Definitions of "Albuminuria"*

	Normo-albuminuria	Micro-albuminuria	Macro-albuminuria
Urine albumin/ creatinine ratio 'UACR' (mg/g creatinine)	< 30	30 - 300	> 300

* These definitions were derived from studies looking at the risk of progressing to ESRD; they are NOT applicable for assessing macrovascular risk

Diabetes Care 2004;27:S79-S83

HOPE Trial

Urine Albumin/Creatinine Ratio (UACR) Strong Predictor of All-Cause Mortality *

Quartiles	1ST	2ND	3RD	4Th
UACR (mg/g Creatinine)	<1.90	1.9-5.11	5.12-14.2	>14.3
All Patients N = 9043	1	1.08 (0.89-1.32)	1.46 (1.21-1.75)	2.34 (1.99-2.77)
Diabetes N = 3498	1	0.86 (0.58-1.28)	1.41 (1.01-1.95)	2.38 (1.80-3.20)
No Diabetes N = 5545	1	1.17 (0.93-1.47)	1.49 (1.19-1.87)	2.27 (1.82-2.82)

* There was an INCREASED mortality despite "normoalbuminuria" in ALL patients, including those without diabetes.

Ann Intern Med 2001;134:629-636

HOPE Trial

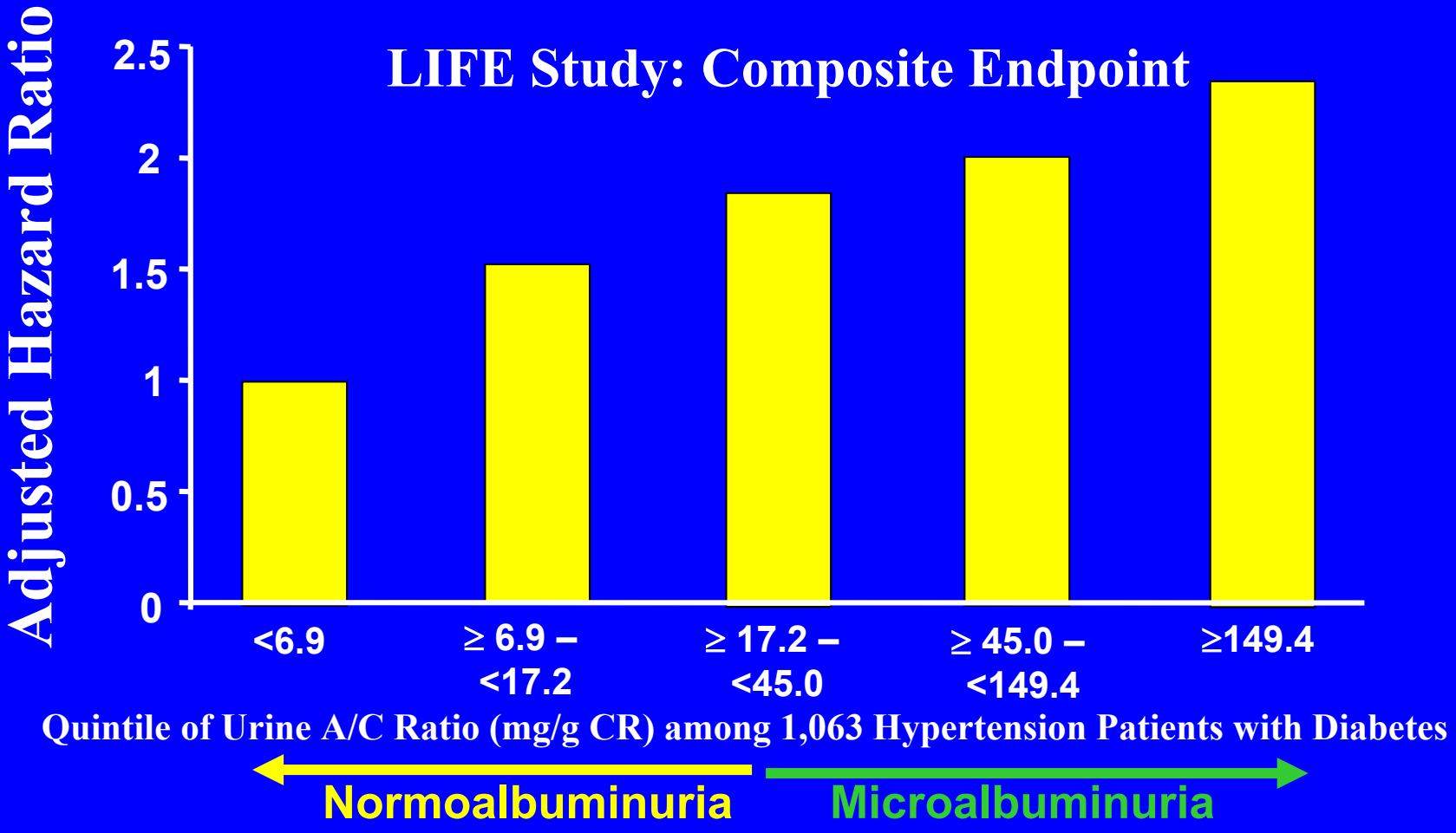
UACR Best Predictor for Combined Endpoints of Cardiovascular Death, Myocardial Infarction, and Stroke

Variable	Hazard Ratio
Urine Albumin/Creatinine Ratio	1.59
CAD	1.51
PVD	1.49
Diabetes Mellitus	1.42
Creatinine > 1.4mg/dL	1.40
Male	1.20
Waist-Hip Ratio	1.13
Age	1.03

N Engl J Med 2000;342:145-153

Albuminuria Predicts Cardiovascular Risk at Levels BELOW Current Definition

Albuminuria Assessment in Patients with Hypertension and Diabetes Improves Cardiovascular Risk Stratification



Lancet 2002;359:995-1003

The LIFE Study

Urine Albumin/Creatinine Ratio (UACR) and Composite Endpoints in 1,063 Diabetes Patients

Quintiles	1ST	2ND	3RD	4TH	5TH
UACR (mg/g Creatinine)	<6.9	6.9-17.1	17.2-45	45.1-149.4	>149.4
All-Cause Mortality	1.0	2.0	1.8	1.8	2.5
Cardiovascular Mortality	1.0	1.8	1.7	2.4	2.7
Myocardial Infarction	1.0	0.8	1.0	1.4	1.1
Stroke	1.0	3.2	3.1	3.4	3.8

Except for myocardial infarction, all endpoints were increased despite "normoalbuminuria". Hazard ratios were adjusted for LVH, age, sex, smoking, race, and serum creatinine.

Lancet 2002;359:1004-1010

UACR* and CVD Risk

Risk when UACR > 7.5 mg/g creatinine in women and > 4.0 mg/g creatinine in men

End Point	Hazard ratio	"p"
CV event	2.92	< 0.001

***simple, inexpensive, independent predictor of CVD; also addresses sex difference as men have higher muscle mass**

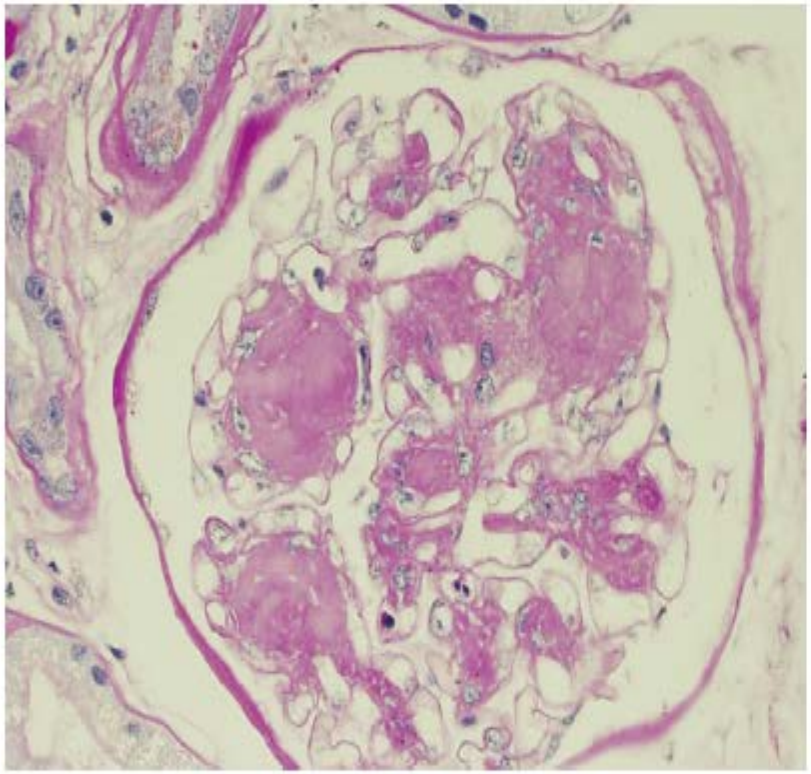
J Am Soc Nephrol 2002;13:1034-1039; Circulation 2005;112:969-975

Three Principal Mediators Contribute to Chronic Kidney Disease (CKD)

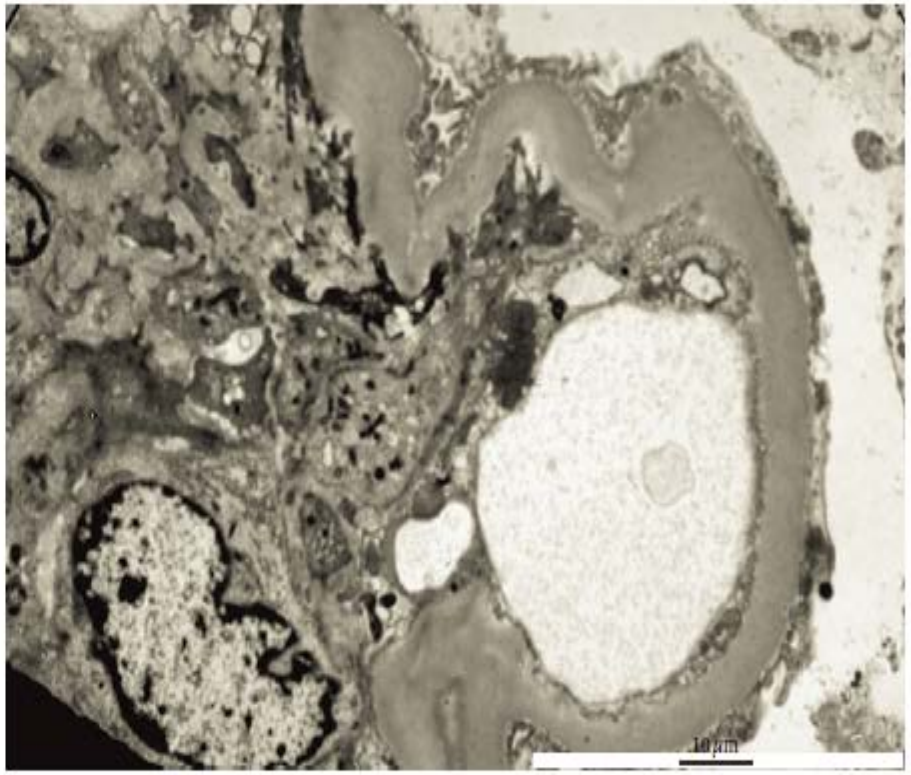
- Loss of nephron mass with resultant glomerular hyperfiltration and increased single nephron glomerular filtration rate
- Hypertension, #1 cause of death in the world
- Albuminuria, represents a common final pathway of CKD irrespective of underlying specific glomerular pathology and heralds the onset of glomerular damage

Pediatr Nephrol 2014; 29:771–784

Kimmelstiel-Wilson Lesion, Thickened Basement Membrane, and Podocyte Foot Process Effacement

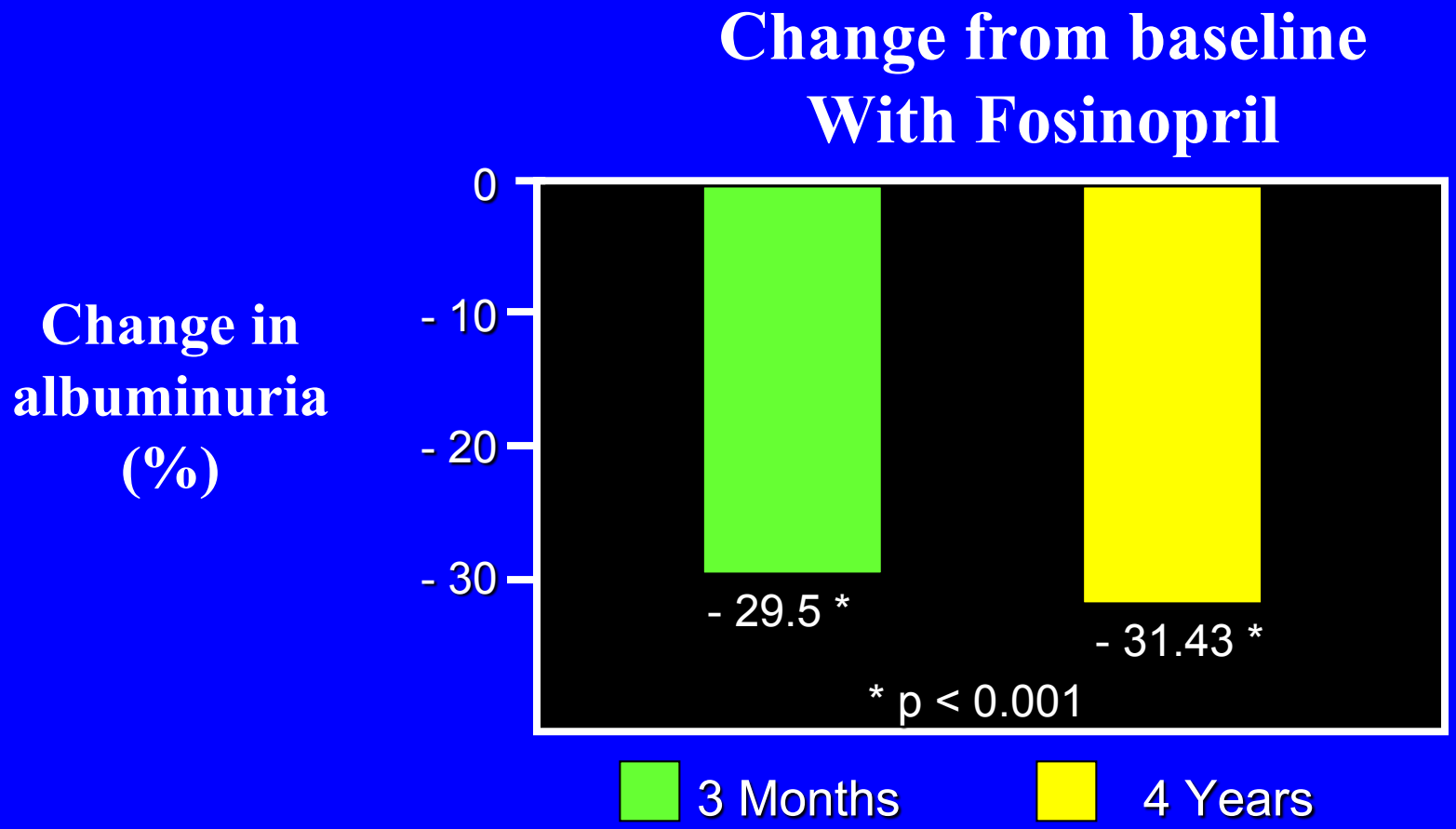


(a)



(b)

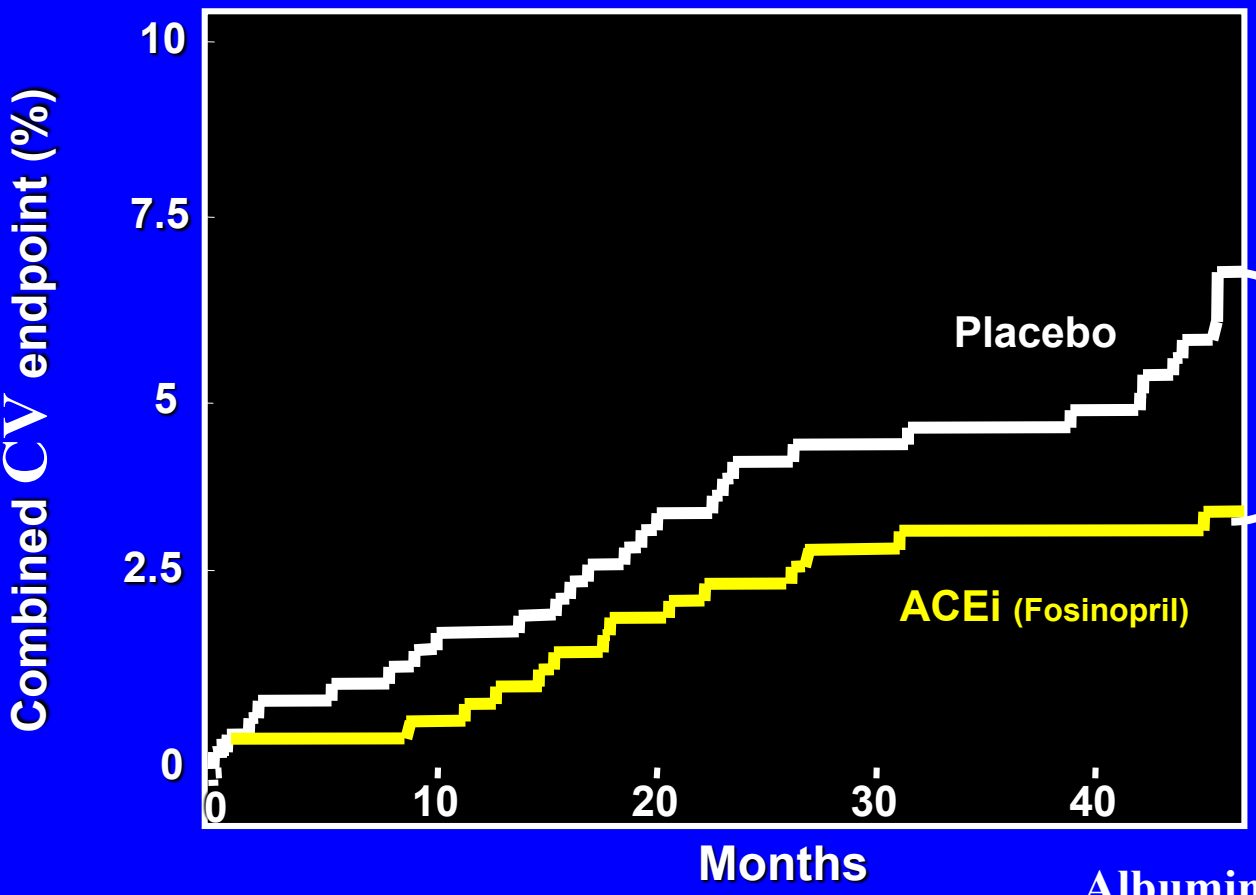
ACE Inhibitor Fosinopril Significantly Decreased Albuminuria



Albuminuria, mg/24h
Pre ACE 23.7 (16.9- 44.5)
Post ACE 16.25 (11.6-30.5)

Circulation 2004;110:2809-2816

ACE inhibitor Fosinopril Reduced Cardiovascular Events in Subjects with Albuminuria



Risk reduction 40%

Number needed to treat 29

Albuminuria, mg/24h
Pre ACE 23.7 (16.9- 44.5)
Post ACE 16.25 (11.6-30.5)

Circulation 2004;110:2809-2816