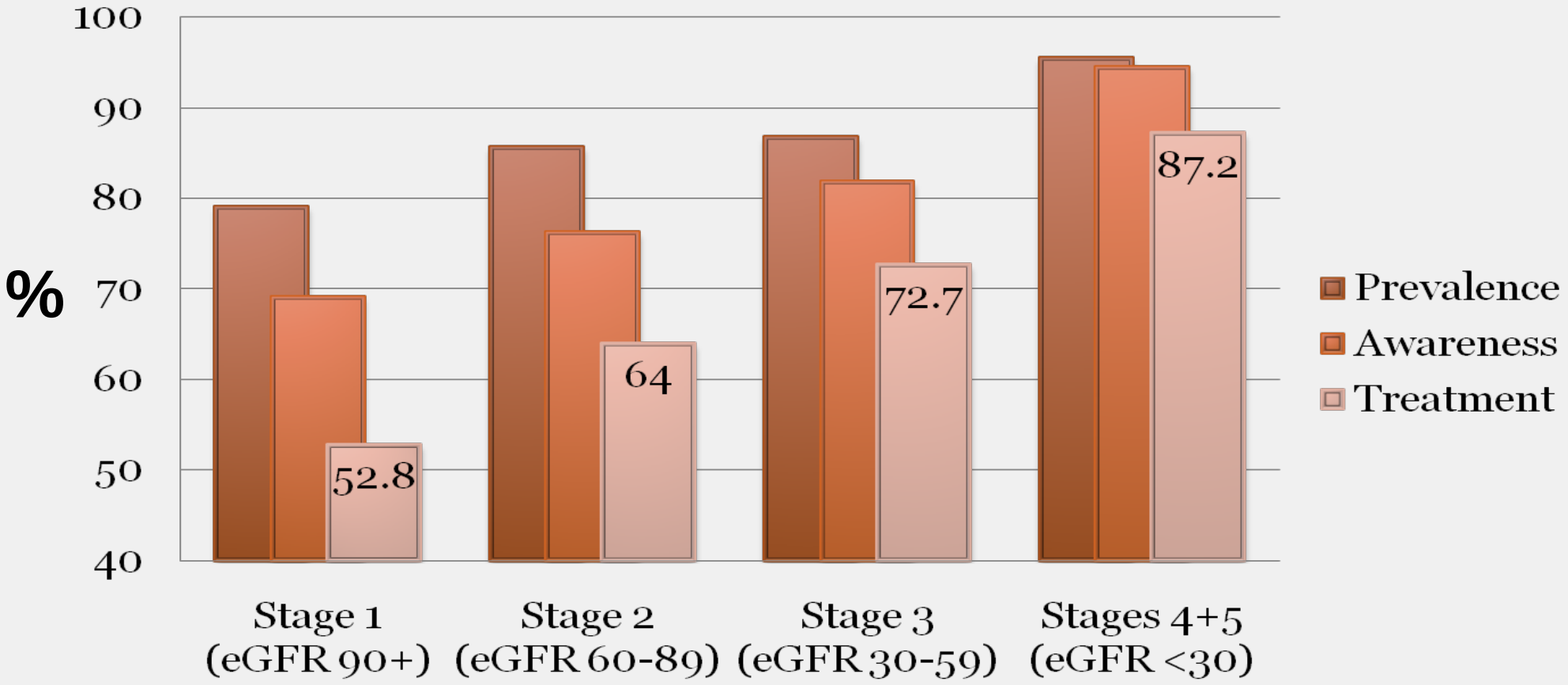


Proportion of NHANES subjects having hypertension by self-report or measured BP ≥ 140/90 mmHg



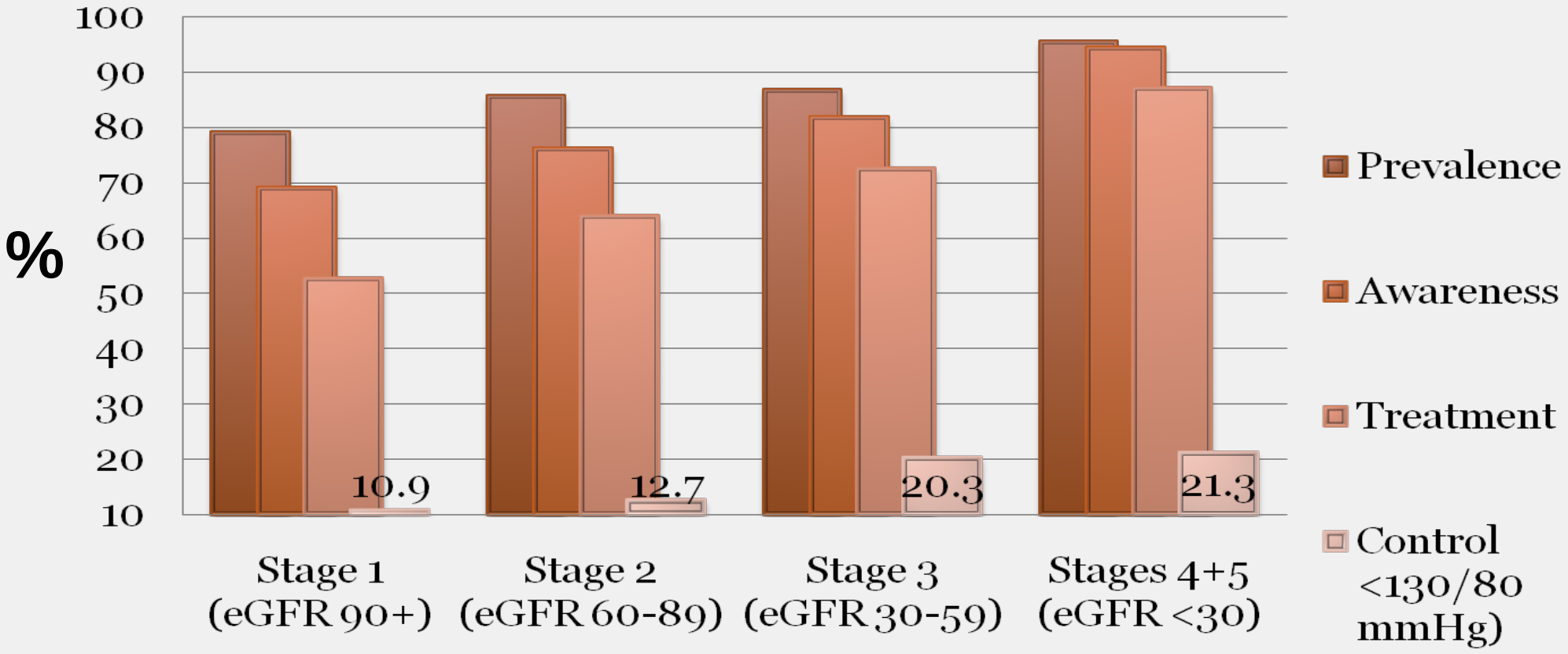
Powe N et.al. CDC-CKD Surveillance Report, 2009

Prevalence, Awareness, Treatment, and Control of Hypertension in Total KEEP Cohort by CKD stage with140/90 mm Hg as threshold. (N=10,819)



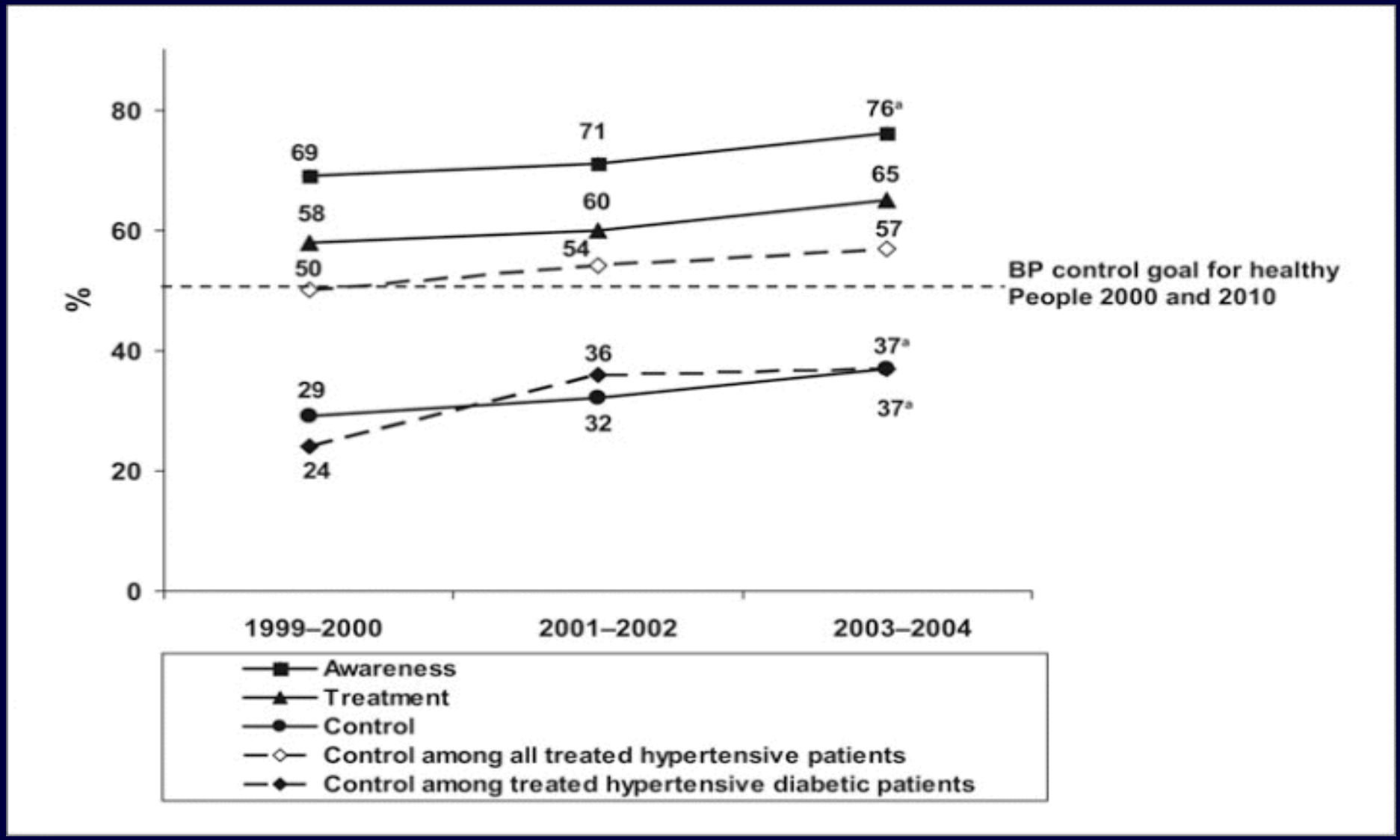
Sarafidis P et.al. Am J Med 2008;121:332-340

Prevalence, Awareness, Treatment, and Control of Hypertension in Total KEEP Cohort by CKD stage with140/90 mm Hg as threshold. (N=10,819)



Sarafidis P et.al. Am J Med 2008;121:332-340

BP Control Rates among those with Diabetes and CKD



Sarafidis P et.al. J Clin Hypertens (Greenwich), 2008

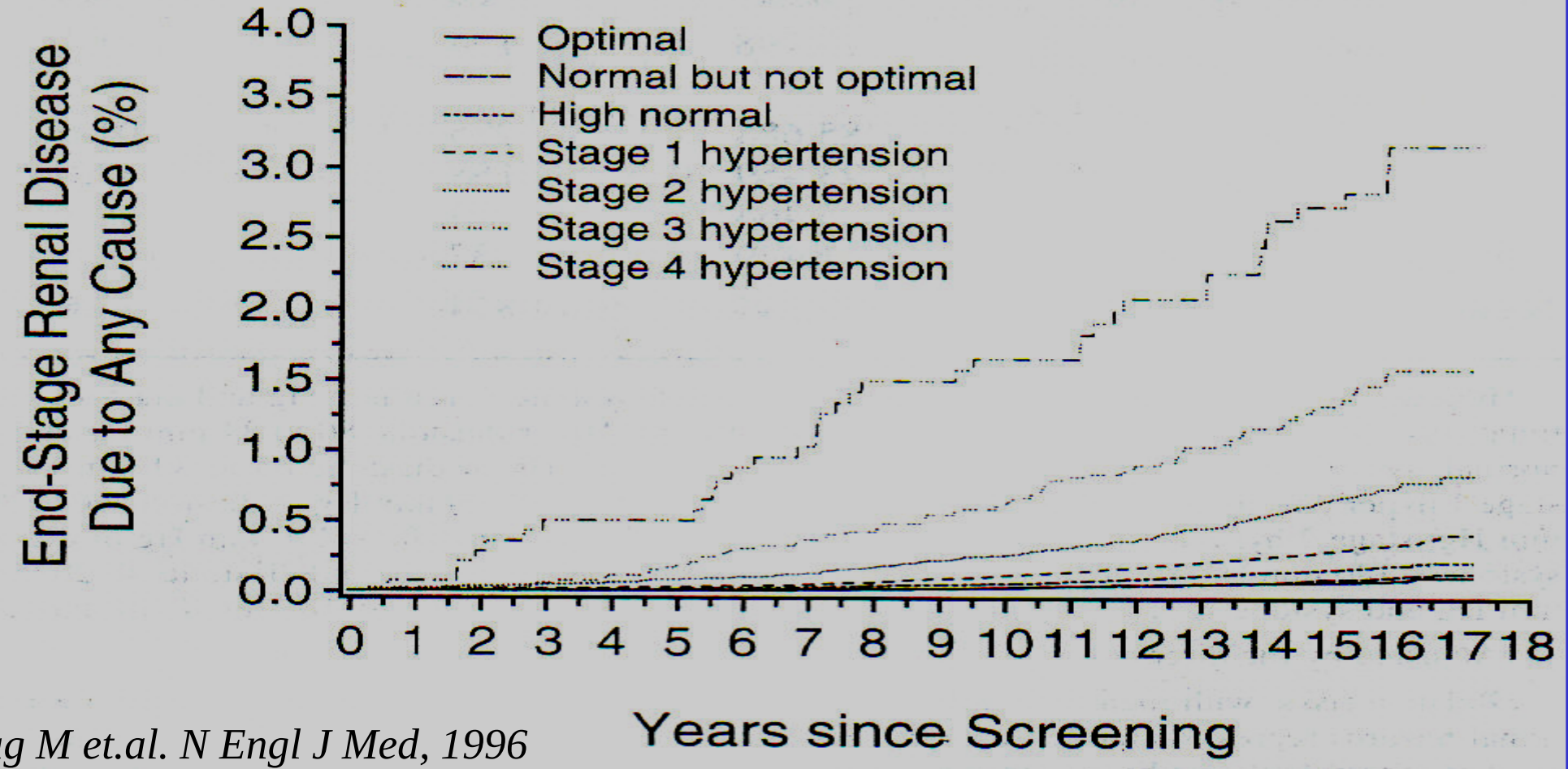
Factors Related to Awareness of CKD and its Progression

- What is the natural history of poorly treated hypertension on development and progression of kidney disease
- How to properly interpret laboratory values to educate the patient about the presence of kidney disease

Sixteen Year Follow-up of Almost 12,000 Men with Hypertension

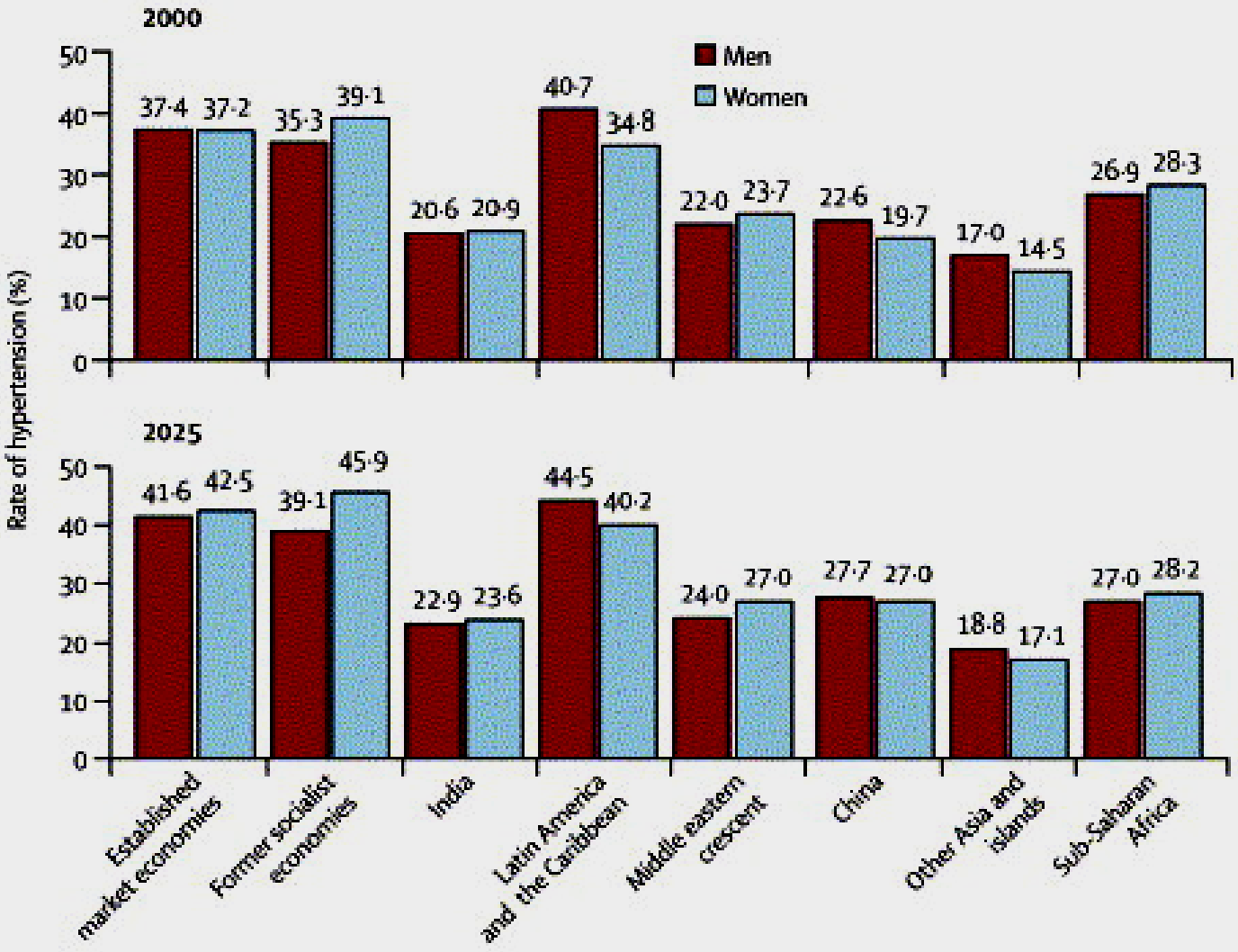
Perry WM et.al. Hypertension 2005

Cumulative incidence of ESRD due to any cause according to BP category in 332.544 men sceened for MRFIT



Klag M et.al. N Engl J Med, 1996

Rate of Hypertension Growth Internationally



In 2000 26.4% hypertensives

In 2025 29.2% hypertensives

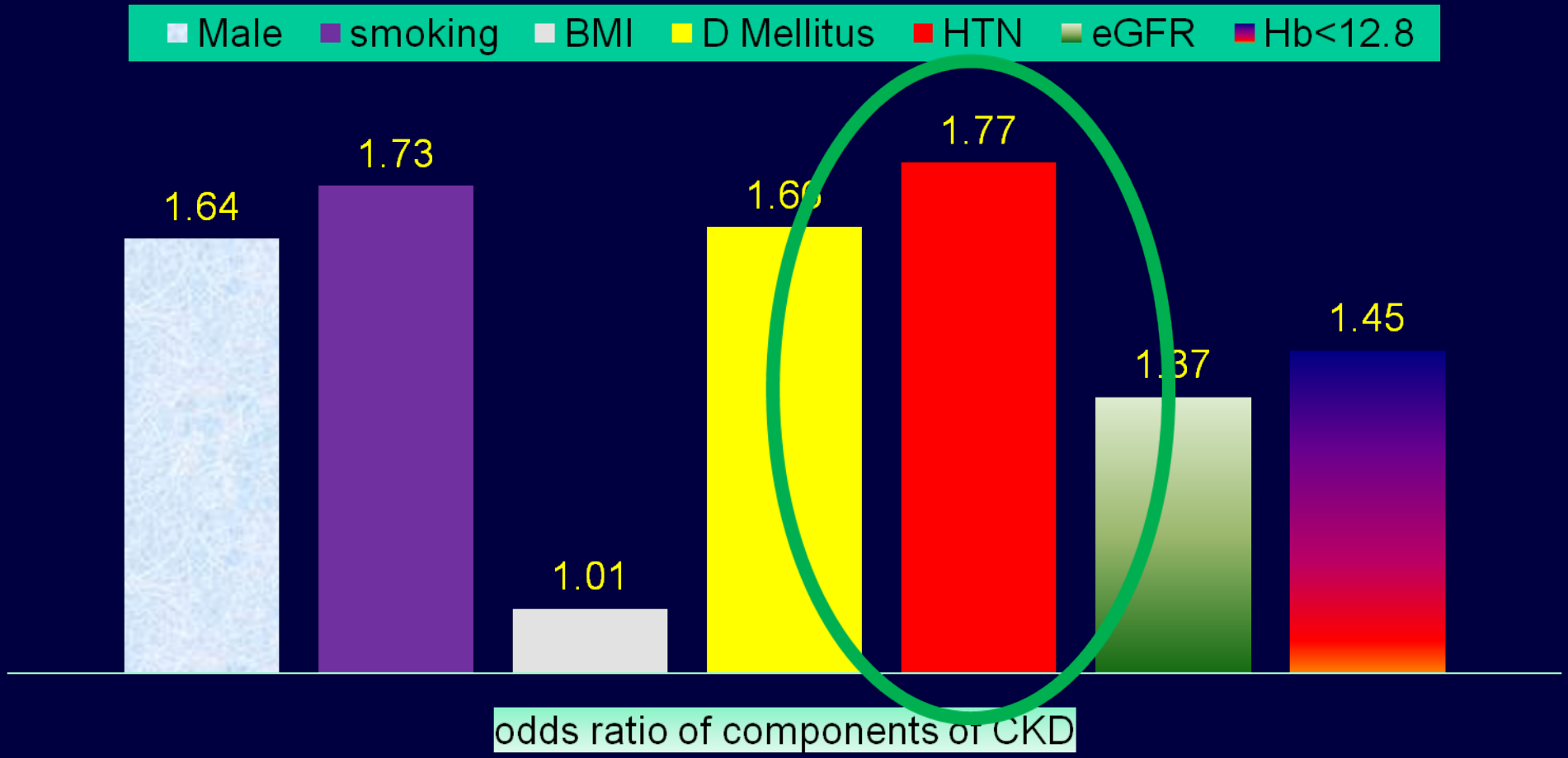
Increased prevalence 60% (80% in developing regions)

(24% in developed countries)

- **The prevalence is the same**
- **between men and women**

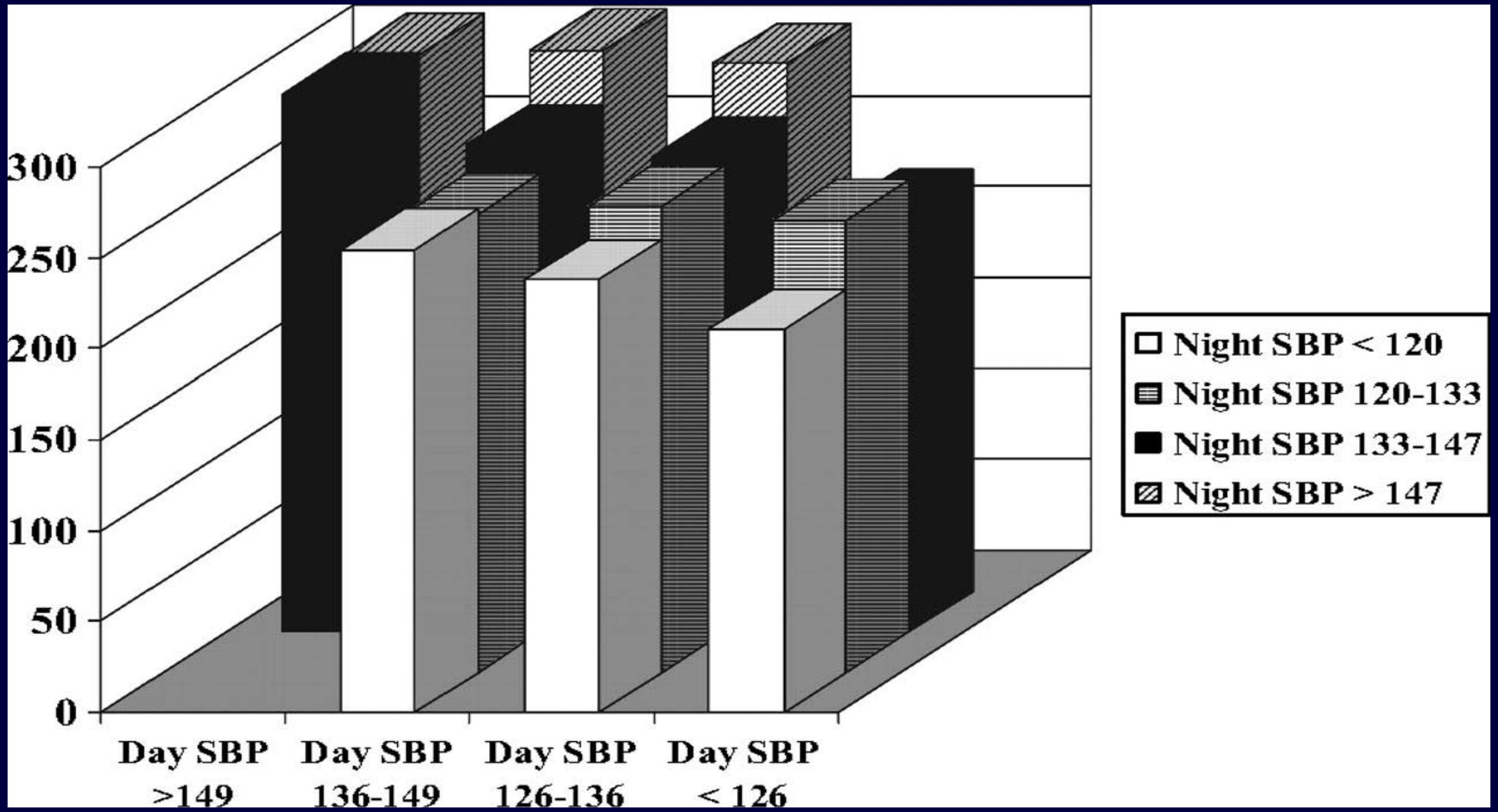
Kearney PM, Lancet 2005

Independent Components of CKD as a Cardiovascular Risk State



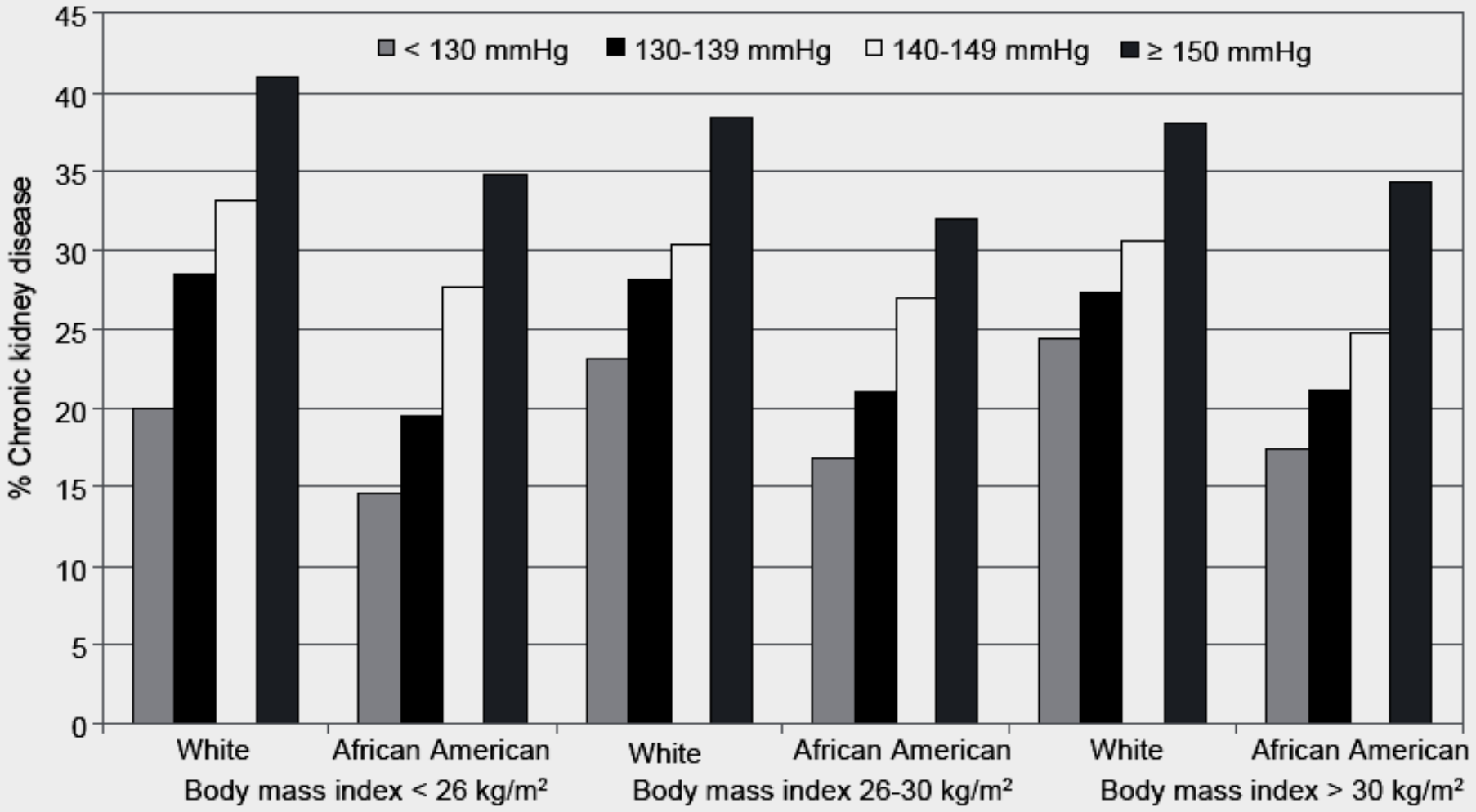
McCullough et al., Arch Intern Med, 2007

Association of LVM with Day and Night SBP



Peterson, G. E. et al. Hypertension 2007;50:1033-1039

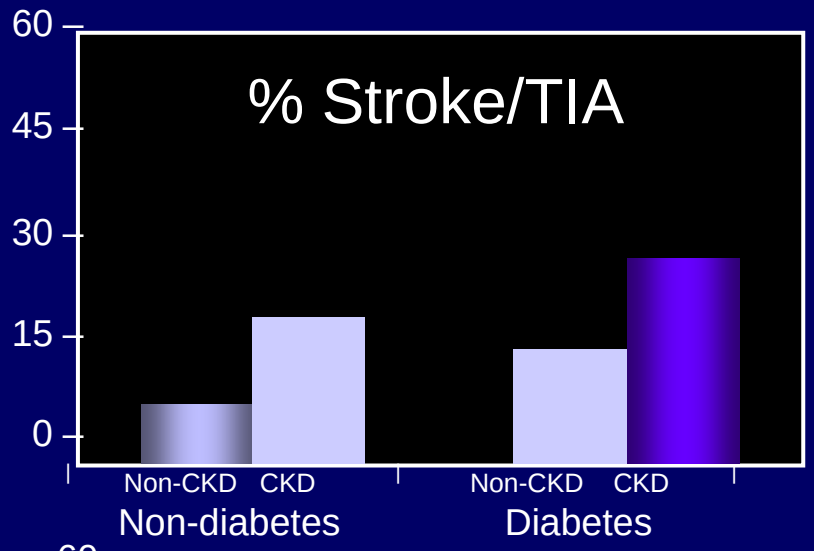
Percentage of CKD in White and African American Participants Stratified by SBP and BMI

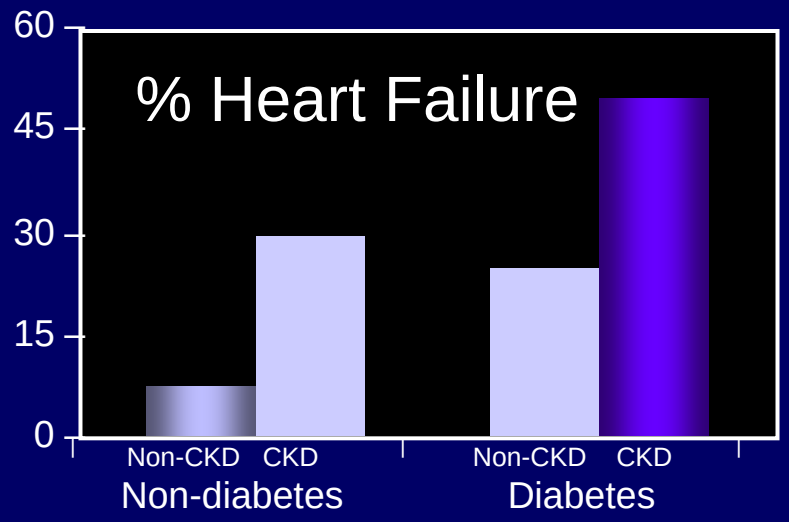


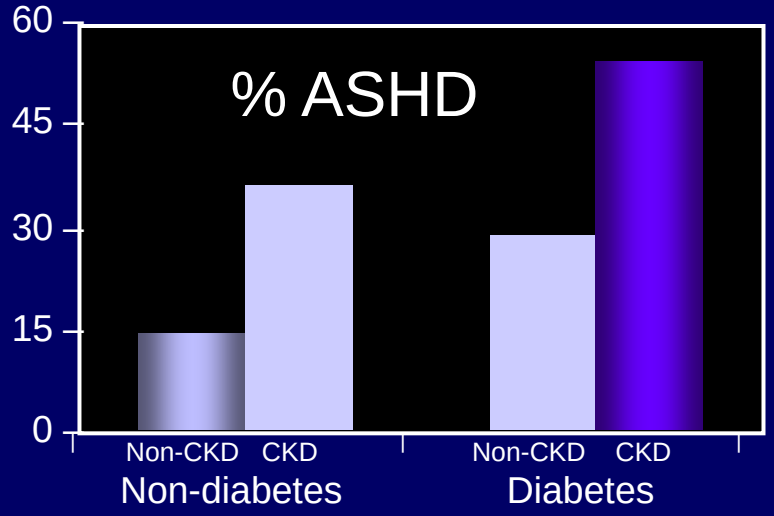
Kalaitzidis et al, AJKD, 2009 (in press)

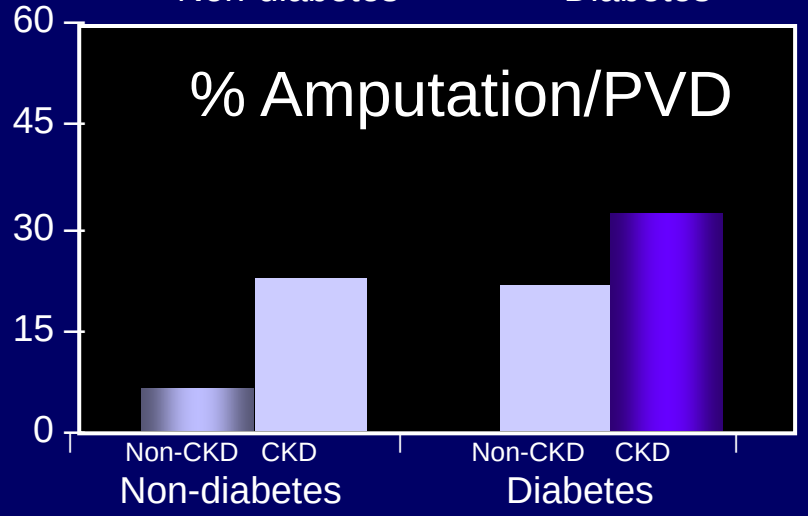
Cardiovascular Comorbidities,

5% Medicare Sample, by Diabetes and CKD Status 1999-2000



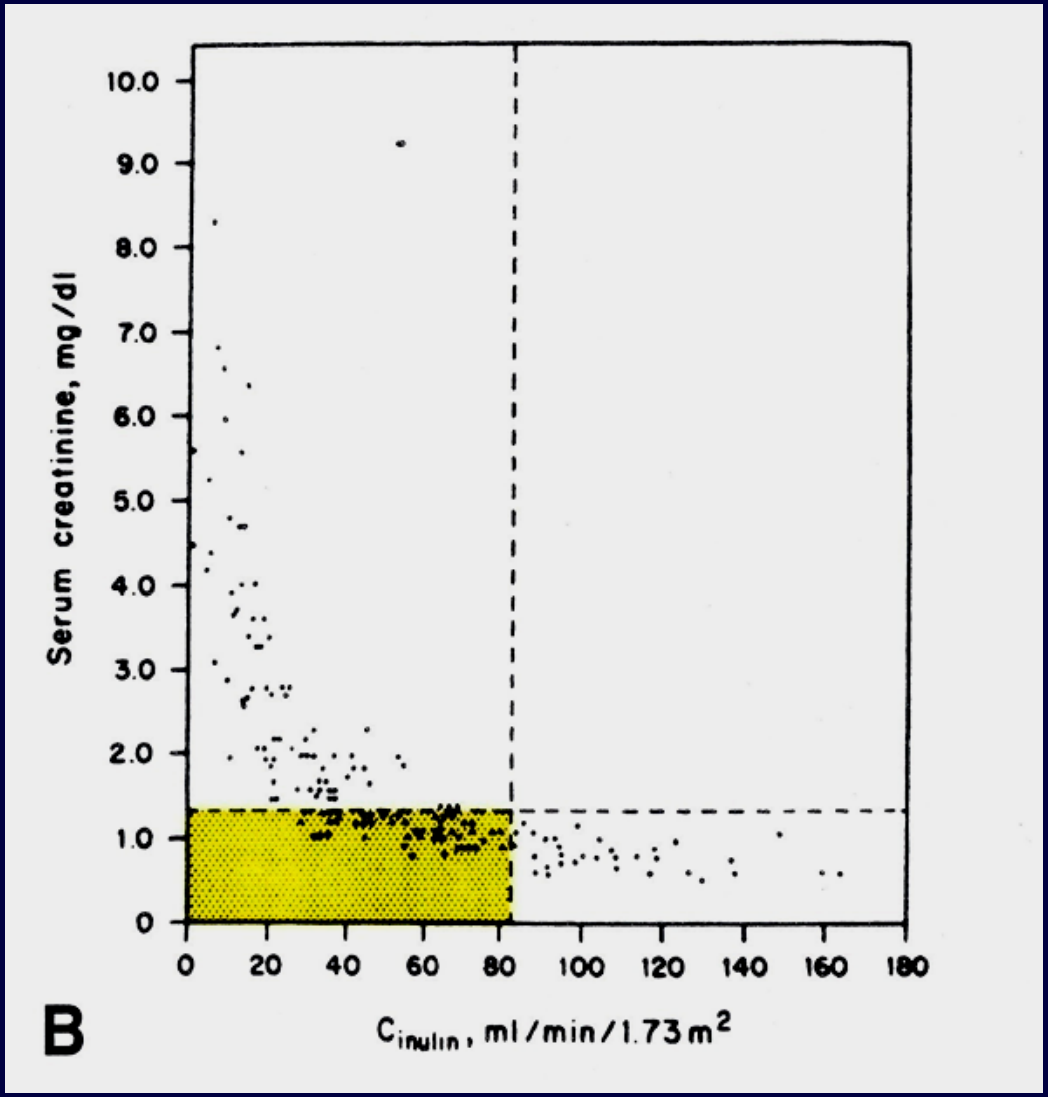






USRDS, 2000.

Correlation between Creatinine and GFR



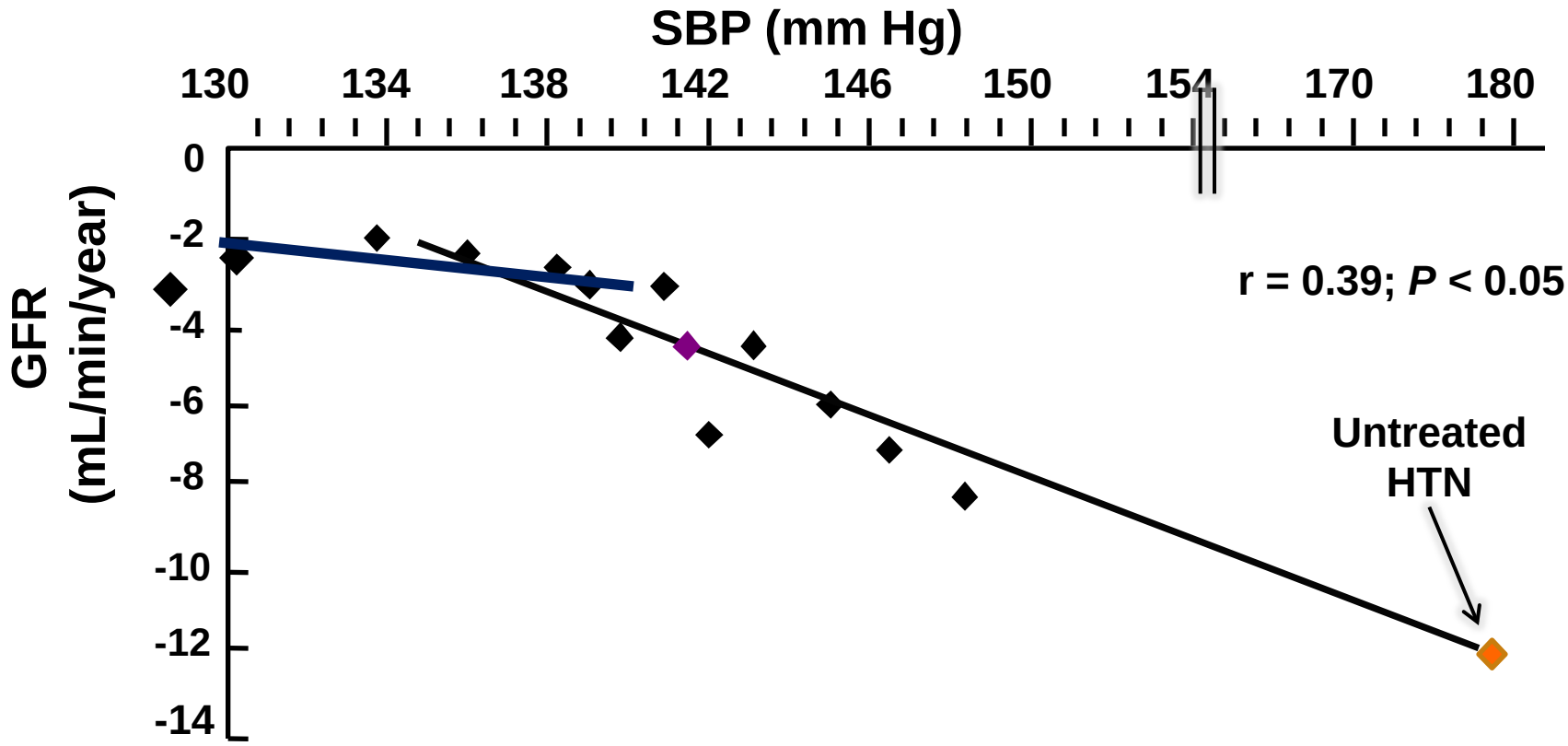
- **40% of the patients with reduced GFR had a serum creatinine into the physiological limits !!!**
- **Increased serum creatinine is not a sensitive index of reduced GFR**

Shemesh et al Kidney Int 28 : 830-838, 1985
LeveyAS, Perone RD και Madias NE
Annu Rev Med 39: 465-490, 1988

The goal of blood pressure in patients with CKD

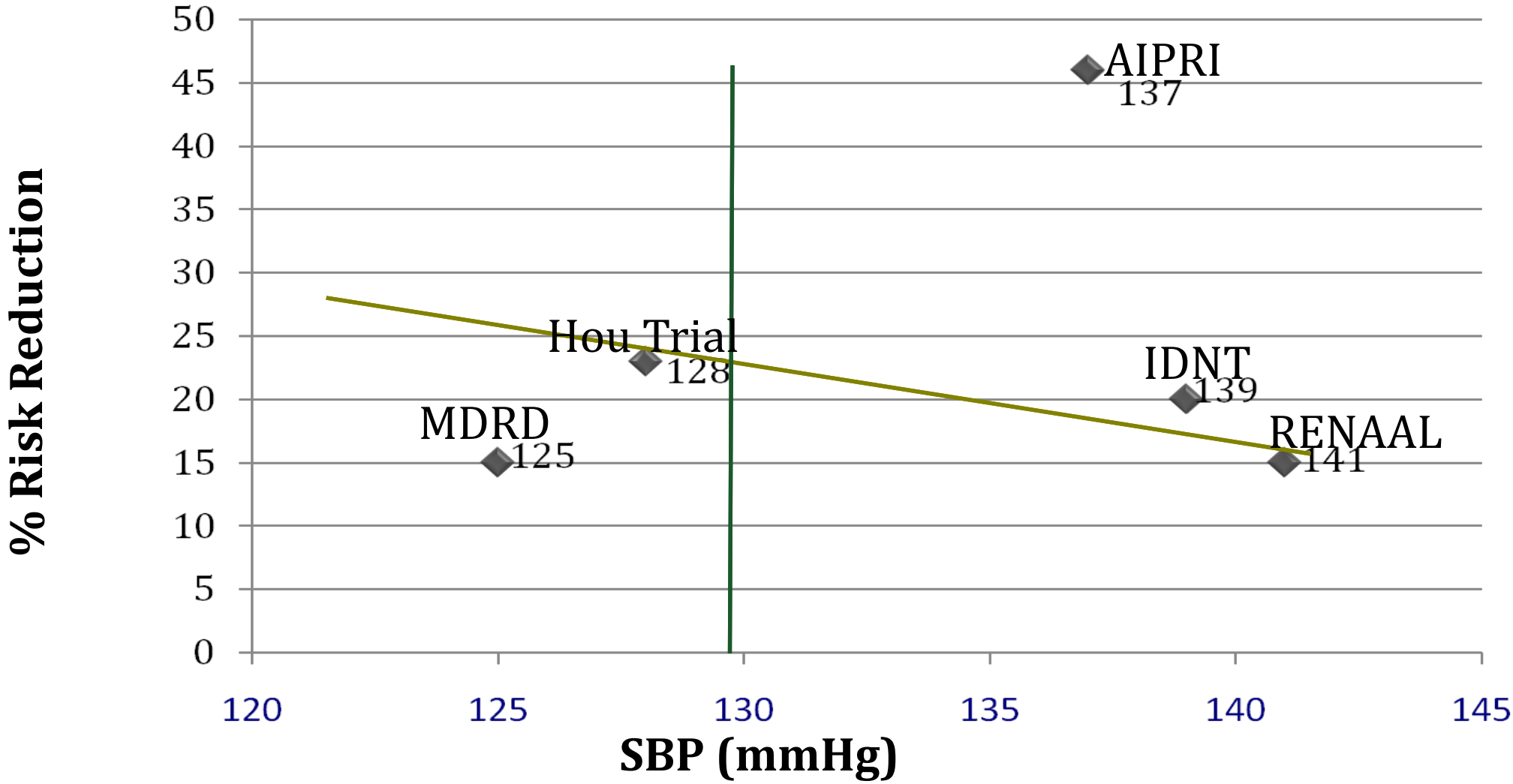
proteinuria > 300 mg/24h → SBP < 130 mmHg

G. BAKRIS…….


SBP (mm Hg)
130
134
138
142
146
150
154
170
180
0
-2
-4
-6
-8
-10
-12
-14
GFR
(mL/min/year)
r = 0.39; P < 0.05
Untreated
HTN

Achieved Mean Systolic BP in Renal Endpoint Trials and Risk Reduction for CKD Progression

Kalaitzidis R et.al Med Clinics N Am, In Press



Challenges of World Kidney Day

- Increase awareness of risk factors for CKD
- Increase Physician awareness to educate patients about the presence of CKD
- Increase both patient and physician awareness that both CKD and hypertension are silent killers and must be assessed frequently and managed

Evidence for Lack of CKD Awareness

- Between 1999-2006 <5% of people with GFR<60ml/min/1.73m^2 and proteinuria were aware of having CKD
- In a study more than 1/3 of the primary care physicians were not aware that family history was a risk factor for CKD

What can be done about this problem

- The road to improve outcomes is to focus on public awareness
- Screening programs as well as programs to educate, e.g. KEEP screening program
- Public health authorities to support efforts to raise public awareness of CKD

Take the test and see if you are at risk

www.worldkidneyday.org

Do you have high blood pressure?
Do you suffer from diabetes?
Are you overweight?
Do you smoke?
Are you over 50 years?
Do you have a family history of kidney disease?
Do you suffer from other kidney diseases?

The economic burden of the problem

- 2005: $32 billion in USA estimated to double by 2010
- Governmental public health initiatives
- International Society of Nephrology (ISN)
- International Federation of Kidney Foundation (IFKF)

- Every individual should now his or her BP