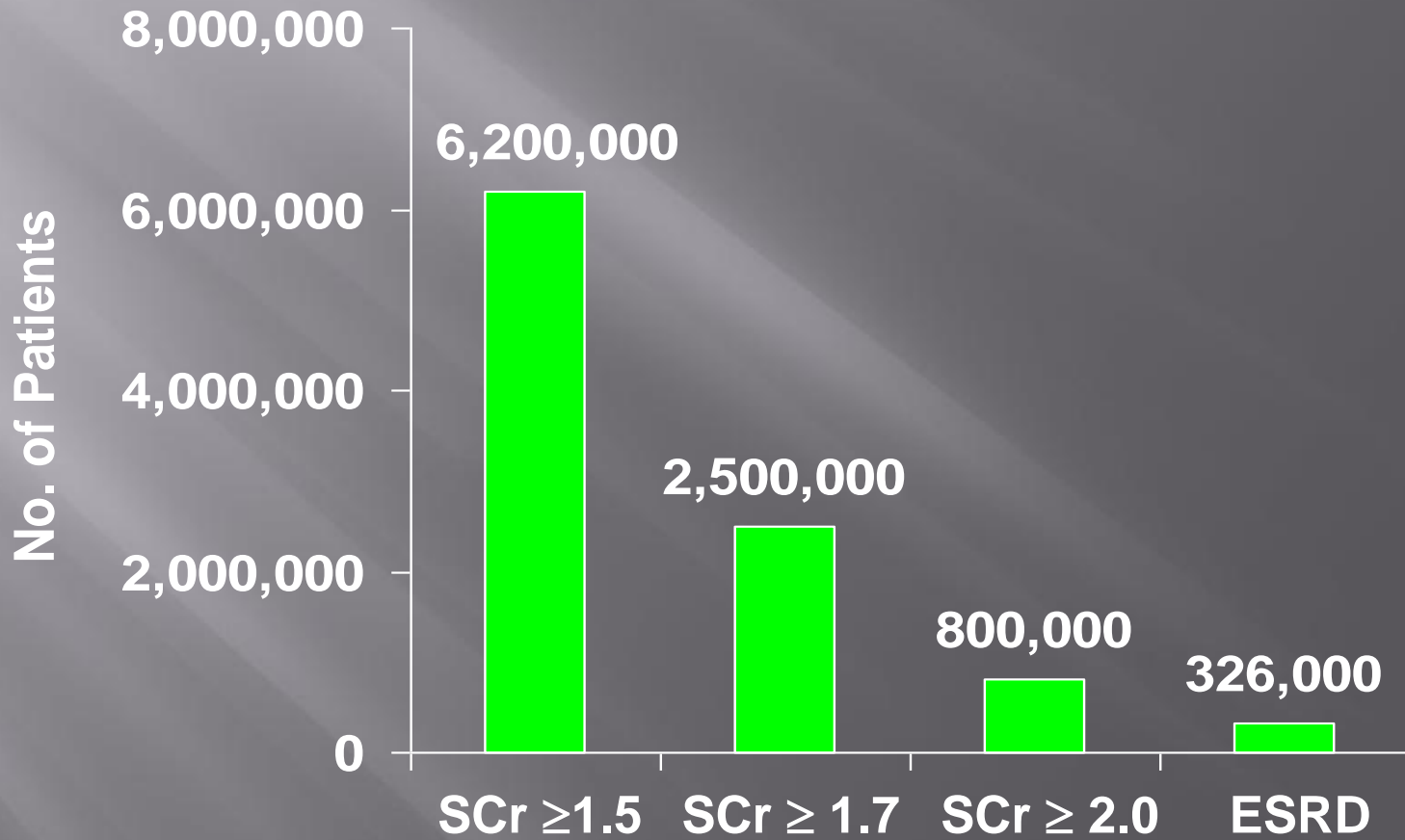


# CKD management in US: Selected data

**Andre A. Kaplan, M.D., FACP, FASN**  
**Professor of Medicine, University of**  
**Connecticut Health Center, Farmington, CT,**  
**USA**

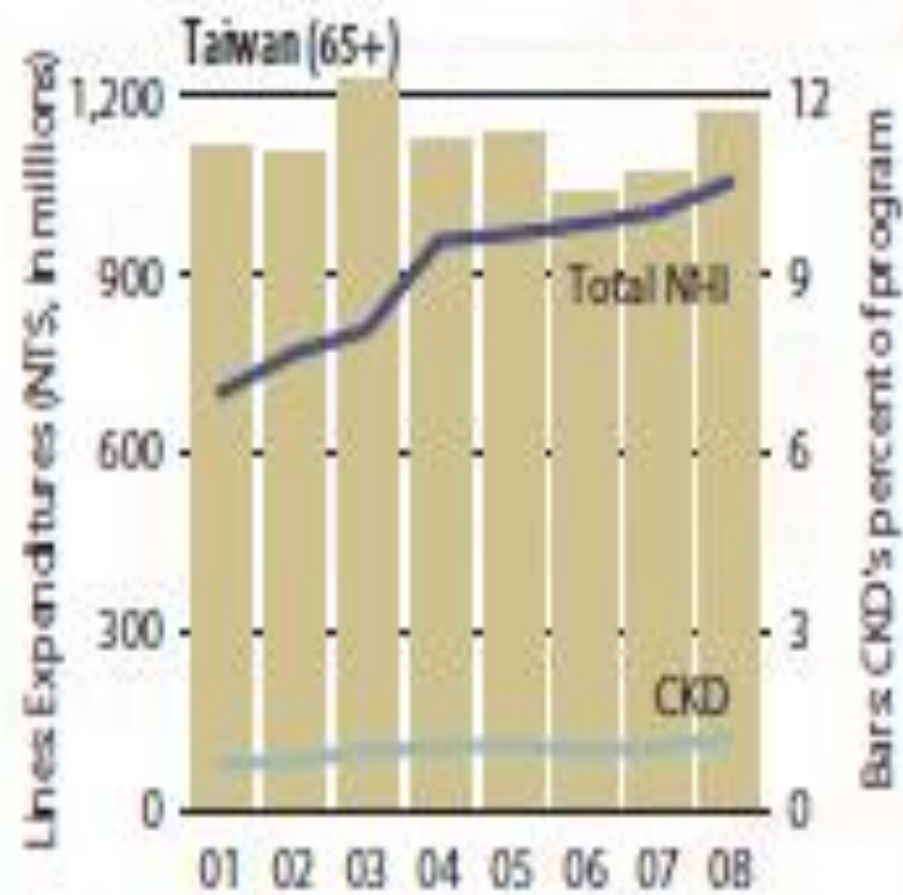
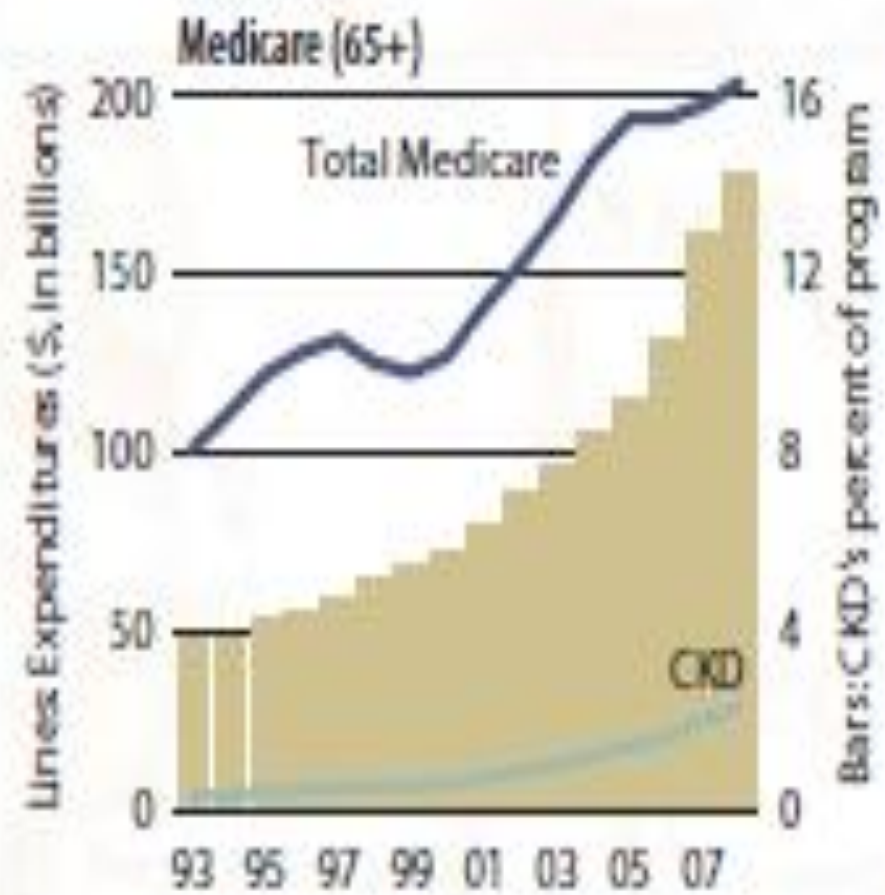
# Prevalence of CKD



NHANES data 1988-1994  
USRDS 2000 for patients with ESRD.

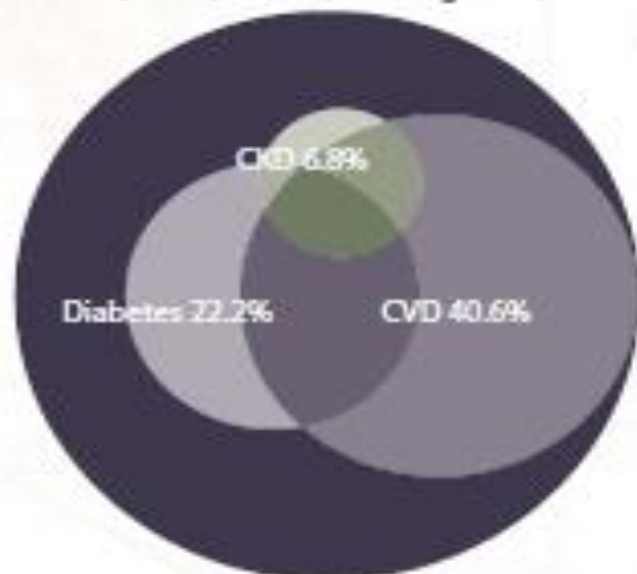
*Jones. Am J Kidney Dis. 1998;32:992.*

9 **18i** Overall expenditures for CKD in the U.S. & Taiwan

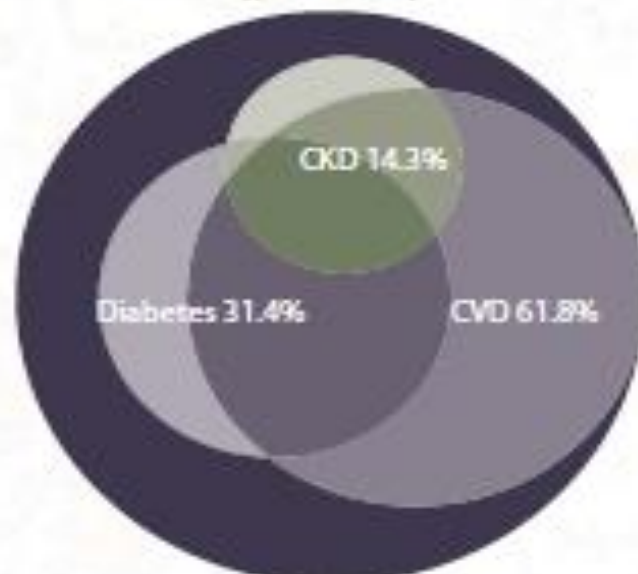


9 **li** Distribution of costs of point prevalent general (fee-for-service) Medicare & Taiwanese patients with diagnosed CKD, cardiovascular disease, & diabetes

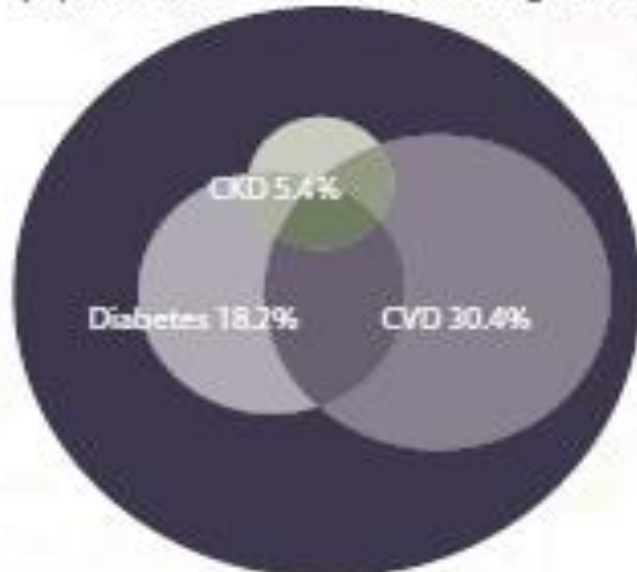
General Medicare, age 65+: population, 2008  
(n = 23,943,000; mean age 76.2)



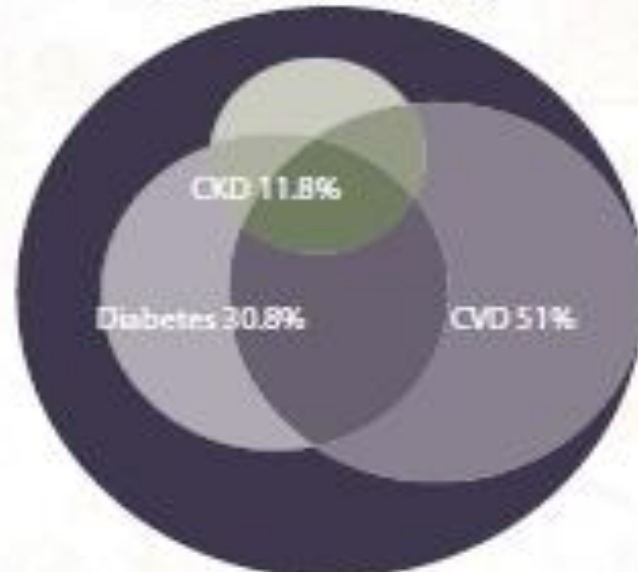
General Medicare, age 65+: costs, 2008  
(\$203 billion)



Taiwan National Health Insurance, age 65+:  
population, 2008 (n = 21,788; mean age 74.9)



Taiwan National Health Insurance, age 65+:  
costs, 2008 (\$1.07 billion)

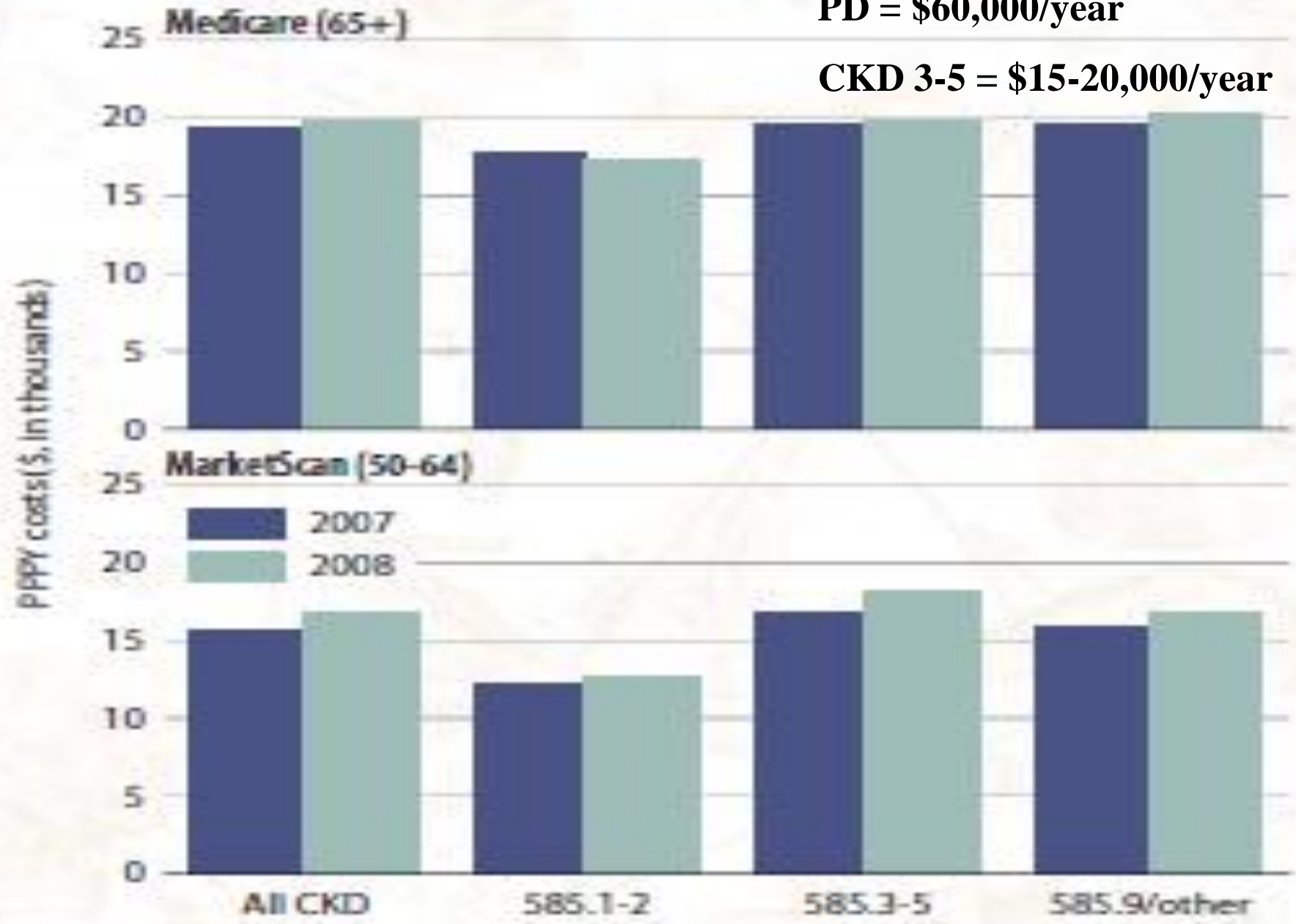


Overall PPPY costs in CKD patients, by CKD diagnosis code, dataset, & year

Cost for HD = \$80,000/year

PD = \$60,000/year

CKD 3-5 = \$15-20,000/year



# Financial Goals of CKD Care

- ▣ Each ESRD patient costs Medicare approximately 4 times more than a CKD patient.
- ▣ From a financial point of view, limiting the number of CKD patients that progress to dialysis should be major goal of CKD care.

**Does CKD care work: Is it cost effective ?**

- ▣ **The special case of diabetic nephropathy...**

# Diabetic Nephropathy and End Stage Renal Disease

- ▣ **Diabetes accounts for 45% of all patients with ESRD**
- ▣ **40% of patients with IDDM develop ESRD**
- ▣ **10% of patients with NIDDM develop ESRD**

# Diabetic Nephropathy: Treatment Options

- ▣ Blood pressure control
- ▣ Protein restriction
- ▣ Glycemic control

# Diabetic Nephropathy: Treatment Options

- ▣ **Blood pressure control**
- ▣ **Protein restriction**
- ▣ **Glycemic control**

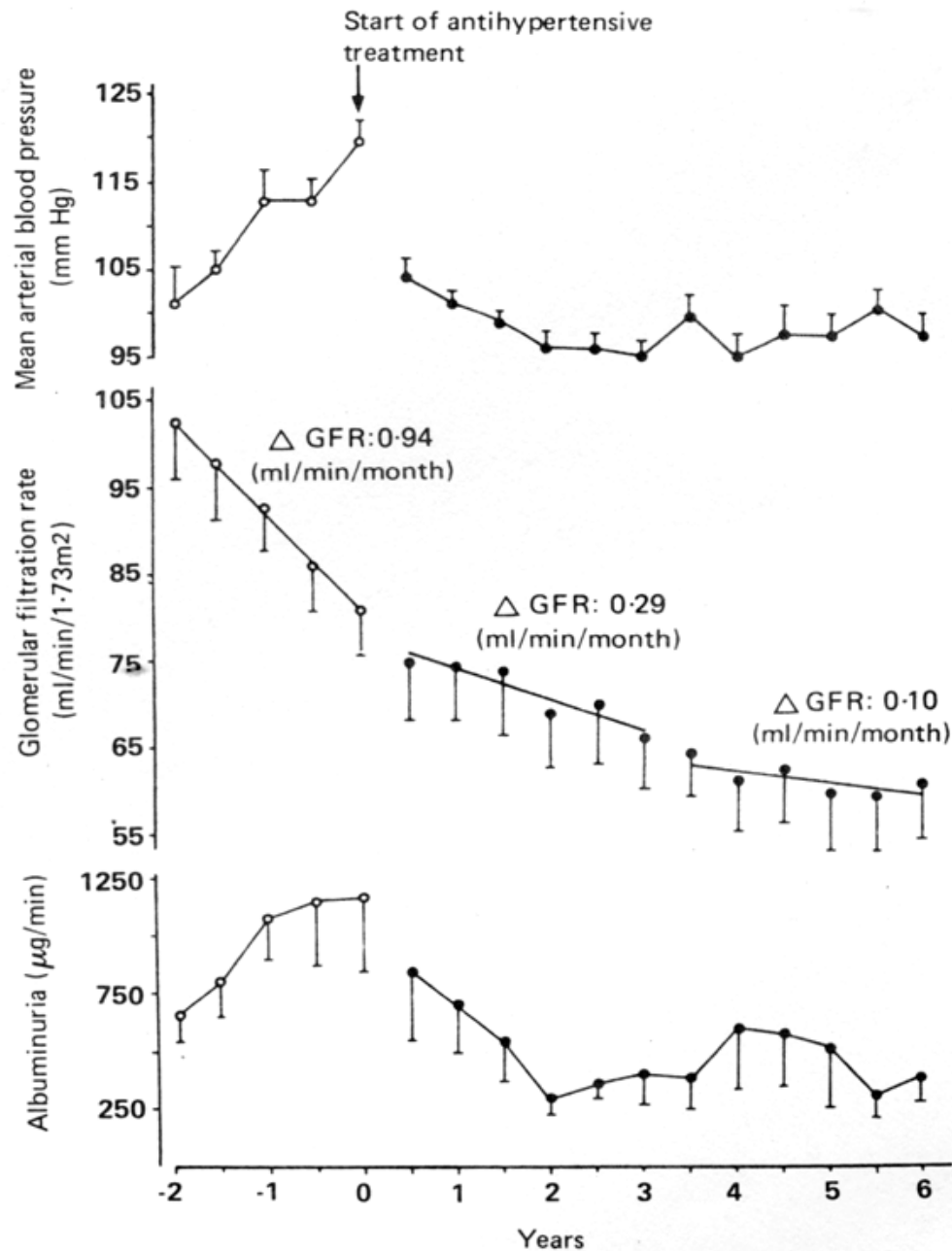
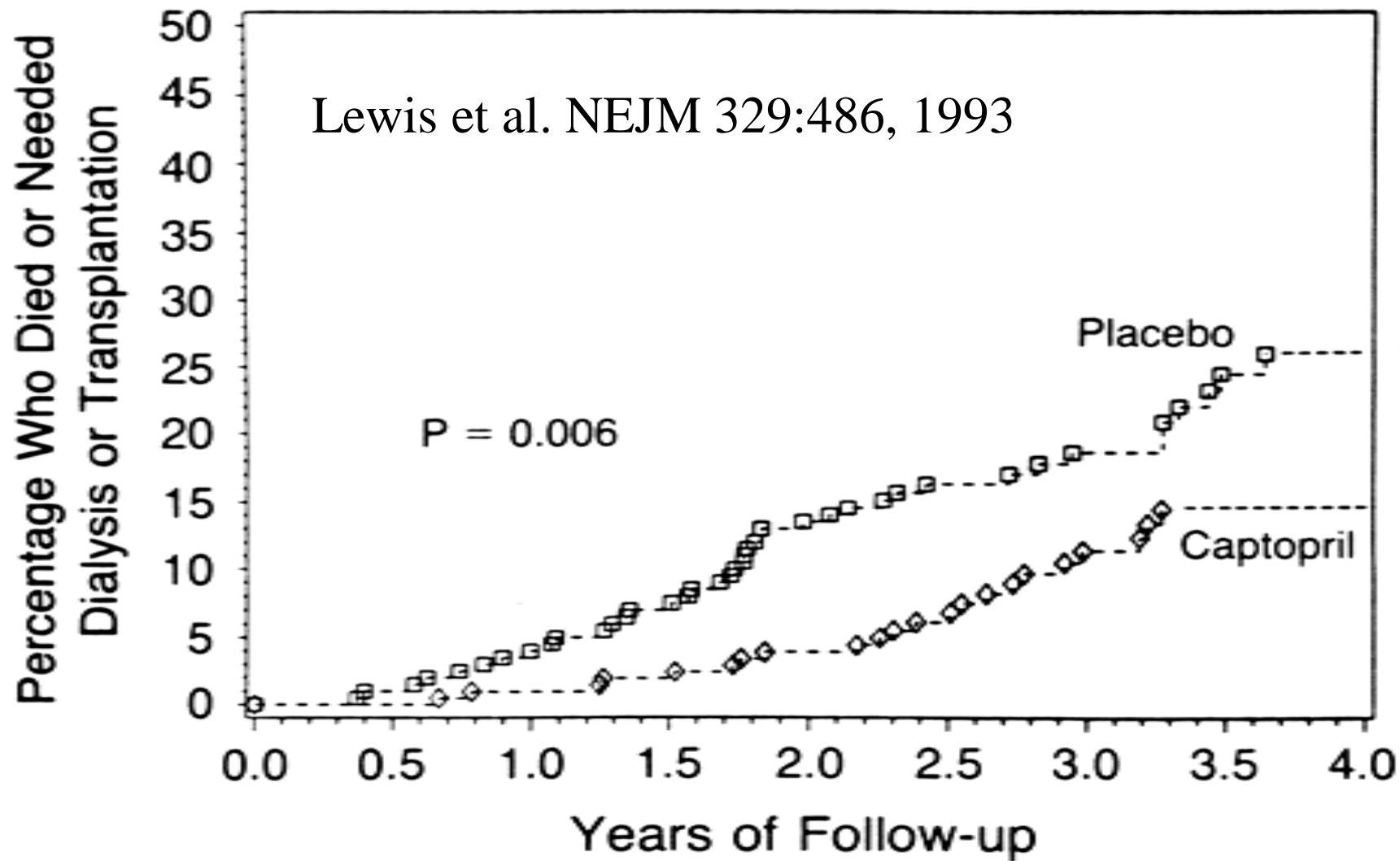


FIG 1—Average course of mean arterial blood pressure, glomerular filtration rate, and albuminuria before (○) and during (●) long term effective antihypertensive treatment of nine insulin dependent diabetic patients who had nephropathy.

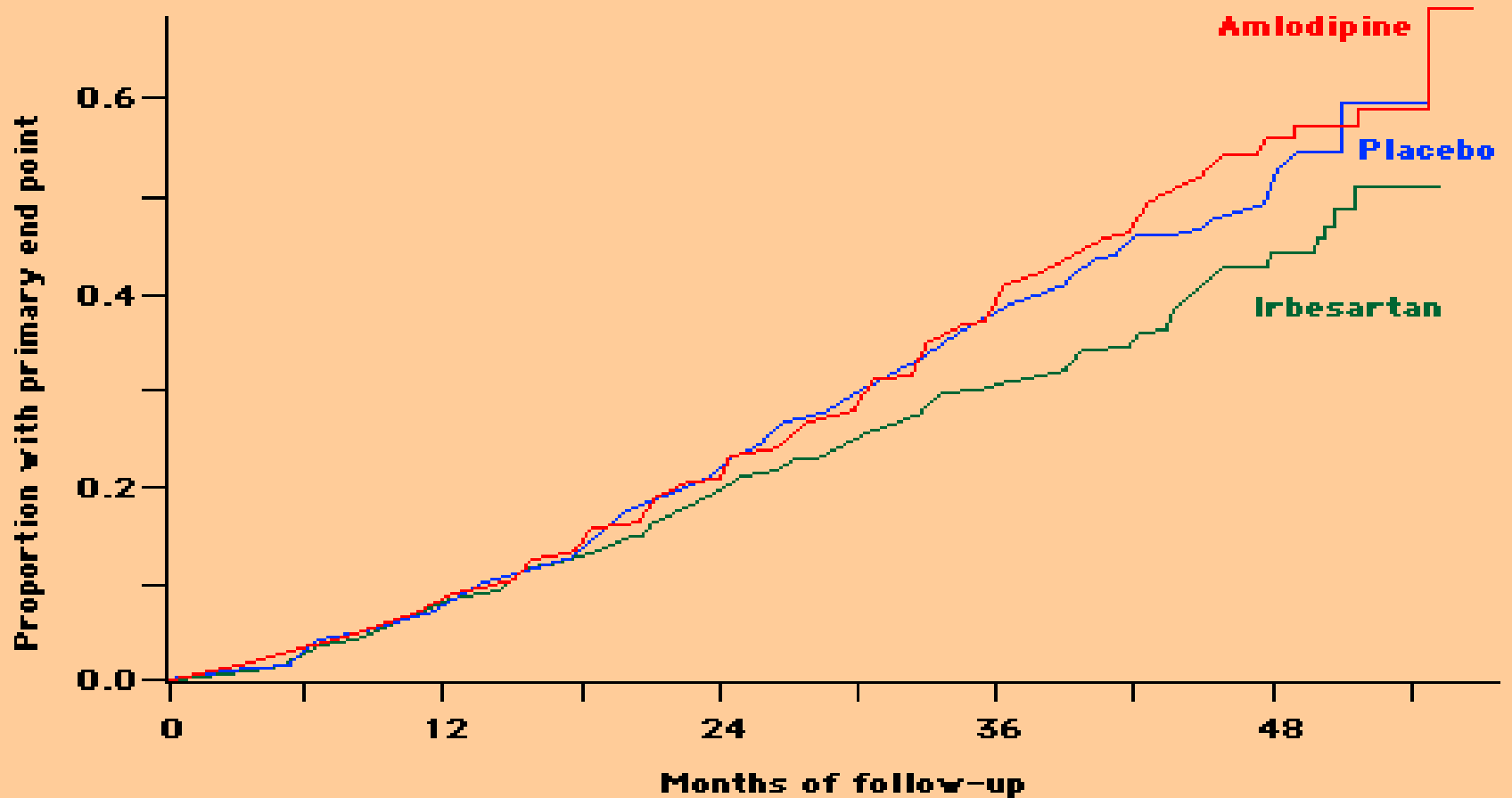
Parving et al.  
 BMJ 294:  
 1443,1987

# Diabetic Nephropathy: Treatment Options

- ▣ **Blood pressure control:  
ACEI and ARBs**
- ▣ Protein restriction
- ▣ Glycemic control

**B**

Placebo	202	198	192	186	171	121	100	59	26
Captopril	207	207	204	201	195	140	103	64	37



## Irbesartan slows progression of nephropathy in type 2 diabetes

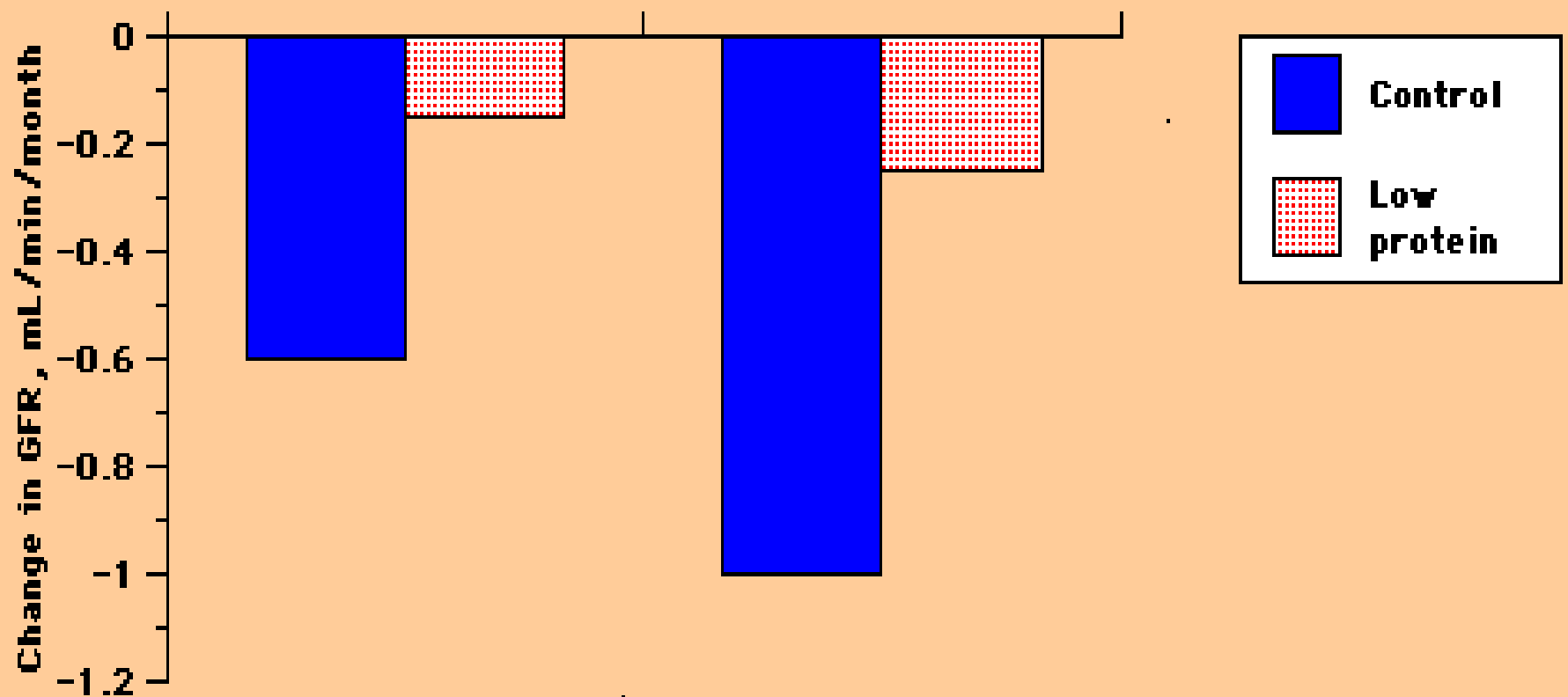
Effect of irbesartan, amlodipine, and placebo on the course of hypertensive patients with nephropathy due to type 2 diabetes; the target blood pressure was similar in the three groups. Treatment with irbesartan was associated with a risk of the primary end point (doubling of the baseline serum creatinine, development of end-stage renal disease, or death from any cause) that was 20 percent lower than placebo and 23 percent lower than amlodipine. (Adapted from data published in Lewis, EJ, Hunsicker, LG, Clarke, WR, et al. N Engl J Med

# Diabetic Nephropathy: Treatment Options:

- ▣ Blood pressure control:
- ▣ At present, key management strategy for slowing progression of DM nephropathy
- ▣ ACE inhibitors and ARBs are clearly superior to standard antihypertensive therapy

# Diabetic Nephropathy: Treatment Options

- ▣ Blood pressure control
- ▣ **Protein restriction**
- ▣ Glycemic control

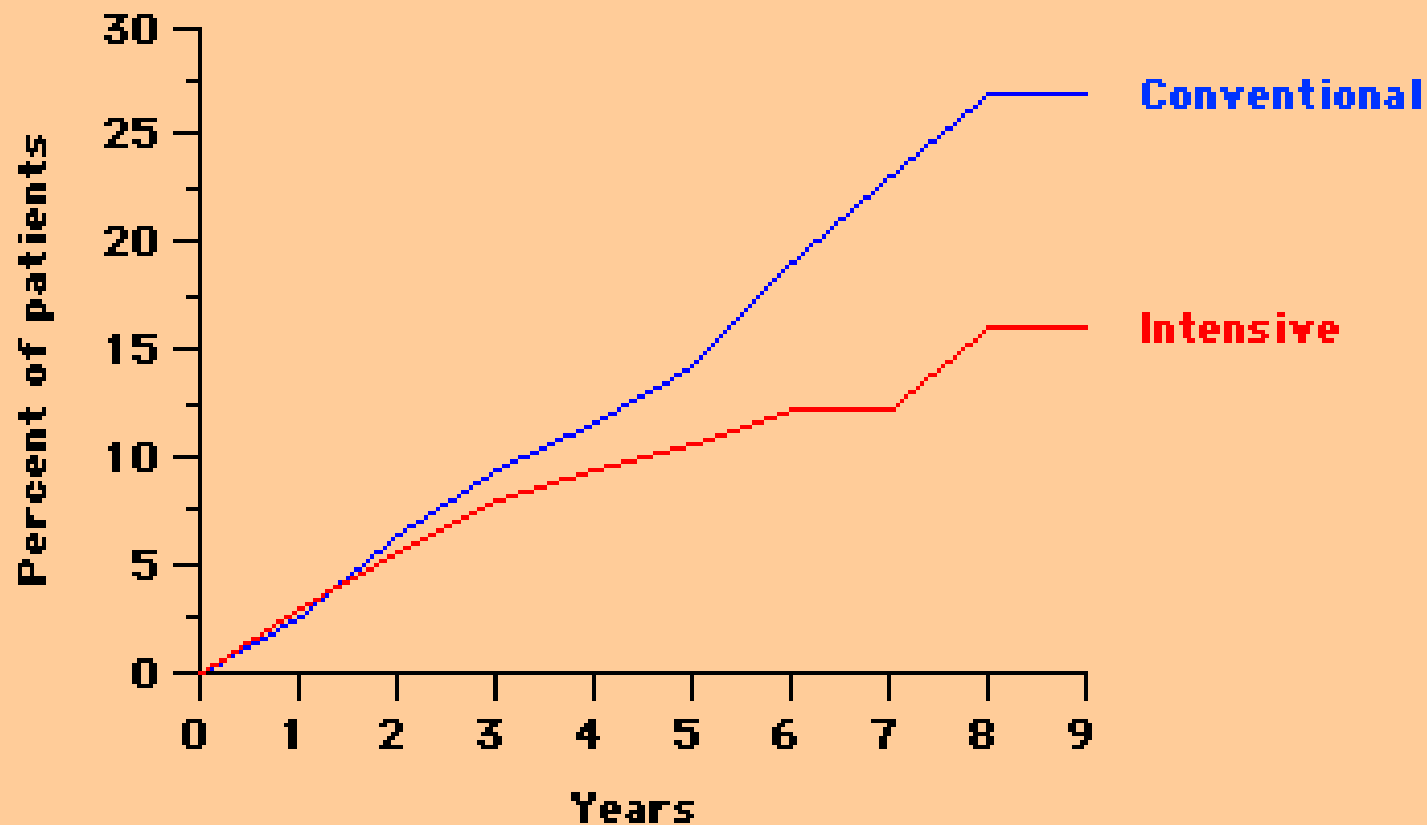


## Protein restriction slows progression of diabetic nephropathy

Dietary protein restriction – to about 0.6 g/kg per day or 30 to 40 percent lower than the control group – in two studies in patients with diabetic nephropathy (left and right panels) led to a 75 percent reduction in the rate of loss of glomerular filtration rate (GFR) at 18 to 36 months. (Data from Walker, JD, Bending, JJ, Dodds, RA, et al, Lancet 1989; 2:1411 and Zeller, K, Whittaker, E, Sullivan, L, et al, N Engl J Med 1991; 324:78.)

# Diabetic Nephropathy: Treatment Options

- ▣ Blood pressure control
- ▣ Protein restriction
- ▣ Glycemic control



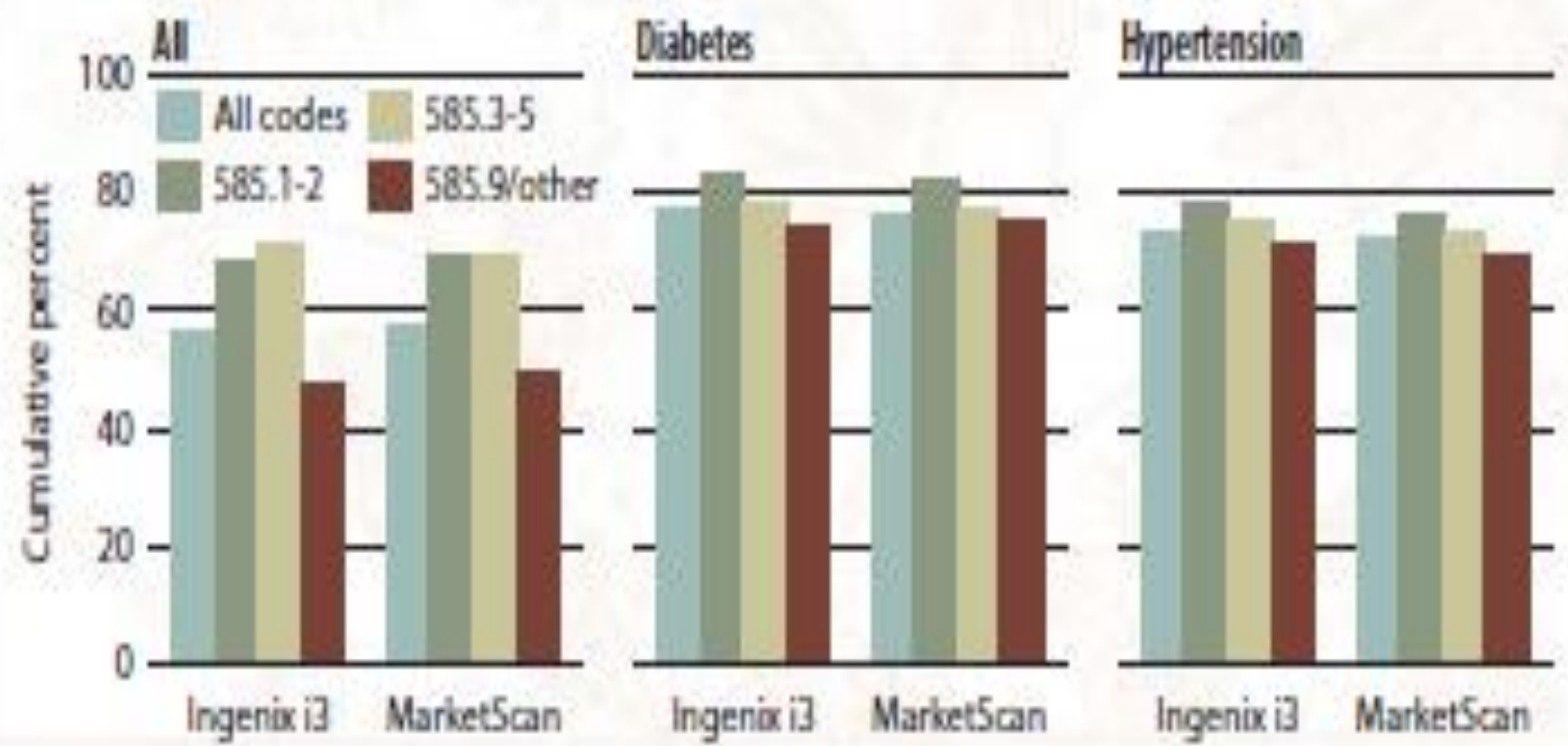
**Strict glycemic control prevents microalbuminuria in patients with type 1 diabetes mellitus** Cumulative incidence of microalbuminuria in patients with type 1 diabetes treated with either conventional or intensive insulin therapy for up to nine years. There was an increasing benefit of intensive therapy over time ( $p < 0.04$ ). (Data from The Diabetes Control and Complications Trial Research Group, *N Engl J Med* 1993; 329:977.)

**Does CKD care work: Is it cost effective ?**

- ▣ **The special case of diabetic nephropathy...**

17i

CKD patients with at least one claim for an ACEI/ARB/renin inhibitor in the 12 months following the disease-defining entry period, by dataset & CKD diagnosis code, 2008



# Progression to ESRD

Rates

Rate per million population

160

120

80

40

0

Diabetes

Hypertension

Glomerulonephritis

Cystic kidney

80

84

88

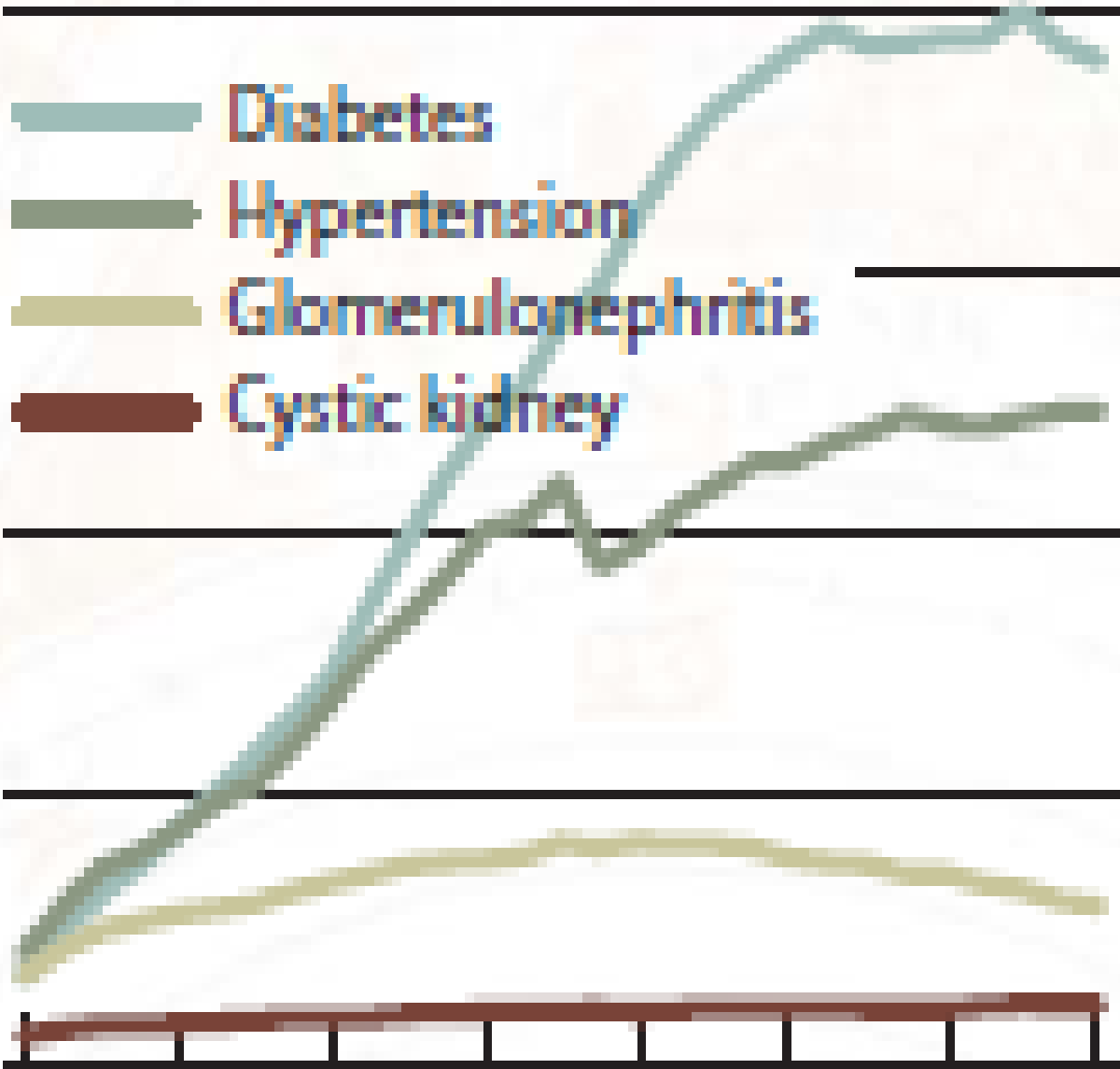
92

96

00

04

08



**1) 7.6 million people with GFR 30-60 ml/min/1.73m<sup>2</sup>  
(stage 3)**

**2) About 4,500 full-time nephrologists**

**3) Nearly 2,000 new patients per nephrologist**

**➤ 7 new patients per day per nephrologist!**

**Primary physicians – nurse practitioners must be  
involved**

# Financial Goals of CKD Care

- ▣ Each ESRD patient costs Medicare approximately 4 times more than a CKD patient.
- ▣ From a financial point of view, limiting the number of CKD patients that progress to dialysis should be major goal of CKD care.
- ▣ Current strategies have been shown to slow progression of CKD to ESRD, but implementation will be difficult and requires substantial financial and personnel resources.