Epidemiologia della malattia renale cronica nel diabete

Ferdinando Carlo Sasso, MD-PhD
Dipartimento di Scienze Medico Chirurgiche Avanzate

Università
degli Studi
della Campania
Luigi Vanvitelli

Dichiarazione esplicita di trasparenza delle fonti di finanziamento e dei rapporti con soggetti portatori di interessi commerciali

Il sottoscritto **Prof. Ferdinando Carlo Sasso**

in qualità di Relatore

ai sensi dell'art. 3.3 sul Conflitto di Interessi, pag. 17 del Reg. Applicativo dell'Accordo Stato-Regione del 5 novembre 2009, dichiara *che negli ultimi due anni ha avuto i seguenti rapporti anche di finanziamento con soggetti portatori di interessi commerciali in campo sanitario:*

Eli Lilly, Mundipharma,
Roche Diagnostics,
Novo Nordisk, MSD

29 febbraio 2020

Inquadramento Diagnostico

JAMA | Review JAMA. 2019;322(13):1294-1304

Chronic Kidney Disease Diagnosis and Management

CKD is defined as the presence of an abnormality in kidney structure or function **persisting for more than 3 months**. This includes 1 or more of the following:

(1) GFR <60 mL/min/1.73 m2,

(2) Albuminuria (ie, urine albumin 30 mg/24h or urine albumin-to-creatinine ratio [ACR] 30 mg/g)

(3) Abnormalities in urine sediment, histology

(4) Imaging suggestive of kidney damage

(5) History of kidney transplantation

Identificare i soggetti a rischio è semplice, economico e…

cost-effective

Prognosis of CKD by GFR and Albuminuria Categories: KDIGO 2012

GFR categories (ml/min/ 1.73m²) Description and range			Persistent albuminuria categories Description and range		
			A1	A2	A3
			Normal to mildly increased	Moderately increased	Severely increased
			<30 mg/g <3 mg/mmol	30-300 mg/g 3-30 mg/mmol	>300 mg/g >30 mg/mmol
G1	Normal or high	≥90			
G2	Mildly decreased	60-89			
G3a	Mildly to moderately decreased	45-59			
G3b	Moderately to severely decreased	30-44			
G4	Severely decreased	15-29			
G5	Kidney failure	<15			

sCreat (costo 1.13 €)

Es. urine (costo 1.14 €)

Kidney inter., Suppl. 2013; **3**: 1–150.

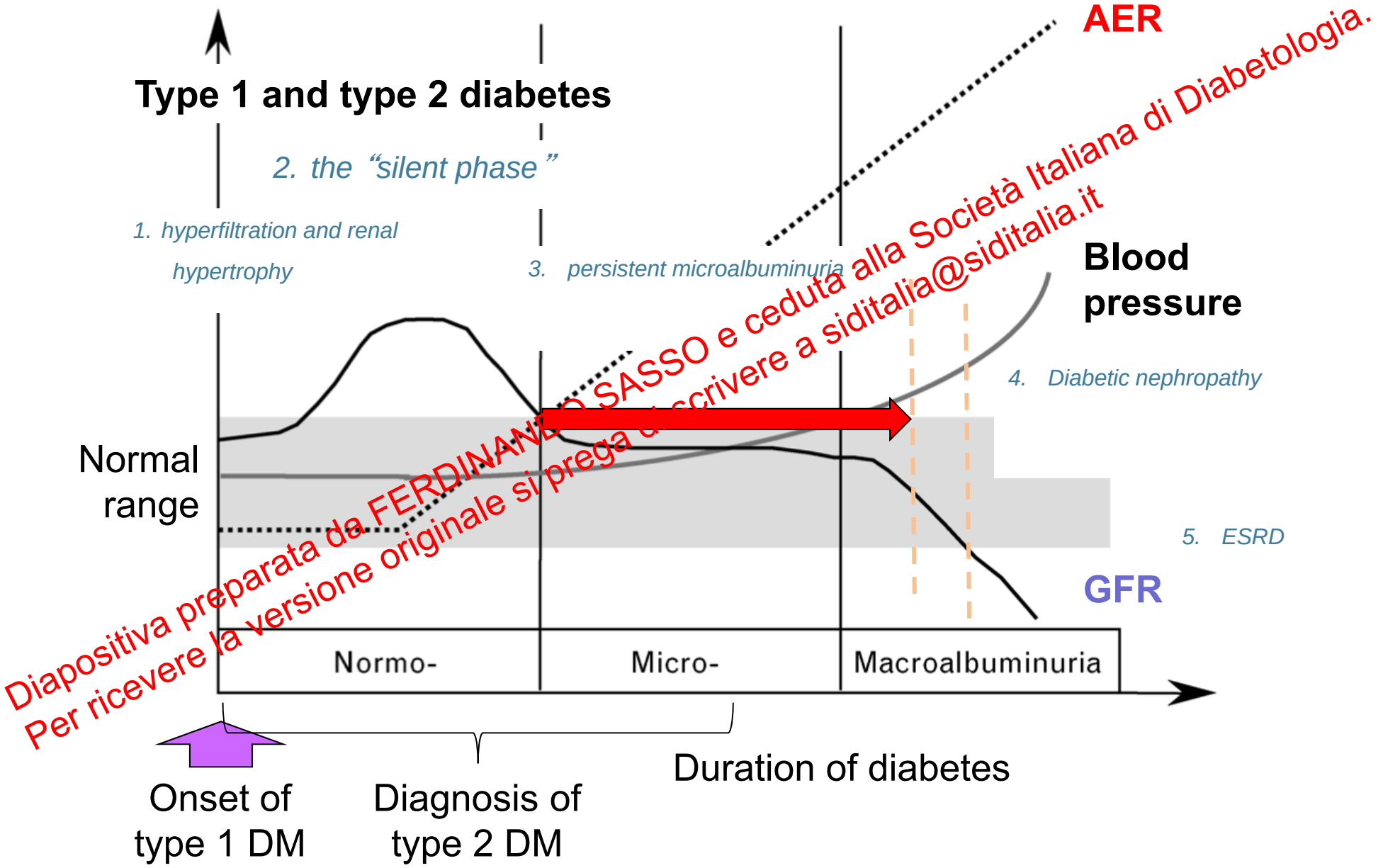
Mai basarsi sulla sola creatininemia negli anziani….

Serum creatinine concentrations corresponding to eGFR levels of 60 mL/min/1.73 m^2 by the abbreviated MDRD equation or 60 mL/min by the Cockcroft–Gault equation

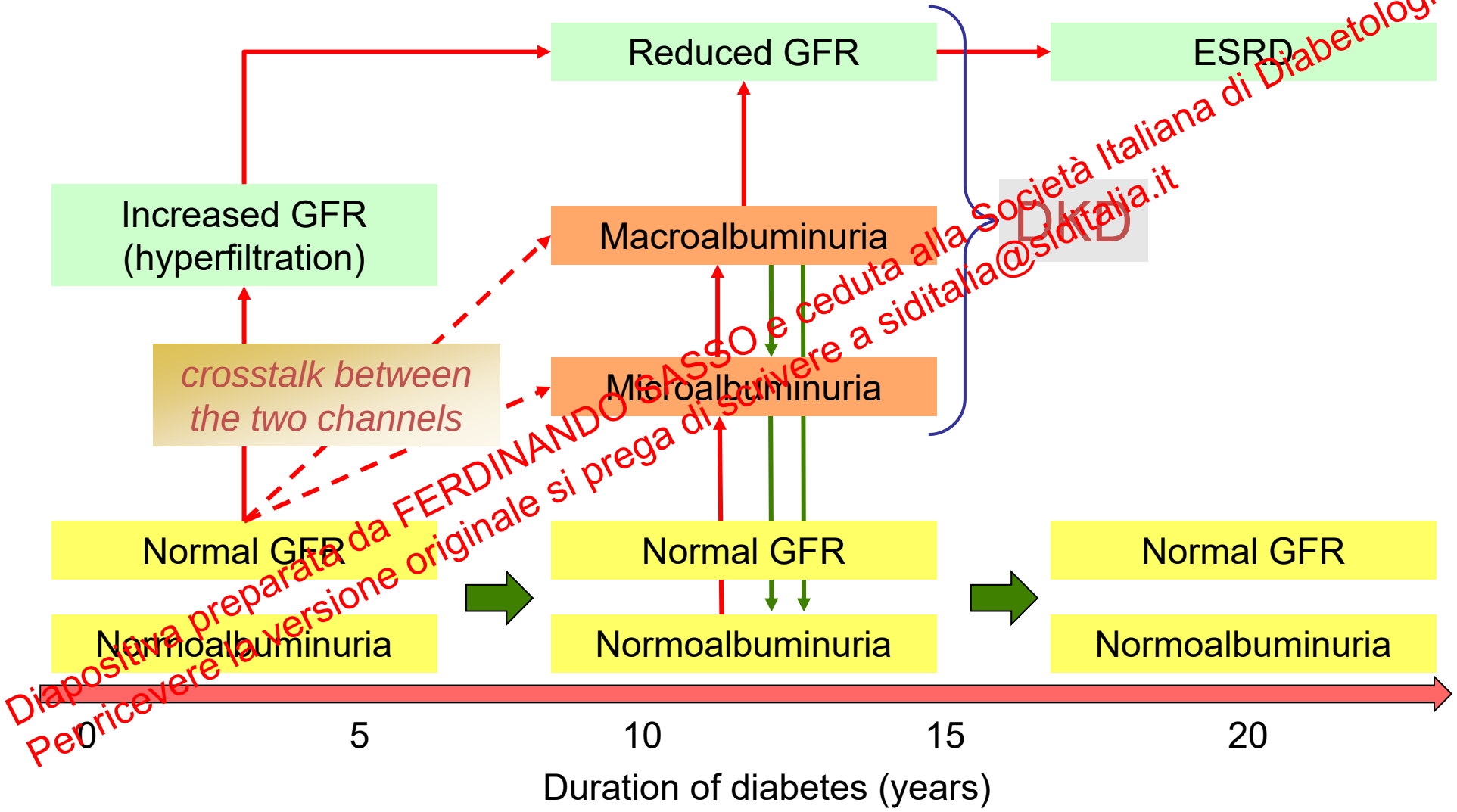
	MDRD Equation					
	European-American		African-American		Cockcroft–Gault	
Age (yrs)	Men	Women	Men	Women	Men	Women
50	1.34	1.08	1.58	1.22	1.50	1.28
60	1.30	1.00	1.53	1.18	1.33	1.13
70	1.26	0.97	1.49	1.15	1.17	0.99
80	1.23	0.95	1.46	1.12	1.00	0.85

Calculations assume weight of 72 kg and body surface area of 1.73 m^2. Creatinine in mg/dL.

Historically, for people at risk of developing DKD, an initial increase in AER has been linked to a subsequent decline in GFR



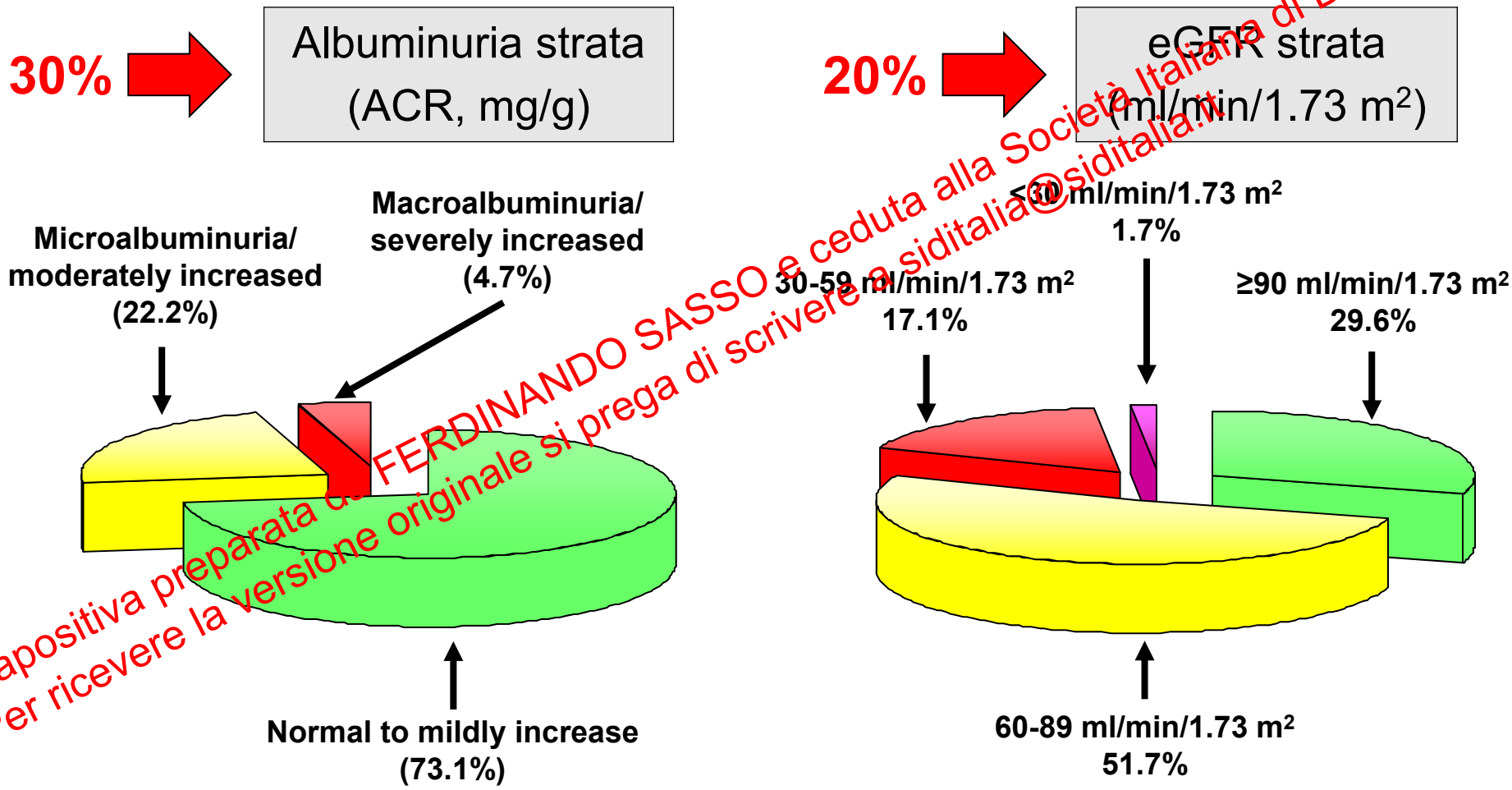
Schematic presentation of variable clinical courses of Diabetic Kidney Disease (DKD)



Boger CA et al., **PLOS Genetics**, 8: e1002989, **2012 (modified)**

Renal dysfunction is common in patients with T2DM

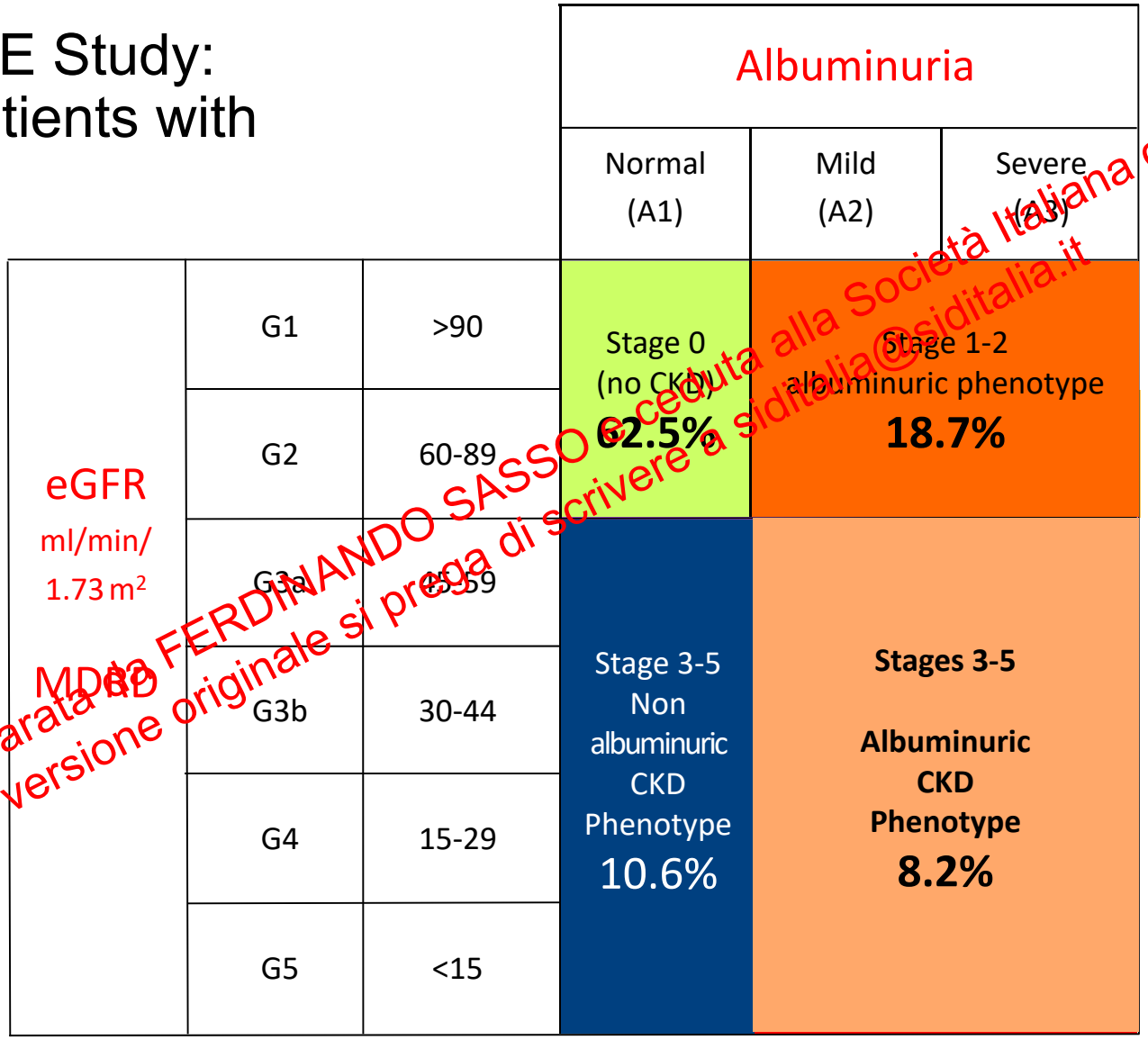
The RIACE Study: 15,773 patients with T2DM



Penno G, et al., The RIACE Study Group. J Hypertens 29: 1802-1809, **2011**

Renal dysfunction is common in patients with T2DM

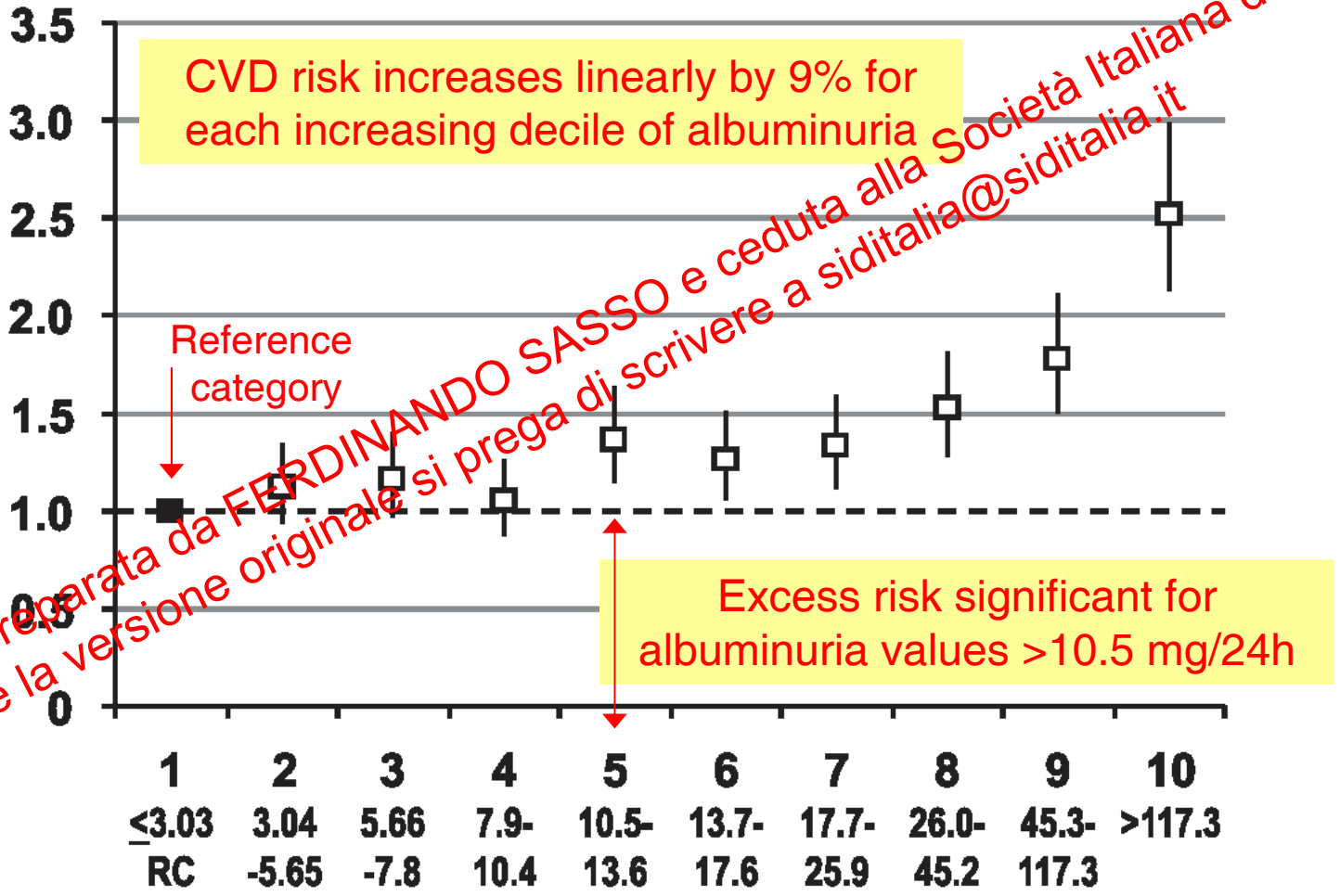
The RIACE Study:
15,773 patients with T2DM



Penno G et al. **J Hypertens** 29: 1802-1809, **2011**

The RIACE (Renal Insufficiency and Cardiovascular Events) study

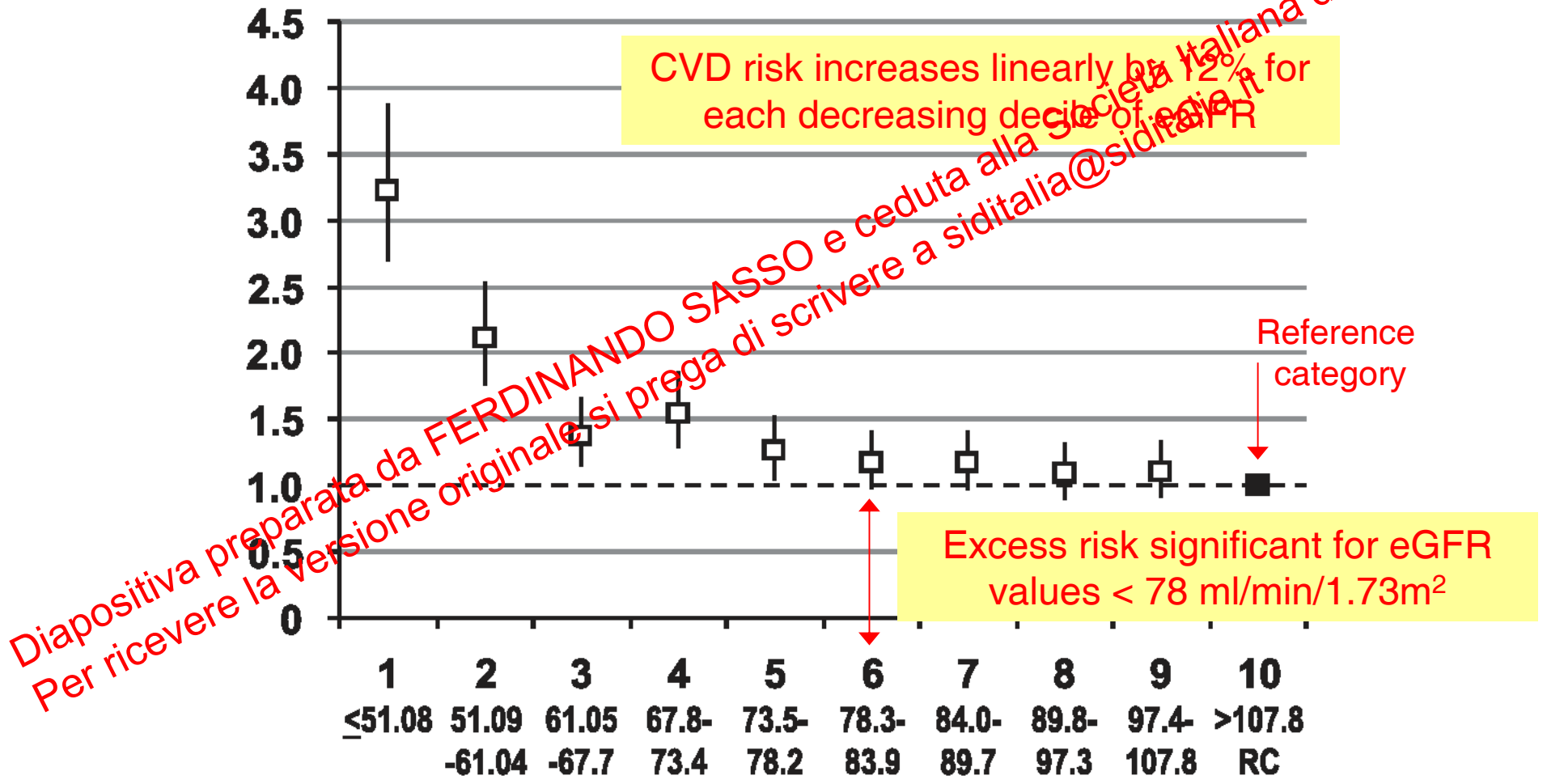
Age and sex-adjusted risk of major CVD events according to albuminuria deciles (mg/24h)



Solini A. et al, The RIACE Study Group. Diabetes Care 35: 143-149, **2012**

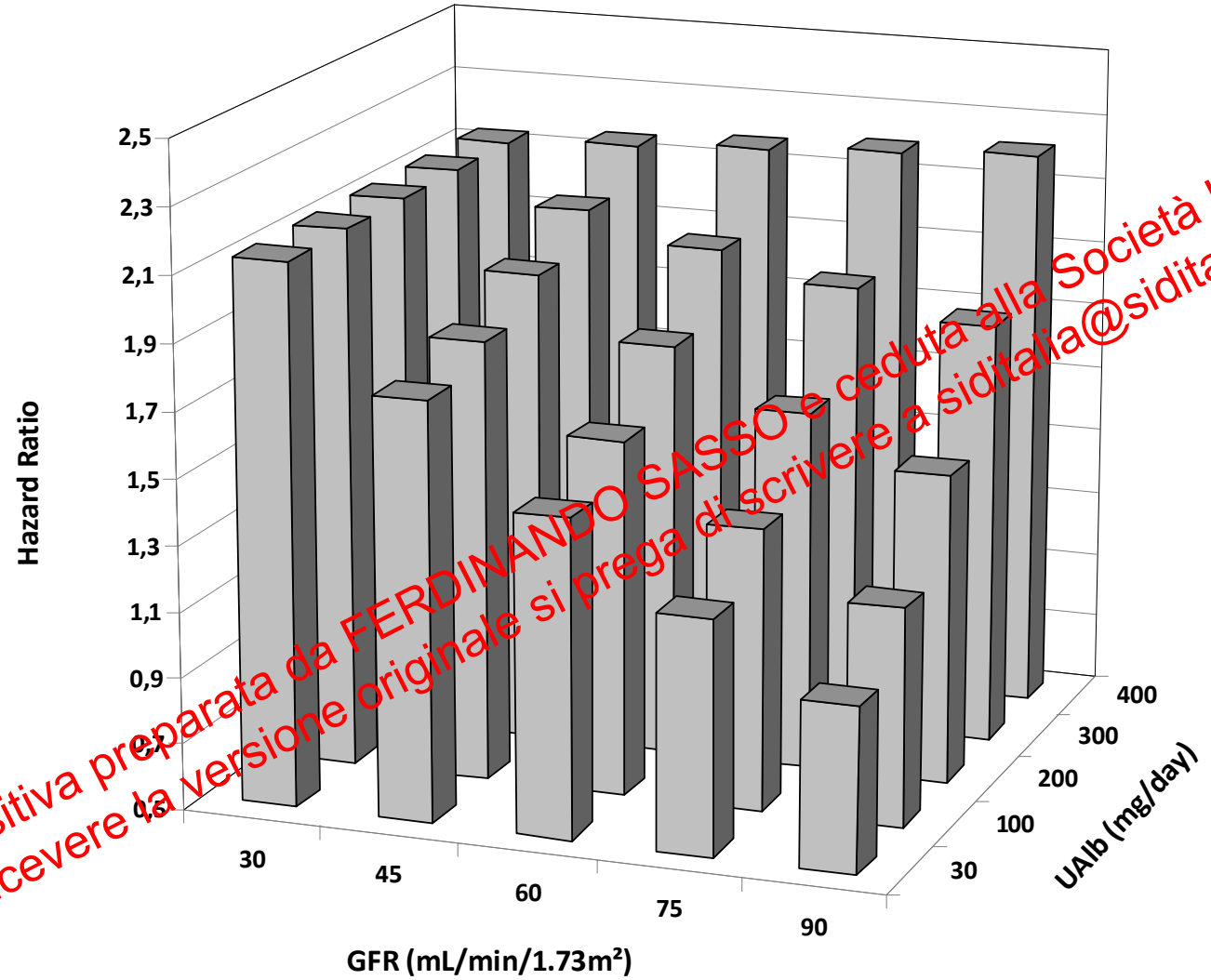
The RIACE (Renal Insufficiency and Cardiovascular Events) study

Age and sex-adjusted risk of major CVD events according to eGFR deciles (mg/24h)



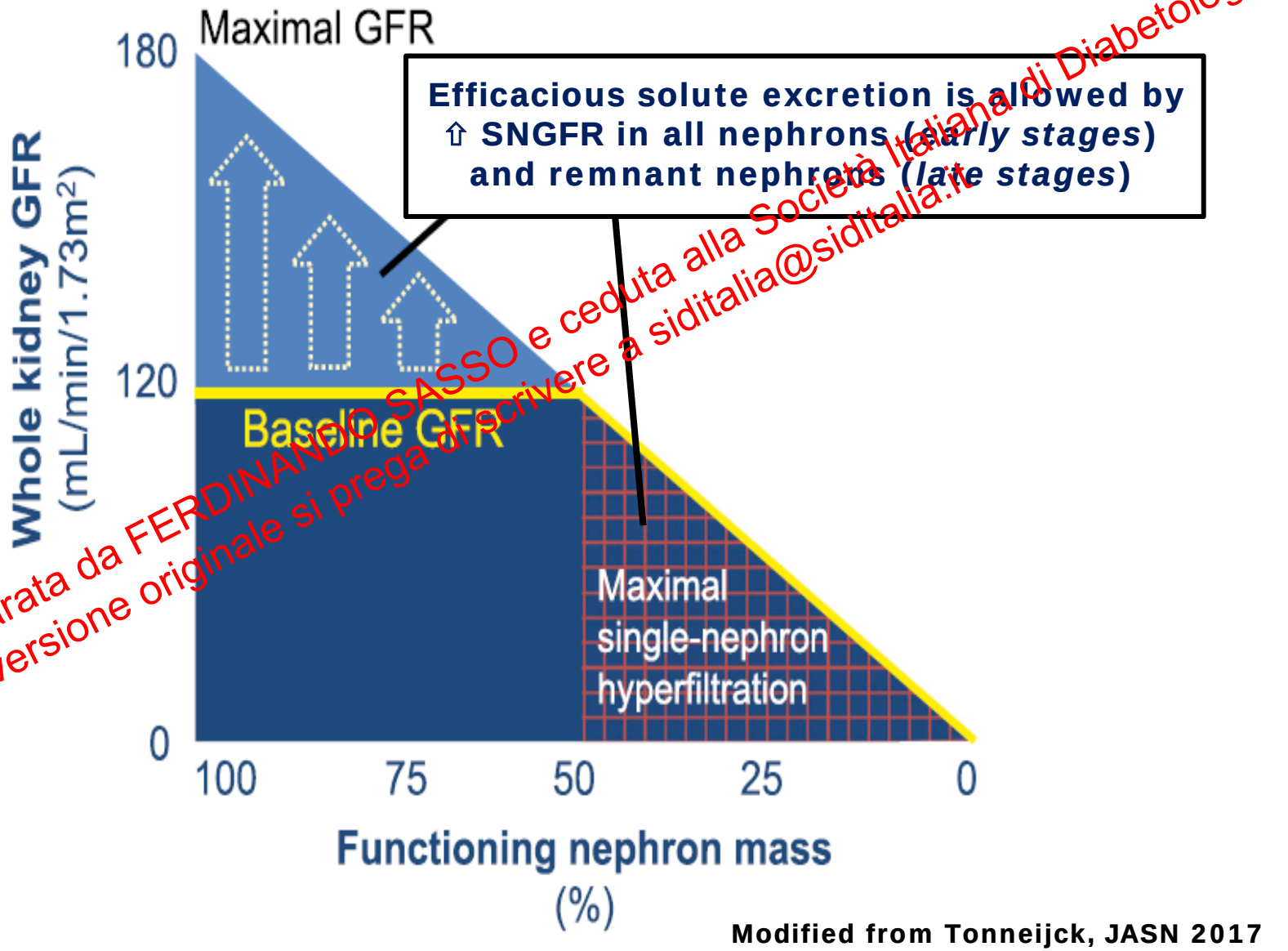
Solini A. et al, The RIACE Study Group. Diabetes Care 35: 143-149, **2012**

NID-2 Study: Rischio CV e funzione renale



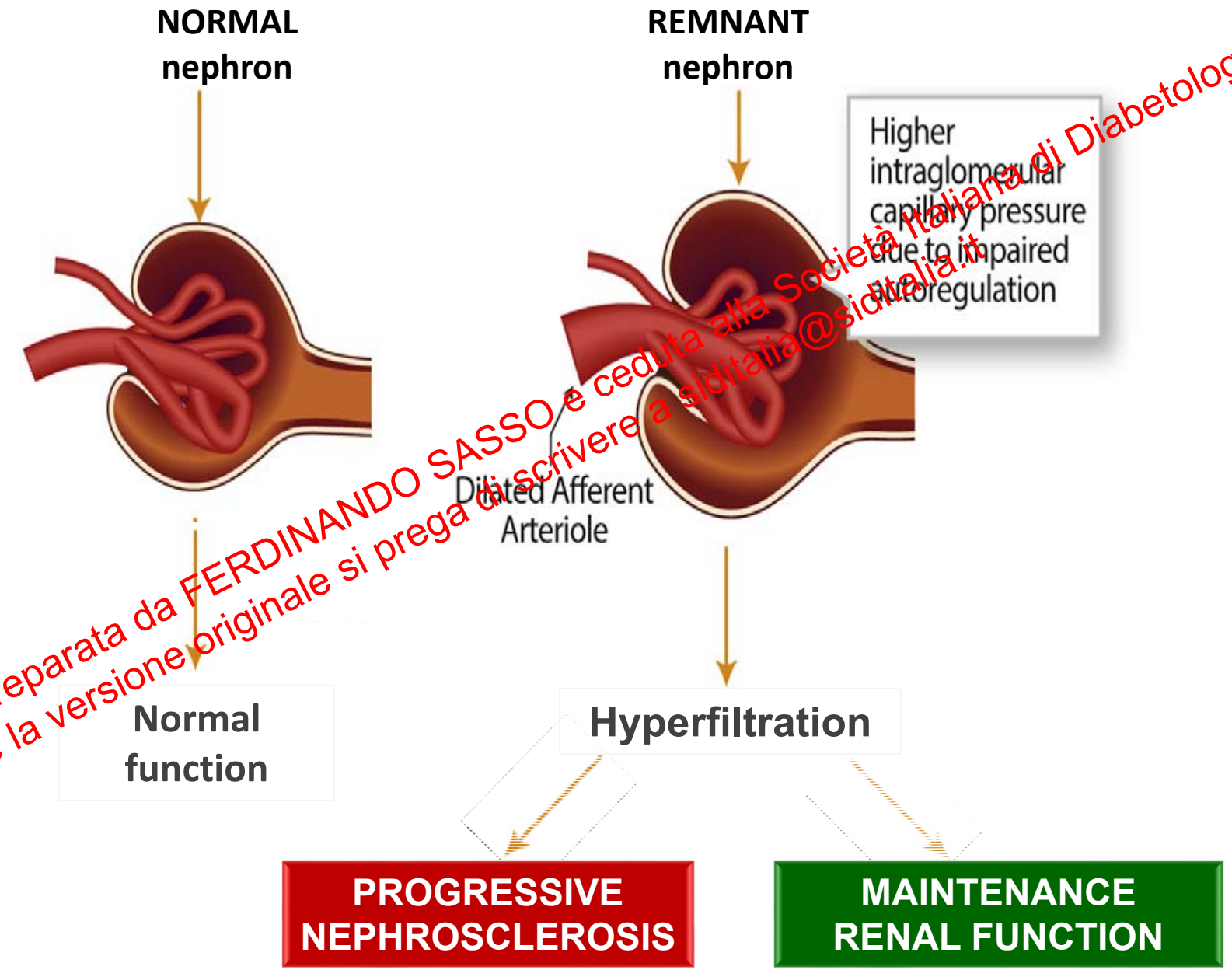
Sasso et al, Nephrol Dial Transplant 2012

Hyperfiltration: early and persistent compensatory mechanism to maintain adequate solute excretion in CKD



Modified from Tonneijck, JASN 2017

Hyperfiltration: the two sides of the coin…



Epidemiologia della CKD

850,000,000+

People world wide have kidney diseases

10.4% men and 11.8% women

Kidney Diseases 850 M

Diabetes Mellitus 422 M

Cancer 42 M

HIV/AIDS 37 M

Mark D. Okusa,
President ASN 2018

ASN LEADING THE FIGHT AGAINST KIDNEY DISEASE

Oct 2018

Jager, Kidney Int, 30 Sept 2019

Analysis of the Global Burden of Disease study highlights the global, regional, and national trends of chronic kidney disease epidemiology from 1990 to 2016

Yan Xie[1], Benjamin Bowe[1], Ali H. Mokdad[2], Hong Xian[1,3], Yan Yan[1,4], Tingting Li[1,5], Geetha Maddukuri[1], Cheng-You Tsai[1,3], Tasheia Floyd[1,6] and Ziyad Al-Aly[1,5,7,8]

Kidney International (2018) **94,** 567–581;

The significant increase of global burden of CKD is primarily driven by demographic expansion and aging

	Change in the last 25 years (1990-2016)		
	Absolute	Rate (100,000 persons)	Age-standardized rate (100,000 person)
Incidence of CKD	**+89%**	**+34%**	**+4%**
Prevalence of CKD	**+87%**	**+33%**	**+0.4%**
Death due to CKD	**+98%**	**+41%**	**+8%**
DALYs* due to CKD	**+62%**	**+16%**	**-4%**

DALYs:** ***Disability-Adjusted Life-Years **= (years lost due to premature death + years living with disability due to CKD)**

Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the Global Burden of Disease Study 2017

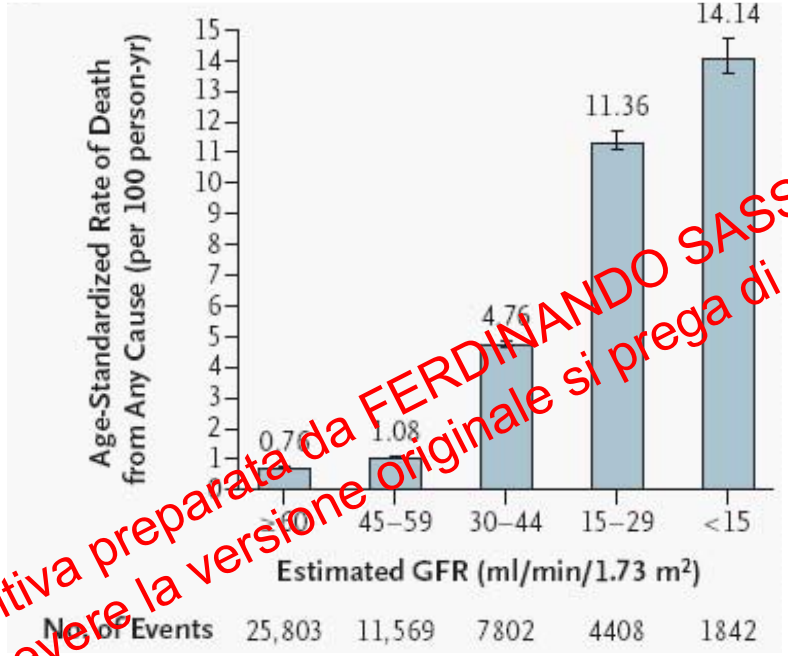
GBD 2017 Causes of Death Collaborators*

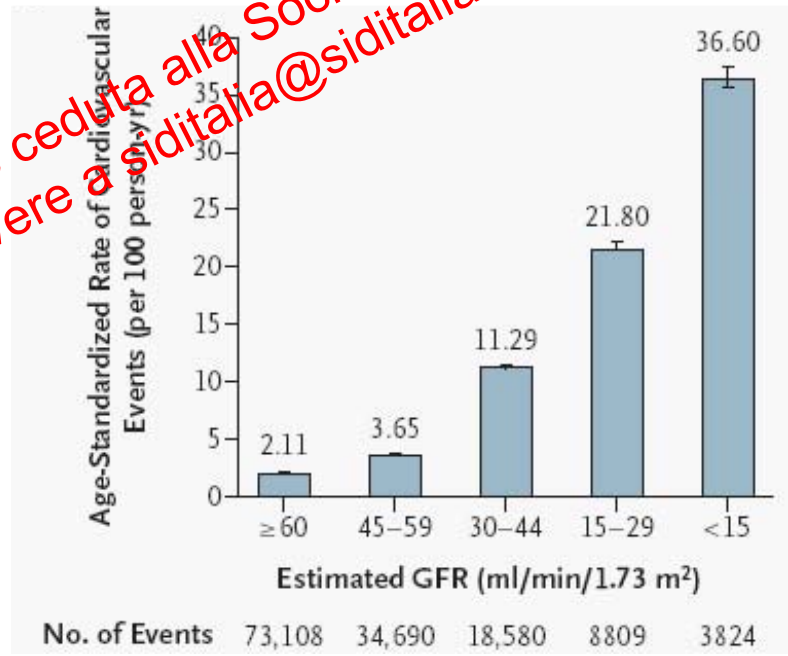
Lancet 2018; 392: 1736–88

Ten-year change in mortality rate by CKD cause

	All-age deaths (thousands)		Age-standardised death rate (per 100 000)		All-age YLLs (thousands)		Age-standardised YLL rate (per 100 000)	
	2017	Percentage change, 2007–17	2017	Percentage change, 2007–17	2017	Percentage change, 2007–17	2017	Percentage change, 2007–17
Chronic kidney disease	1230·2 (1195·1 to 1258·8)	33·7% (30·5 to 36·1)*	15·9 (15·5 to 16·2)	1·5% (−0·9 to 3·2)	28 508·5 (27 610·2 to 29 314·0)	21·0% (18·2 to 23·5)*	359·4 (348·2 to 369·6)	−2·5% (−4·7 to −0·6)*
Chronic kidney disease due to type 1 diabetes mellitus	77·3 (62·4 to 95·2)	23·1% (19·0 to 27·4)	0·9 (0·8 to 1·2)	−1·2% (−4·0 to 1·2)	2622·0 (2121·7 to 3205·5)	17·8% (13·6 to 22·3)*	31·9 (25·9 to 38·9)	−2·9% (−5·6 to −0·3)*
Chronic kidney disease due to type 2 diabetes mellitus	340·0 (284·6 to 395·9)	40·0% (36·4 to 43·6)*	4·5 (4·0 to 5·1)	4·2% (1·4 to 6·2)*	6671·9 (5825·5 to 7625·9)	35·4% (31·0 to 38·7)*	82·8 (72·4 to 94·5)	2·9% (−0·2 to 5·2)
Chronic kidney disease due to hypertension	341·1 (290·6 to 391·5)	41·4% (37·4 to 44·2)*	4·6 (4·0 to 5·2)	3·2% (0·4 to 5·2)*	5954·8 (5175·1 to 6741·9)	33·4% (29·3 to 36·5)*	75·2 (65·4 to 84·9)	2·3% (−0·7 to 4·5)
Chronic kidney disease due to glomerulonephritis	189·7 (165·2 to 217·3)	25·5% (22·1 to 28·8)*	2·4 (2·1 to 2·8)	−1·3% (−3·2 to 0·7)	5554·9 (4929·1 to 6250·8)	12·7% (9·6 to 16·1)*	70·6 (62·8 to 79·4)	−5·5% (−7·5 to −3·3)*
Chronic kidney disease due to other and unspecified causes	266·8 (232·8 to 304·0)	25·9% (22·4 to 29·4)*	3·4 (3·0 to 3·9)	−1·4% (−3·7 to 0·6)	7704·8 (6794·9 to 8614·8)	10·0% (6·8 to 13·4)*	98·9 (87·4 to 110·0)	−7·7% (−9·9 to −5·4)*

Il rischio CV aumenta sin dalle fasi iniziali della CKD

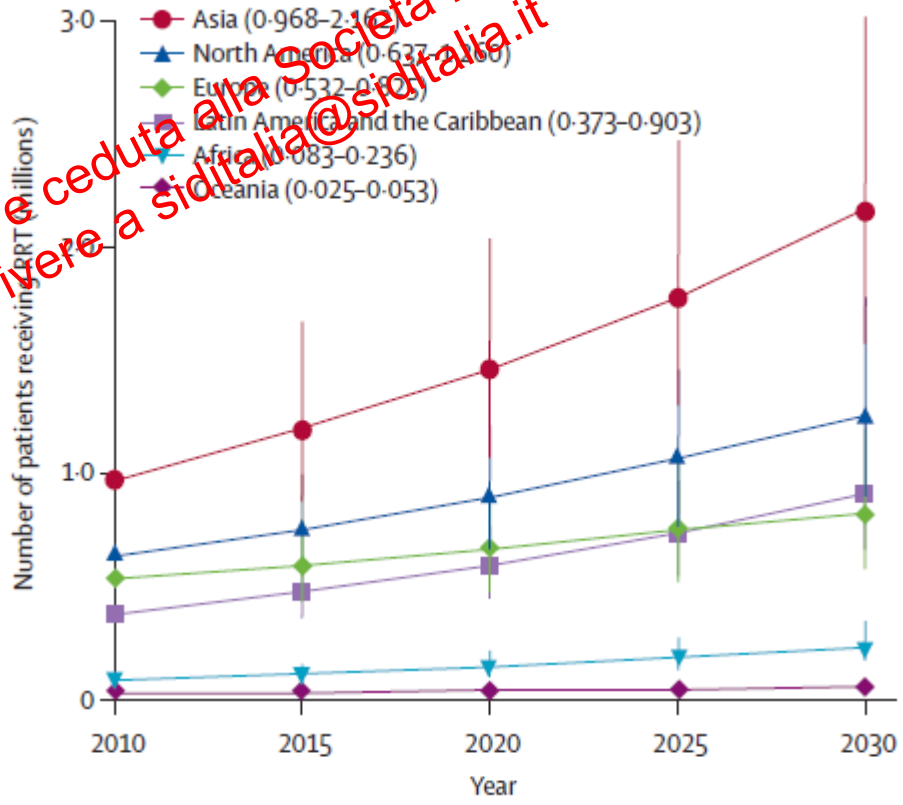




Go, NEJM 2004

Se non riusciamo a rallentare/fermare la progressione della CKD…

…nel 2030 (vs 2010) avremo il doppio dei pazienti in dialisi



Liyanage, Lancet 2015

Chronic kidney disease prevalence in the general population: heterogeneity and concerns

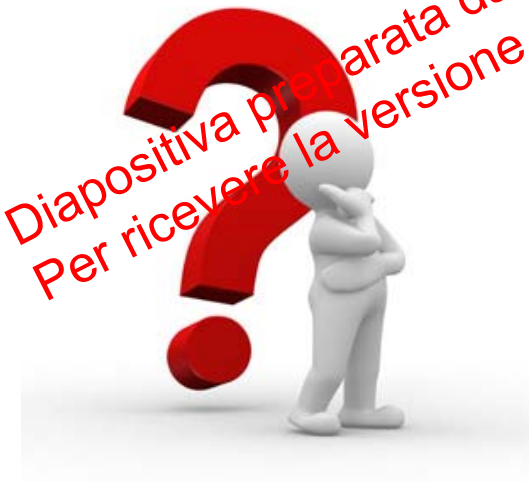
Luca De Nicola[1] and Carmine Zoccali[2]

Nephrol Dial Transplant (2016) 31: 331–335

Country	Period	N	eGFR	CKD, %
Poland	2011	2,413	CKD-EPI	**5.8**
Tanzania	2014	481	MDRD	**7.0**
Italy	**2008-12**	**7,552**	**CKD-EPI**	**7.1**
India	2010-11	5,757	CKD-EPI	**7.3**
Spain	2004-08	2,746	MDRD	**9.1**
Malaysia	2011	8,376	CKD-EPI	**9.1**
Sweden	2001-03	1,120	MDRD	**9.8**
Norway	2006-08	2,614	MDRD	**10.1**
Netherlands	1997-98	2,489	MDRD	**10.4**
China	2007-10	47,204	MDRD	**10.8**
Australia	1999-00	10,949	CKD-EPI	**11.5**
England	2009-10	5,799	CKD-EPI	**11.9**
Canada	2007-09	3,689	CKD-EPI	**12.5**
USA	1999-04	13,233	MDRD	**13.1**

- **CKD Stage 1-5 : 10.4% (95%CI 11.7-15.1%)**
- **CKD Stage 3-5 : 3.8% (95%CI 9.2–12.2%)**

Epidemiology of Diabetic CKD



Osservatorio ARNO Diabete

Il profilo assistenziale della popolazione con diabete

CINECA

SID Società Italiana di Diabetologia

FONDAZIONE RICERCA E SALUTE

Rapporto 2019

Volume XXXI

Collana Rapporti Arno

Grafico 23[15]

Le 10 più frequenti diagnosi principali nei ricoveri ordinari in soggetti con e senza diabete
(tassi per 1000 soggetti)

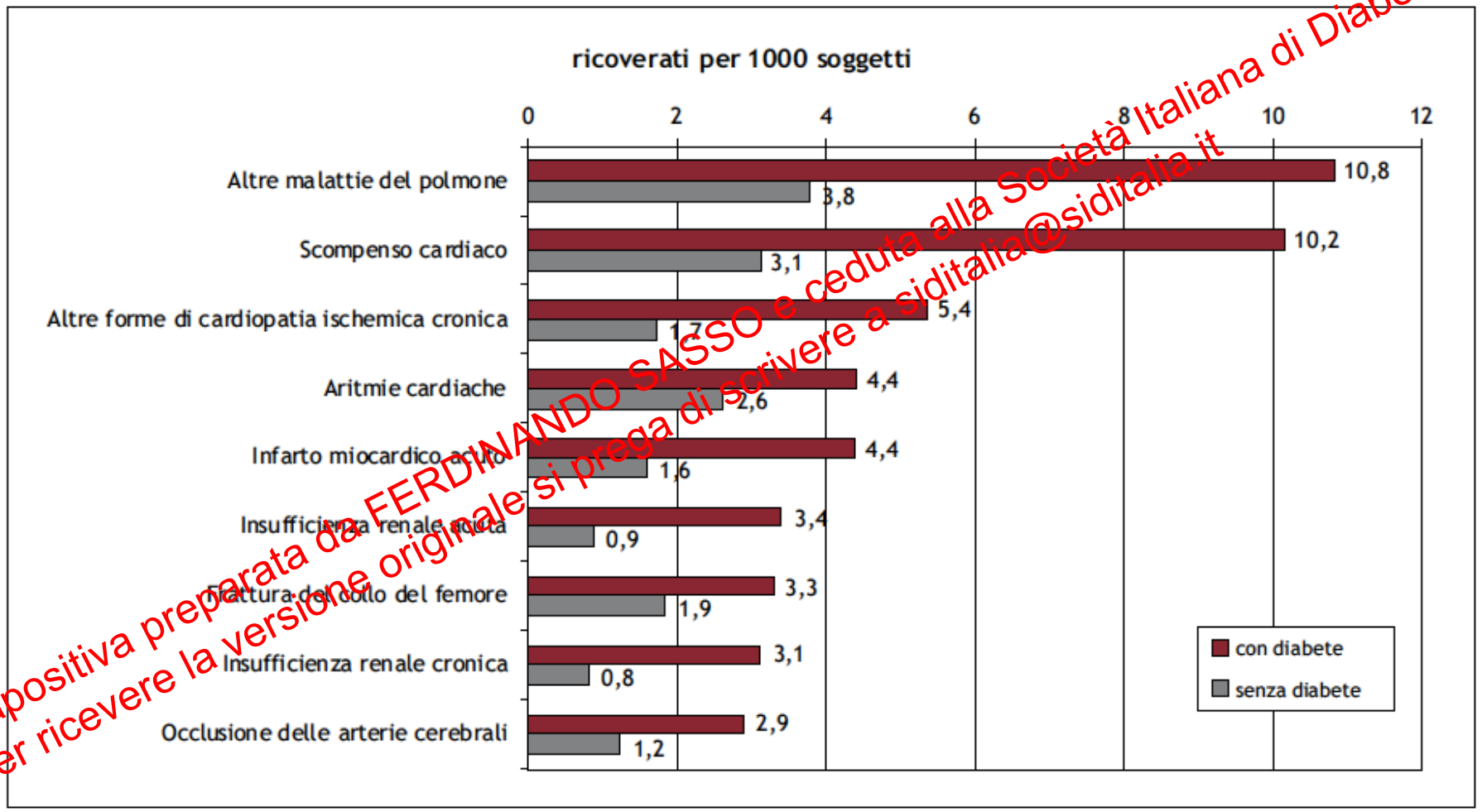
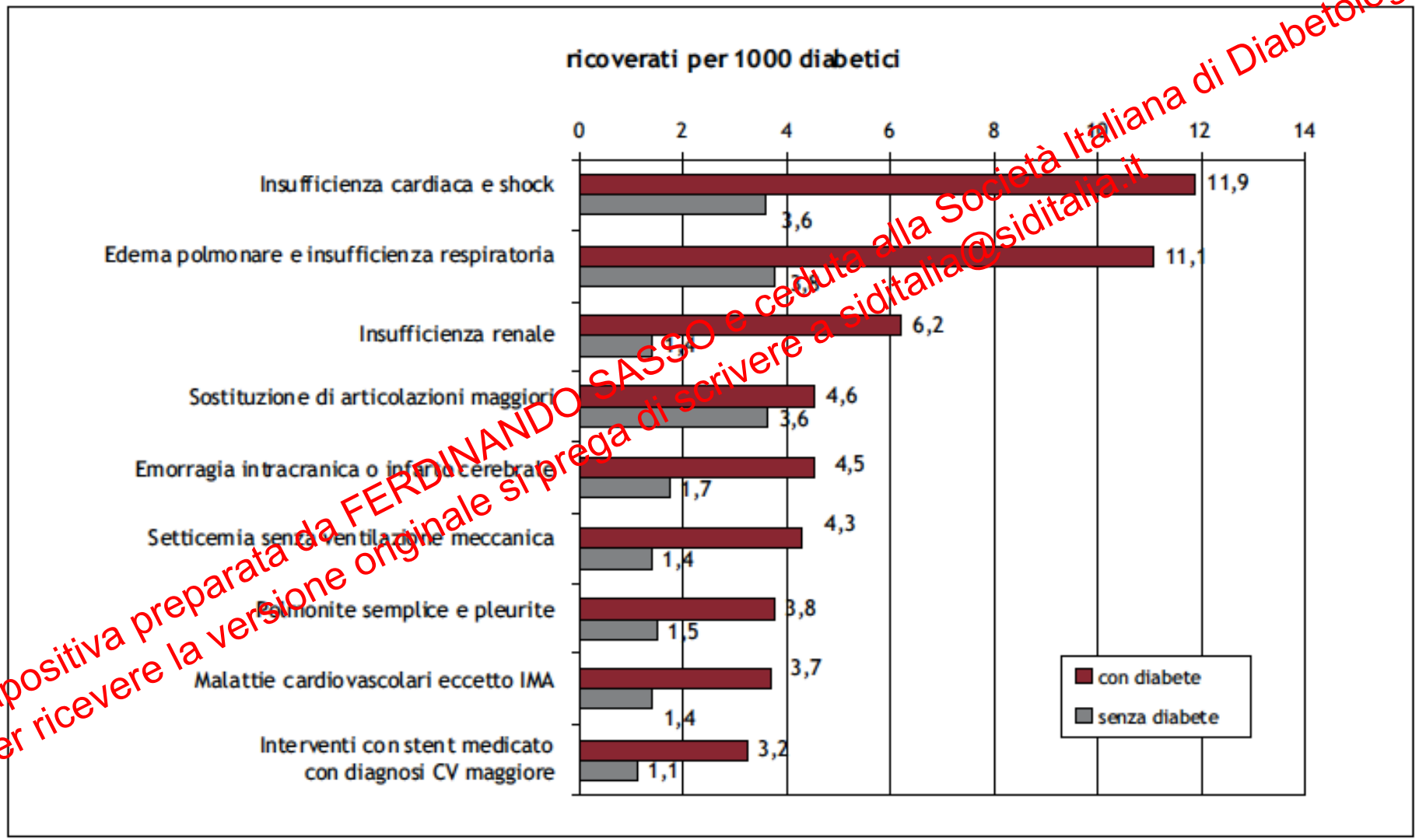


Grafico 28[17]

I 10 più frequenti DRG in caso di ricovero ordinario nei soggetti con e senza diabete
(tassi per 1000 soggetti)

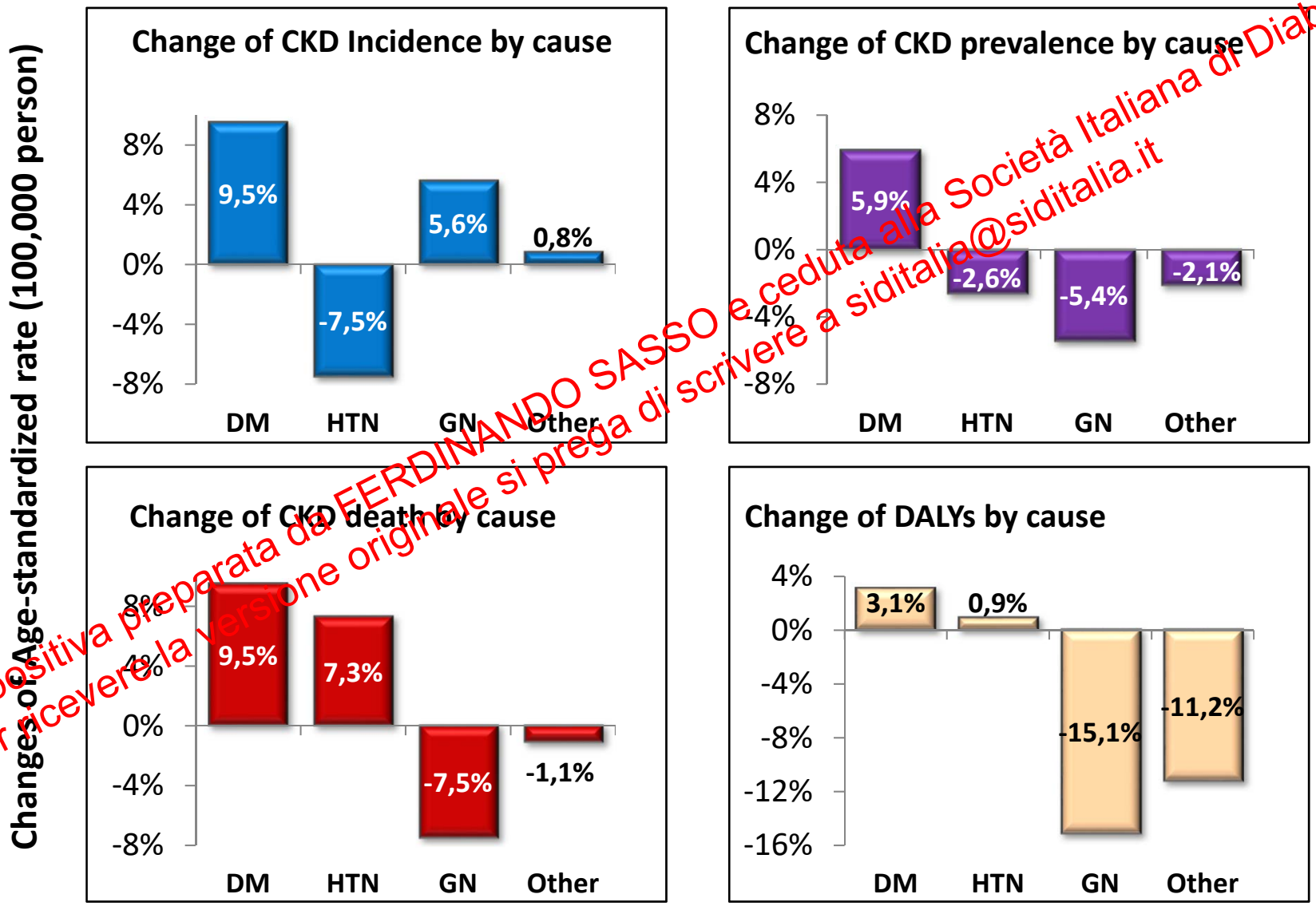


Frequenza di alcuni indicatori di esito in ambito diabetologico (ricoveri e procedure)

Indicatore	N. pazienti	% (N=697.208)	Δ% Casi vs Controlli	% Femmine (N=341.269)	% Maschi (N=355.939)
Malattie apparato circolatorio (ICD-IX: 390-459)	29.302	4,2	109%	3,4	4,9
Cardiopatia ischemica (ICD-IX: 410-414)	7.421	1,1	188%	0,6	1,5
Diabete (ICD-IX: 250)	7.113	1,0	-	0,8	1,2
Vasculopatia cerebrale (ICD-IX: 430-434;436;437-438)	5.664	0,8	92%	0,8	0,8
Infarto miocardico acuto (ICD-IX: 410)	2.293	0,3	161%	0,2	0,4
Insufficienza renale (ICD-IX: 585-586)	1.767	0,3	329%	0,2	0,3
Emodialisi (Spec. 39.95.1 - 39.95.9)	1.693	0,2	275%	0,2	0,3
Rivascolarizzazione coronarica (Intervento : 36.0X)	1.435	0,2	221%	0,1	0,3
Arteriopatia arti inferiori (ICD-IX: 440.2X)	1.400	0,2	286%	0,1	0,3
Fotocoagulazione retinica (Spec. 14.33-14.34)	1.395	0,2	353%	0,2	0,2

Analysis of the Global Burden of Disease study highlights the global, regional, and national trends of chronic kidney disease epidemiology from 1990 to 2016

Kidney International (2018) **94,** 567–581;



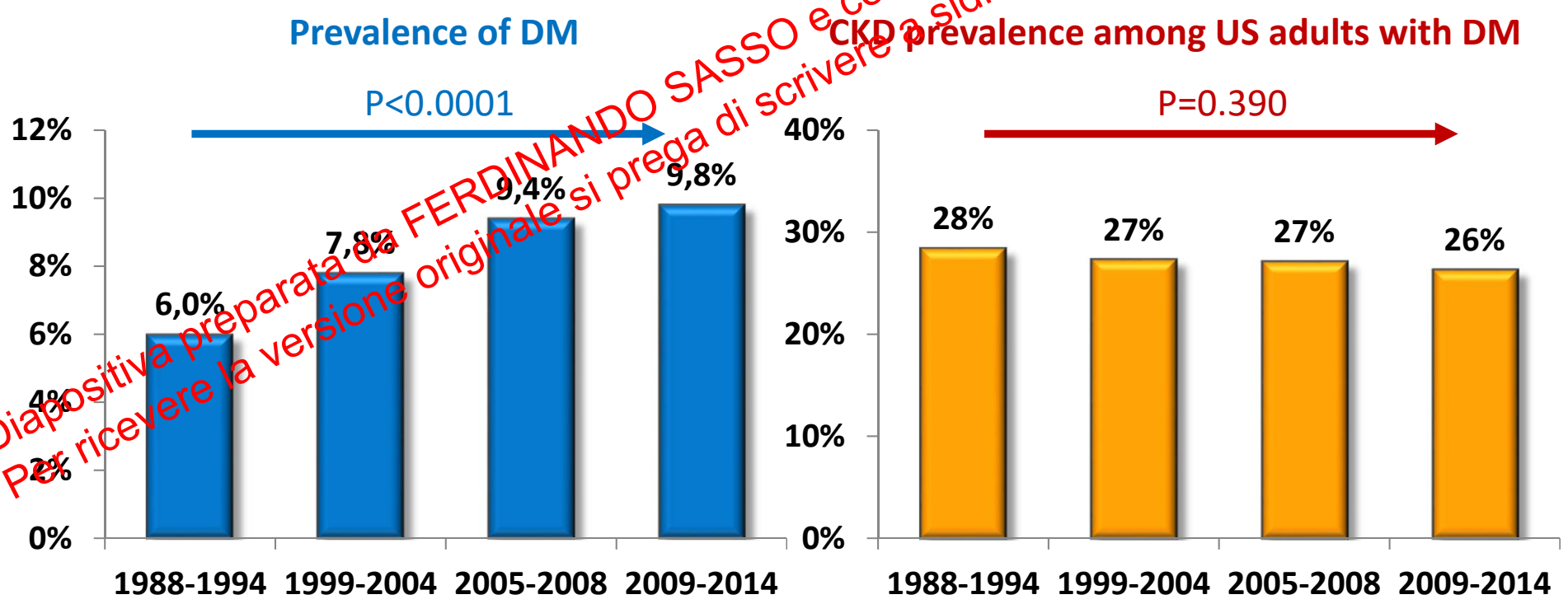
JAMA | Original Investigation

Clinical Manifestations of Kidney Disease Among US Adults With Diabetes, 1988-2014

Maryam Afkarian, MD, PhD; Leila R. Zelnick, PhD; Yoshio N. Hall, MD; Patrick J. Heagerty, PhD; Katherine Tuttle, MD, FASN, FACP; Noel S. Weiss, MD, DrPH; Ian H. de Boer, MD, MS

JAMA. 2016;316(6):602-610.

DESIGN, SETTING, AND PARTICIPANTS Serial cross-sectional studies of adults aged 20 years or older with diabetes mellitus participating in National Health and Nutrition Examination Surveys from 1988 through 2014.



Come si sta modificando negli ultimi decenni la prevalenza dei markers di CKD nel DM2?

a) La prevalenza di ACR >30mg/g sta aumentando

b) La prevalenza di GFR<60 ml/min/1.73m2 sta riducendosi

c) La prevalenza di ACR >30mg/g sta riducendosi e di GFR<60 ml/min/1.73m2 sta aumentando

d) La prevalenza di ACR >30mg/g sta aumentando e di GFR<60 ml/min/1.73m2 sta riducendosi

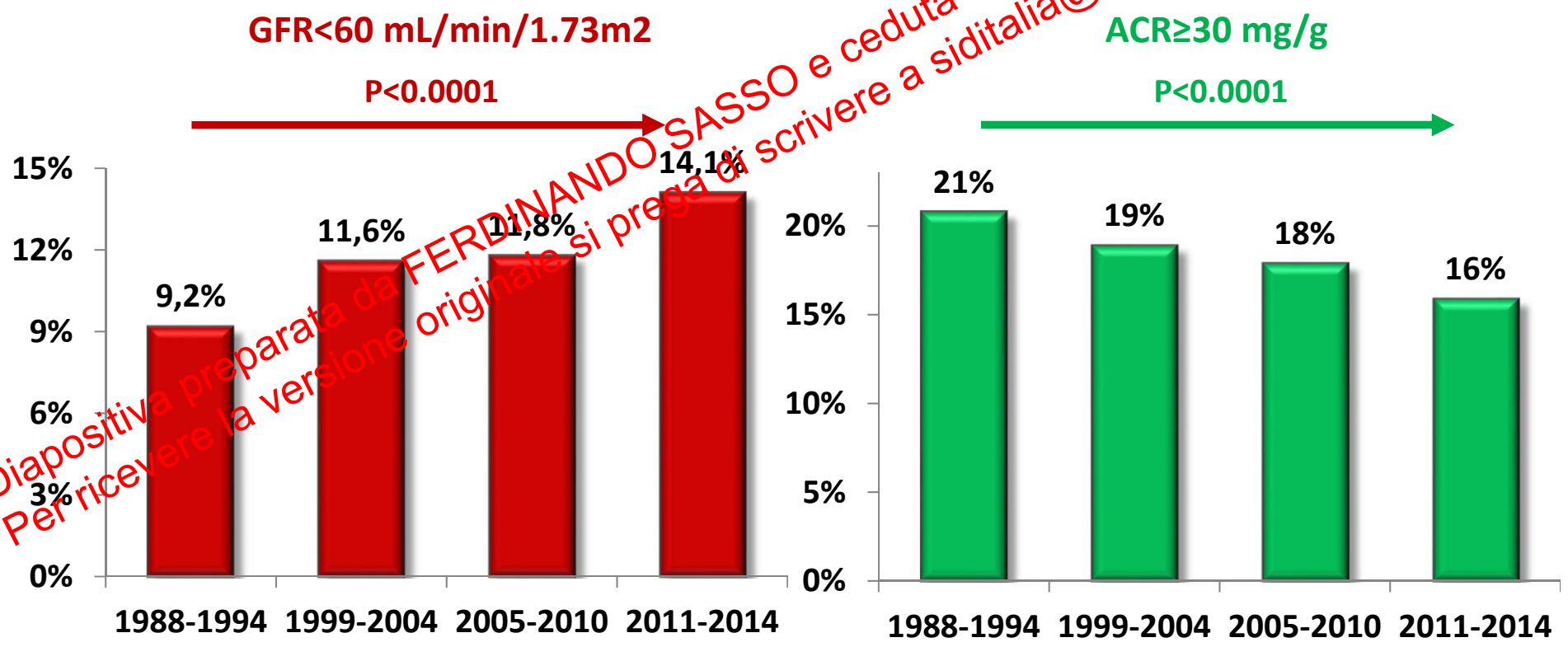
JAMA | Original Investigation

Clinical Manifestations of Kidney Disease Among US Adults With Diabetes, 1988-2014

Maryam Afkarian, MD, PhD; Leila R. Zelnick, PhD; Yoshio N. Hall, MD; Patrick J. Heagerty, PhD; Katherine Tuttle, MD, FASN, FACP; Noel S. Weiss, MD, DrPH; Ian H. de Boer, MD, MS

JAMA. 2016;316(6):602-610.

Prevalence of CKD markers among US adults with DM



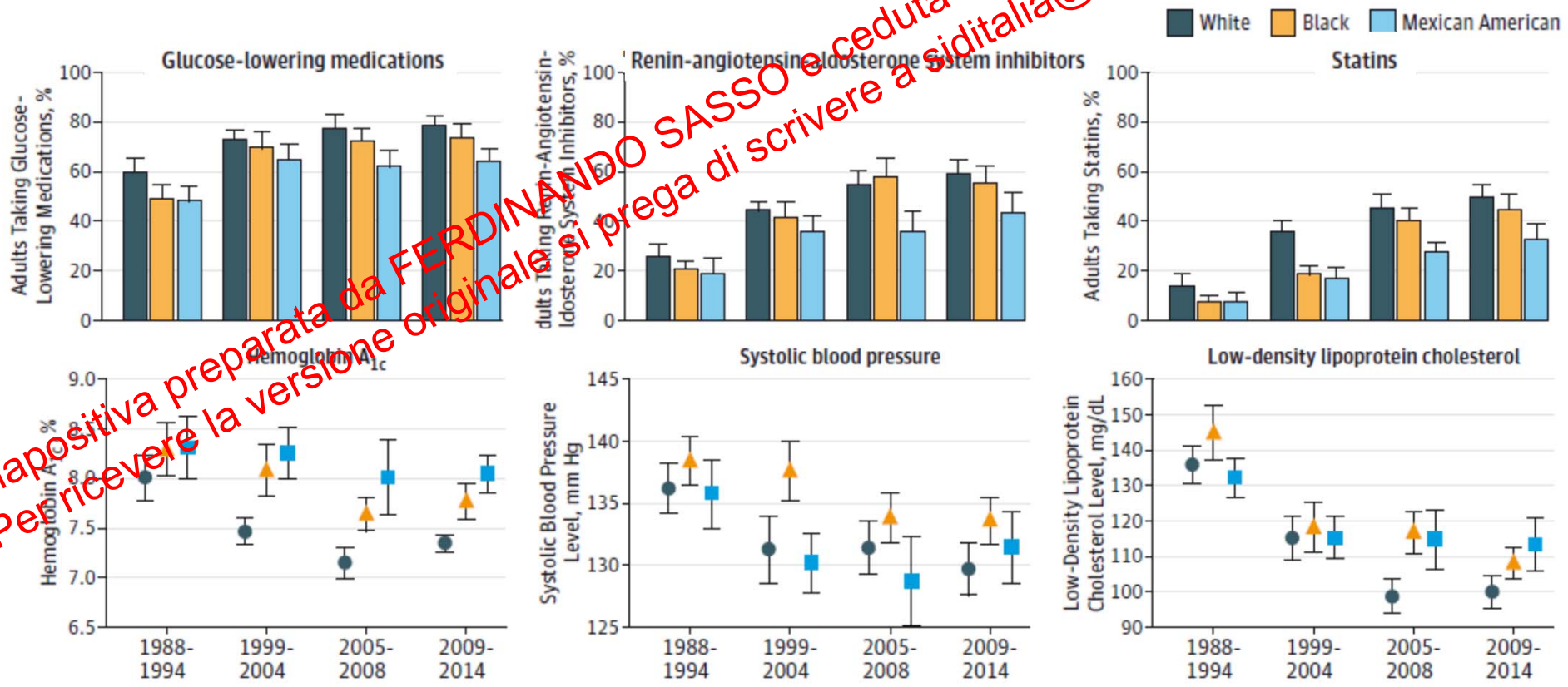
JAMA | Original Investigation

Clinical Manifestations of Kidney Disease Among US Adults With Diabetes, 1988-2014

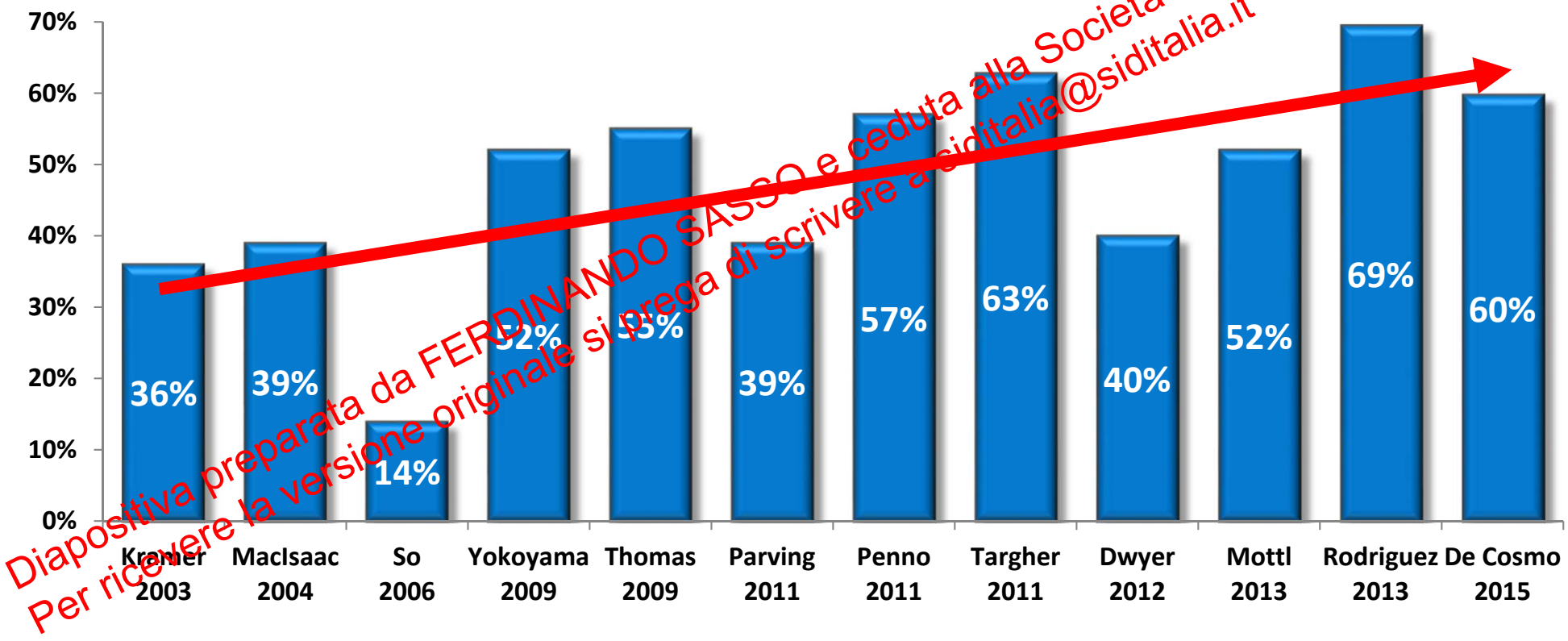
Maryam Afkarian, MD, PhD; Leila R. Zelnick, PhD; Yoshio N. Hall, MD; Patrick J. Heagerty, PhD; Katherine Tuttle, MD, FASN, FACP; Noel S. Weiss, MD, DrPH; Ian H. de Boer, MD, MS

JAMA. 2016;316(6):602-610.

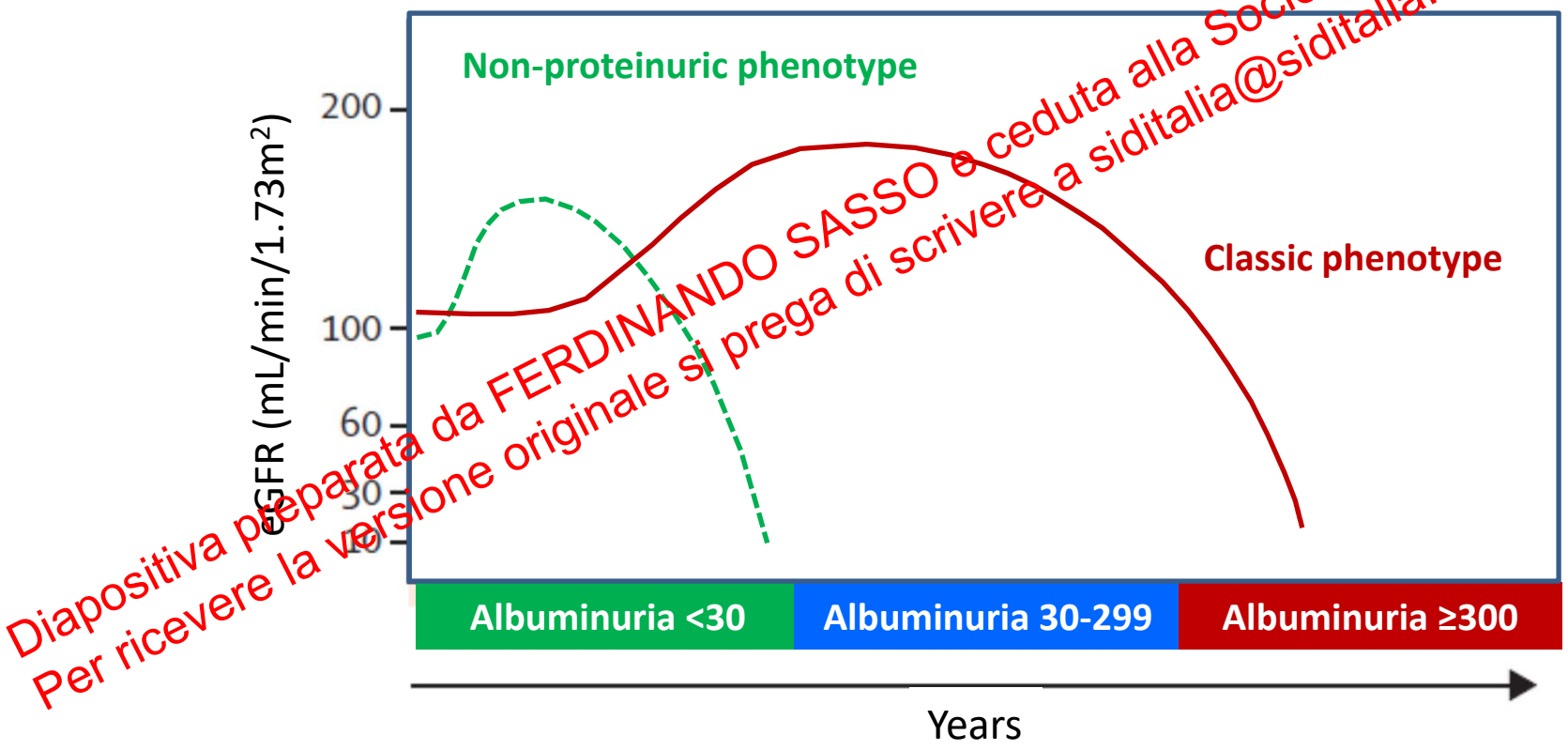
The lower prevalence of albuminuria observed over time may be attributable to a higher rate of glucose-lowering drugs, RAAS inhibitors, and statins with a consequent lower HbA1c, SBP and LDL



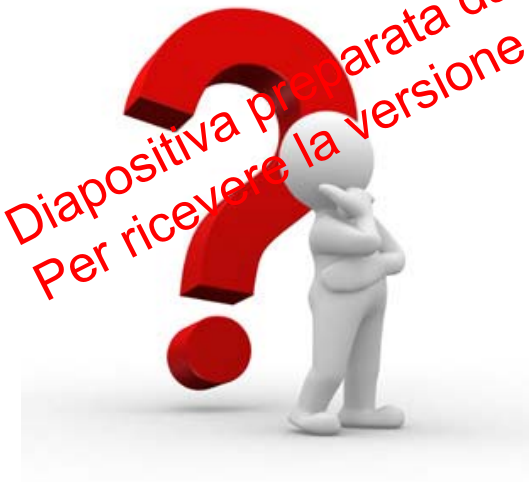
Increasing prevalence of the non-proteinuric phenotype of renal disease in cross-sectional studies in type 2 diabetes



Evolution of renal function in the classic versus non-proteinuric phenotype of diabetic kidney disease

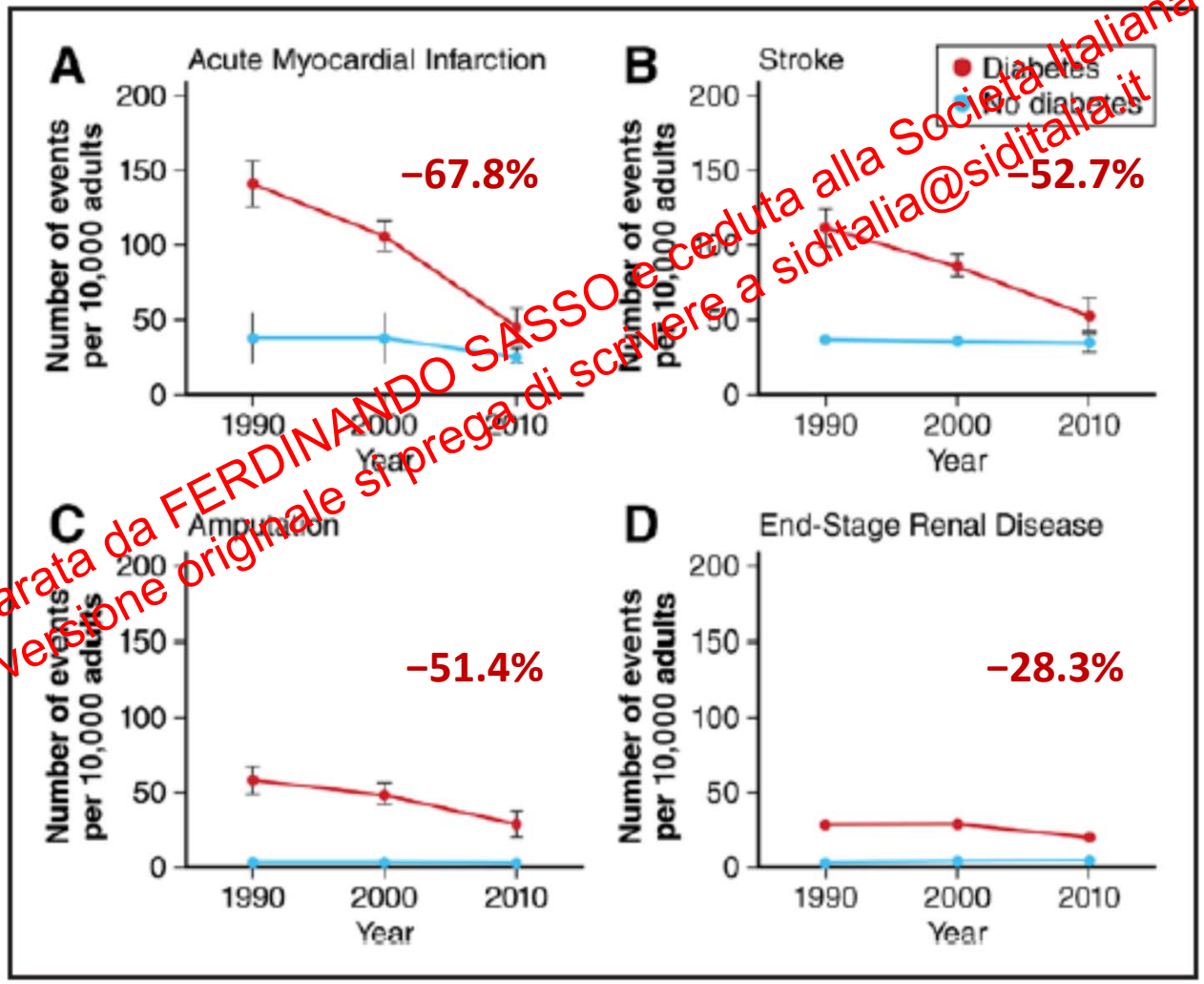


Prognosis of Diabetic CKD



Changes in Diabetes-Related Complications in the United States, 1990–2010

Data from the National Health Interview Survey, the National Hospital Discharge Survey, the U.S. Renal Data System, and the U.S. National Vital Statistics System



Gregg, NEJM 2014

Il fenotipo non albuminurico della DKD nel DM2 si associa a:

a) Minor mortalità

b) Minor rischio CV

c) Minor rischio renale

d) a+b+c

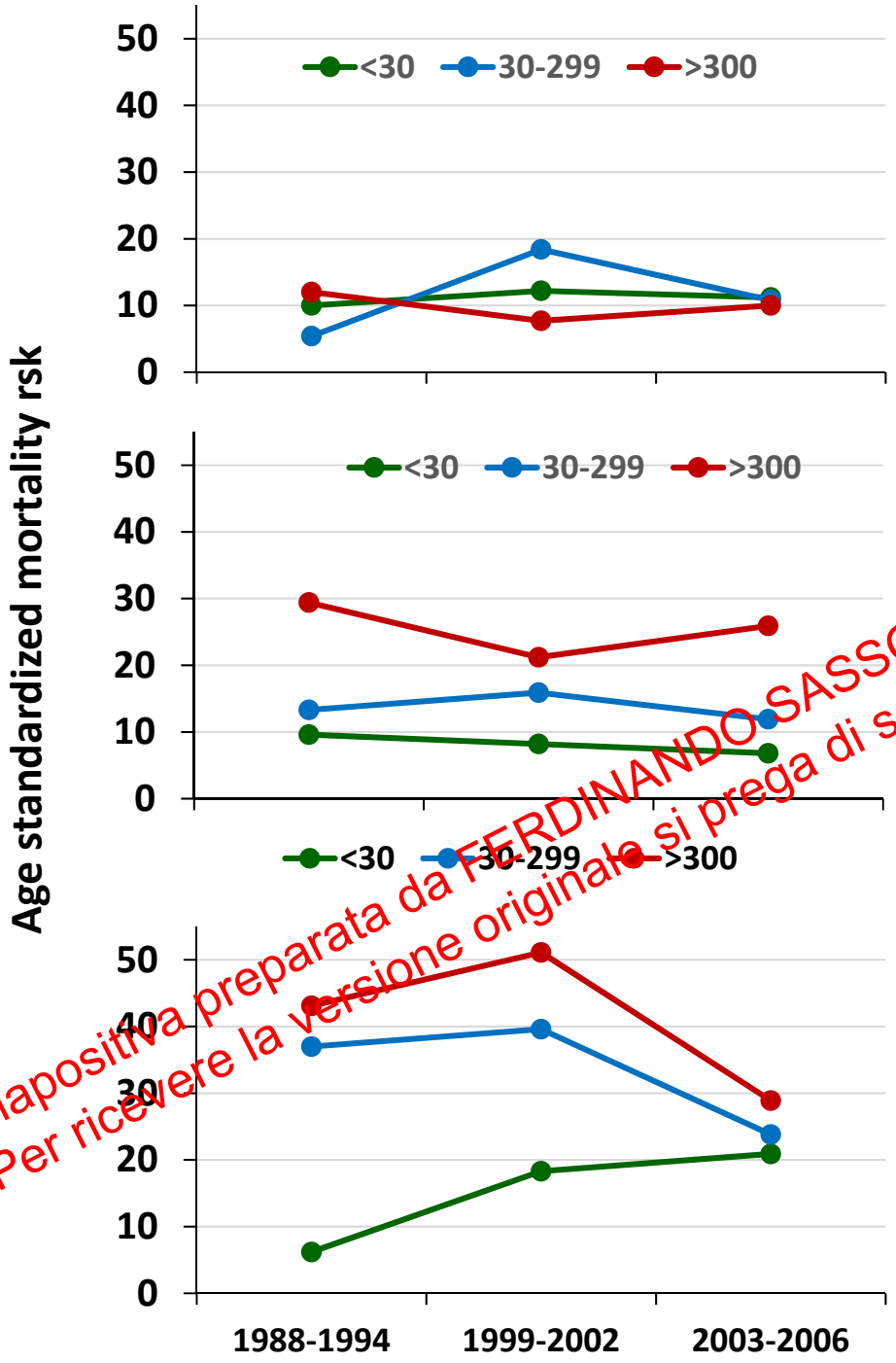
Increasing Mortality in Adults With Diabetes and Low Estimated Glomerular Filtration Rate in the Absence of Albuminuria

Holly Kramer,[1,2,3] Robert E. Boucher,[4] David Leehey,[2,3] Linda Fried,[5] Guo Wei,[4] Tom Greene,[4] Sylvia E. Rosas,[6] Richard Cooper,[1] Guichan Cao,[1] and Srinivasan Beddhu[4,7]

Diabetes Care Publish Ahead of Print, published online February 7, 2018

RESEARCH DESIGN AND METHODS

Data from the National Health and Nutrition Examination Surveys (NHANES) 1988–2006 were used to examine mortality trends in adults with diabetes, defined as physician diagnosis, fasting glucose ≥126 mg/dL, hemoglobin A_{1c} >6.5% (48 mmol/mol), or use of glucose-lowering medications. Mortality trends by CKD phenotype (estimated glomerular filtration rate [eGFR] and urine albumin-to-creatinine ratio [ACR] level)



GFR ≥90 mL/min/1.73m2

GFR 60-89 mL/min/1.73m2

GFR <60 mL/min/1.73m2

Non-albuminuric renal impairment is a strong predictor of mortality in individuals with type 2 diabetes: the Renal Insufficiency And Cardiovascular Events (RIACE) Italian multicentre study

Giuseppe Penno[1] · Anna Solini[2] · Emanuela Orsi[3] · Enzo Bonora[4] · Cecilia Fondelli[5] · Roberto Trevisan[6] · Monica Vedovato[7] · Franco Cavalot[8] · Olga Lamacchia[9] · Marco Scardapane[10] · Antonio Nicolucci[10] · Giuseppe Pugliese[11] · for the Renal Insufficiency And Cardiovascular Events (RIACE) Study Group

- Prospective cohort of 15,656 individuals with DM2 enrolled in 2006-2008
- Outcome: all-cause mortality (mean follow-up 7.4 years) in patients stratified by albuminuria (AER>30 mg/d) and/or low GFR (<60 mL/min/1,73m^2)

DKD phenotype	Description	Prevalence [N (%)]
No DKD	*AER<30/GFR≥60*	9984 (63.8)
Albuminuric with preserved GFR	*AER≥30/GFR≥60*	2966 (18.9)
Non-albuminuric DKD	*AER<30/GFR<60*	1476 (9.4)
Albuminuric DKD with reduced GFR	*AER≥30/GFR<60*	1230 (7.9)

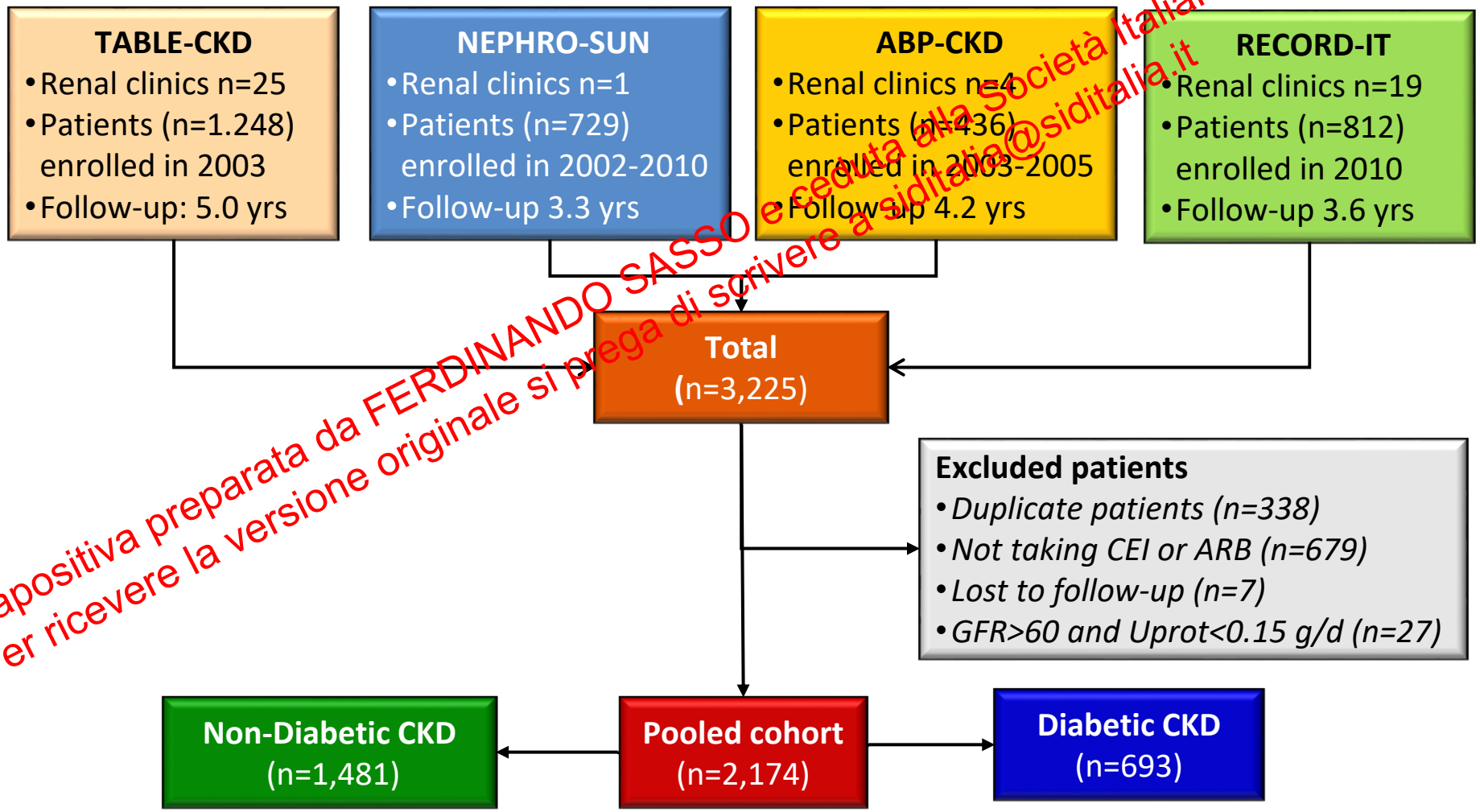
* Adjusted for: age, sex, smoking, diabetes duration, HbA1c, BMI, eWC, triacylglycerols, cholesterol, HDL, lipid lowering treatment, SBP, DBP, antihypertensive treatment, diabetic retinopathy grade, any CVD and any cancer

Diabetologia Published online: 21 July 2018

Cardiorenal prognosis by residual proteinuria level in diabetic chronic kidney disease: pooled analysis of four cohort studies

Roberto Minutolo[1], Francis B. Gabbai[2], Michele Provenzano[1], Paolo Chiodini[3], Silvio Borrelli[1], Carlo Garofalo[1], Ferdinando C. Sasso[4], Domenico Santoro[5], Vincenzo Bellizzi[6], Giuseppe Conte[1] Luca De Nicola[1]

Nephrol Dial Transplant (2018) 1–8

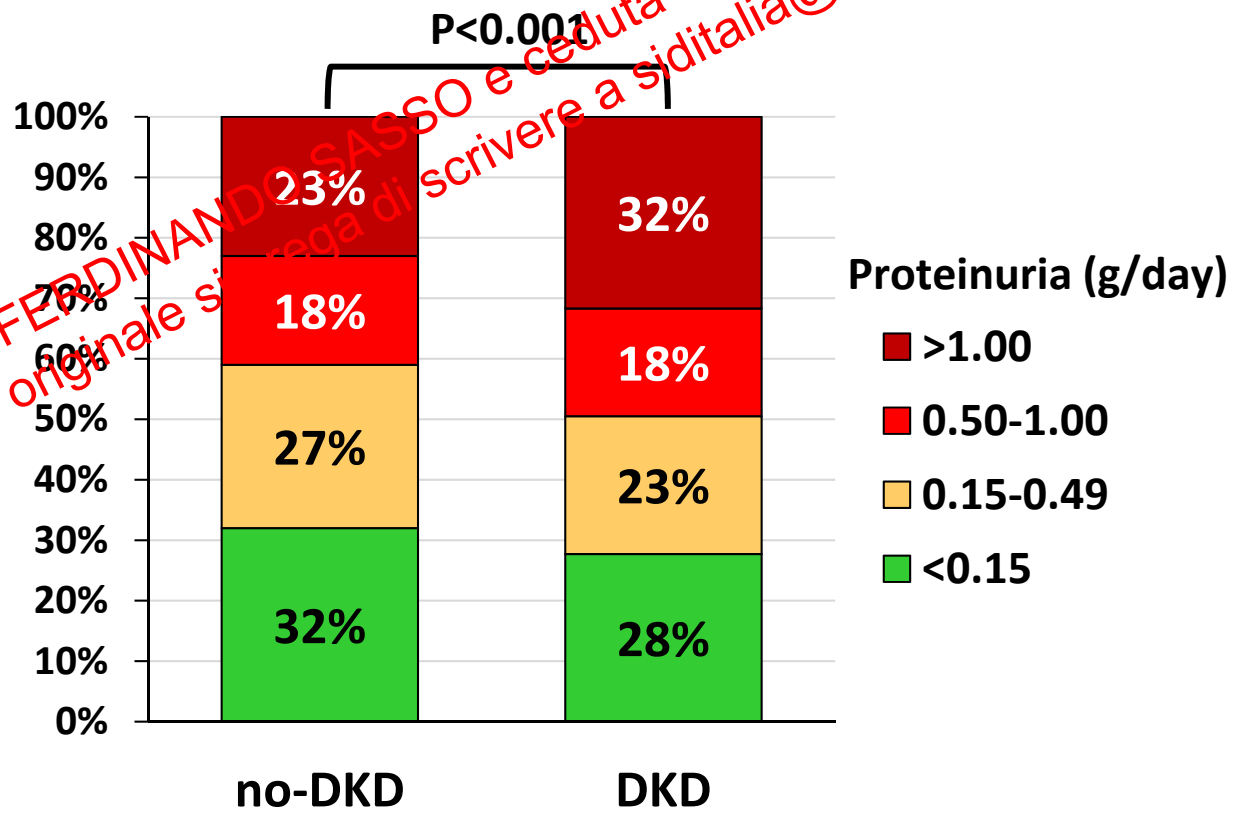


Cardiorenal prognosis by residual proteinuria level in diabetic chronic kidney disease: pooled analysis of four cohort studies

Roberto Minutolo[1], Francis B. Gabbai[2], Michele Provenzano[1], Paolo Chiodini[3], Silvio Borrelli[1], Carlo Garofalo[1], Ferdinando C. Sasso[4], Domenico Santoro[5], Vincenzo Bellizzi[6], Giuseppe Conte[1] Luca De Nicola[1]

Nephrol Dial Transplant (2018) 1–8

	24h Proteinuria (g/day)			
Proteinuria categories	**<0.15**	**0.15-0.49**	**0.50-1.00**	**>1.00**



Cardiorenal prognosis by residual proteinuria level in diabetic chronic kidney disease: pooled analysis of four cohort studies

Roberto Minutolo[1], Francis B. Gabbai[2], Michele Provenzano[1], Paolo Chiodini[3], Silvio Borrelli[1], Carlo Garofalo[1], Ferdinando C. Sasso[4], Domenico Santoro[5], Vincenzo Bellizzi[6], Giuseppe Conte[1] Luca De Nicola[1]

Nephrol Dial Transplant (2018) 1–8

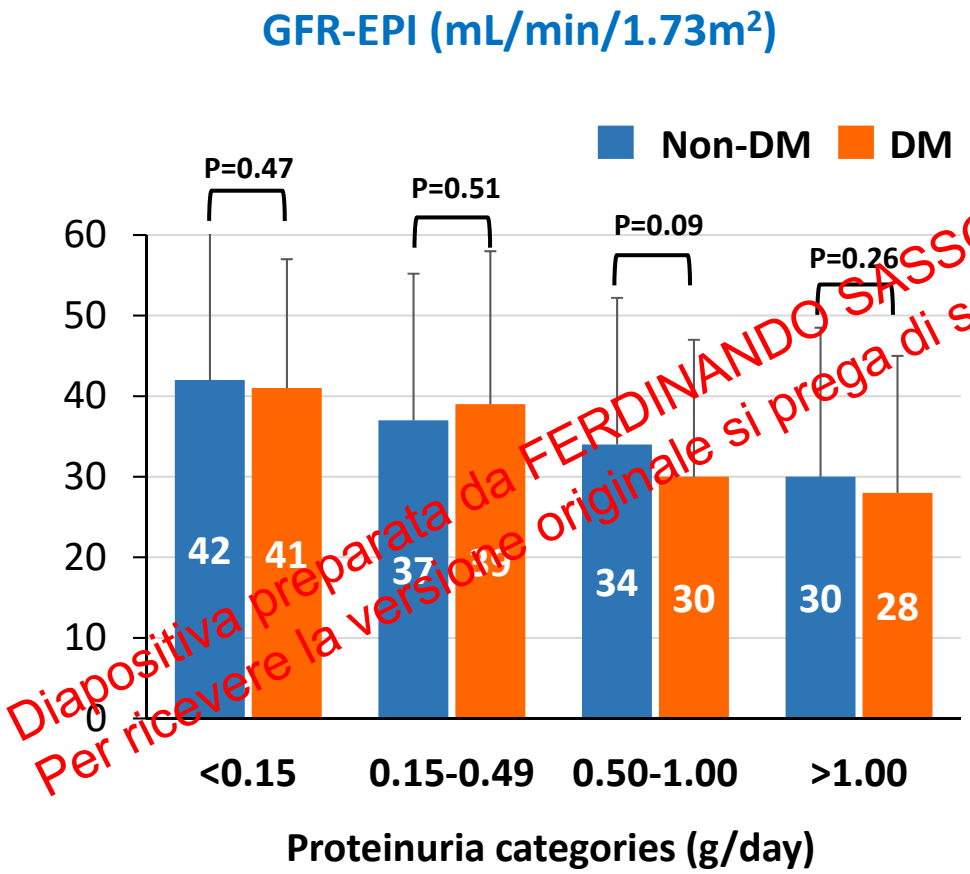
Demographic and clinical characteristics of DKD and non-DKD patients stratified according to proteinuria category

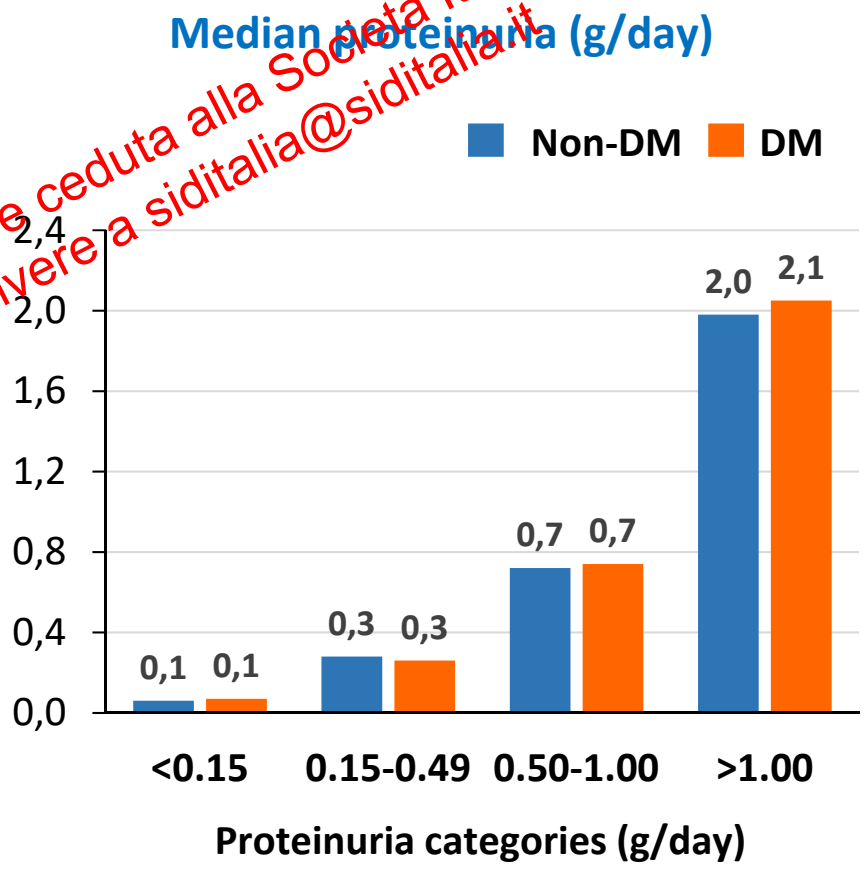
	No DM-CKD (N=1481)					DM-CKD (N=693)				
	Proteinuria categories (g/day)				*P*	*Proteinuria categories (g/day)*				*P*
	<0.15	0.15-0.49	0.5-1	>1	*for trend*	<0.15	0.15-0.49	0.5-1	>1	*for trend*
Number	471	401	266	343		191	159	124	219	
Age (years)	69±14	66±14	64±15	60±16	***<0.001***	**72±8***	**69±11***	**68±11***	**66±11***	***<0.001***
Males (%)	49.9	57.4	63.5	65.9	***<0.001***	56.0	54.7	54.0	64.4	*0.140*
BMI (kg/m^2)	27.8±4.7	27.2±4.7	27.1±4.8	27.6±4.9	*0.099*	**30±5***	**30±6***	**29±6***	**29±5***	*0.132*
CVD (%)	33.8	27.9	27.1	24.5	***0.026***	**52.9***	**48.4***	**42.7***	**47.9***	*0.371*
SBP (mmHg)	136±19	135±18	137±19	139±18	*0.006*	**141±17***	**141±19***	**141±20***	**147±20***	**0.001**
DBP (mmHg)	78±11	79±11	80±11	82±10	***<0.001***	**76±11***	**78±11**	**78±11**	**80±12***	**0.001**

Cardiorenal prognosis by residual proteinuria level in diabetic chronic kidney disease: pooled analysis of four cohort studies

Roberto Minutolo[1], Francis B. Gabbai[2], Michele Provenzano[1], Paolo Chiodini[3], Silvio Borrelli[1], Carlo Garofalo[1], Ferdinando C. Sasso[4], Domenico Santoro[5], Vincenzo Bellizzi[6], Giuseppe Conte[1] Luca De Nicola[1]

Nephrol Dial Transplant (2018) 1–8





Cardiorenal prognosis by residual proteinuria level in diabetic chronic kidney disease: pooled analysis of four cohort studies

Roberto Minutolo[1], Francis B. Gabbai[2], Michele Provenzano[1], Paolo Chiodini[3], Silvio Borrelli[1], Carlo Garofalo[1], Ferdinando C. Sasso[4], Domenico Santoro[5], Vincenzo Bellizzi[6], Giuseppe Conte[1] Luca De Nicola[1]

Nephrol Dial Transplant (2018) 1–8

	Proteinuria categories (g/day)			
	<0.15	0.15–0.49	0.50–1.00	>1.00
	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)
All-cause mortality				
Non-diabetic CKD	Reference	1.15 (0.79–1.71)	**1.60 (1.07–2.40)**	**1.69 (1.20–2.55)**
Diabetic CKD	0.81 (0.50–1.32)	**1.92*** **(1.25–2.95)**	**1.99 (1.26–3.15)**	**1.98 (1.28–3.06)**

Cox models were stratified by cohort and adjusted for baseline covariates: age, gender, BMI, smoking, CVD, LVH, calcium, phosphate, albumin, Hb, GFR, SBP, LDL-C, tryglicerides, RAS inhibitors, statin

Original Investigation

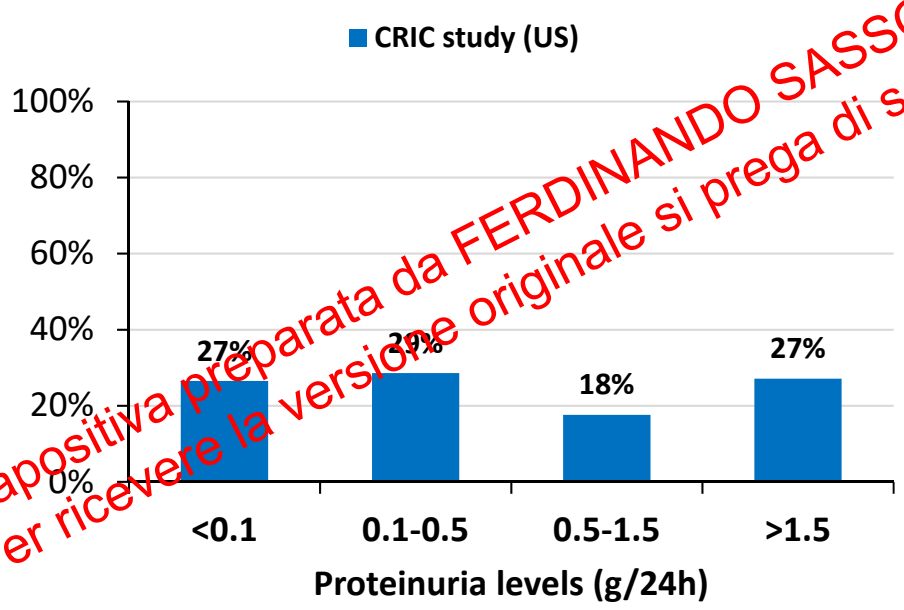
AJKD

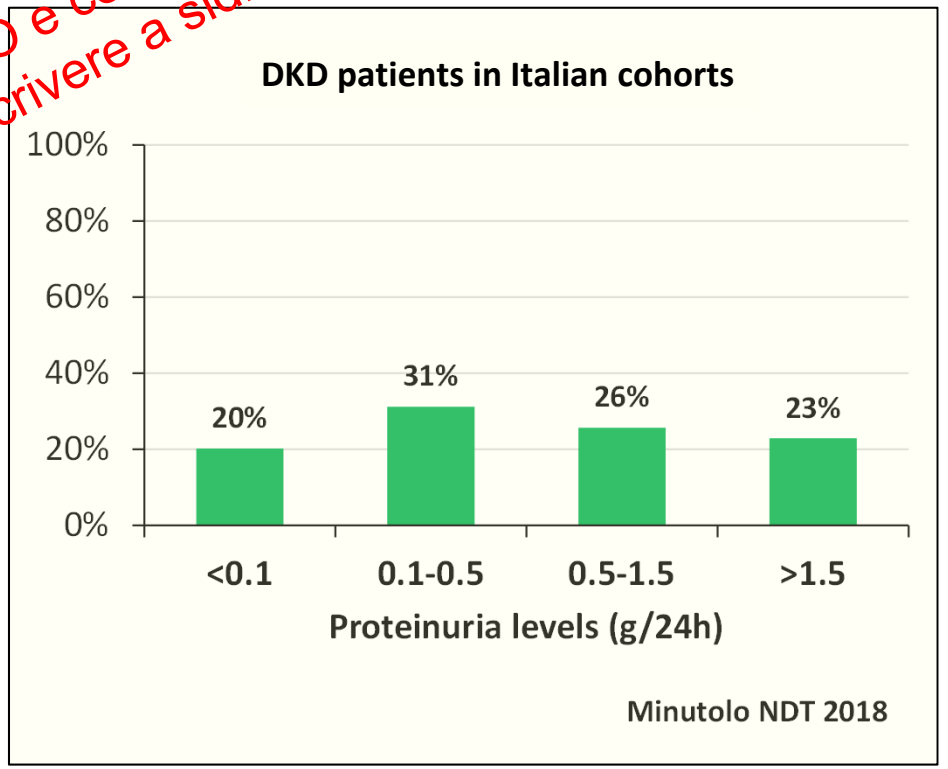
Risk of Progression of Nonalbuminuric CKD to End-Stage Kidney Disease in People With Diabetes: The CRIC (Chronic Renal Insufficiency Cohort) Study

Digsu N. Koye, Dianna J. Magliano, Christopher M. Reid, Christopher Jepson, Harold I. Feldman, William H. Herman, and Jonathan E. Shaw

AJKD Vol XX | Iss XX | Month 2018

CRIC participants with diabetes and reduced GFR (n=1,813) stratified by proteinuria





Original Investigation

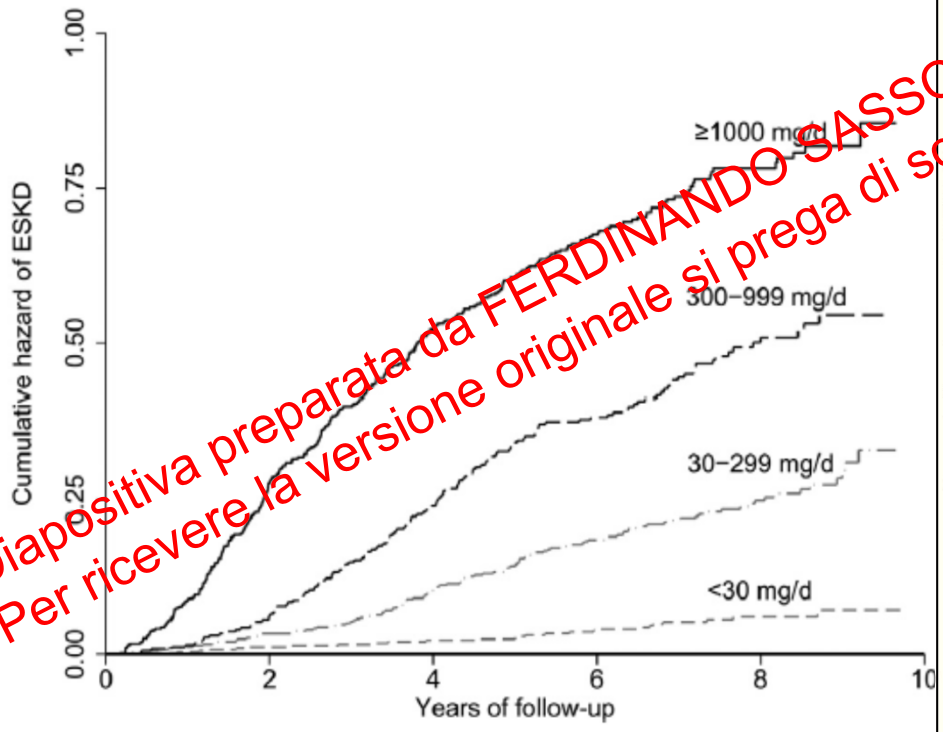
AJKD

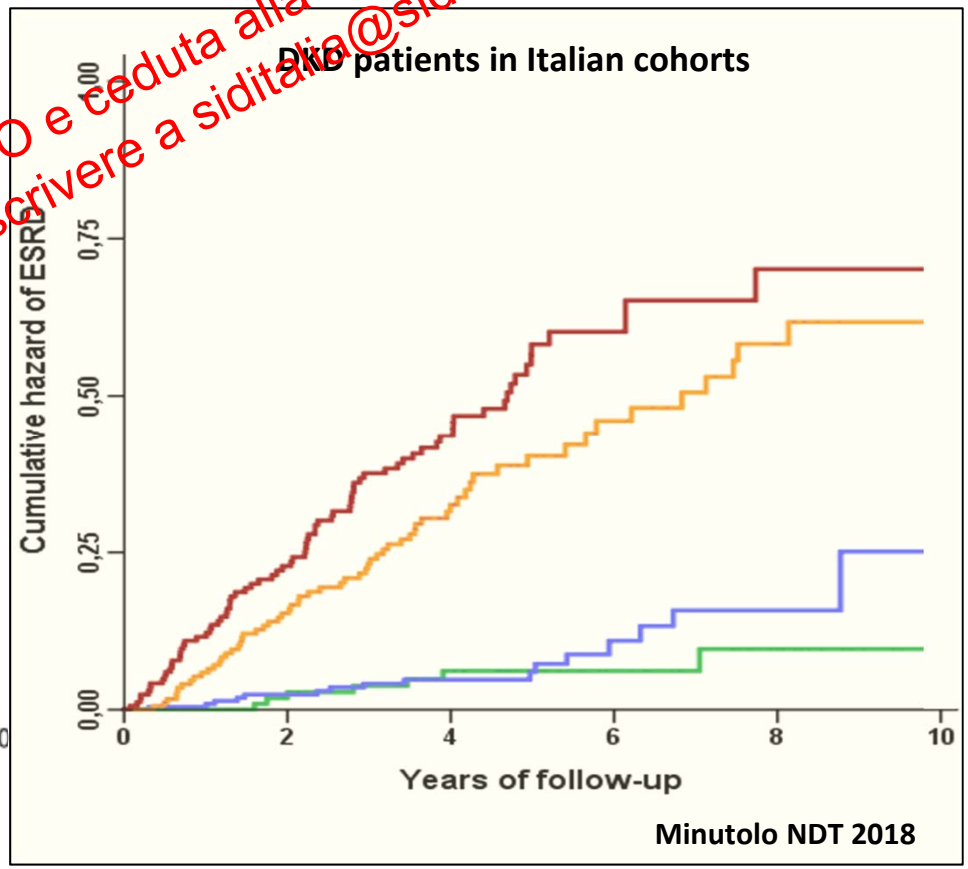
Risk of Progression of Nonalbuminuric CKD to End-Stage Kidney Disease in People With Diabetes: The CRIC (Chronic Renal Insufficiency Cohort) Study

Digsu N. Koye, Dianna J. Magliano, Christopher M. Reid, Christopher Jepson, Harold I. Feldman, William H. Herman, and Jonathan E. Shaw

AJKD Vol XX | Iss XX | Month 2018

CRIC participants with diabetes and reduced GFR (n=1,813) stratified by proteinuria





Take home message

1. **Prevalence of non-proteinuric phenotype of DKD is increasing in the last years likely due to a wider use of RAS inhibitors and better glycemic control**

2. **Non-proteinuric phenotype of DKD is associated with lower mortality, CV and renal risk, similarly to non-diabetic CKD.**

3. **In proteinuric patients (>0.5 g/day), cardiorenal risk similarly increases regardless of diabetic status.**

4. **The effect of diabetic status *per se* only emerges in the presence of moderate proteinuria (0.15–0.49 g/day), where diabetes heralds a higher risk of CV morbidity and mortality**

US approach to CKD: Old and New

1943
artificial kidney

1960
shunt for dialysis

2016

13	die each day waiting for a transplant
90,000	are waiting for a kidney transplant
120,000	annually began dialysis

Scientific Registry of Transplant Recipient: 2017 Annual Data Report

July 10, 2019

Advancing American Kidney Health

Reduce risk of kidney failure	Improve access to and quality of person-centered treatments for kidney failure	Increase access to kidney transplants
By 2030, ↓ new ESKD pts by 25%	By 2025, 80% new pts with home dialysis or transplant	By 2030, double number of kidneys available for transplant

The time has come for dialysis to take its place in a museum among the most revolutionary, lifesaving, and soon to be historical medical devices

US Department of Health and Human Services – **cJASN 5 November 2019**

OLD view

Is There a "Point of No Return" in Progressive Renal Disease?[1]

Giuseppe Maschio,[2] Lamberto Oldrizzi, and Carlo Rugiu

The protective effects of both dietary and pharmacological intervention in CKD becomes less effective when sCreat is only slightly increased (1.5-2.0 mg/dL)

Perspective

CJASN ePress. Published on October 8, 2019 as doi: 10.2215/CJN.07820719

Preserving Kidney Function Instead of Replacing It

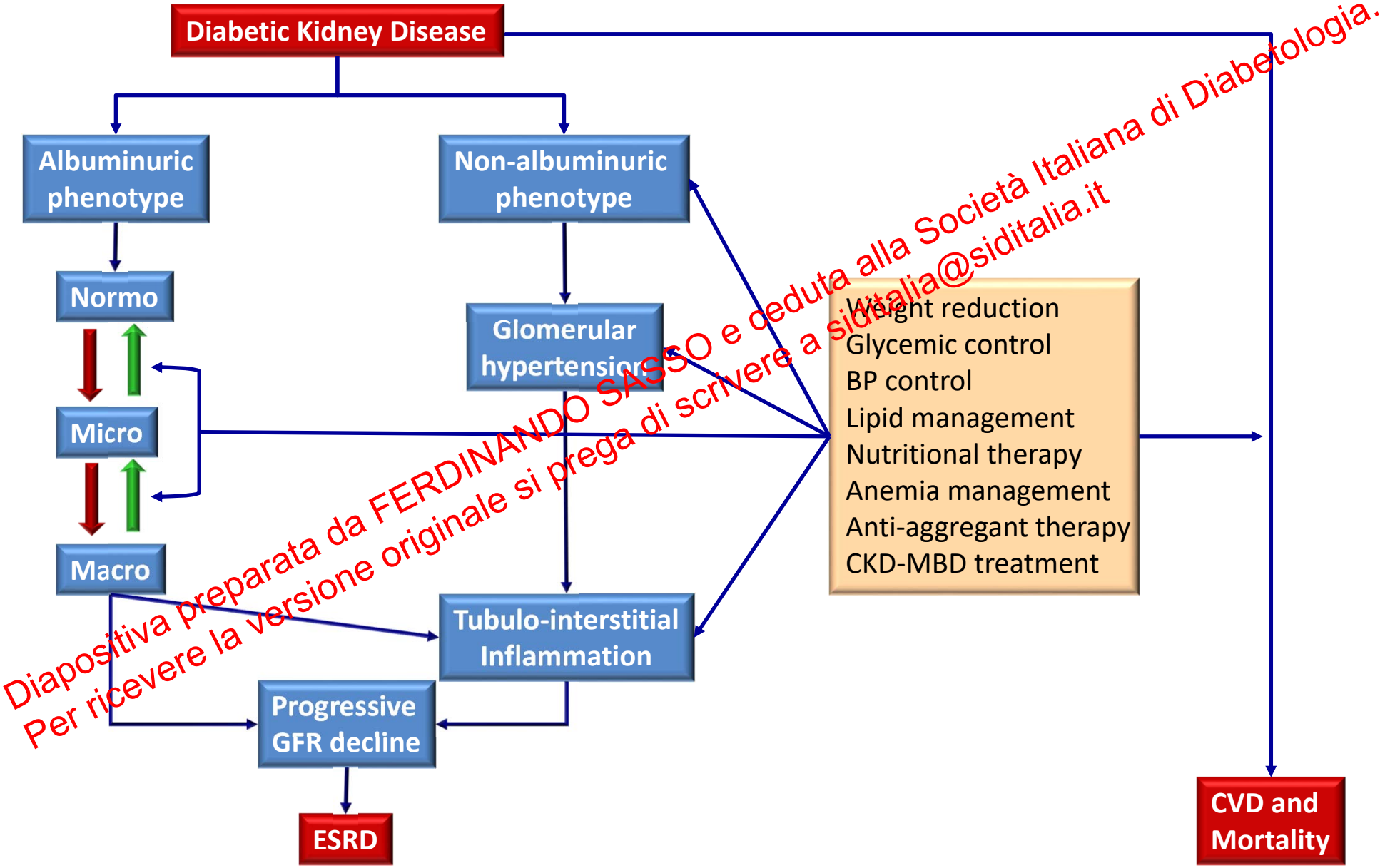
*Alan S. Kliger,[1] and Frank C. Brosius[2] on behalf of the Diabetic Kidney Disease Task Force of the American Society of Nephrology**

It is time for nephrology to embrace a change in paradigm: returning to our traditional focus on pathophysiology and kidney preservation.

Kidney Health for Everyone Everywhere – from Prevention to Detection and Equitable Access to Care

Approach	Main goal	Additional targets	Alarming signs	Risk factors to target	Interventions
Primary prevention	Avert kidney disease	Manage risk factors for kidney disease; educate on primordial prevention	Glomerular hyperfiltration	Diabetes; hypertension; obesity; solitary kidney; genetic risks; other risk factors	Support lifestyle modifications with moderate physical activity; provide dietary advice including avoidance of high sodium and excessive protein intake; prevent and manage obesity; improve glycaemic and blood pressure control; identify genetic risk factors; ensure adequate hydration
Secondary prevention	Identify early disease	Slow CKD progression; prolong kidney health	Emerging or worsening albuminuria; declining eGFR	Proteinuria; uncontrolled hypertension; poor glycaemic control; high protein intake	Manage proteinuria; encourage low-sodium and low-protein diet; encourage more plant-based sources for dietary protein; identify and offer effective pharmacotherapy; individualize therapy; identify and manage additional CKD risk factors; explore integrative and alternative approaches
Tertiary prevention	Avoid kidney failure	Delay dialysis transition; preserve the remaining kidney function	Worsening uraemic signs and symptoms	AKI events and AKI risk factors; worsening cardiac function (cardiorenal syndrome)	Manage uraemic symptoms and comorbidities; manage fluid and sodium retention; manage cardiovascular risk factors; explore novel kidney preservative and supportive therapies

What to do next……



Prospettive Future ?

MULTIDISCIPLINARIETÀ

Riferimento in tempo della CKD

Maggiore efficacia della terapia

Società Italiana di Diabetologia (SID)
Società Italiana di Nefrologia (SIN)

Documento congiunto su "Storia naturale della malattia renale nel diabete e trattamento dell'iperglicemia nei pazienti con diabete di tipo 2 e ridotta funzione renale"

A cura del Gruppo di Lavoro Intersocietario SID-SID sulla Nefropatia Diabetica