

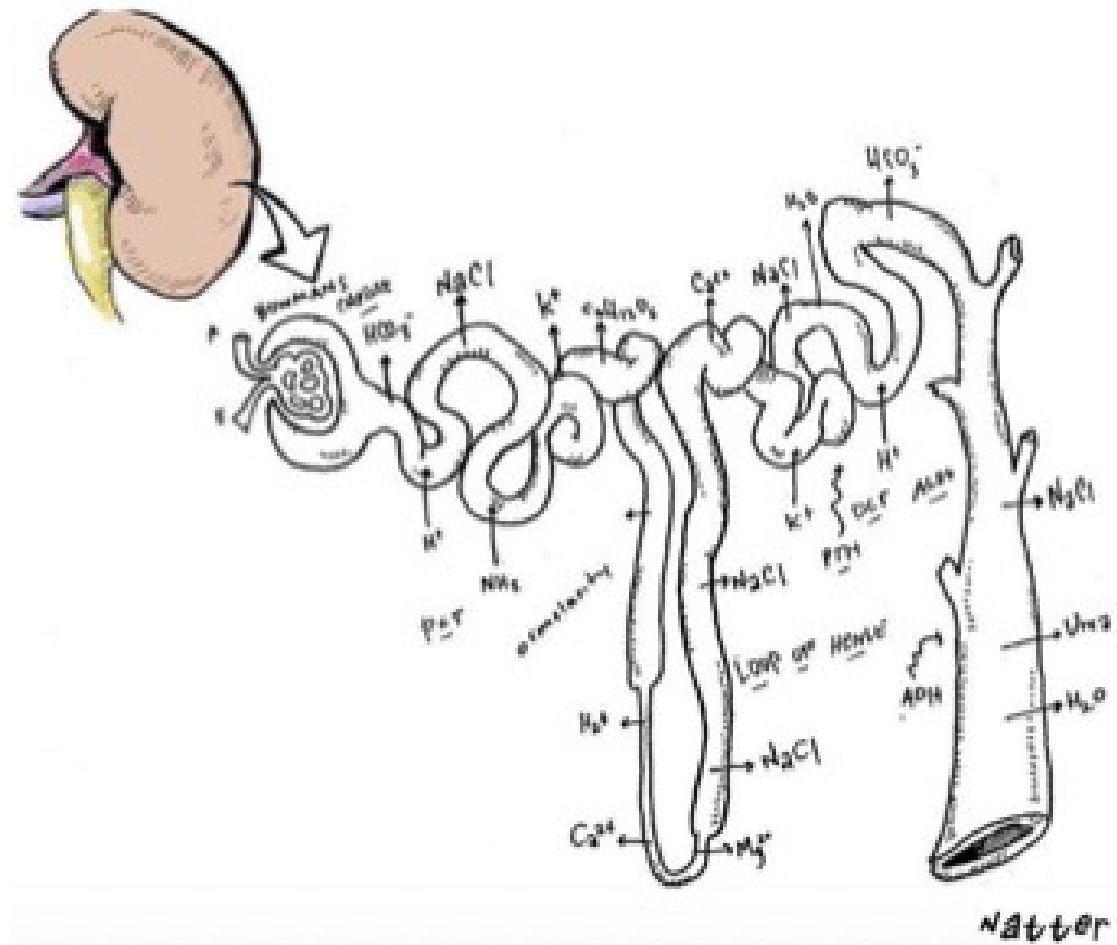
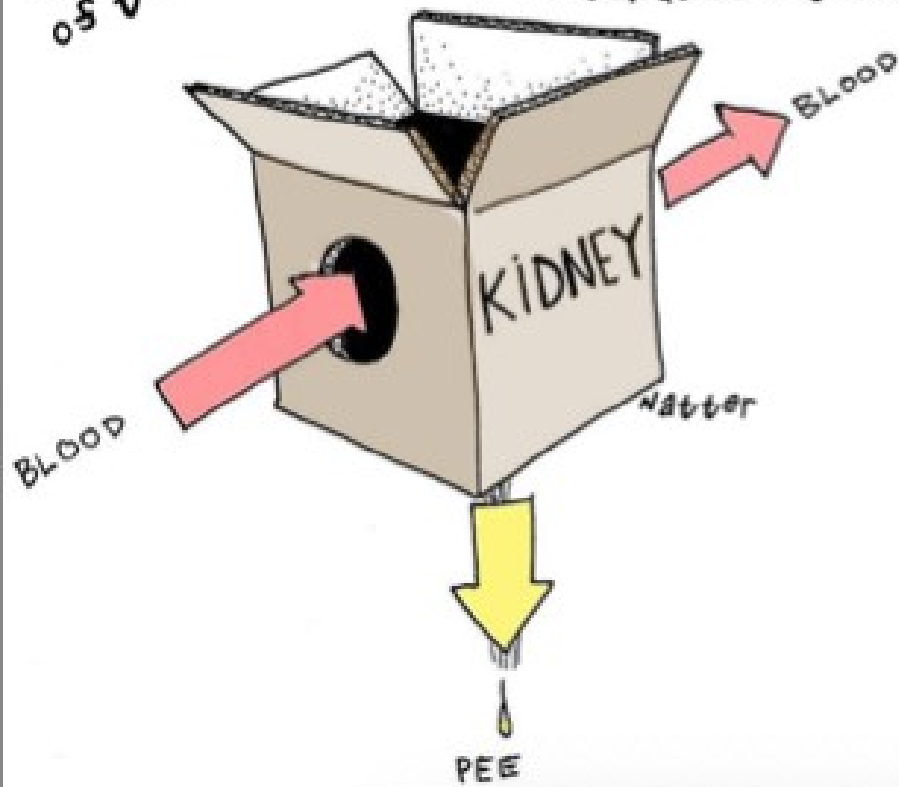
# HTA et Maladie Rénale

Dr Y. Dimitrov

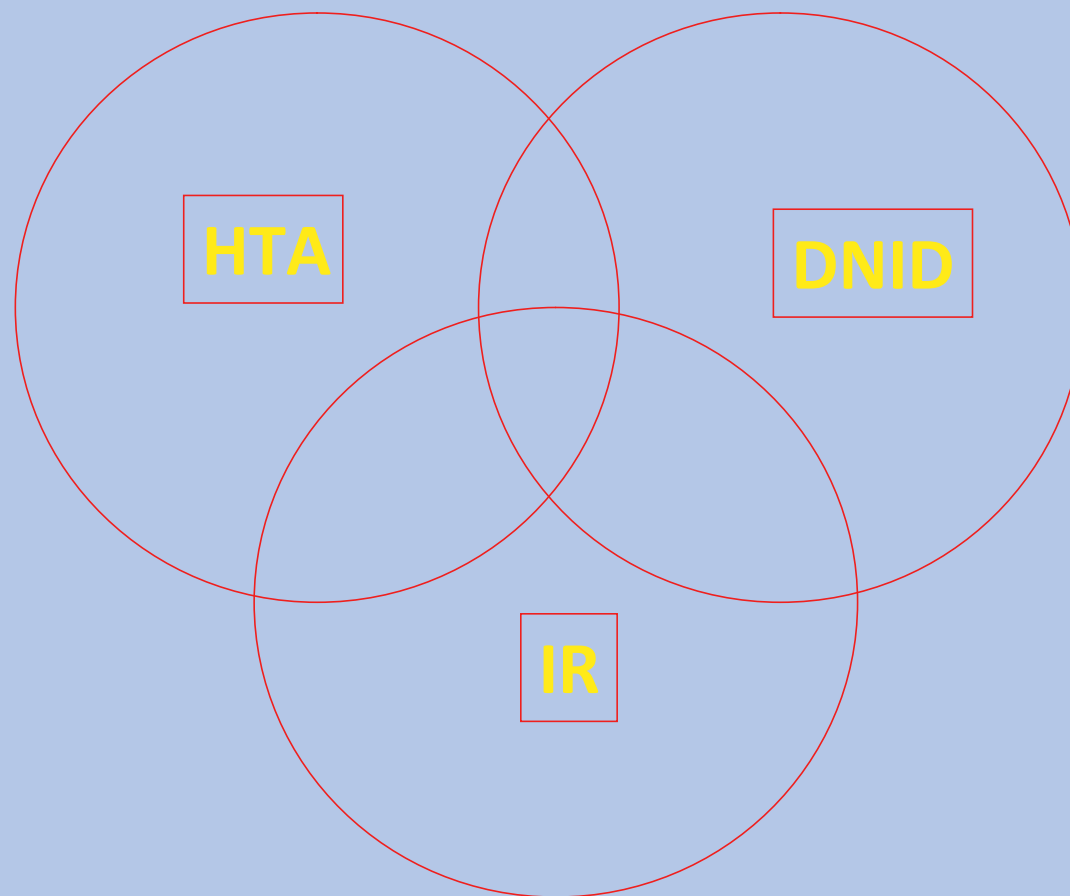
CH Haguenu

My understanding  
of the kidney

stuff happens in there...  
something about Potassium  
and maybe sodium & calcium, too,  
urea? filtration n' junk.



# LA TRILOGIE FATALE



# Chapitre 1 : HTA

# GLOBAL HEALTH RISKS

## Mortality and burden of disease attributable to selected major risks



World Health Organization

Table 1: Ranking of selected risk factors: 10 leading risk factor causes of death by income group, 2004

Risk factor	Deaths (millions)	Percentage of total	Risk factor	Deaths (millions)	Percentage of total
<b>World</b>			<b>Low-income countries<sup>a</sup></b>		
1 High blood pressure	7.5	12.8	1 Childhood underweight	2.0	7.8
2 Tobacco use	5.1	8.7	2 High blood pressure	2.0	7.5
3 High blood glucose	3.4	5.8	3 Unsafe sex	1.7	6.6
4 Physical inactivity	3.2	5.5	4 Unsafe water, sanitation, hygiene	1.6	6.1
5 Overweight and obesity	2.8	4.8	5 High blood glucose	1.3	4.9
6 High cholesterol	2.6	4.5	6 Indoor smoke from solid fuels	1.3	4.8
7 Unsafe sex	2.4	4.0	7 Tobacco use	1.0	3.9
8 Alcohol use	2.3	3.8	8 Physical inactivity	1.0	3.8
9 Childhood underweight	2.2	3.8	9 Suboptimal breastfeeding	1.0	3.7
10 Indoor smoke from solid fuels	2.0	3.3	10 High cholesterol	0.9	3.4
<b>Middle-income countries<sup>a</sup></b>			<b>High-income countries<sup>a</sup></b>		
1 High blood pressure	4.2	17.2	1 Tobacco use	1.5	17.9
2 Tobacco use	2.6	10.8	2 High blood pressure	1.4	16.8
3 Overweight and obesity	1.6	6.7	3 Overweight and obesity	0.7	8.4
4 Physical inactivity	1.6	6.6	4 Physical inactivity	0.6	7.7
5 Alcohol use	1.6	6.4	5 High blood glucose	0.6	7.0
6 High blood glucose	1.5	6.3	6 High cholesterol	0.5	5.8
7 High cholesterol	1.3	5.2	7 Low fruit and vegetable intake	0.2	2.5
8 Low fruit and vegetable intake	0.9	3.9	8 Urban outdoor air pollution	0.2	2.5
9 Indoor smoke from solid fuels	0.7	2.8	9 Alcohol use	0.1	1.6
10 Urban outdoor air pollution	0.7	2.8	10 Occupational risks	0.1	1.1

<sup>a</sup> Countries grouped by gross national income per capita – low income (US\$ 825 or less), high income (US\$ 10 066 or more).

## **PREVALENCE DE L'HTA EN FRANCE**

### **Etude IHPAF**

*Lang T et al. Hypertension 2001; 38: 449-54.*

**2 visites de médecine du travail à 1 mois d'intervalle entre janvier 1997 et avril 1998 : 17 359 hommes et 12 267 femmes.  
Moyenne de 3 mesures par appareil automatique.**

	<b>Hommes</b>	<b>Femmes</b>
<b>&lt; 30 ans</b>	<b>4,9 %</b>	<b>1,4 %</b>
<b>30 – 39 ans</b>	<b>8,5 %</b>	<b>3,1 %</b>
<b>40 – 49 ans</b>	<b>21,0 %</b>	<b>11,8 %</b>
<b>≥ 50 ans</b>	<b>36,8 %</b>	<b>28,6 %</b>

# Three-City study

( $\geq 65$  y, Bordeaux, Dijon, Montpellier, n=8679)

Mean age: 74.2 y, > 80 years : 17%

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## $\geq 160/95$ mmHg

**Total** 62.1%

Men 66.5%

Women 59.4%

## $\geq 140/90$ mmHg

**Total** 78.1%

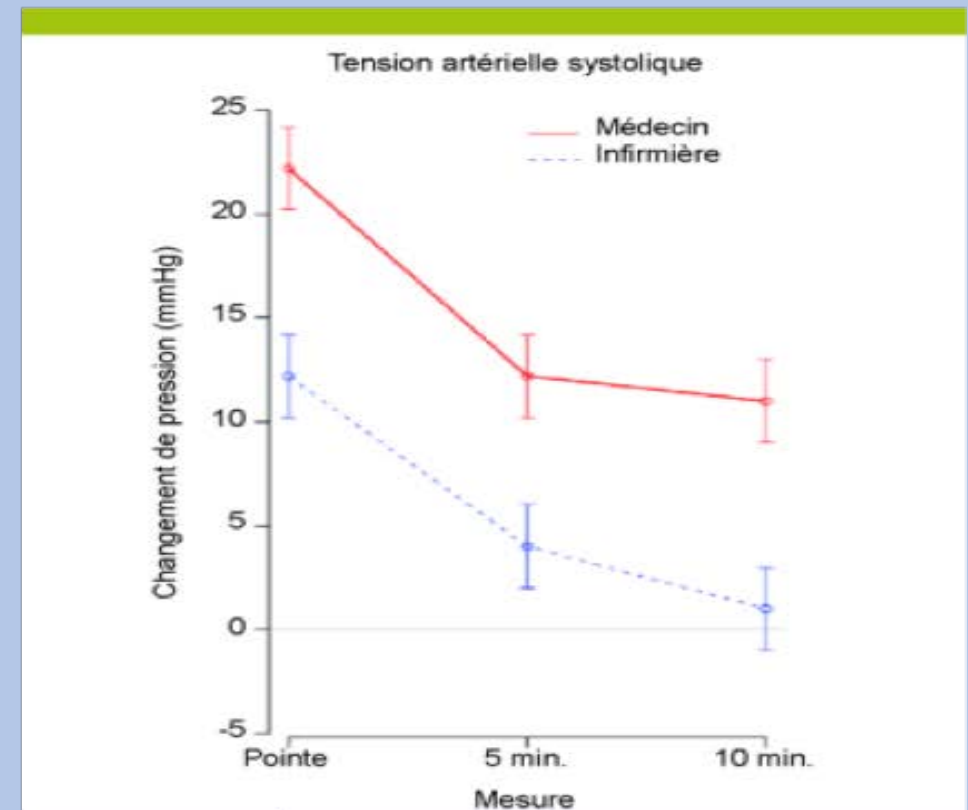
Men 83.3%

Women 74.8%

---

# Effet Blouse Blanche

- 20-30 % des patients > 70 ans



**Figure 2.** Augmentation de la pression systolique (par mesure intra-artérielle) chez 30 patients au cours d'une prise tensionnelle au moyen d'un sphygmomanomètre par un médecin ou une infirmière inconnue (Selon réf. <sup>36</sup>).



THIS  
WORLD  
TODAY

# EXTRA!

## San Francisco Chronicle

The City and State - Chronicle Newspaper

# F. D. R. DIES!

### War in The West

Tanks of North  
Cross the Elbe  
-By Staff Writer

"As long  
as I have  
my teeth"



Wells  
Fargo  
Bank

One Bright Thing  
In Berlin - the Sun



### The President Sudden Death Occurs at Warm Springs; Cerebral Hemorrhage Is the Cause Passing Told in Georgia Cabinet Assembling; Funeral Saturday; Burial at Hyde Park

WASHINGTON, April 12.—The President Roosevelt died today at Warm Springs, Ga., of a cerebral hemorrhage. Death occurred this afternoon at Warm Springs, Ga.

A White House statement said: "The President Roosevelt has been notified. He was called to the White House and returned by Mrs. Roosevelt."

The Secretary of State has been advised. A Cabinet meeting has been called.

The four Roosevelt boys in the service have been sent a message by their mother, which said: "The President died away this afternoon. He did his job to the end, as he would want to do."

His sons all read at one time, whether Roosevelt. She turned the message "Mother."

"Father's services will be held Sunday afternoon in the East Room of the White House. Attendance will be at Hyde Park for the funeral. He directed arrangements in regard to his funeral to be decided upon by me."

Henry G. Truman, former Senator, Missouri, recently judge and now here, Kansas City, father-in-law to Mr. Roosevelt's death, wrote up to the highest office in the land.

He had left for the White House with a few minutes before the news was made public.

Mr. Roosevelt had been at Warm Springs for about a week. He had been attending to his duties as usual.

His remains should be returned to the President's home and to rest here in Washington in the presence of Mrs. Roosevelt.

The funeral will be held at 11 a.m. at the White House. The burial will be at 11 a.m. at the Hyde Park. The remains will be taken to the White House at 11 a.m.

### The East Front

Shaken Launches New Front Drive  
Versus Europe With 5,000 Tanks

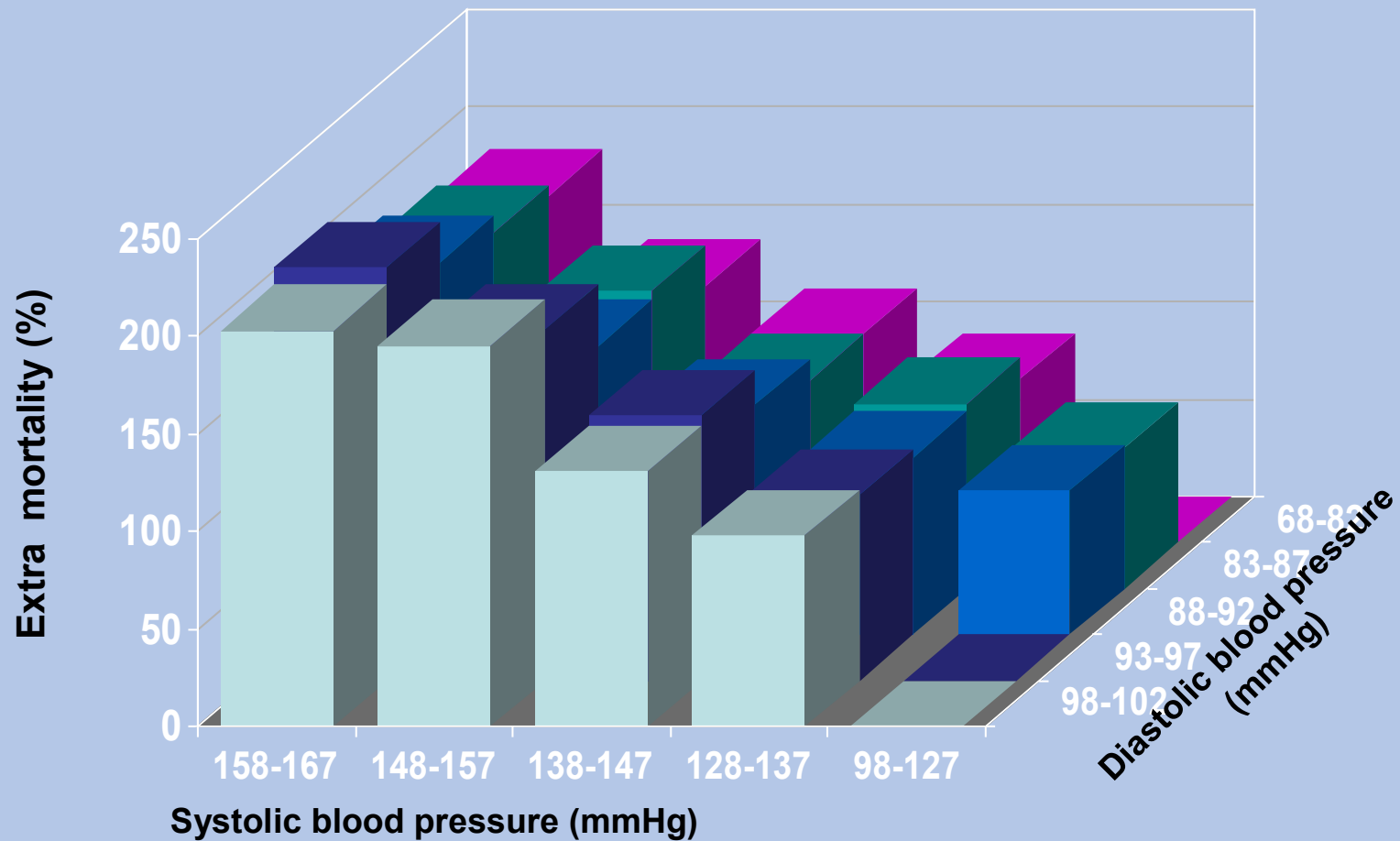
### Pacific Fronts

Naval Units Ready  
To Meet Japanese

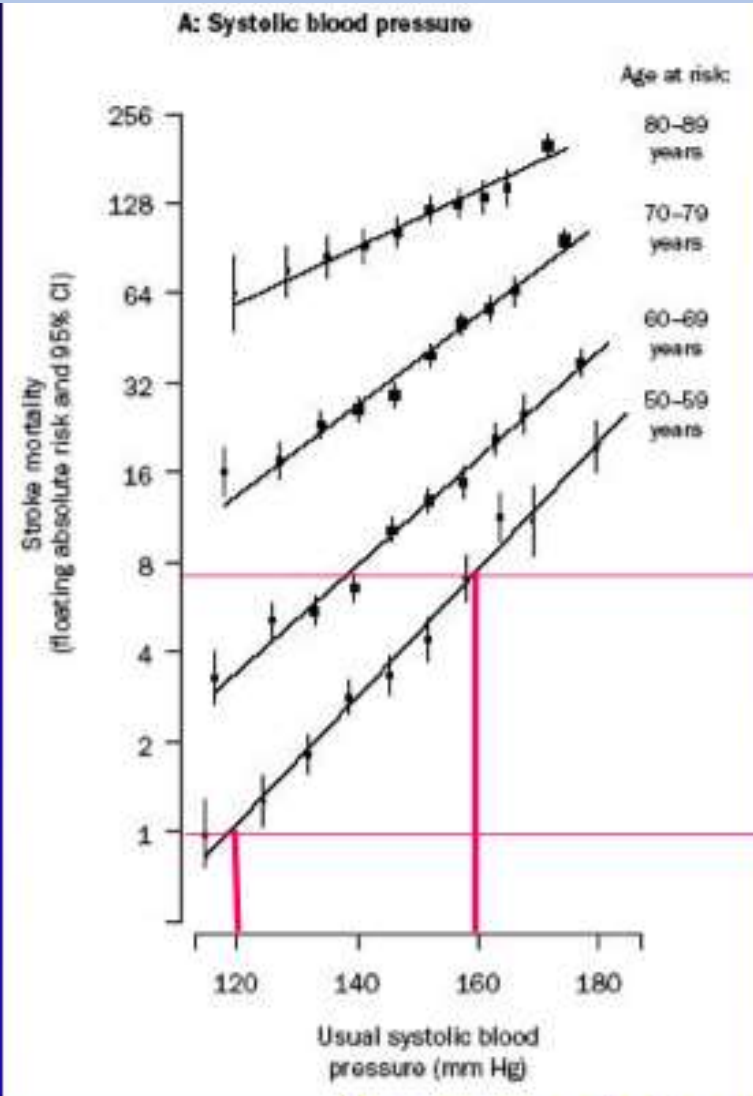
The Conference  
May Move to  
St. Petersburg

# 1939: The recognition of risk factors

n=1.300.000



Society of Actuaries. Blood Pressure Study, 1939.



RA: X 8

A meta-analysis of individual data for one million adults in 61 prospective studies, *Lancet* 2002; 360: 1903-13.

# Baisse de PA de 10/5

- Événements CV

- AVC 36%
- IC 43%
- IDM 16%
- DC CV 18%
- DC 11%

- Nbre patients à traiter pdt 5 ans

- AVC 58
- Evnmts CV 36
- DC CV 141

# Quels anti-hypertenseurs ?

	Diurétiques	Beta-bloquants	Anticalciques	IEC	ARA II
<b>AVC</b>	Green	Green	Green	Green	Green
<b>IDM</b>	Green	Red	Red	Green	Red
<b>Insuff. Cardiaque</b>	Green	Green	Red	Green	Green
<b>DC CV</b>	Green	Red	Green	Red	Red
<b>DC toutes causes</b>	Green	Red	Green	Red	Red

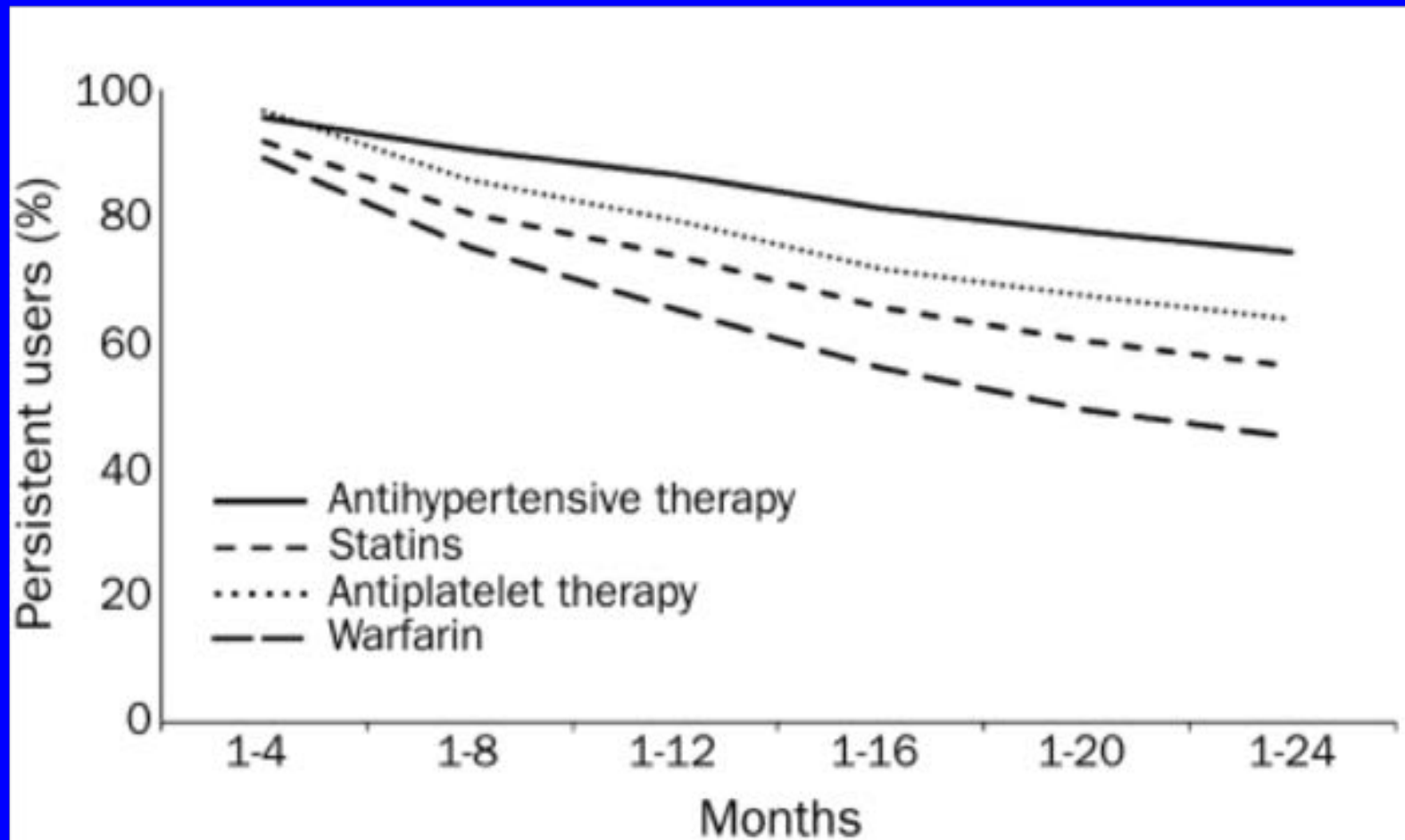
Effects of blood pressure-lowering on outcome incidence in hypertension: 5. Head-to-head comparisons of various classes of antihypertensive drugs ^ overview and meta-analyses

Costas Thomopoulos, Gianfrancesco Parati, and Alberto Zanchetti. Journal of Hypertension 2015; 33:1221

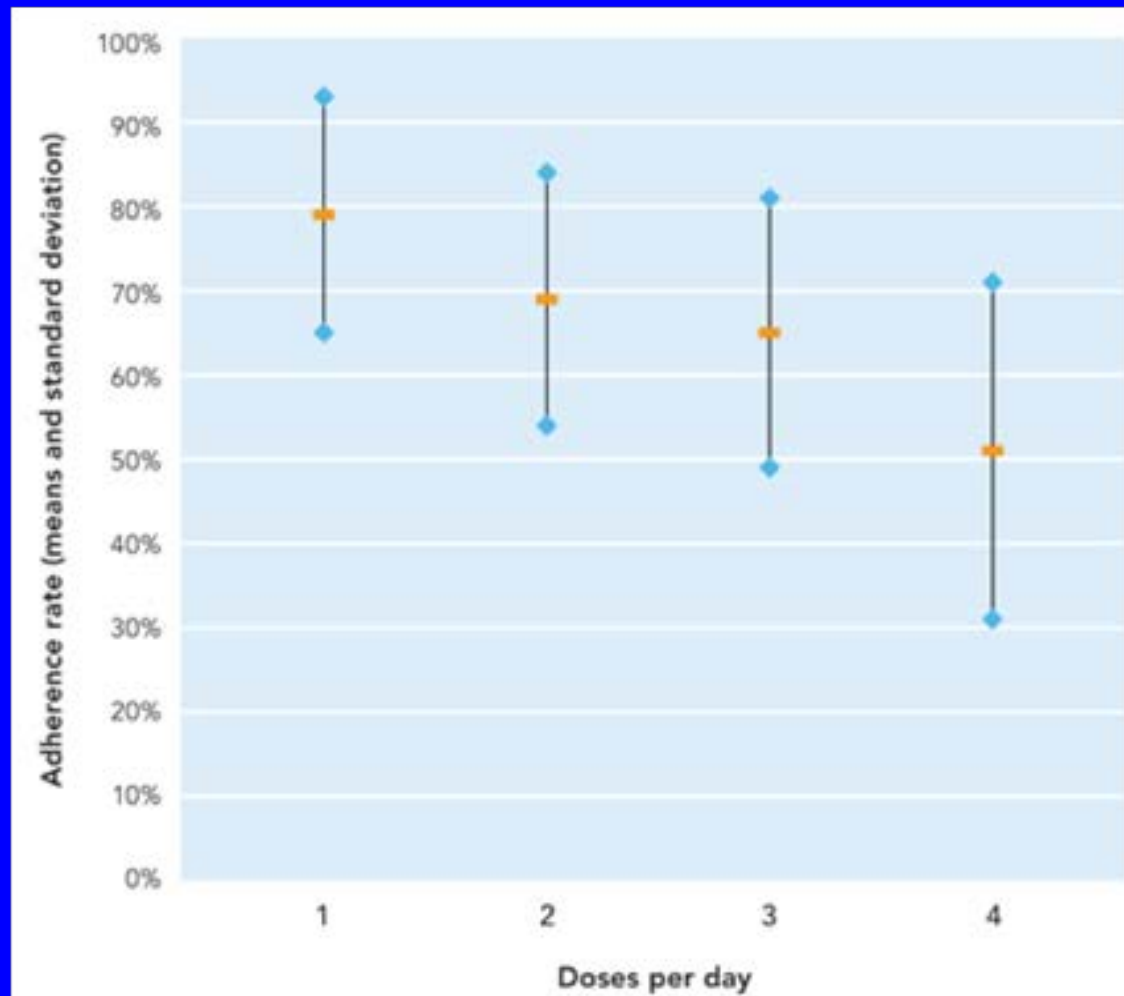
# HTA ESSENTIELLE: RESULTATS

**SEULS 30 % DES HYPERTENDUS SONT  
EQUILIBRES (TA < 140/90)**

# Observance: Effet temps



# Observance: Effet quantité



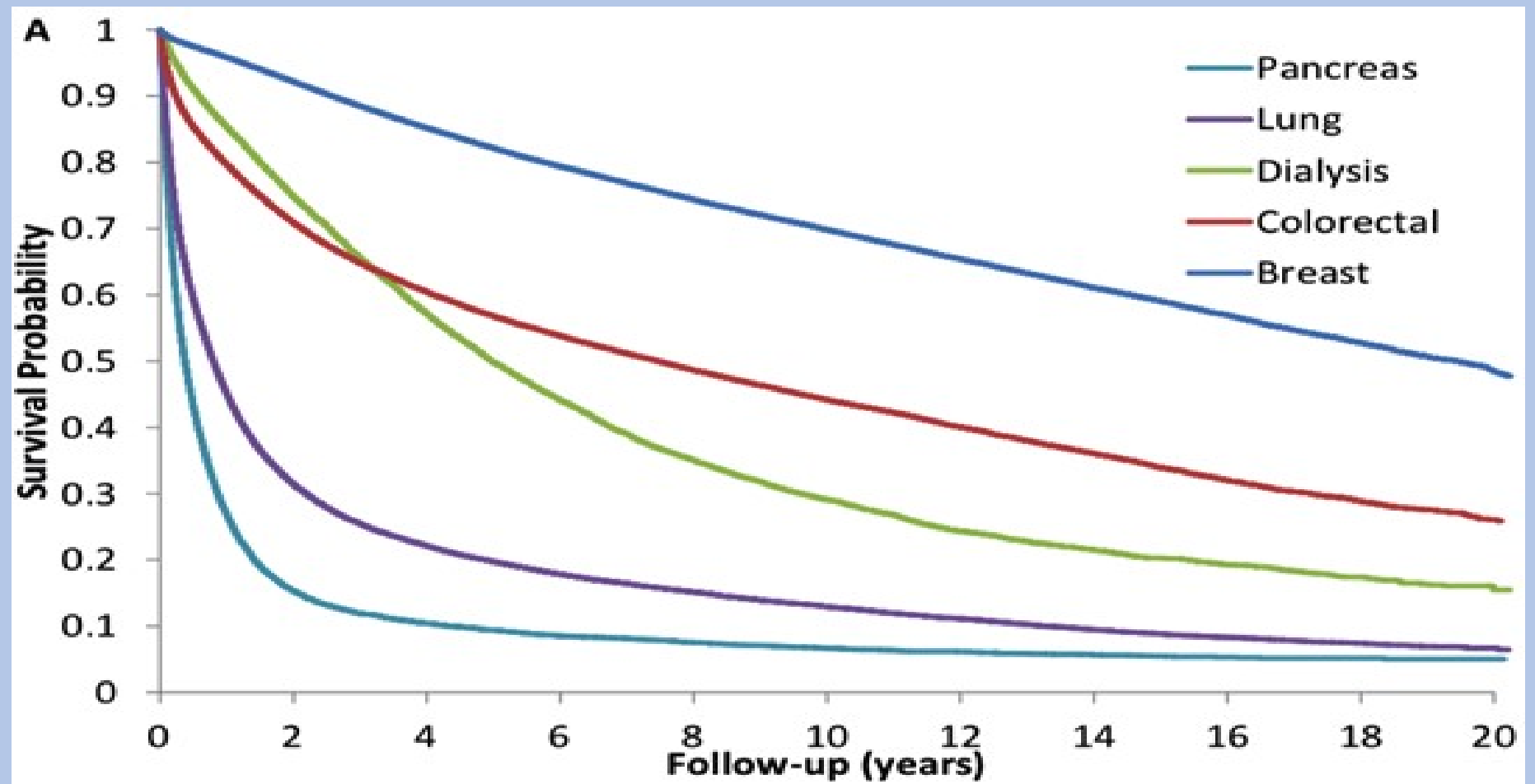


# Chapitre 2 : Maladie Rénale

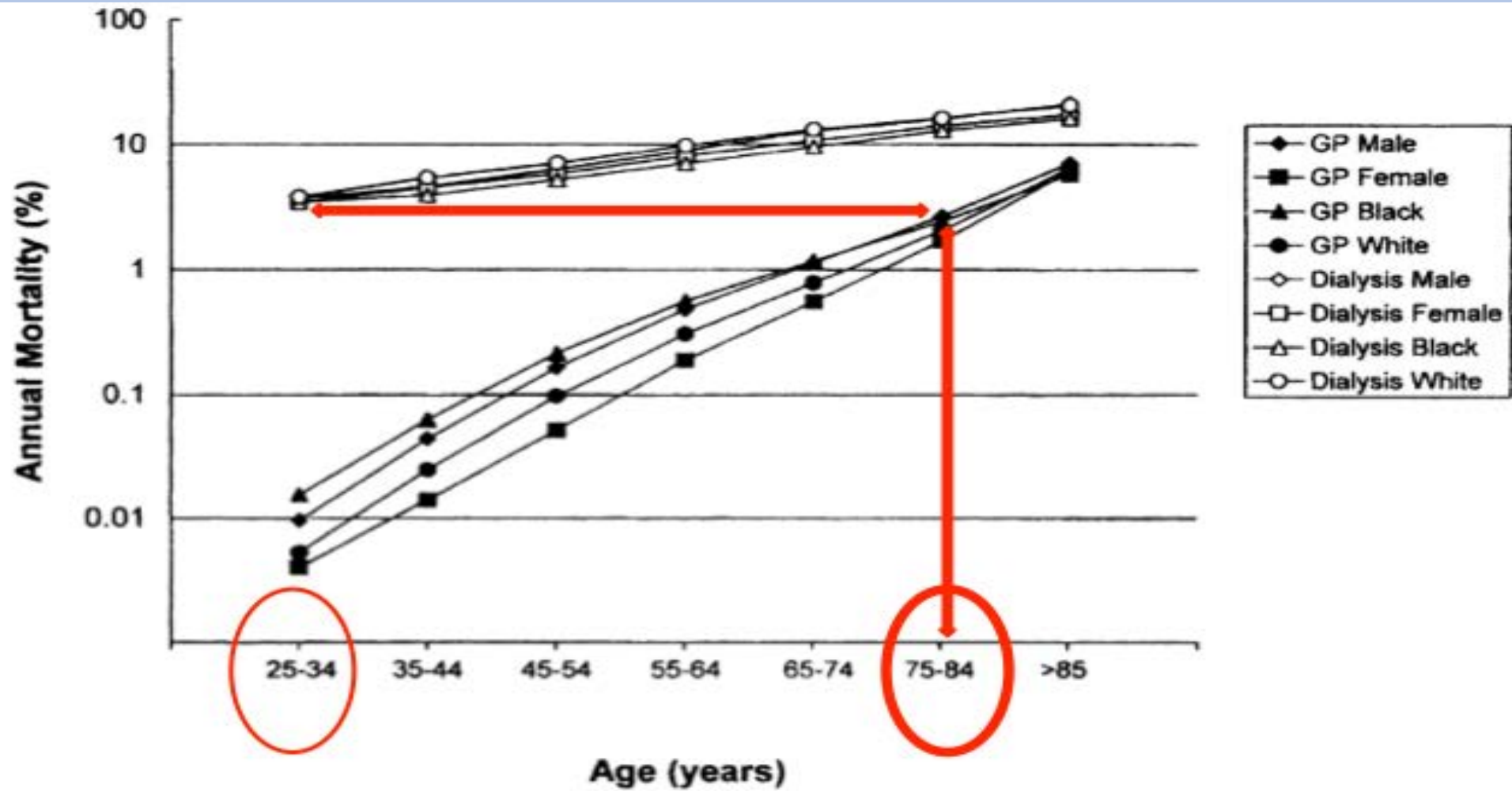
# ETIOLOGIES EN HD

- Diabète 50 %
- Vasculaires 30 %
- Autres 20 %
  - Glomérulopathies
  - Toxiques
  - Myélome
  - Obstacle
  - PKR

# MORTALITE EN HD



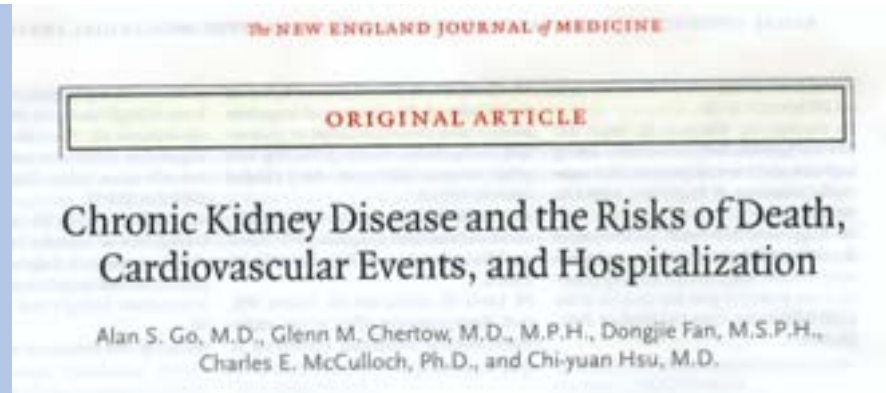
# MORTALITE EN HD



## Le dialysé: un cas très particulier

- C'est un survivant !
- 2 maladies: l'insuffisance rénale et la dialyse
- PA normale ??? PAS 150 ???
- Pas de Statines
- Pas d'AVK/AAP
- Betabloquants meilleurs que IEC

MALADIE RENALE  
UN FDR CV ?

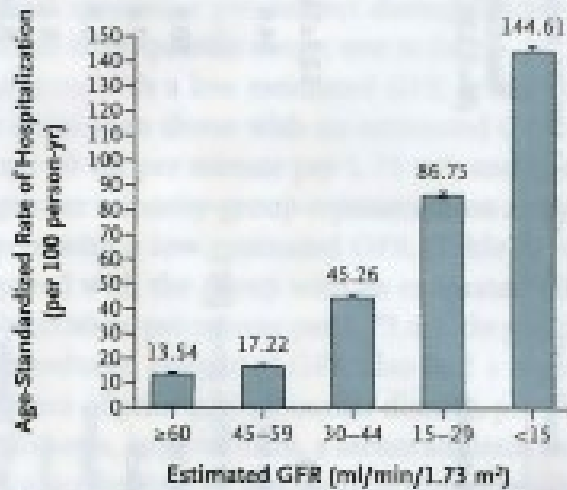


- N = 1 120 295 patients
- Suivi 2,84 ans soit 3 132 192 patients-années
- Age 52 ans
- Femmes 55 %
- HTA 19 %
- Coronaropathie 6 %
- Diabète 9,6 %

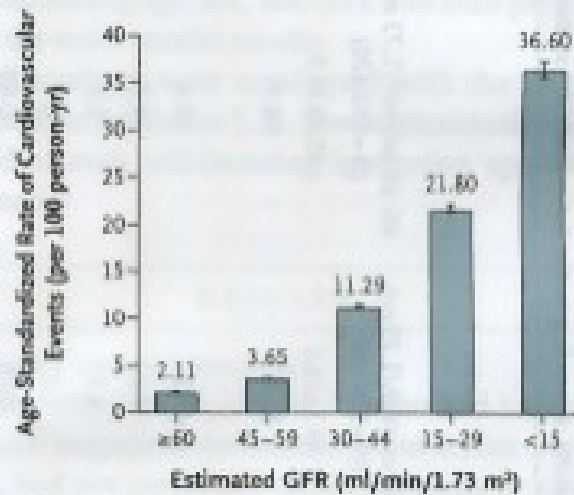
ORIGINAL ARTICLE

# Chronic Kidney Disease and the Risks of Death, Cardiovascular Events, and Hospitalization

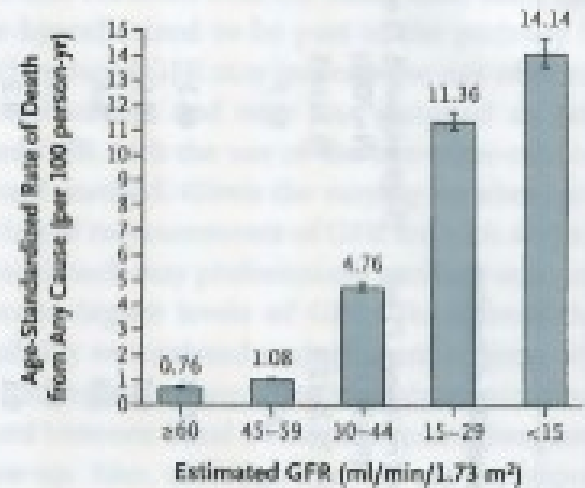
Alan S. Go, M.D., Glenn M. Chertow, M.D., M.P.H., Dongjie Fan, M.S.P.H., Charles E. McCulloch, Ph.D., and Chi-yuan Hsu, M.D.



No. of Events 366,737 106,543 49,177 20,581 11,593



No. of Events 71,108 34,690 18,580 8809 3824



No. of Events 25,803 11,569 7802 4408 1842



ORIGINAL ARTICLE

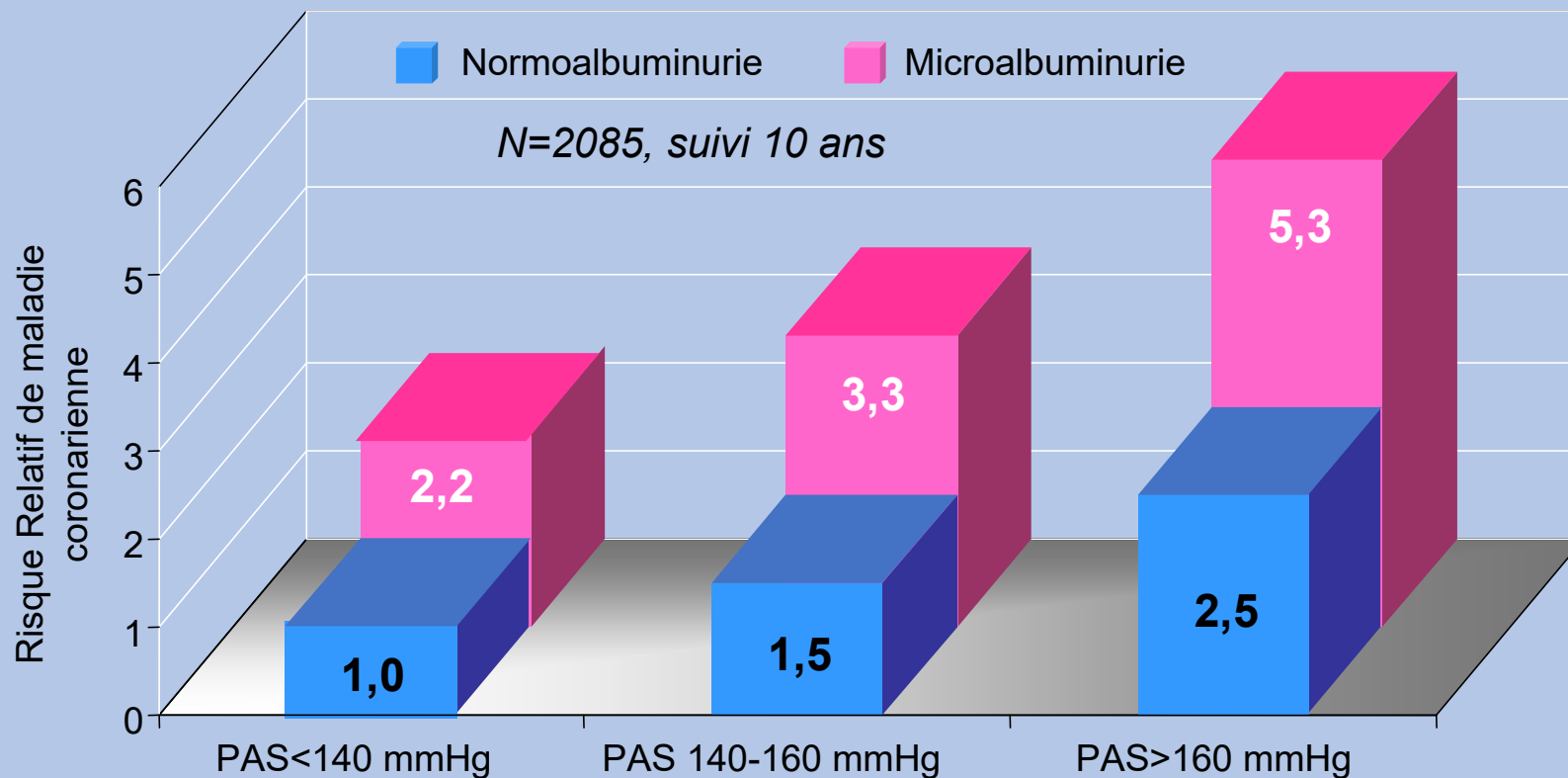
Chronic Kidney Disease and the Risks of Death, Cardiovascular Events, and Hospitalization

Alan S. Go, M.D., Glenn M. Chertow, M.D., M.P.H., Dongjie Fan, M.S.P.H., Charles E. McCulloch, Ph.D., and Chi-yuan Hsu, M.D.

**Table 2.** Adjusted Hazard Ratio for Death from Any Cause, Cardiovascular Events, and Hospitalization among 1,120,295 Ambulatory Adults, According to the Estimated GFR.\*

Estimated GFR	Death from Any Cause	Any Cardiovascular Event	Any Hospitalization
<i>adjusted hazard ratio (95 percent confidence interval)</i>			
≥60 ml/min/1.73 m <sup>2</sup> †	1.00	1.00	1.00
45–59 ml/min/1.73 m <sup>2</sup>	1.2 (1.1–1.2)	1.4 (1.4–1.5)	1.1 (1.1–1.1)
30–44 ml/min/1.73 m <sup>2</sup>	1.8 (1.7–1.9)	2.0 (1.9–2.1)	1.5 (1.5–1.5)
15–29 ml/min/1.73 m <sup>2</sup>	3.2 (3.1–3.4)	2.8 (2.6–2.9)	2.1 (2.0–2.2)
<15 ml/min/1.73 m <sup>2</sup>	5.9 (5.4–6.5)	3.4 (3.1–3.8)	3.1 (3.0–3.3)

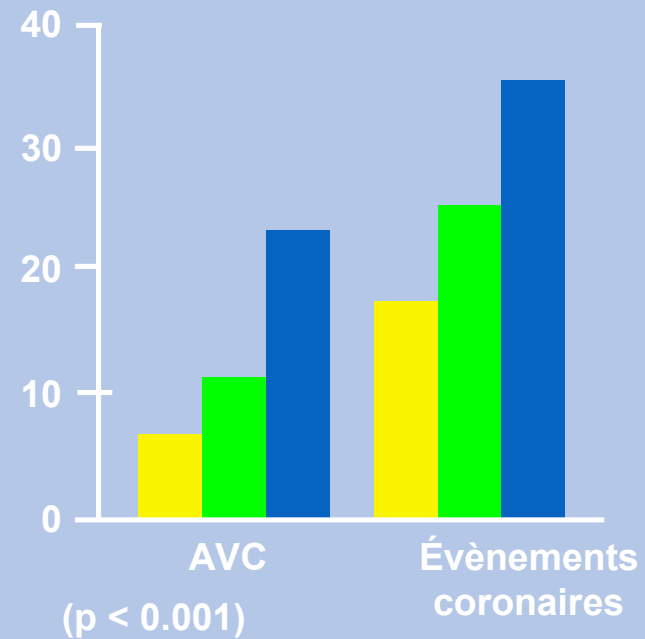
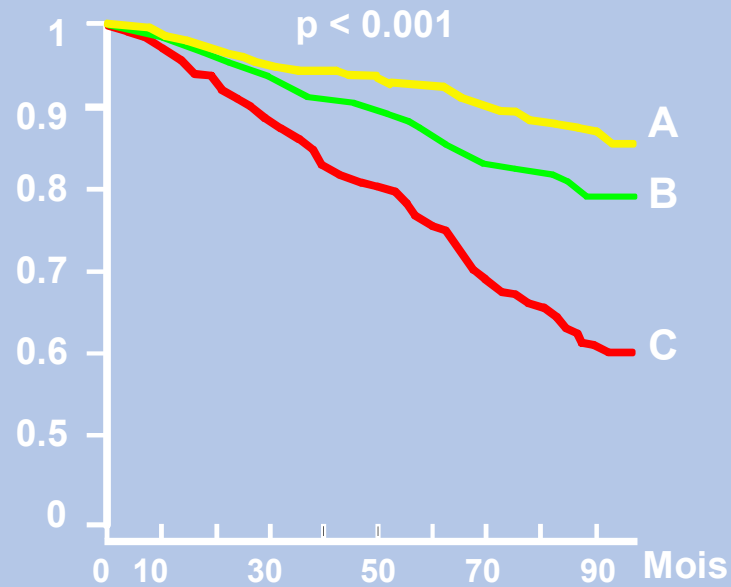
# Microalbuminurie et HTA augmentent le risque de maladie coronarienne



(8) Borch-Johnsen et al. Urinary Albumin Excretion. An Independent Predictor of Ischemic Heart Disease. *Arterioscler Thromb Vasc Biol* 1999;19:1992-7

# POPULATION À RISQUE EVENEMENTS CV/PROTEINURIE

■ A: U-Prot < 150 mg/l      ■ B: U-Prot 150–300 mg/l      ■ C: U-Prot > 300 mg/l



U - Prot = Concentration de protéines urinaires

# POPULATION À RISQUE EVENEMENTS CV/PROTEINURIE

ETUDE SUEDOISE                      835 HYPERTENDUS

SUIVI > 10 ANS

42 % DES PROTEINURIQUES EVT CV À 10 ANS

VALEUR PREDICTIVE DE LA PROTEINURIE

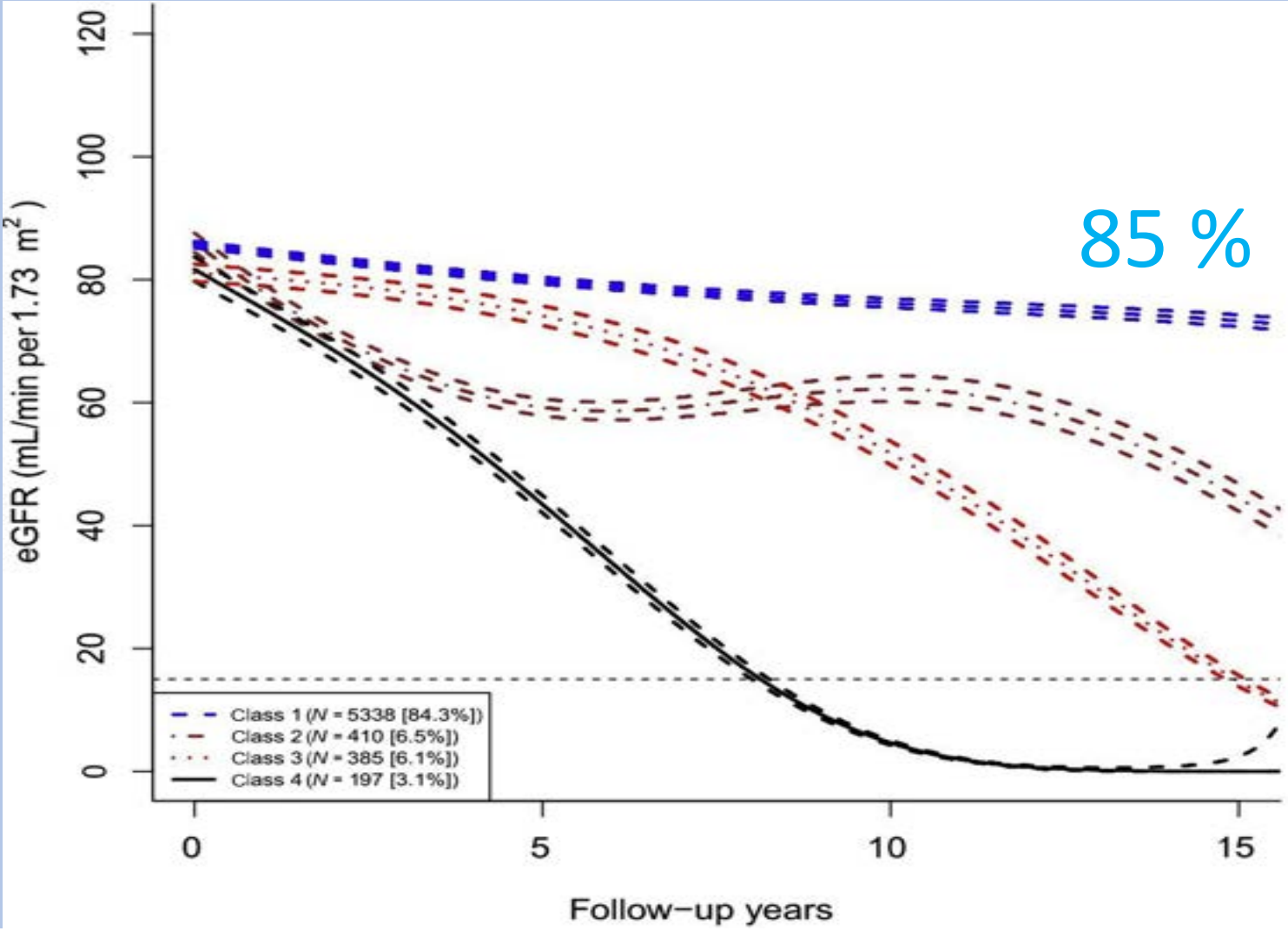
> HYPERCHOLESTEROLEMIE

> TABAGISME

= ANGOR SYMPTOMATIQUE

Qui dépister ? / Qui adresser ?

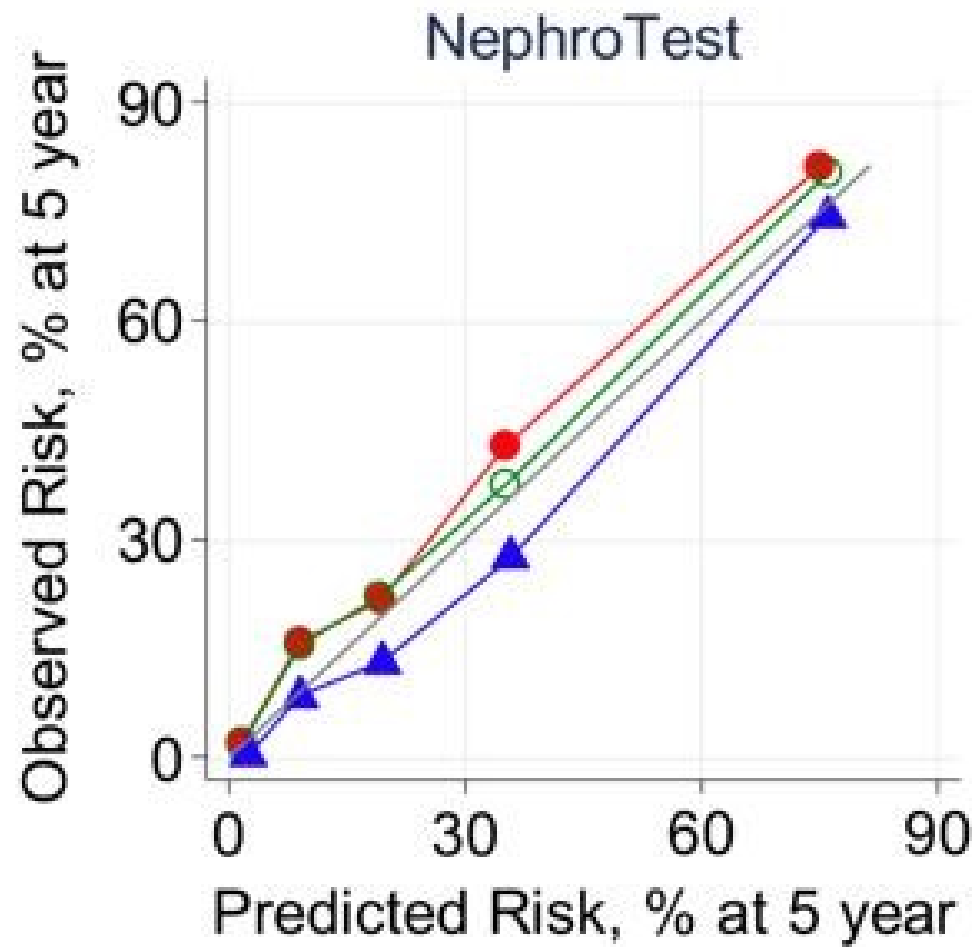
# Evolution naturelle de la néphropathie diabétique



# Comment dépister ?

- Calcul du **Score de Risque Rénal (KFRE)**
- Nécessite: Age, Sexe, DFG, Albuminurie/Créatininurie (RAC)
- - **SRR à 5 ans > 15 % :** adressage au néphrologue nécessaire
- - **SRR à 5 ans entre 5 et 15 % :** adressage au néphrologue recommandé
- - **SRR à 5 ans < 5 % :** un avis spécialisé peut être souhaitable si
- - Rapport albumine/créatinine (RAC) > 500 mg/g
  - Microalbuminurie persistante (RAC > 30 mg/g) chez un diabétique
  - DFGe < 30 ml/min/1,73m<sup>2</sup>
  - DFGe en diminution de plus de 10% par an.
  - Hyperkaliémie > 5,5 mmol/L de façon répétée
  - Néphropathie héréditaire ou kystique

# Score de risque Rénal





# Protéinurie, la réalité. Etude sur 1 an

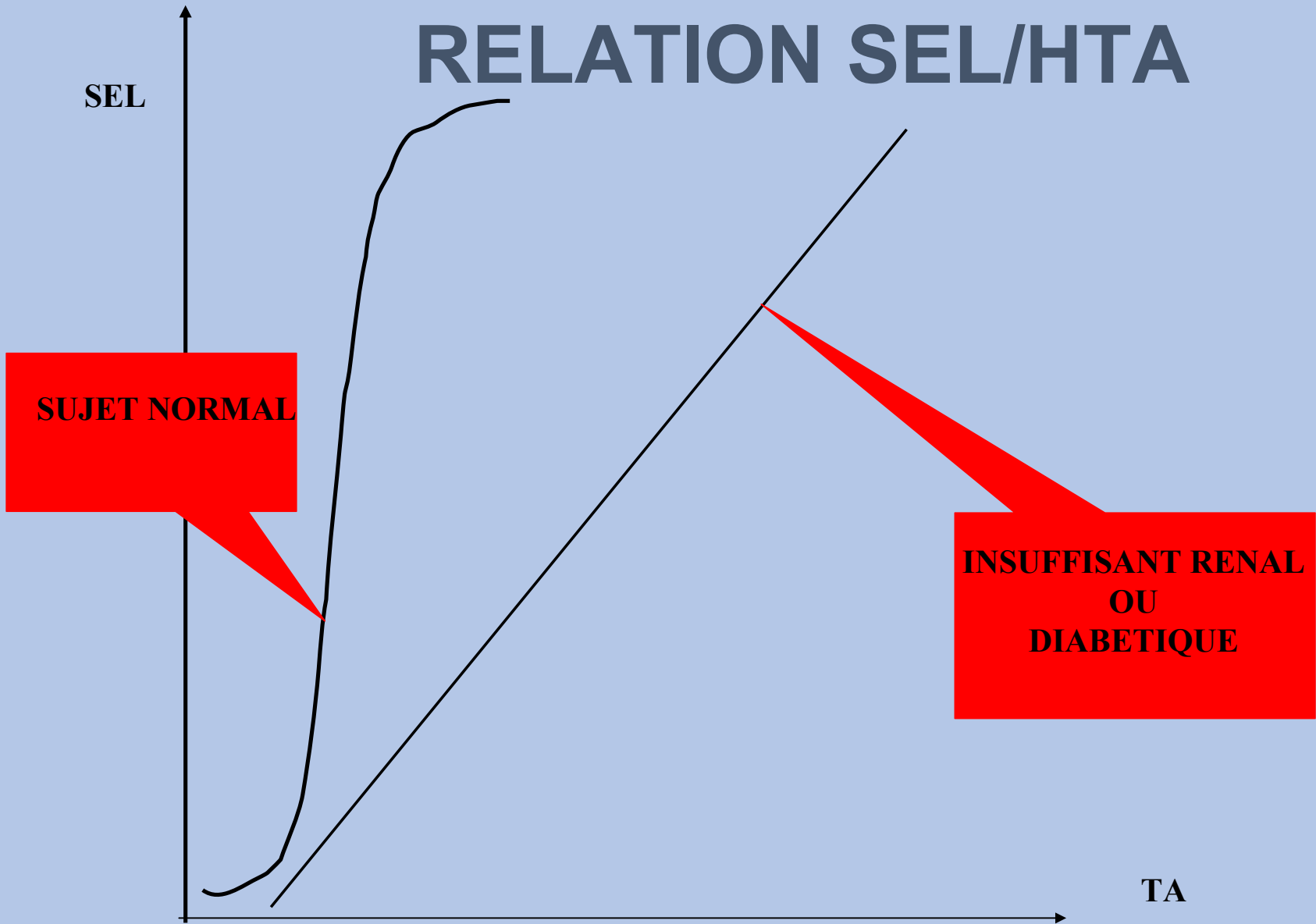
	Diabétiques 56435	Hypertendus 54234
67	34,5 % (19-37)	21,2 % (13-26)
68	40,6 % (35-44)	25,5 % (20-27)

# Chapitre 3 : HTA et Maladie rénale

# EQUILIBRE TENSIONNEL

- SRAA
- ELIMINATION DU SEL
- REIN COUPABLE D'HTA

# RELATION SEL/HTA

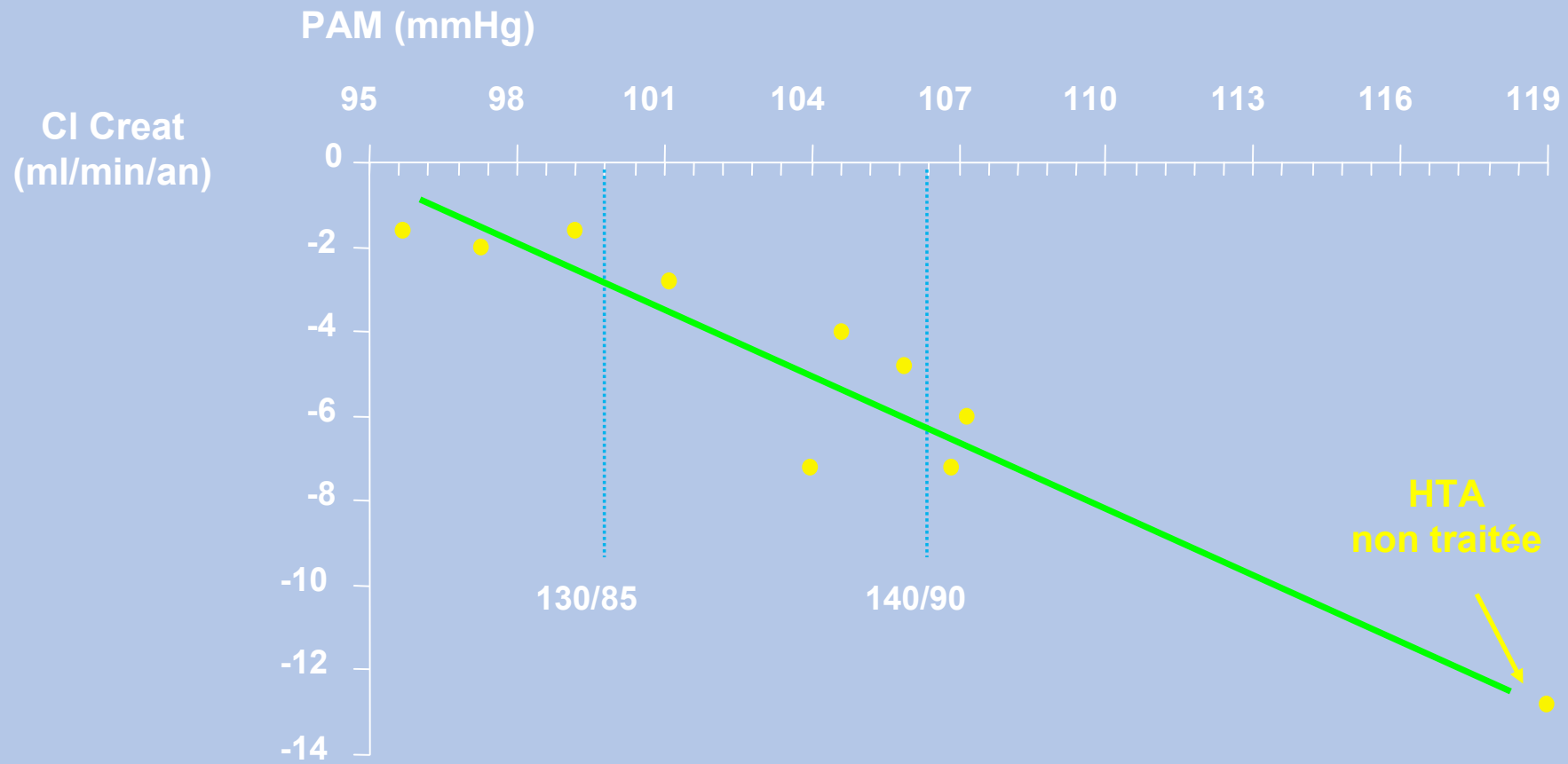


# REIN COUPABLE D'HTA

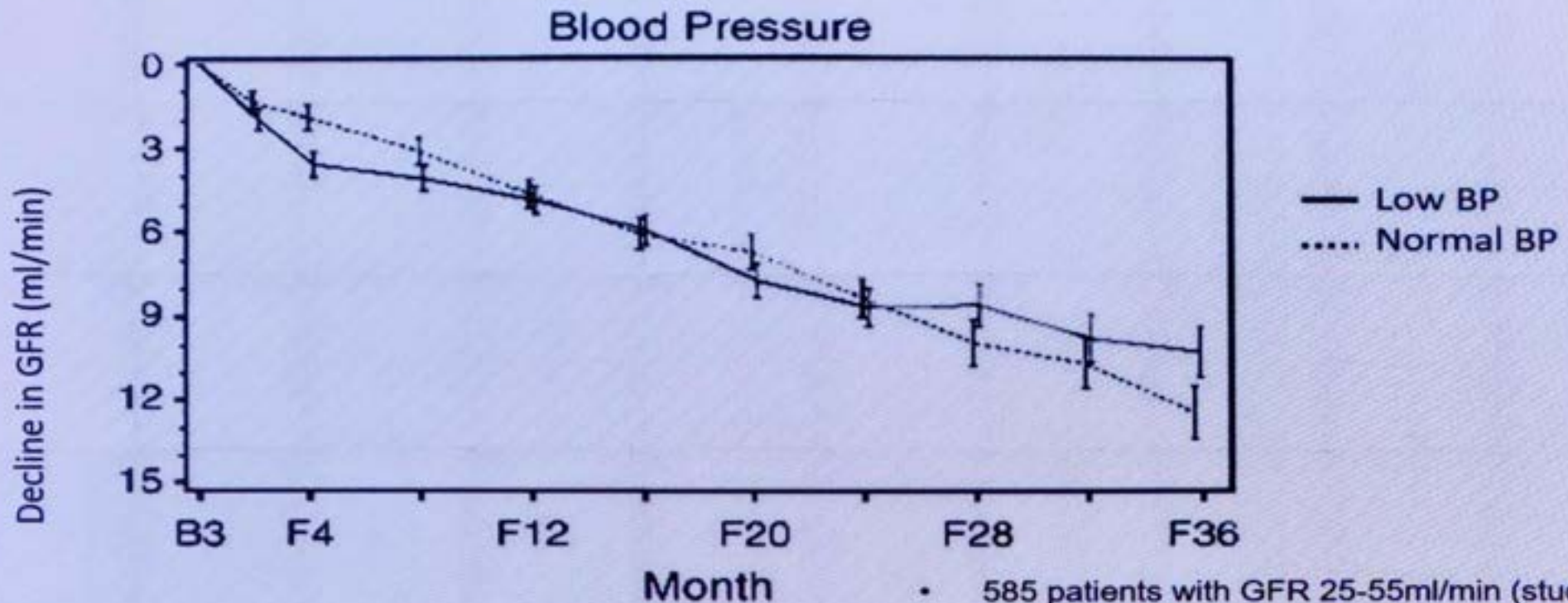
- 70 À 90 % DES IRC SONT HYPERTENDUS
- RATS NORMAUX TRANSPLANTES AVEC DES REINS HYPERTENDUS DEVIENNENT HYPERTENDUS
- RATS HYPERTENDUS TRANSPLANTES AVEC DES REINS NORMAUX NE SONT PLUS HYPERTENDUS

LE REIN "TRANSPORTE" L'HYPERTENSION

# EFFET DU TRAITEMENT ANTI-HYPERTENSEUR



# MDRD Study



Klahr et al. NEJM 330:877; 1994

- 585 patients with GFR 25-55ml/min (study 1)
- 255 patients with GFR 13-24ml/min (study 2)
- "Normal" (MAP<107; 140/90) vs.
- "Low" (MAP<92; 125/75) BP control
- Follow-up 2.2 years

# NEPHROPATHIES NON DIABETIQUES: EFFET DES IEC

ETUDE REIN : 352 PATIENTS, CL 45, SUIVIS 3 ANS  
RAMIPRIL VS PLACEBO, TA = ENTRE LES 2 GROUPES

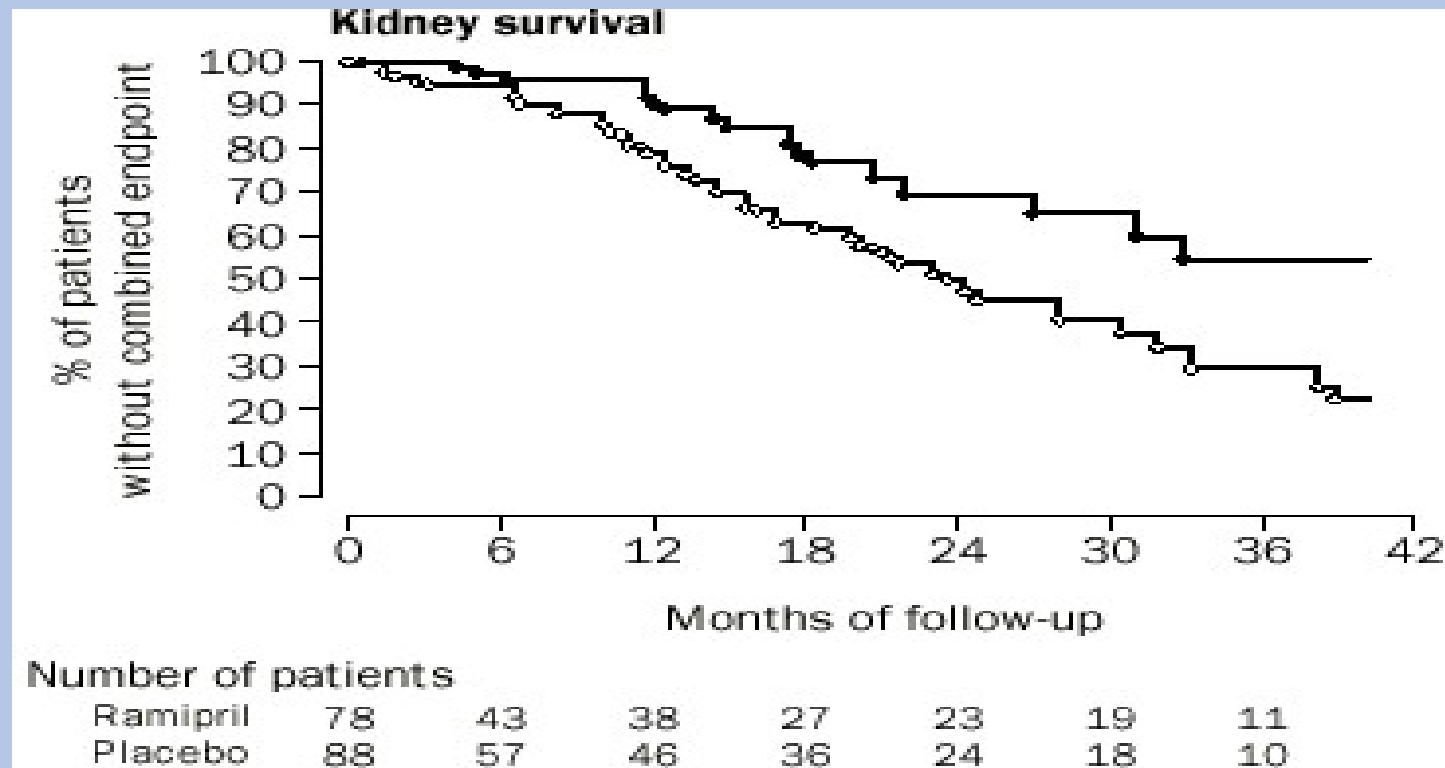
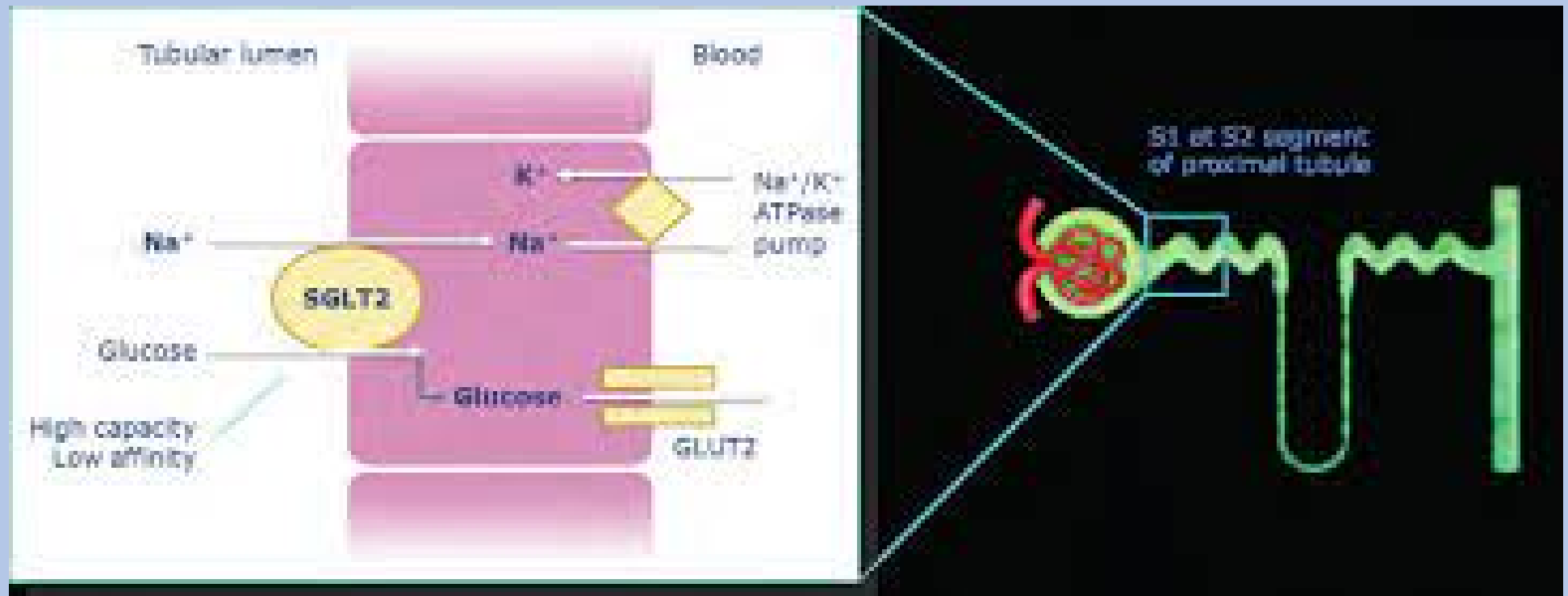


Figure 4: **Kidney survival**



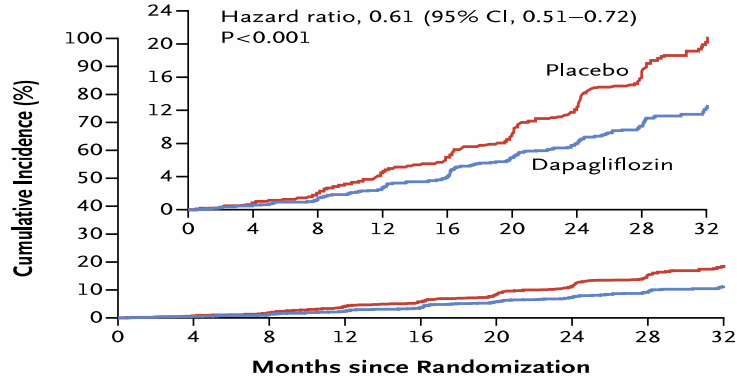
# Chapitre 4 : Du nouveau ?

# Inhibiteurs SGLT2: une révolution ?



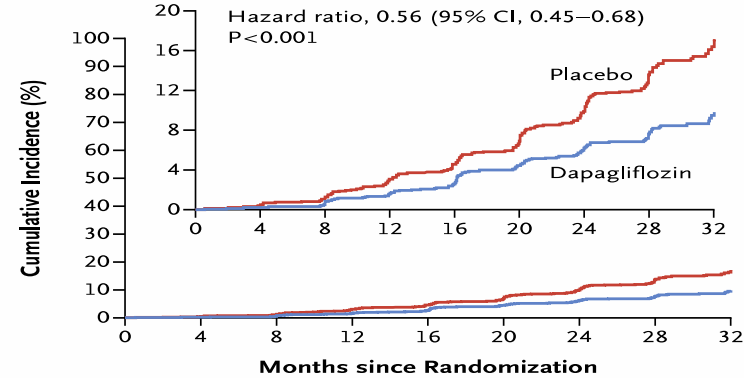
## Dapagliflozin in Patients with Chronic Kidney Disease

### A Primary Composite Outcome



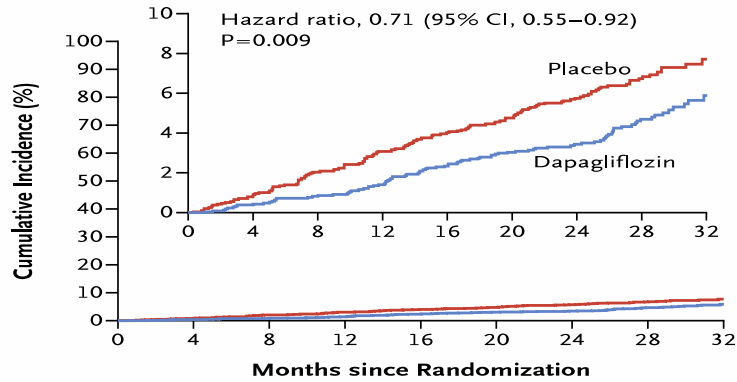
No. at Risk		0	4	8	12	16	20	24	28	32
Placebo	2152	1993	1936	1858	1791	1664	1232	774	270	
Dapagliflozin	2152	2001	1955	1898	1841	1701	1288	831	309	

### B Renal-Specific Composite Outcome



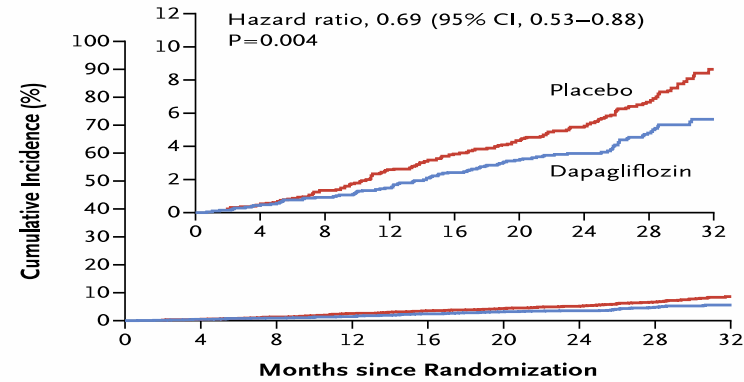
No. at Risk		0	4	8	12	16	20	24	28	32
Placebo	2152	1993	1936	1858	1791	1664	1232	774	270	
Dapagliflozin	2152	2001	1955	1898	1841	1701	1288	831	309	

### C Composite of Death from Cardiovascular Causes or Hospitalization for Heart Failure



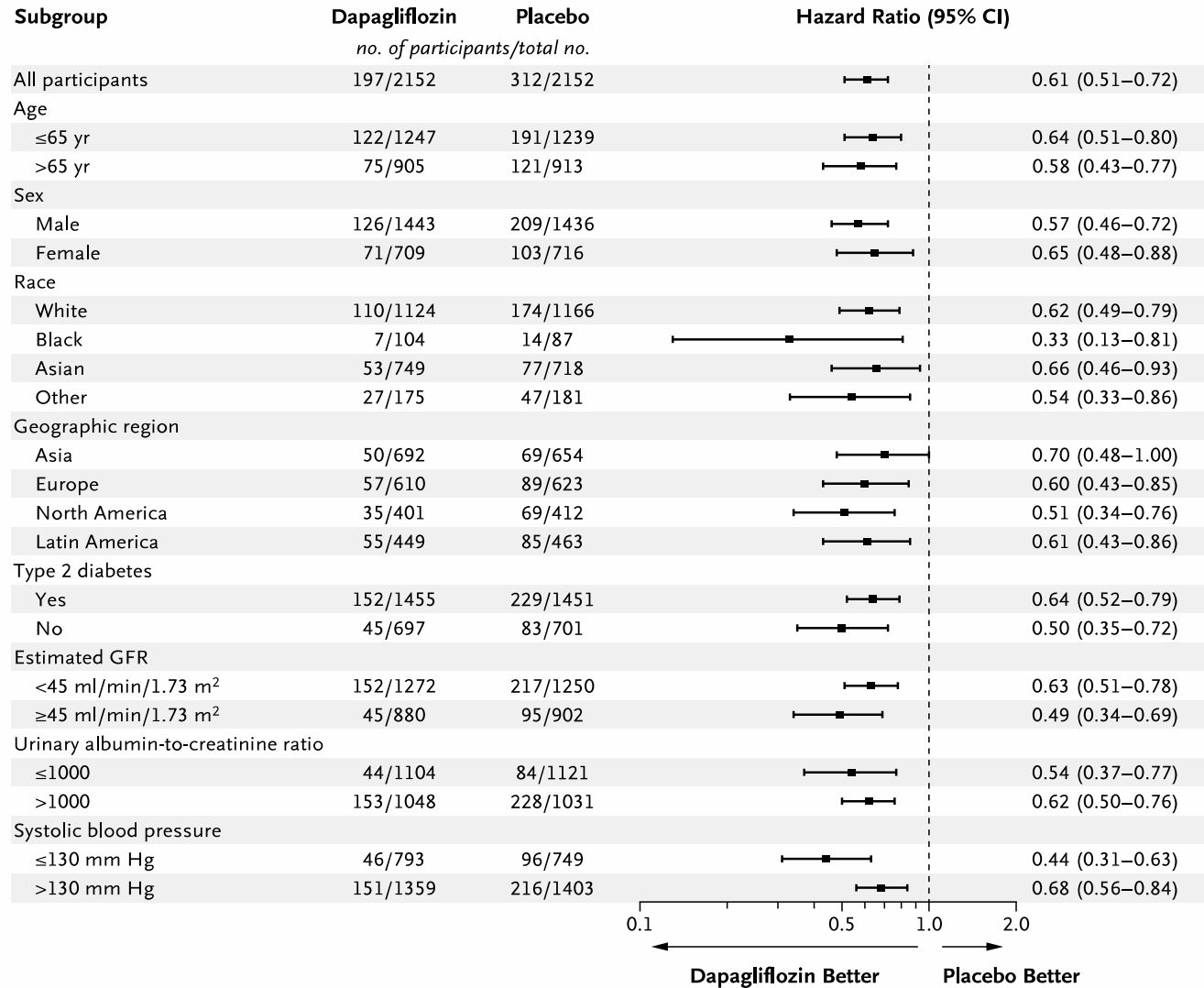
No. at Risk		0	4	8	12	16	20	24	28	32
Placebo	2152	2023	1989	1957	1927	1853	1451	976	360	
Dapagliflozin	2152	2035	2021	2003	1975	1895	1502	1003	384	

### D Death from Any Cause

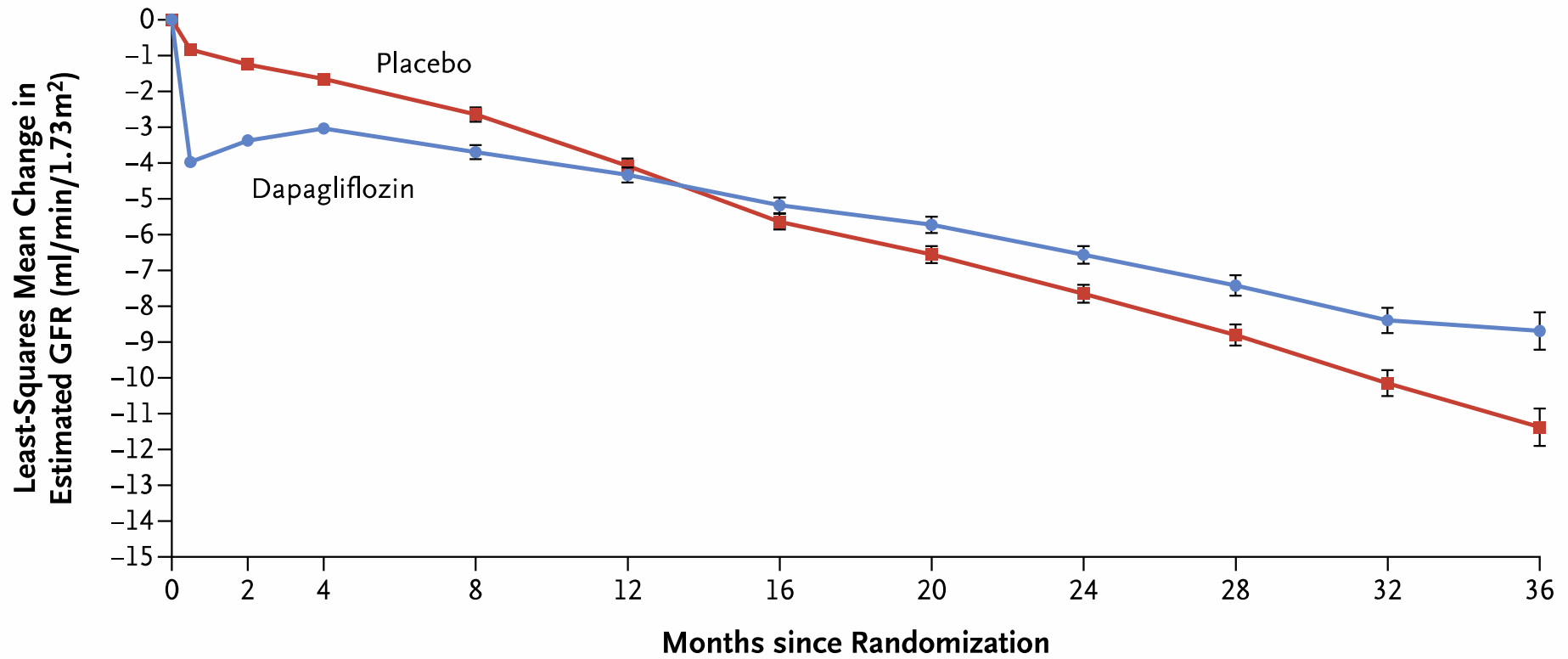


No. at Risk		0	4	8	12	16	20	24	28	32
Placebo	2152	2035	2018	1993	1972	1902	1502	1009	379	
Dapagliflozin	2152	2039	2029	2017	1998	1925	1531	1028	398	

Dapagliflozin in Patients with Chronic Kidney Disease



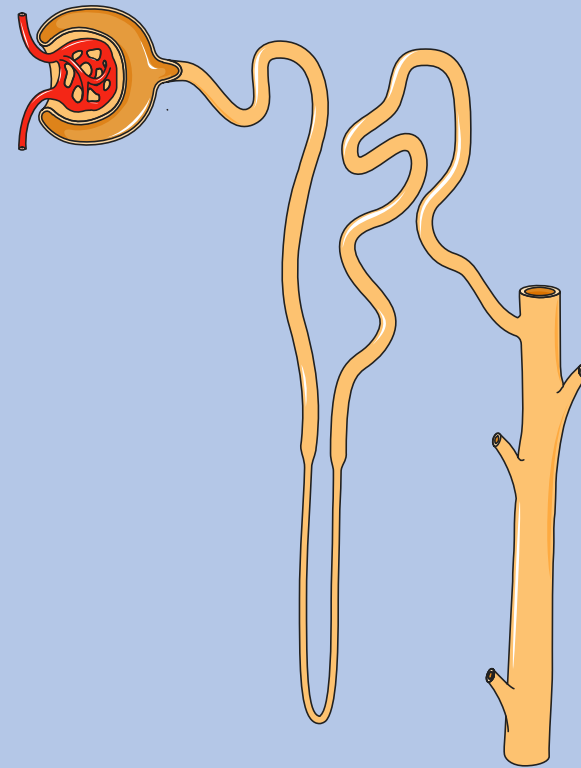
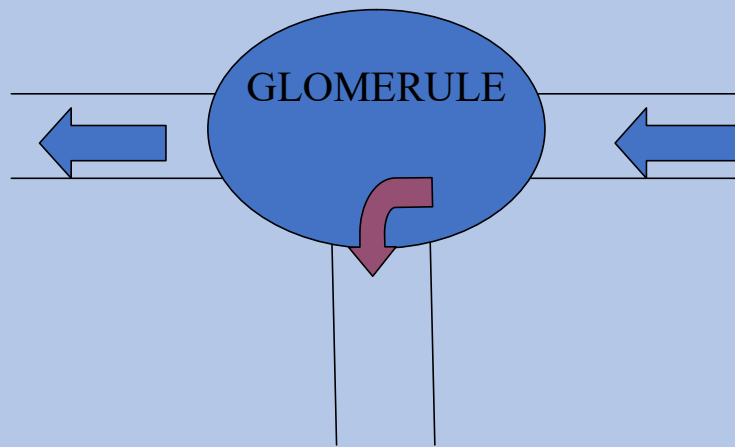
Dapagliflozin in Patients with Chronic Kidney Disease



No. of Participants

Placebo	2152	2029	1981	1866	1795	1753	1672	1443	935	447	157
Dapagliflozin	2152	2031	2001	1896	1832	1785	1705	1482	978	496	157

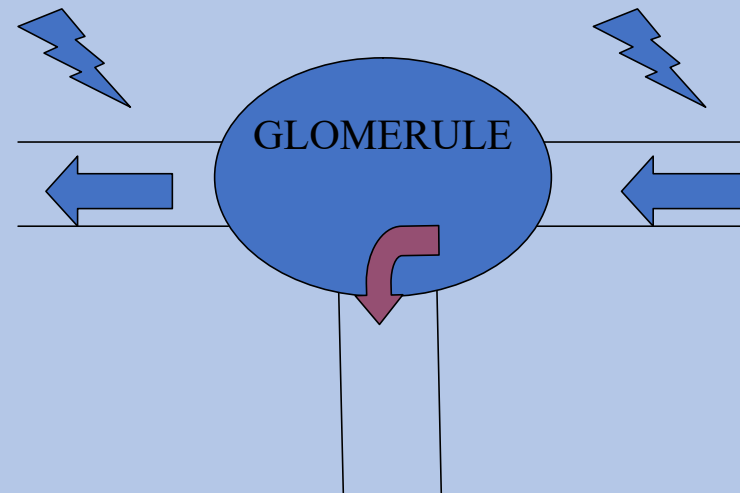
# LE GLOMERULE



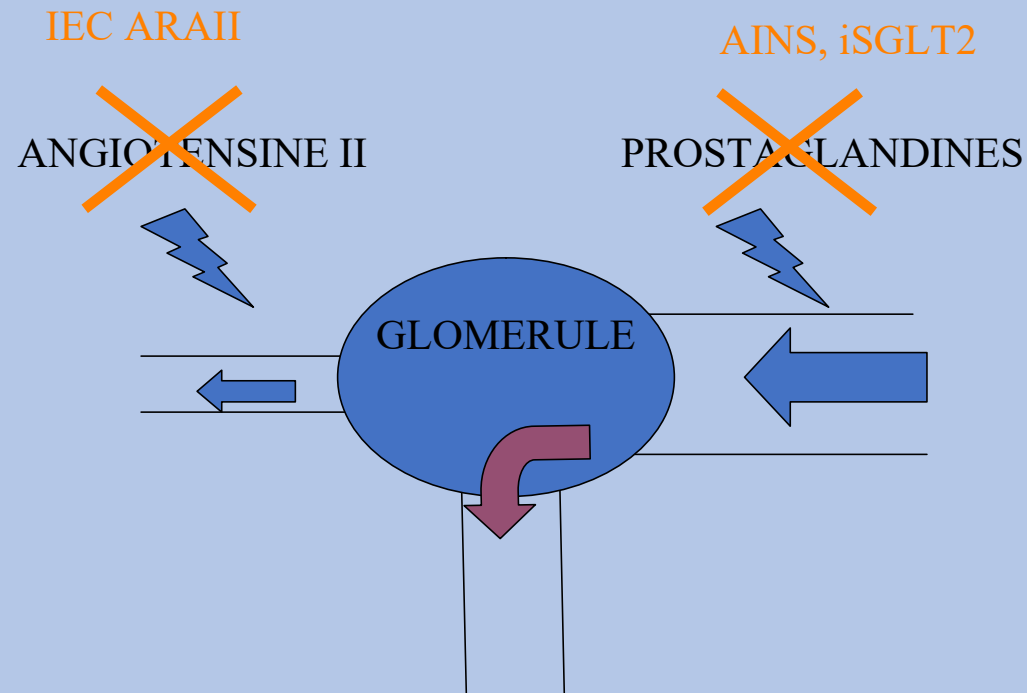
# LE GLOMERULE DESHYDRATATION OU IR

ANGIOTENSINE II

PROSTAGLANDINES



# LE GLOMERULE DESHYDRATATION OU IR





# ISGLT2: Règles de prescription

- DFG 25-75
- Et RAC 200-5000 mg/gr
- Et augmentation du RAC en 3 mois
- Et IEC ou ARA II depuis 1 mois
  
- Prescription par Néphrologue si DFG > 60

# ISGLT2: Précautions

- Acido-cétose x3
- Infection génitale x9
- Infection urinaire ?
- Artérite ?
- Gangrène de Fournier ?

# ISGLT2: Questions non résolues

- Patients non évolutifs ?
- Trop tard !
- DID ?
- Pas de protéinurie ?
- PKR / Autre néphropathies rares

# Conclusion 1

Baisse de PA de 10/5

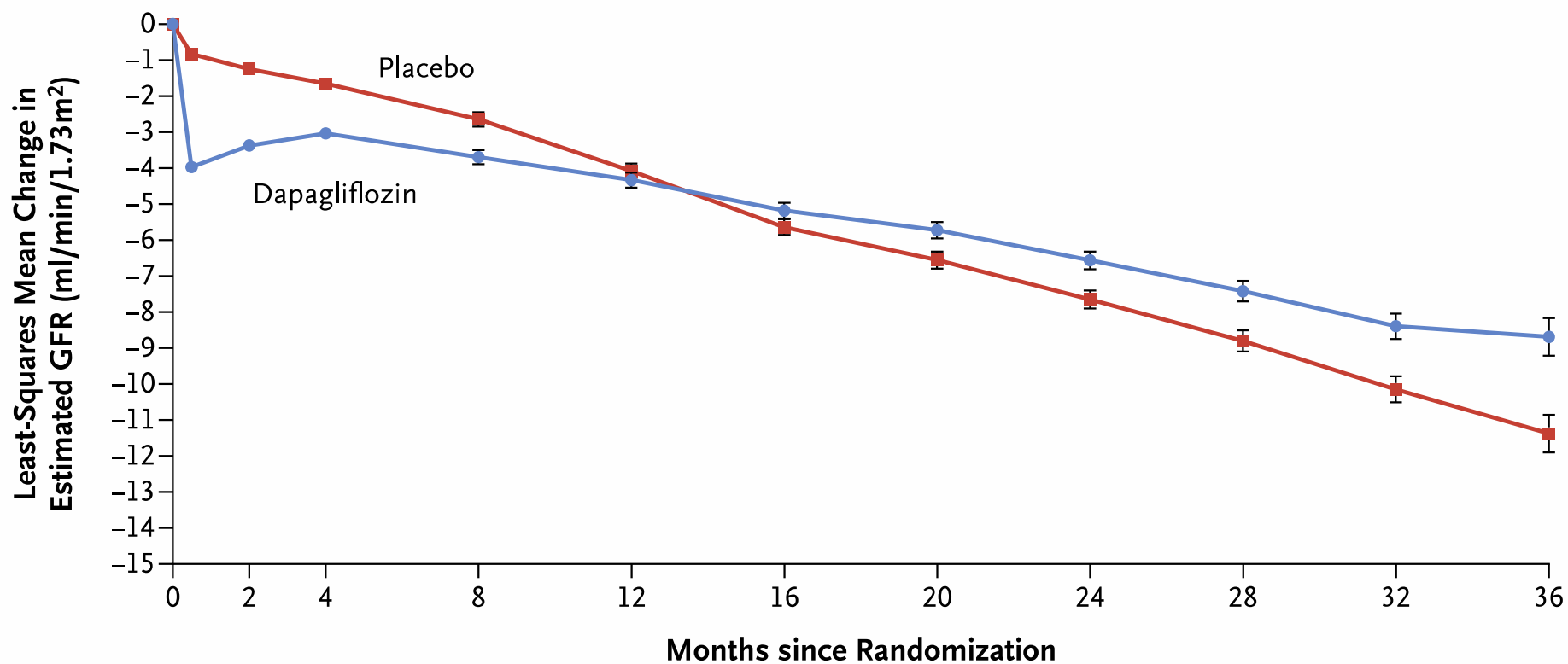
- Evénements CV

- AVC 36%
- IC 43%
- IDM 16%
- DC CV 18%
- DC 11%

- Nbre patients à traiter pdt 5 ans

- AVC 58
- Evnmts CV 36
- DC CV 141

# Conclusion 2



## No. of Participants

Placebo	2152	2029	1981	1866	1795	1753	1672	1443	935	447	157
Dapagliflozin	2152	2031	2001	1896	1832	1785	1705	1482	978	496	157