10H15
11H00

Atelier organisé par Roche

Salle 351

UTILISATION DU NT-PROBNP DANS LA DÉTECTION PRÉCOCE ET LE SUIVI D'UNE ATTEINTE CARDIAQUE CHEZ LES PATIENTS DIABÉTIQUES DE TYPE 2

Roche

Pr Emmanuel COSSON

Service de Diabétologie-Endocrinologie-Nutrition

Bobigny-Bondy-Sevran

Unité de Recherche Epidémiologique Nutritionnelle
UMR U1153 INSERM/U11125 INRA/CNAM/Université Paris13
Bobigny FRANCE

AP-HP. Hôpitaux universitaires Paris Seine-Saint-Denis

CINFO Adultes & Enfants
Centre Intégré Nord Francilien de l'Obésité

Université Sorbonne Paris Nord

Lien d’intérêts

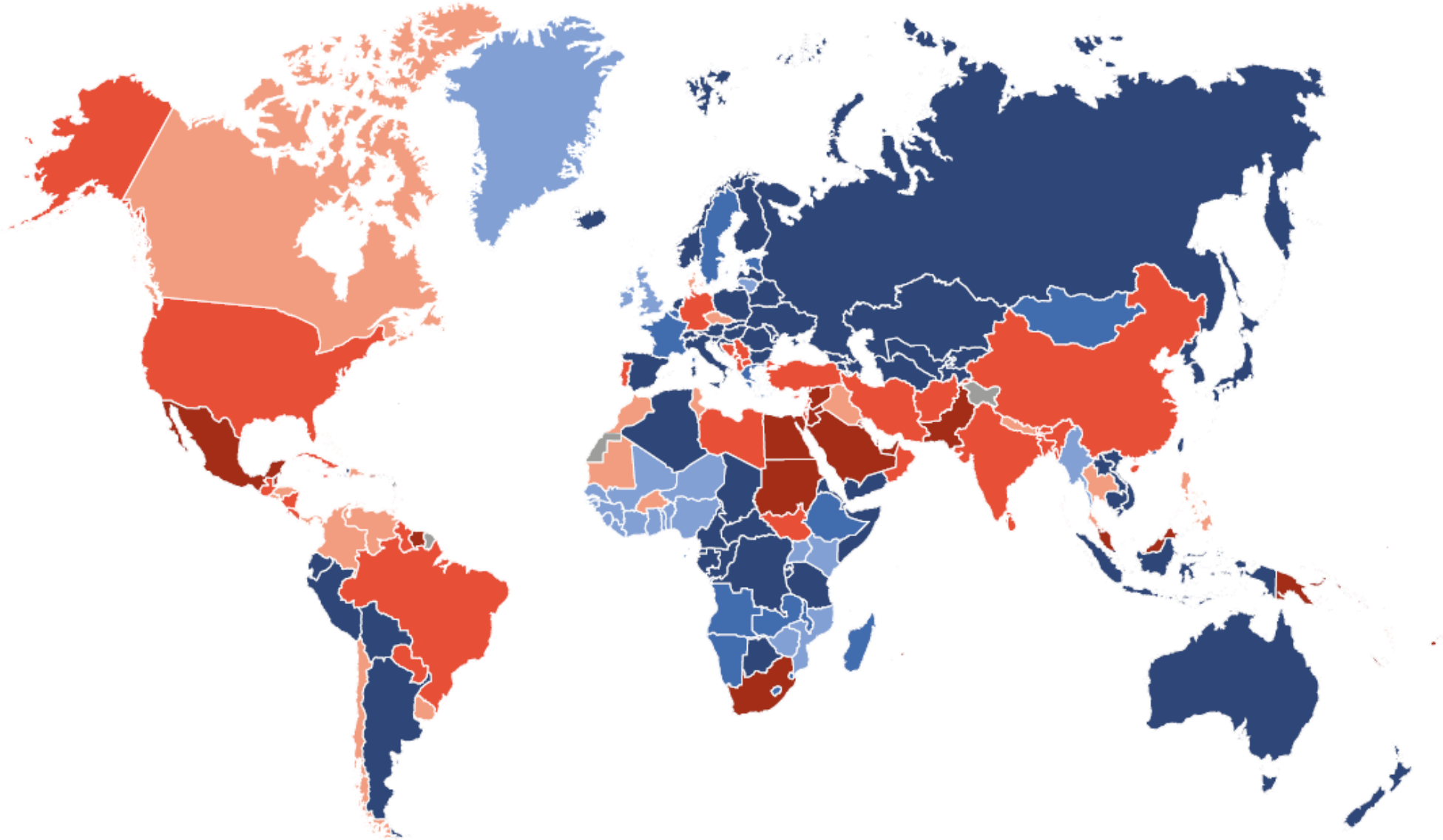
Conférences : Roche Diagnostics

Aide financière pour projet de recherche : Roche Diagnostics et Astra Zeneca

Boards scientifiques et conférences : Lilly - Boehringer Hingelheim et Astra Zeneca

Données épidémiologiques

Diabète (20-79 ans)



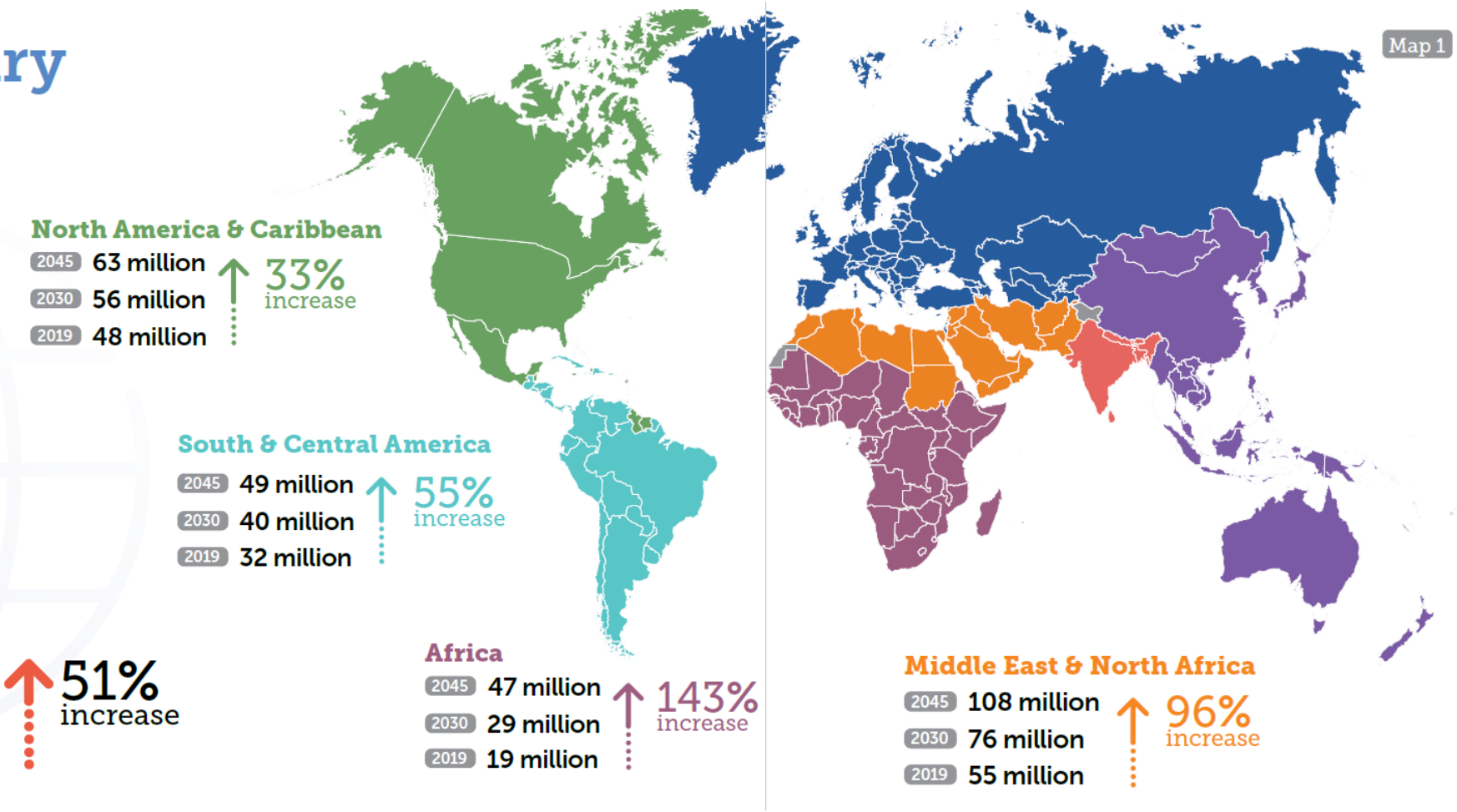
Estimated age-adjusted comparative prevalence of diabetes in adults (20–79 years) in 2019

Données International Diabetes Federation

EC

Augmentation de la prévalence

Summary



Map 1 Number of people with diabetes worldwide and per IDF Region in 2019, 2030 and 2045 (20–79 years)

North America & Caribbean
2045 63 million
2030 56 million
2019 48 million
33% increase

South & Central America
2045 49 million
2030 40 million
2019 32 million
55% increase

WORLD
2045 700 million
2030 578 million
2019 463 million
51% increase

Africa
2045 47 million
2030 29 million
2019 19 million
143% increase

Europe
2045 68 million
2030 66 million
2019 59 million
15% increase

South-East Asia
2045 153 million
2030 115 million
2019 88 million
74% increase

Middle East & North Africa
2045 108 million
2030 76 million
2019 55 million
96% increase

Western Pacific
2045 212 million
2030 197 million
2019 163 million
31% increase

Données International Diabetes Federation

Diabetes & Metabolism xxx (2019) xxx–xxx

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Original article

Is the type 2 diabetes epidemic plateauing in France? A nationwide population-based study

S. Fuentes [a,*], L. Mandereau-Bruno [a], N. Regnault [a], P. Bernillon [a], C. Bonaldi [a], E. Cosson [b,c], S. Fosse-Edorh [a]

[a] *Santé publique France, the French National Public Health Agency, 12, rue du Val d'Osne, 94415 Saint-Maurice, France*
[b] *Department of diabetology, endocrinology and metabolism, CRNH-IdF, CINFO, Paris 13 university, Sorbonne Paris cité, Avicenne hospital, AP–HP, 93000 Bobigny, France*
[c] *UMR U1153 Inserm, U1125 Inra, Cnam, Paris 13 university, Sorbonne Paris cité, 93000 Bobigny, France*

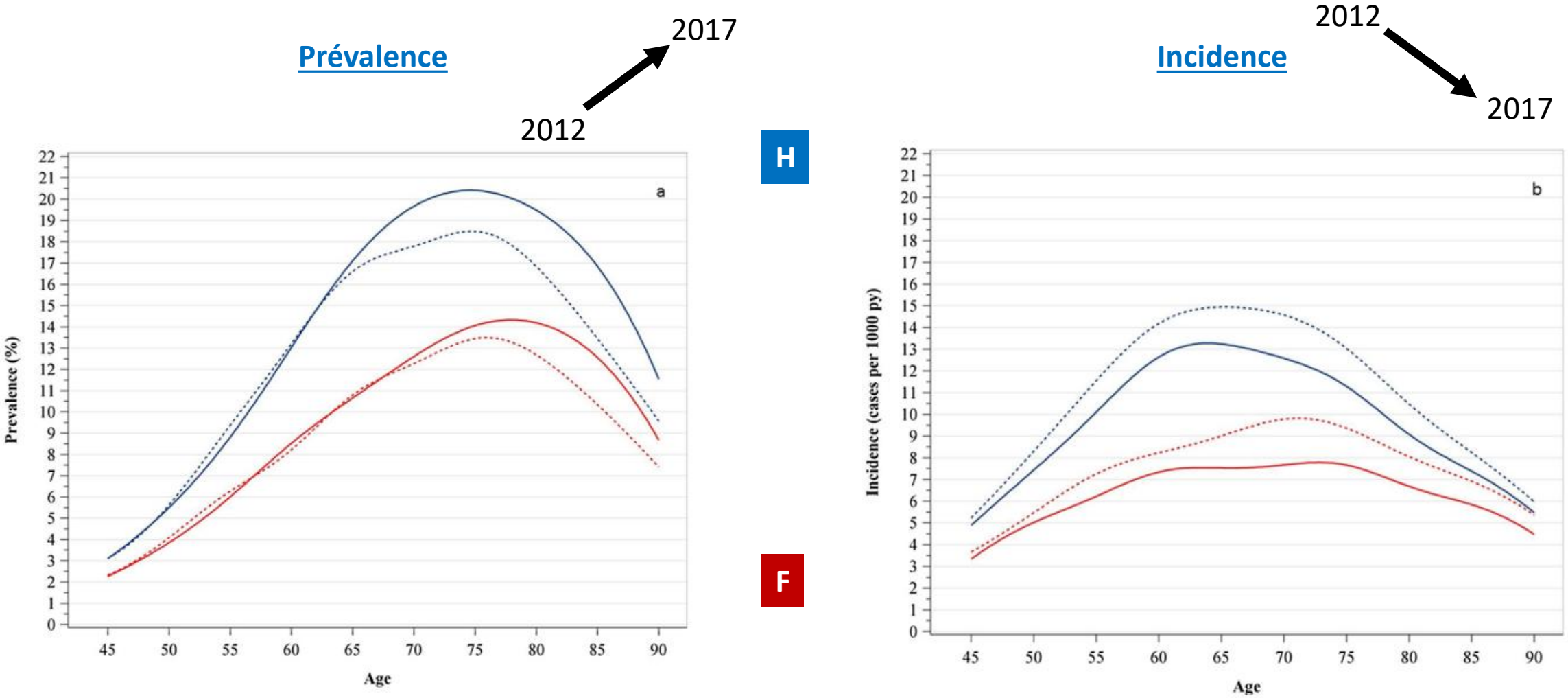
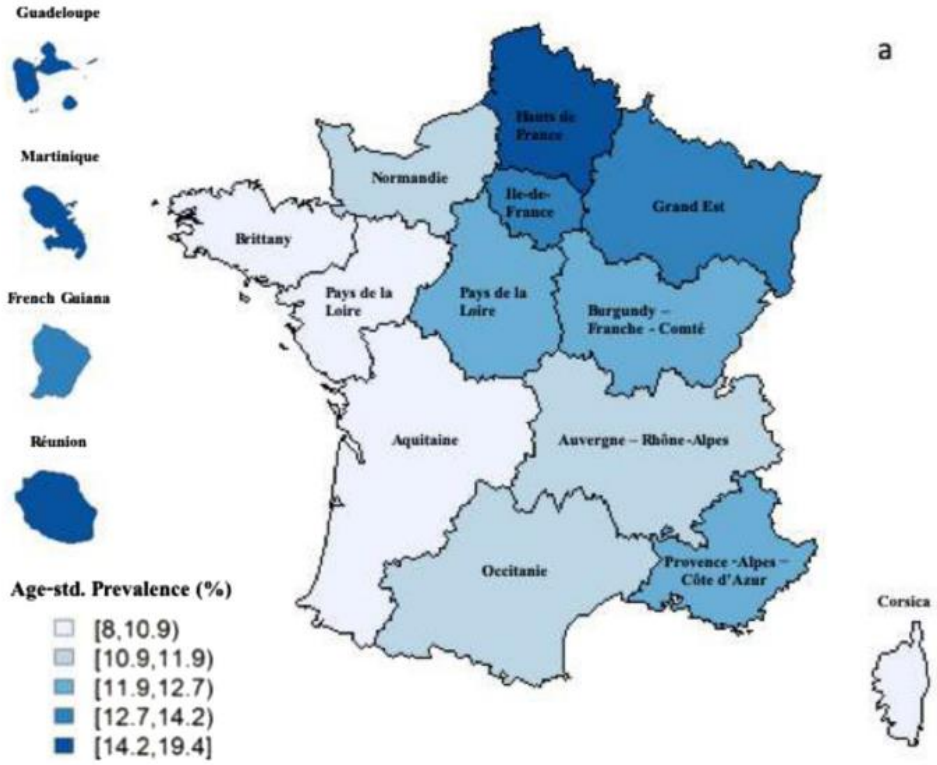


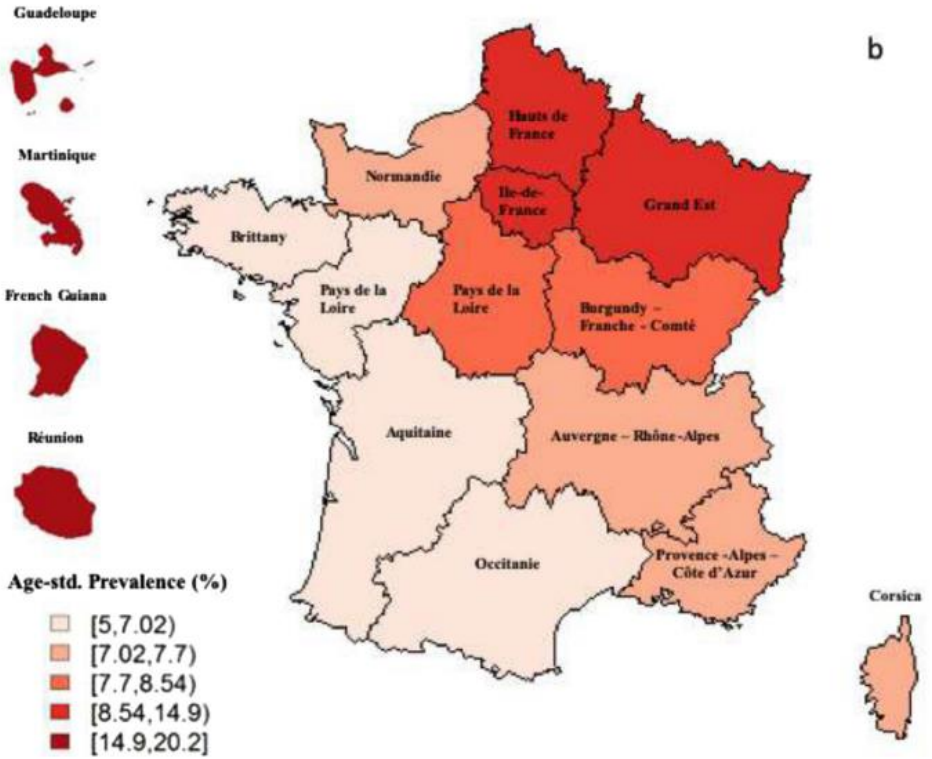
Fig. 2. Age-specific (a) prevalence in 2010 (dotted line) and in 2017 (solid line) and (b) incidence in 2012 (dotted line) and in 2017 (solid line) in France in adults aged ≥ 45 years stratified by gender (blue: men; red: women).

Prévalence

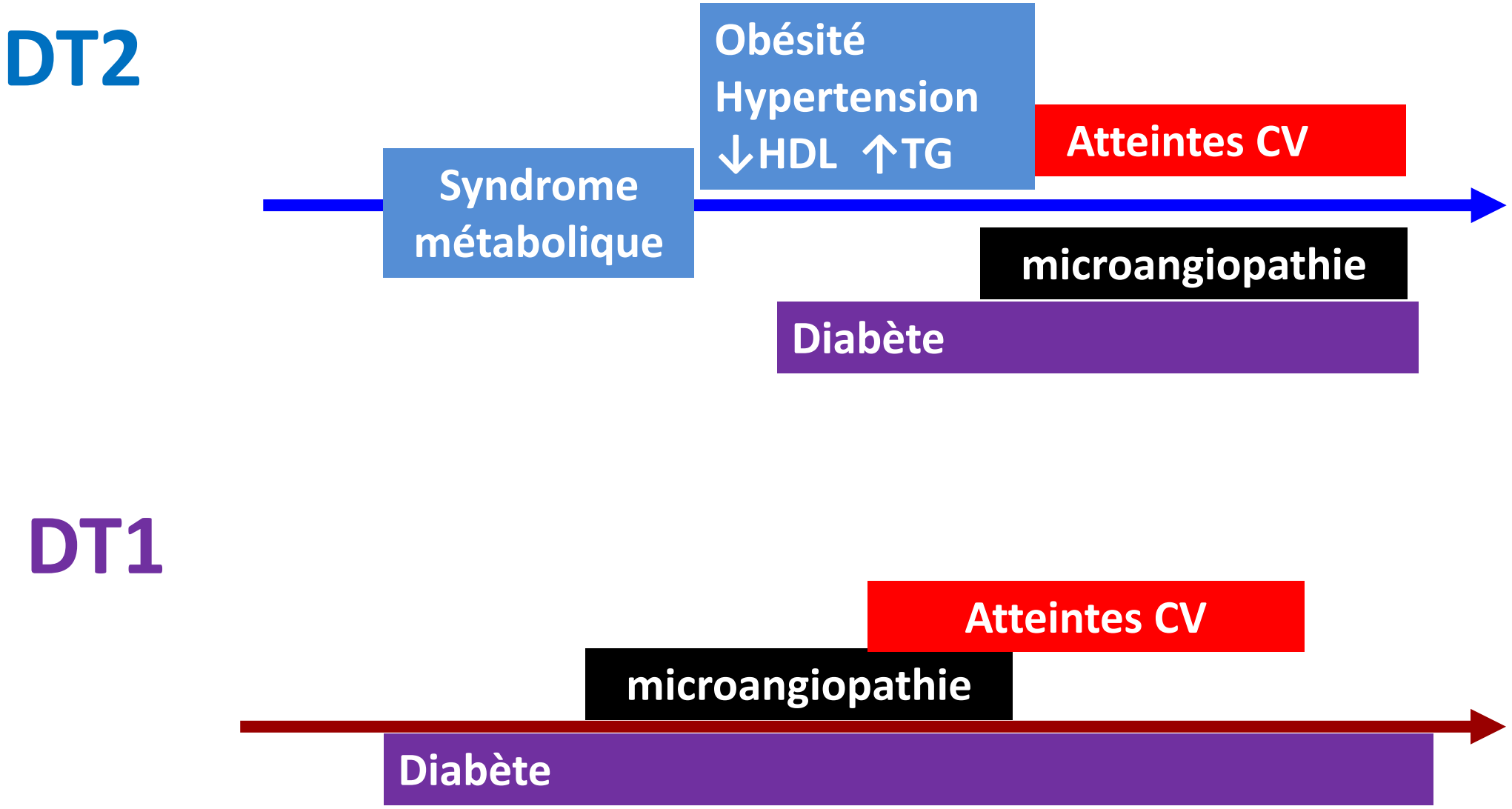
H 2017



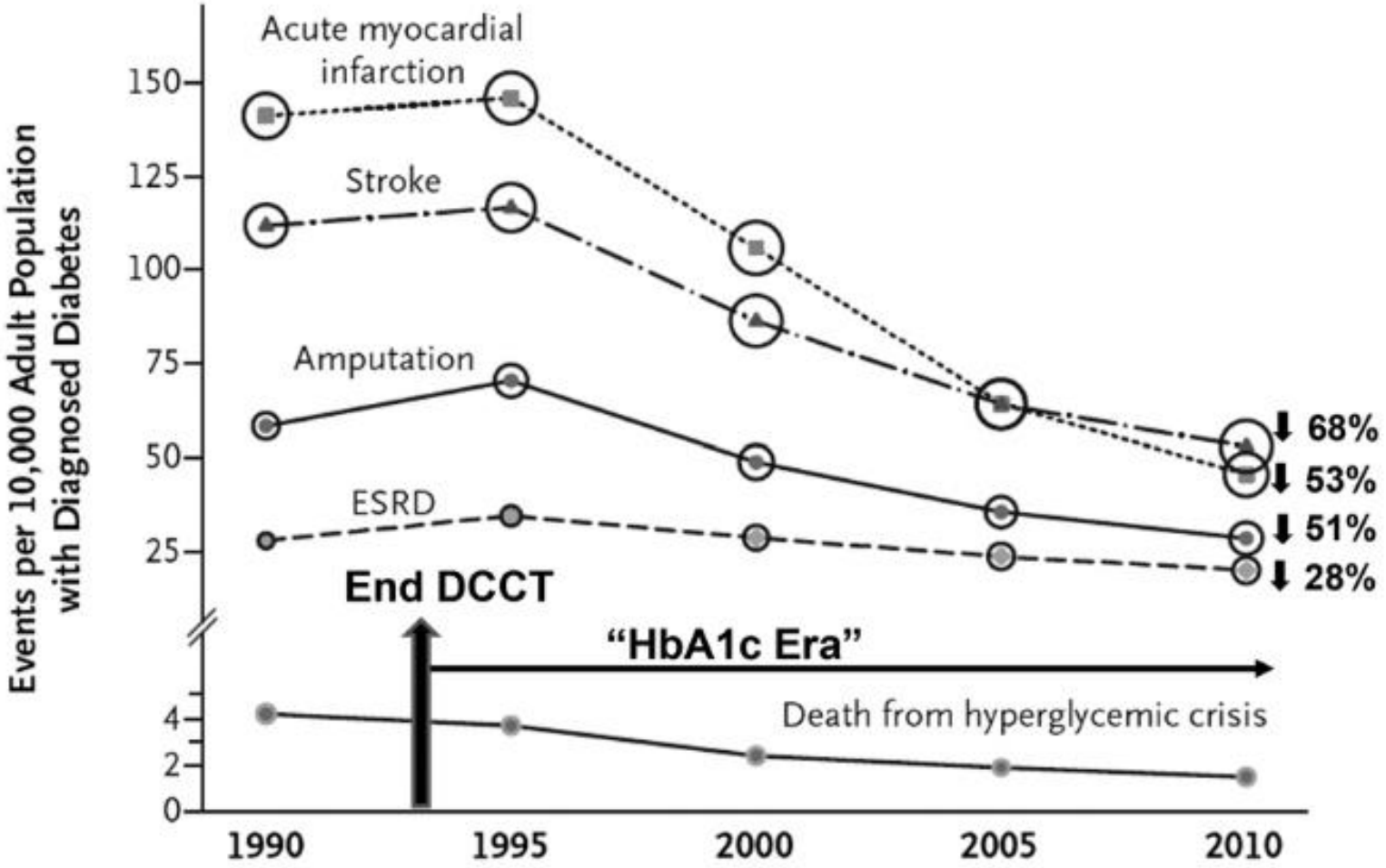
F 2017



Incidence des complications



Diminution des complications du diabète

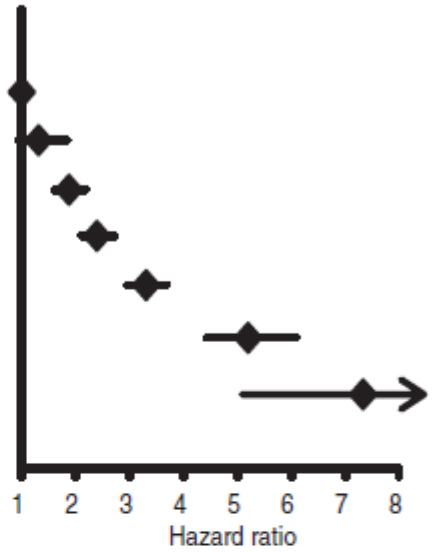


DT1 + DT2

EC

A All-cause mortality

	GROUP	EVENTS	PERSON–YEARS	INCIDENCE RATE	HAZARD RATIO
	Matched controls	4141	1627074	2.55 (2.47 to 2.62)	Reference
Persons with diabetes	No risk factors	41	25928	1.58 (0.95 to 2.21)	1.31 (0.93 to 1.85)
	1 risk factor	286	96572	2.97 (2.49 to 3.44)	1.87 (1.60 to 2.19)
	2 risk factors	642	109556	5.86 (5.16 to 6.56)	2.39 (2.10 to 2.73)
	3 risk factors	676	64068	10.56 (9.48 to 11.63)	3.31 (2.96 to 3.69)
	4 risk factors	360	19672	18.31 (15.51 to 21.10)	5.19 (4.43 to 6.10)
	5 risk factors	69	2411	28.53 (17.84 to 39.23)	7.33 (5.08 to 10.57)



5 facteurs de risque

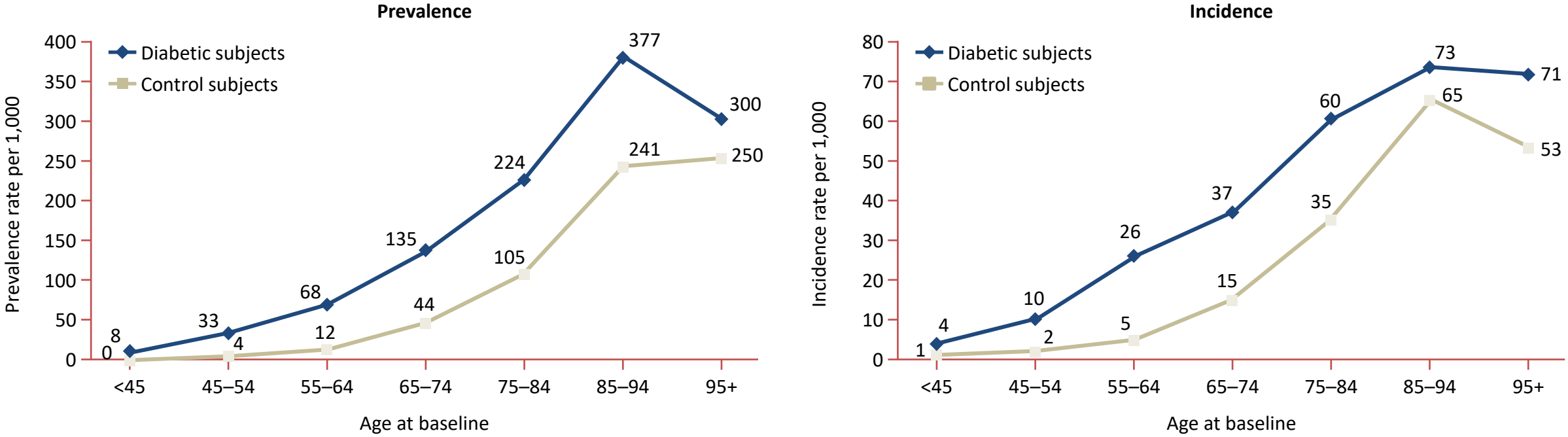
HbA1c 7%
PA 140-80 mmHg
Microalbuminurie
Tabac
LDL 0,97 g/l

Rawshani N Engl J Med 379;7

Quid de l’insuffisance cardiaque?

Risque d'IC en cas de DT2

Age-based risk of heart failure in type 2 diabetes

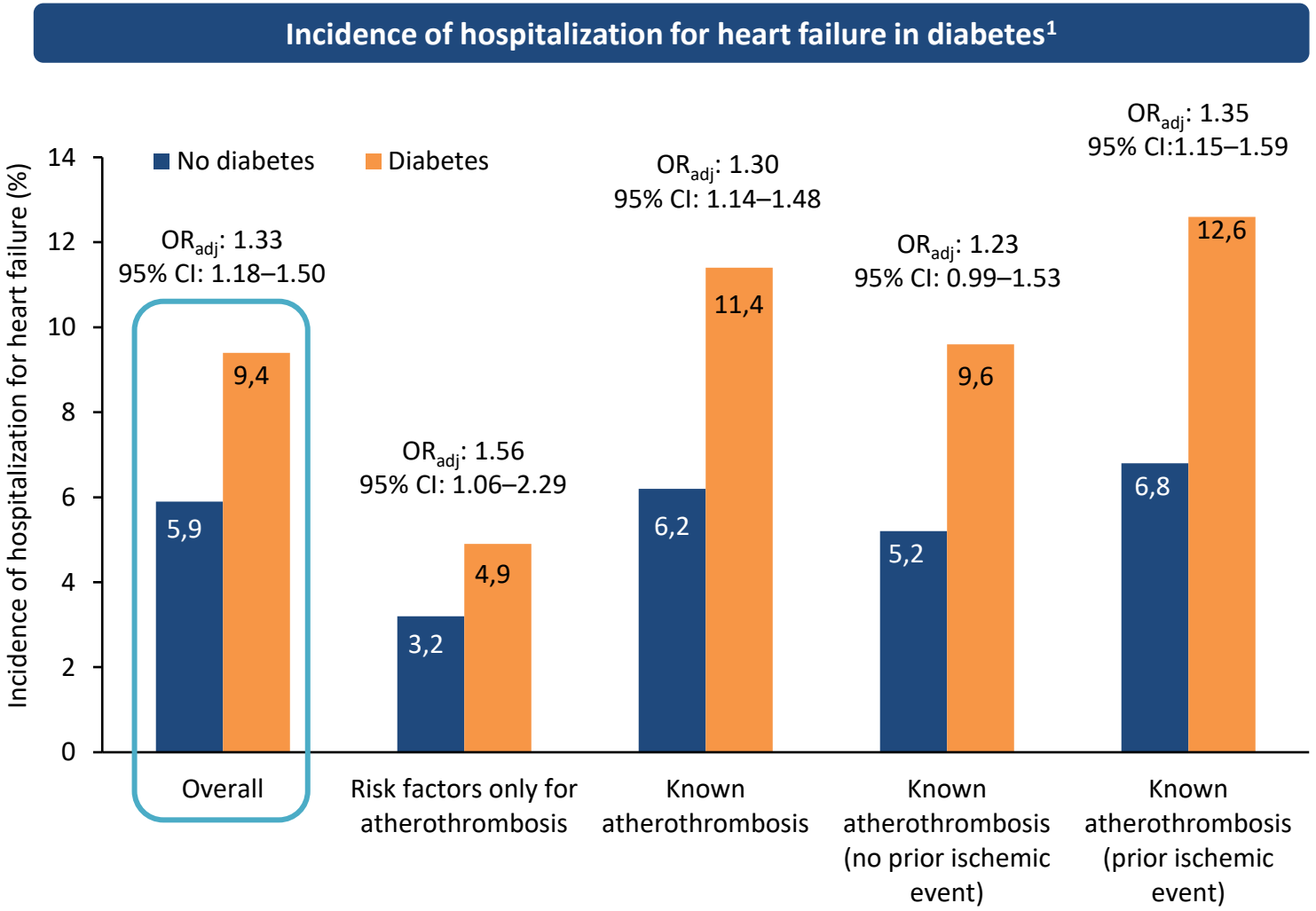


- HF was approximately **2–8× more prevalent** in people with T2D than in the age- and sex-matched control group.
- The incidence of HF in people with T2D **increases dramatically with age**.

Type 2 diabetes adds a constant risk of heart failure, independent of age.

Nichols et al. Diab Care 2001; 24: 1614-19.

Risque d'IC en cas de DT2

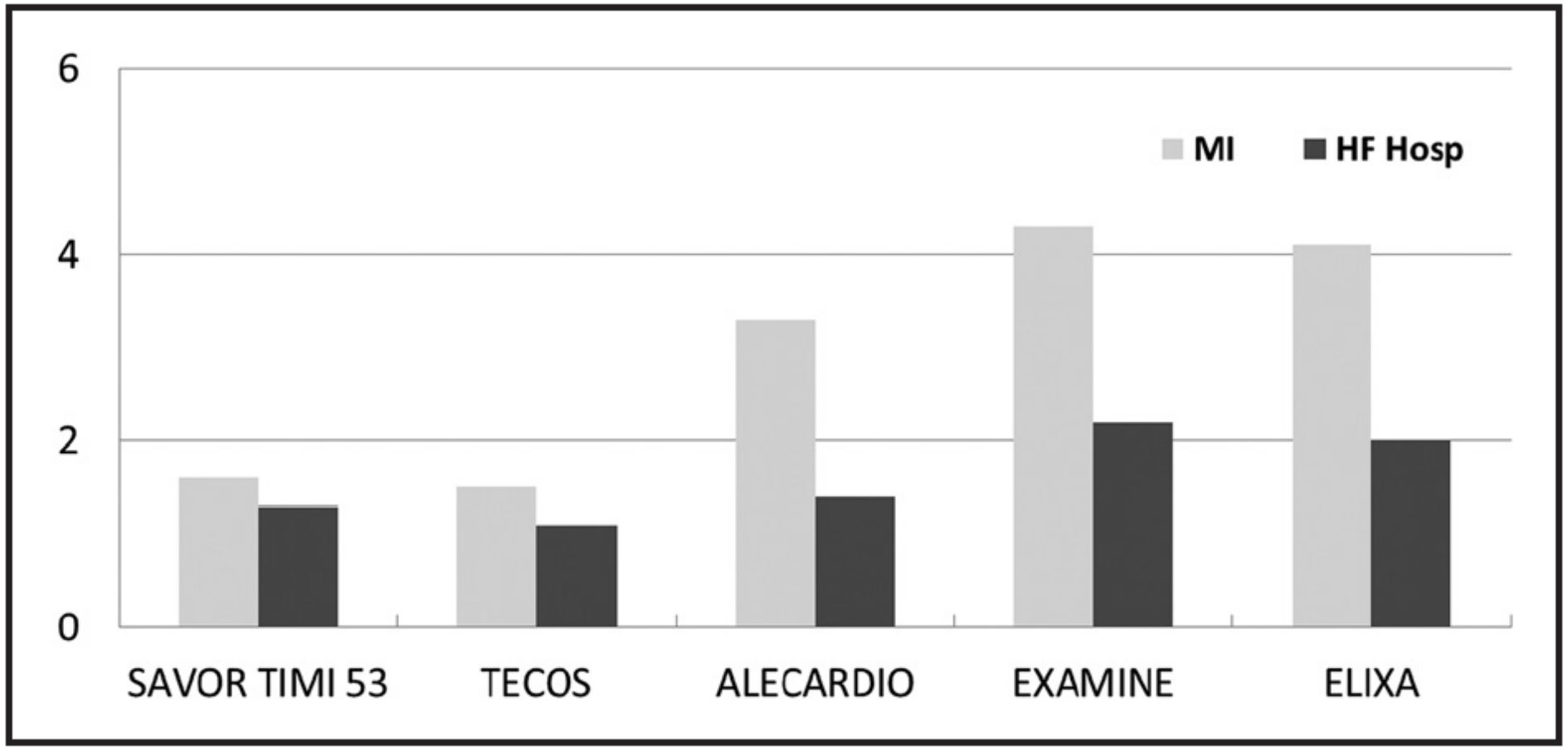


- + **<u>33% hospitalisation pour IC</u>**[1]
- Taux IC vs. "pas de diabète"
  - X 2 Hommes[2]
  - X 4 Femmes[2]

OR$_{adj}$, adjusted odds ratio

1. Cavender et al. Circulation. 2015;132:923-31. 2. Dunlay et al. Circulation. 2019;140:e294-e324.

Incidence d'IDM et d'hospitalisation pour insuffisance cardiaque (DT2 à haut risque CV)



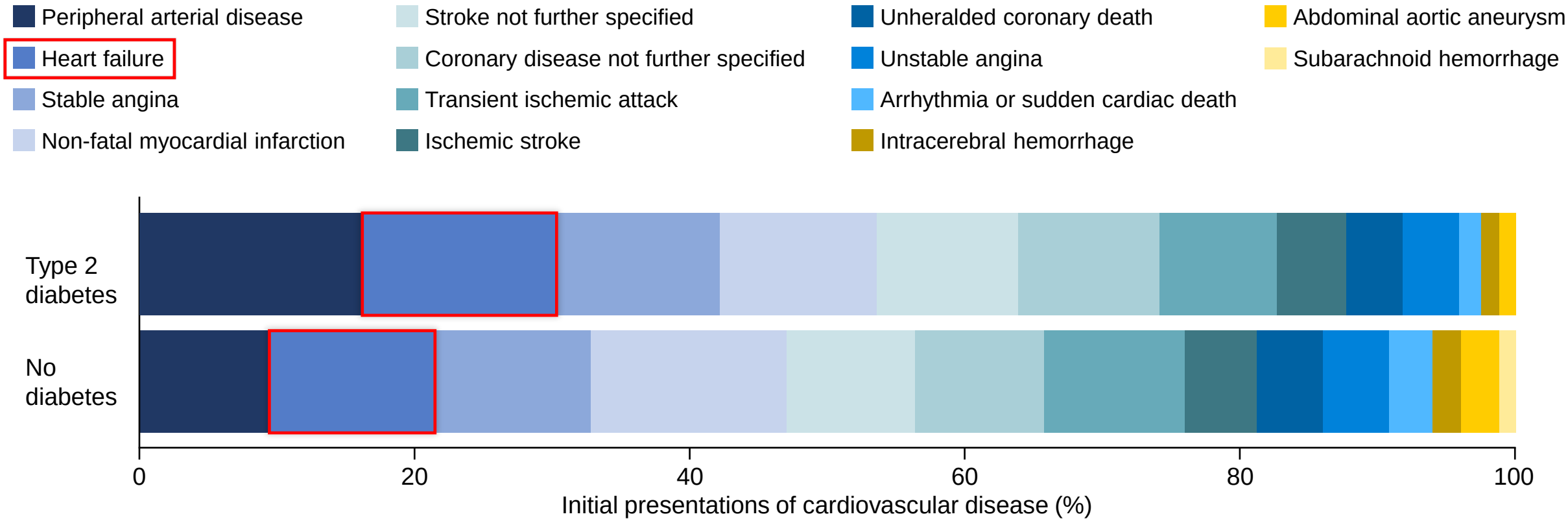
Heart Failure Considerations of Antihyperglycemic Medications for Type 2 Diabetes

Standl E et al.

Circ Res. 2016;118:1830-1843.

Survenue des événements CV en cas de DT2

Distribution of initial presentations of cardiovascular diseases[1]



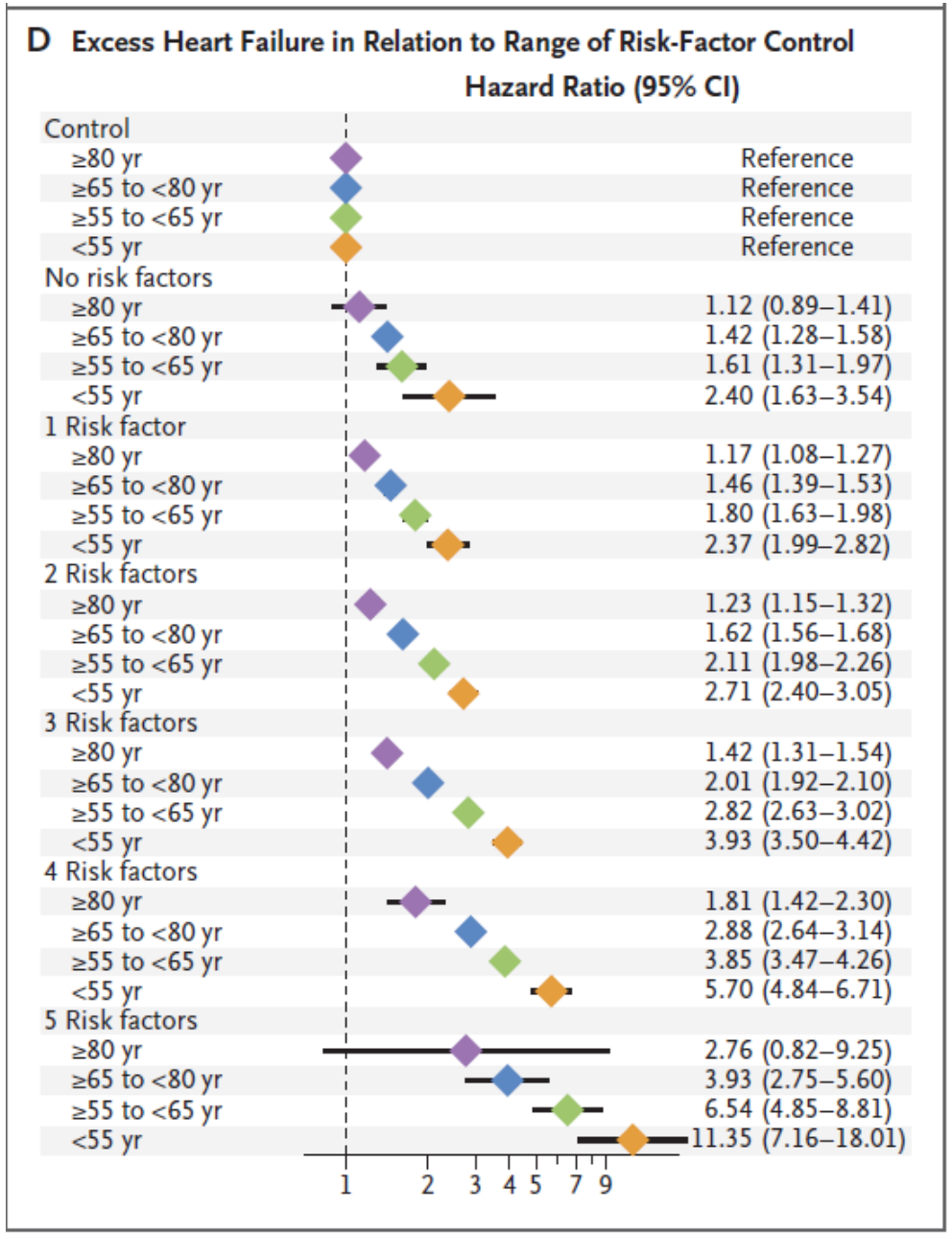
Heart failure is the second most common cardiovascular event experienced by patients with type 2 diabetes.

Shah et al. Lancet Diabetes Endocrinol. 2015;3:105-13.

Rôle des FDR d'autant plus important que patients plus jeunes

5 facteurs de risque

HbA1c 7%
PA 140-80 mmHg
Microalbuminurie
Tabac
LDL 0,97 g/l

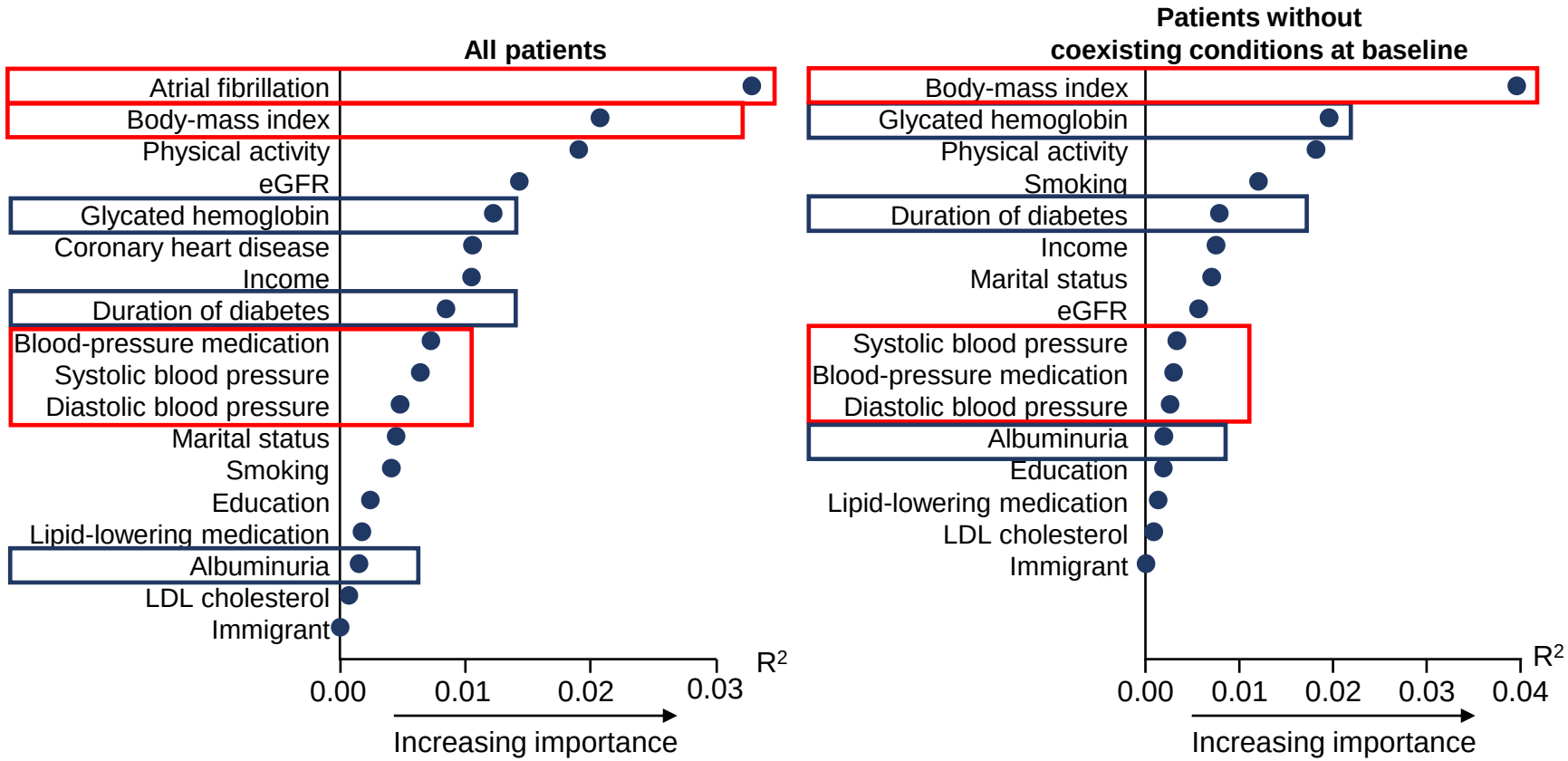


Rawshani N Engl J Med 379;7

FDR d'hospitalisation pour Insuffisance cardiaque – DT2

Diabetes-specific

CV-related



eGFR, estimated glomerular filtration rate.

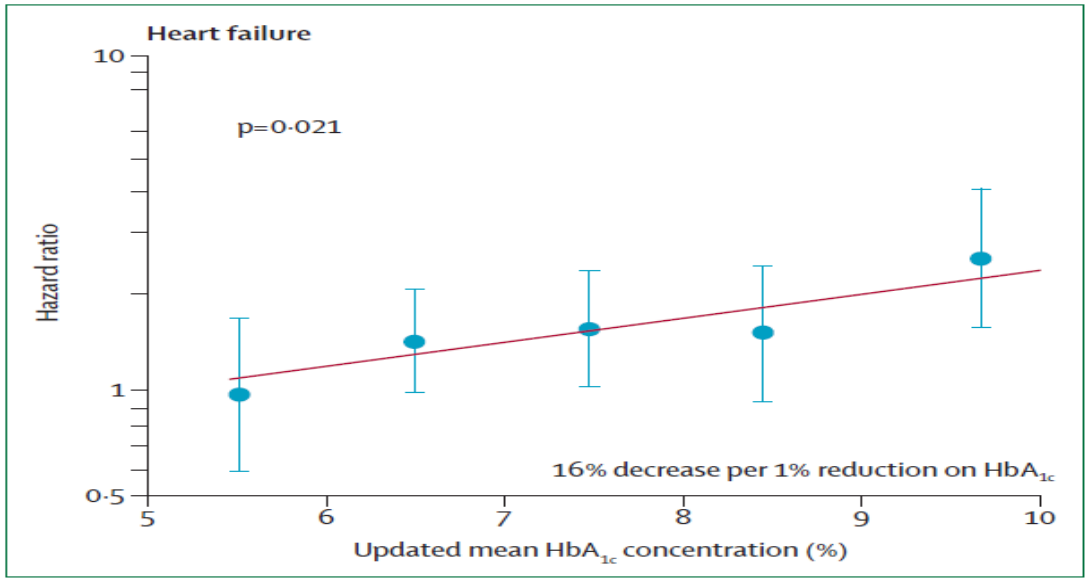
Rawshani et al. N Engl J Med 2018;379:633-44

Diabète et insuffisance cardiaque : épidémiologie

Relation avec l'HbA_{1c}

Diabète de type 2 : étude UKPDS

1 % d'augmentation d'HbA_{1c} associé à 16 % de majoration incidence IC



BMJ 2000;321:405-12

Diabète de type 1

Par rapport aux pts avec HbA_{1c} < 6,5 %, les pts avec HbA_{1c} > 10,5 % :

x 4 risque de développement IC

Lancet 2011;378:140-6

Association between type-2 diabetes mellitus and post-discharge outcomes in heart failure patients: Findings from the RICA registry

Mauvais pronostic après 1er episode IC

SURVIE

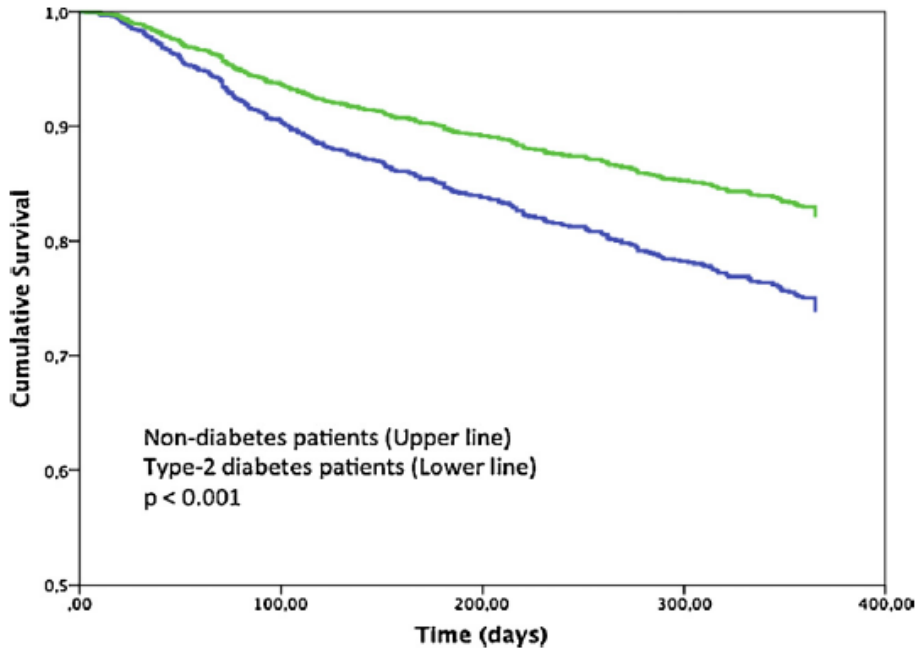


Fig. 1 – Adjusted impact on survival in heart failure patients with type-2 diabetes mellitus after discharge. Kaplan-Meier curves for patients with diabetes (lower line) and patients without diabetes (upper line). All cause mortality at 1-year: 31.3% vs. 23.0%. ($p < 0.001$).

NOUVELLE HOSPITALISATION pour IC

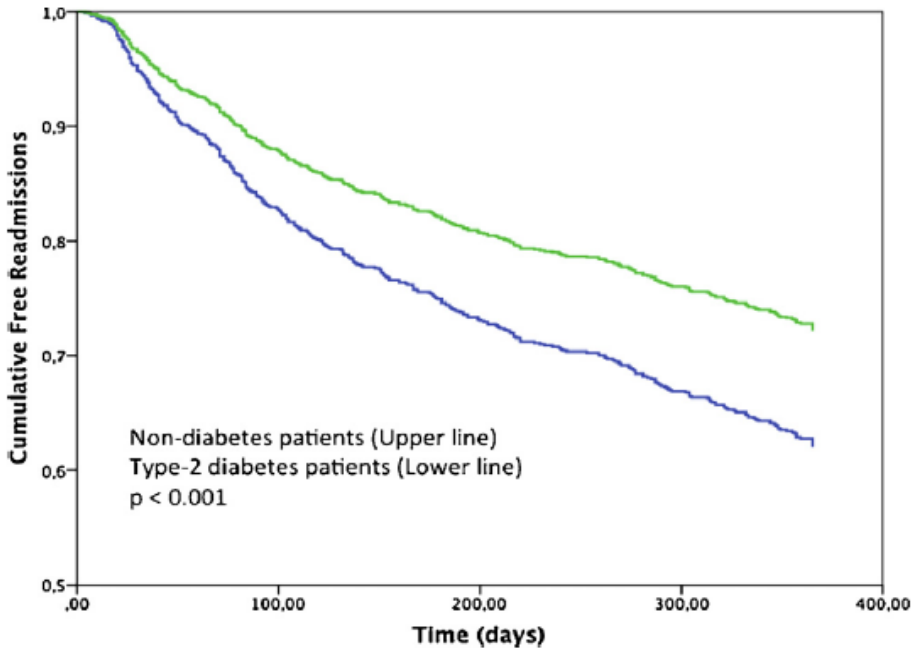


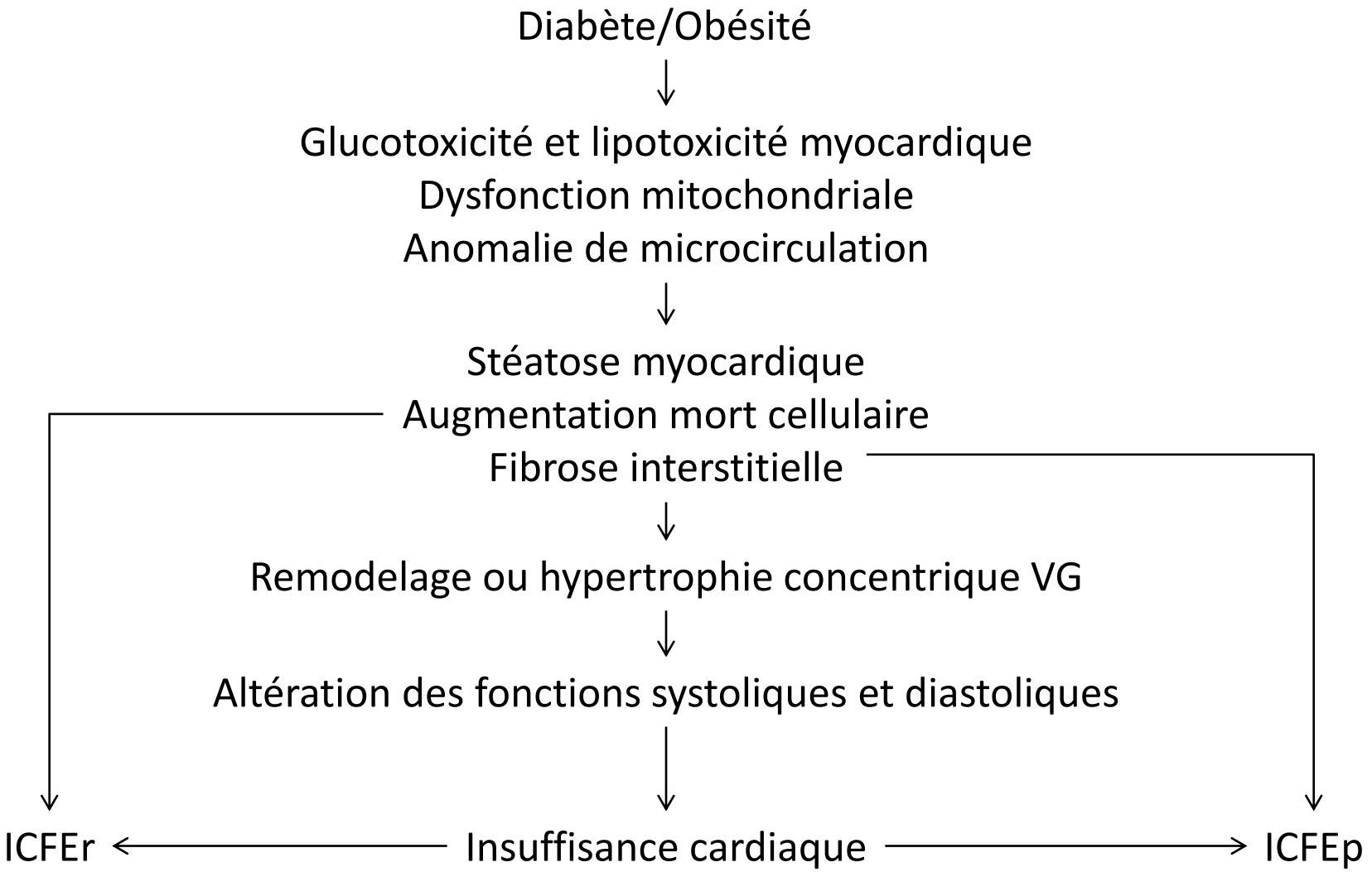
Fig. 2 – Adjusted impact on readmissions in heart failure patients with type-2 diabetes mellitus after discharge. Kaplan–Meier curves for patients with diabetes (lower line) and patients without diabetes (upper line). All cause mortality at 1-year: 40.9% vs. 31.4%. ($p < 0.001$).

Carrasco-Sánchez

Cardiomyopathie diabétique?

Cardiomyopathie diabétique

Définition : apparition d'une dysfonction VG à l'origine d'une IC chez un patient diabétique **sans coronaropathie ou cardiopathie hypertensive ou autre étiologie d'IC connue**



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Diabetes & Metabolism xxx (2011) xxx–xxx

Diabetes & Metabolism

Original article

Transthoracic echocardiographic abnormalities in asymptomatic diabetic patients: Association with microalbuminuria and silent coronary artery disease

M.T. Nguyen [a,b], E. Cosson [a,b], P. Valensi [a], P. Poignard [c], A. Nitenberg [c], I. Pham [c,*,d]

[a] *Département d'endocrinologie-diabétologie-nutrition, AP–HP, Jean-Verdier Hospital, université Paris 13, CRNH-IdF, Bondy, France*
[b] *UMR U557 Inserm/U1125 Inra/Cnam/université Paris 13, Bobigny, France*
[c] *Service des explorations fonctionnelles, AP–HP, hôpital Jean-Verdier, avenue du 14 juillet, Bondy, France*
[d] *EA 23-63, UFR SMBH, université Paris 13, Bobigny, France*

Received 12 August 2010; received in revised form 15 December 2010; accepted 16 December 2010

586 DT2 asymptomatiques
Prévention I

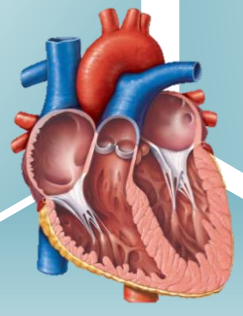
34% hypertrophie ventriculaire gauche
9% dilatation ventriculaire gauche
3% FE <60%
6% hypokinésie

les peptides natriurétiques

N-terminal pro-B-type natriuretic peptide (NT-proBNP)

Atrial natriuretic factor (ANF)

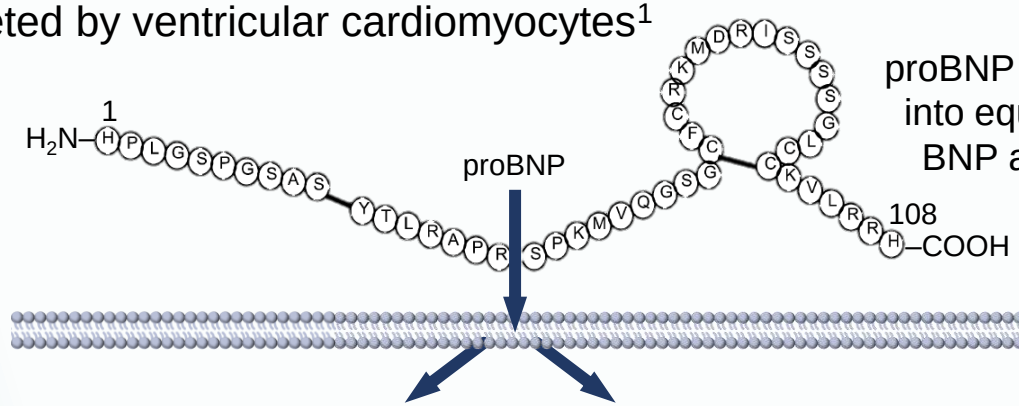
B-type (brain-type) natriuretic peptide (BNP)



C-type natriuretic peptide (CNP)

Natriuretic peptides produced by the heart[1]

proBNP is synthesised and secreted by ventricular cardiomyocytes[1]



proBNP is cleaved by furin into equal proportions of BNP and NT-proBNP[1]

Biologically inactive, 76 amino acid N-terminal fragment – **NT-proBNP**

No physiological function[1]

demi-vie plus longue

Biologically active, 32 amino acid, C-terminal fragment – **BNP**

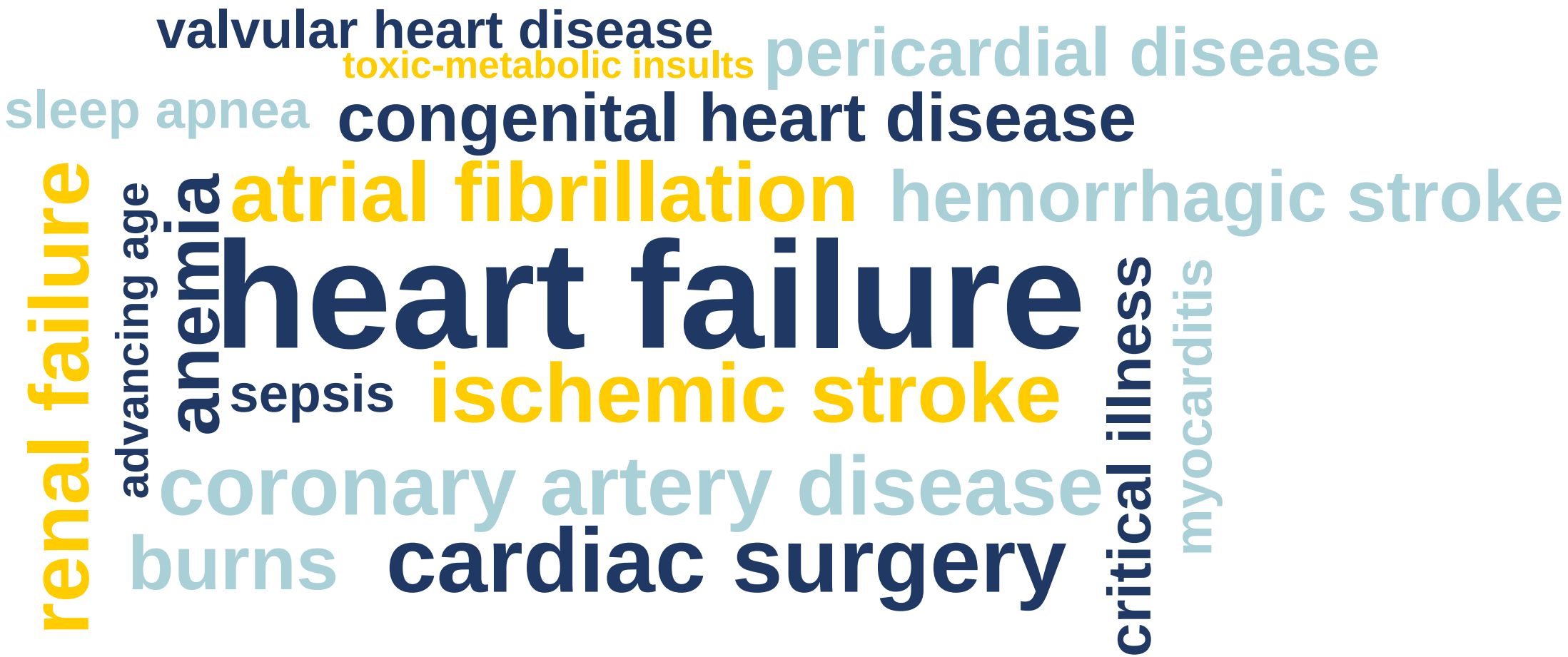
Physiological functions[1]

- Natriuresis/diuresis
- Peripheral vasodilatation,
- Inhibition of the renin–angiotensin–aldosterone and sympathetic nervous systems

Clairance rénale

1. Weber & Hamm. Heart. 2006;92:843-9.

Clinical correlates of elevating natriuretic peptides



Natriuretic Peptides Studies Collaboration. Lancet Diabetes Endocrinol 2016;4: 840-9; Bhardwaj & Januzzi. Crit Pathw Cardiol. 2009;8:146-50.

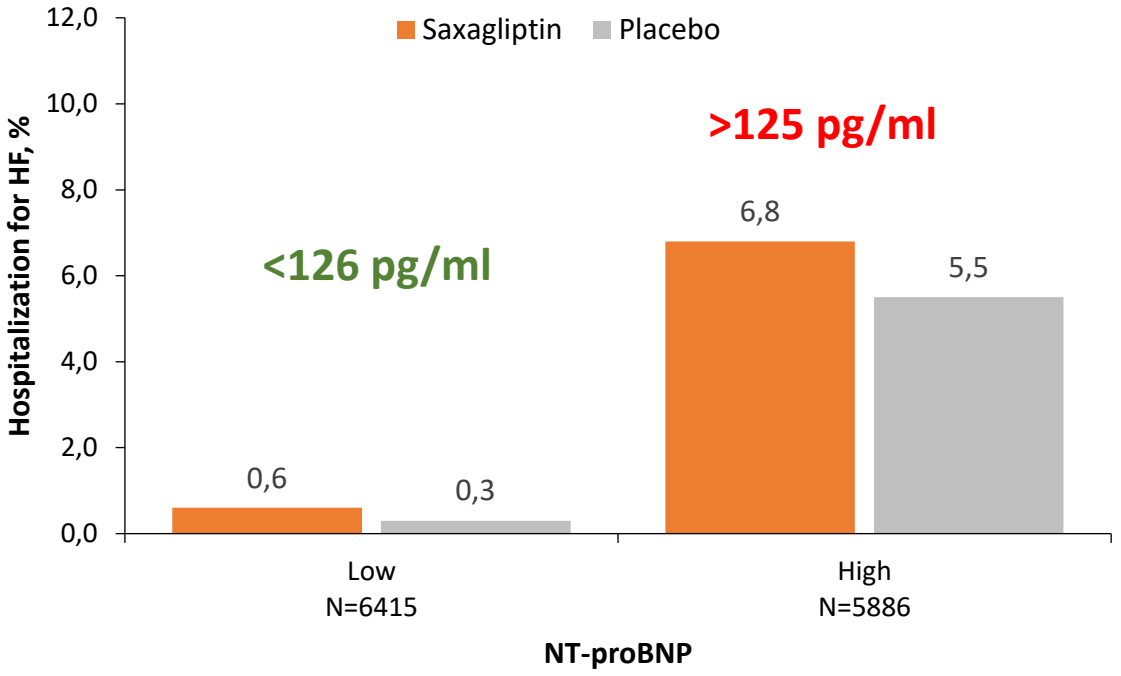
Peptides natriurétiques :
Evaluation du risque de cardiomyopathie

NTproBNP > 125 pg/ml et risque d'hospitalisation pour IC

- Randomized Phase 4 study of 16,492 patients with T2D and a history or risk of CV events
- NT-proBNP measured in 12,301 patients

- NT-proBNP cut-off of >125 pg/mL (for age <75 years) was associated with a significantly increased risk of hospitalization for HF in 12,301 patients with T2D.[1]

Risk of hospitalization for heart failure according to established cut-offs[1]

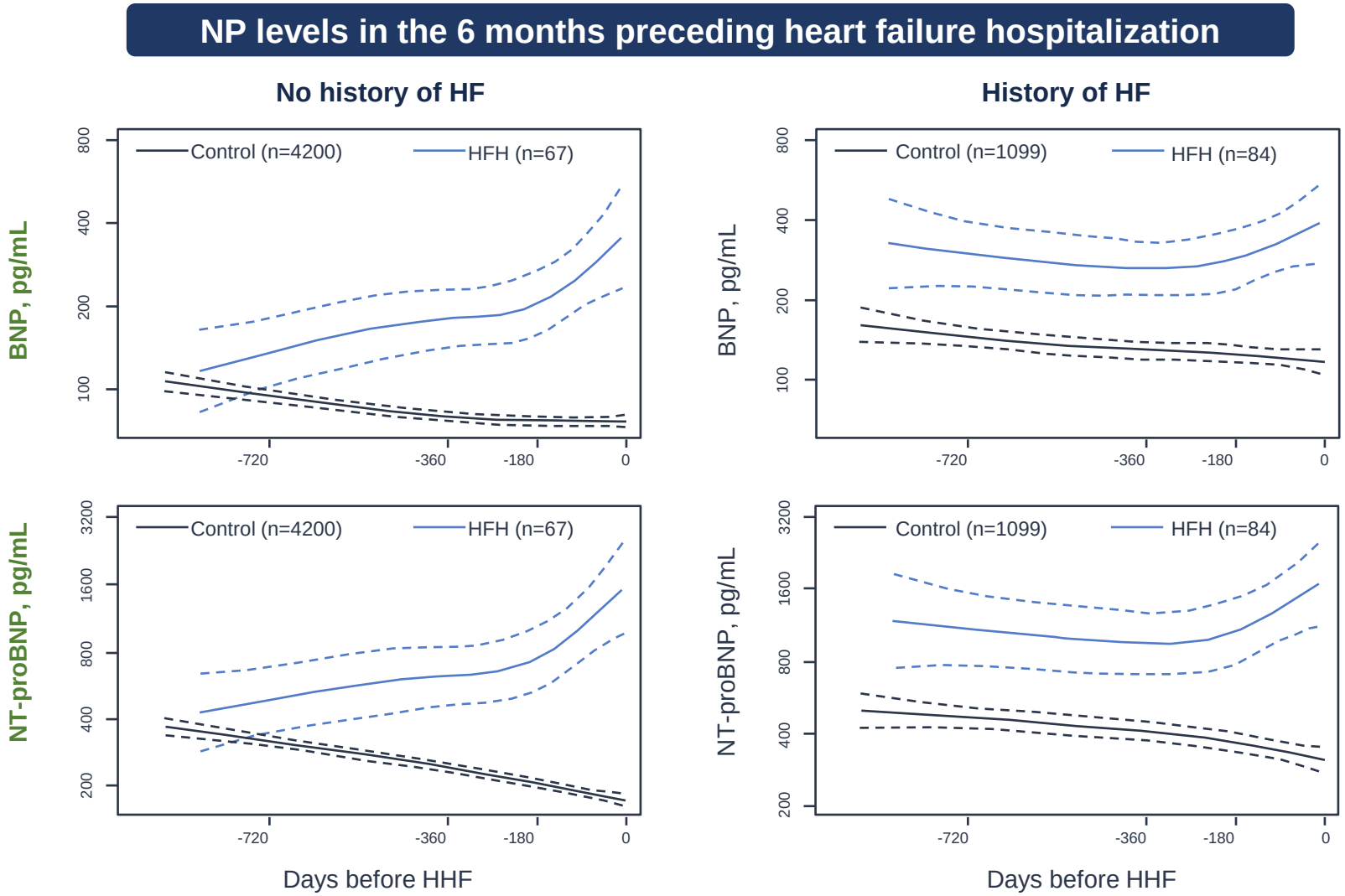


(High >125 pg/mL if <75 years old, or >450 pg/mL if ≥75 years old)

1. Scirica et al. Circulation. 2014; (Supp)130:1579-88; 2. Huelsmann et al. Eur Heart J. 2008;6629:2259-64.

Augmentation des PN avant hospitalisation pour IC

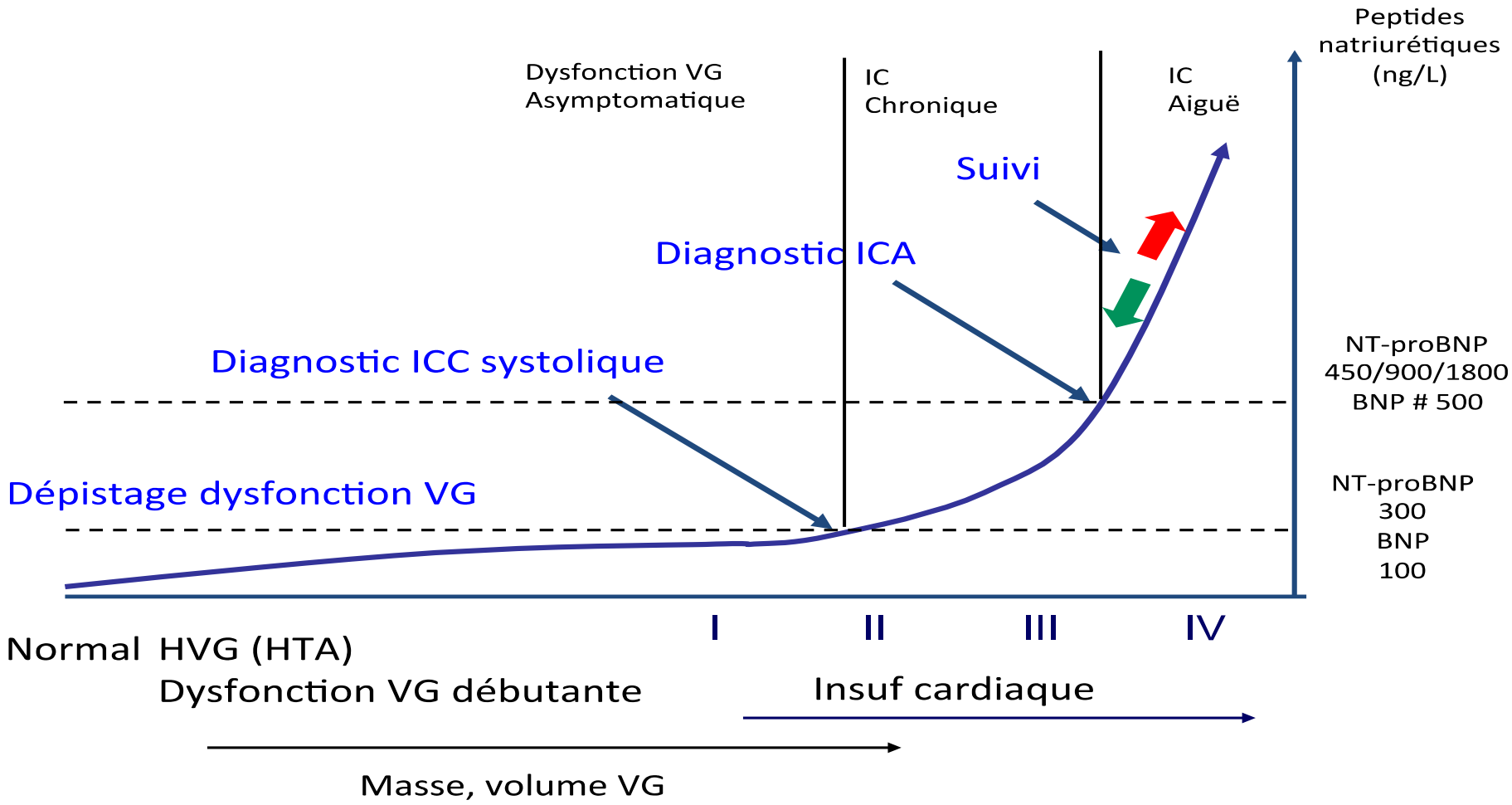
- Randomized Phase 3 study
- 5450 patients with T2D with a recent coronary event, with and without history of HF
- NPs measured at baseline and at 24 weeks
- Median follow-up: 26 months



Wolsk et al. Circulation. 2017;136:1560-2.

Polypeptides Natriurétiques
Utilisables à tous les stades

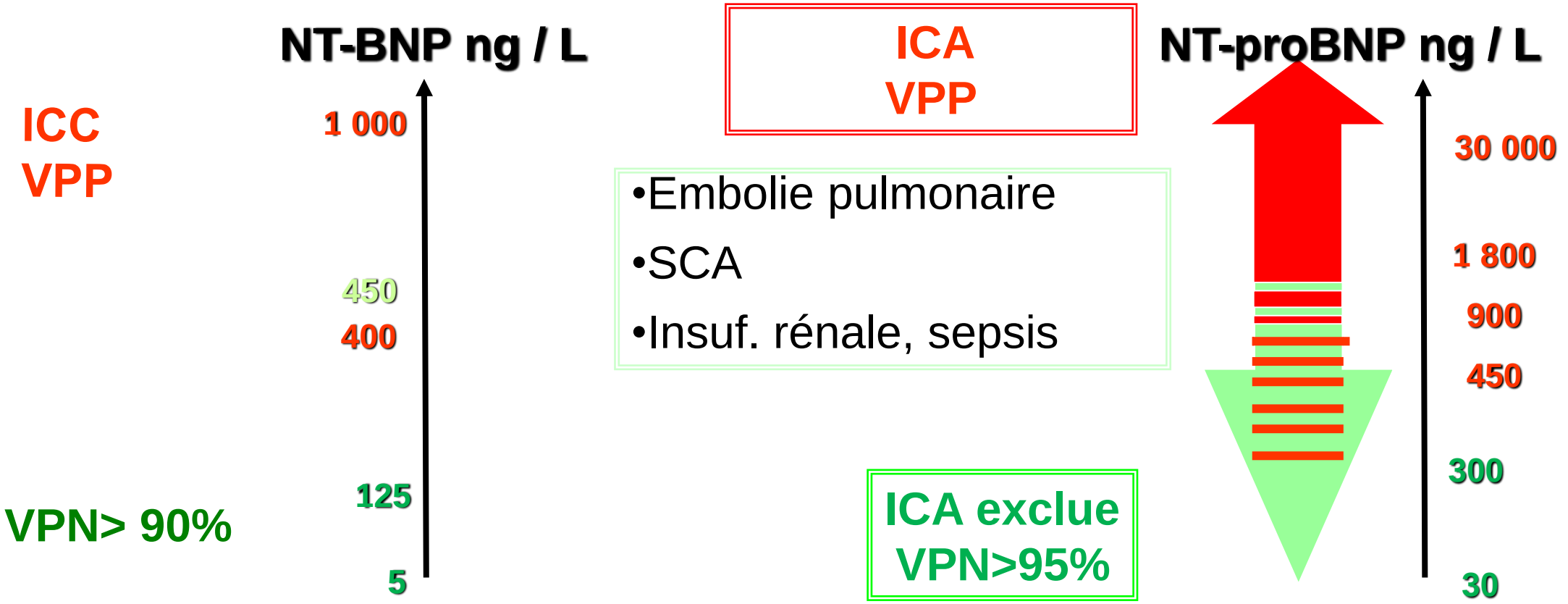
Insuffisance cardiaque, peptides natriurétiques
en pré- et post-hospitalier



Règles générales d'interprétation PN

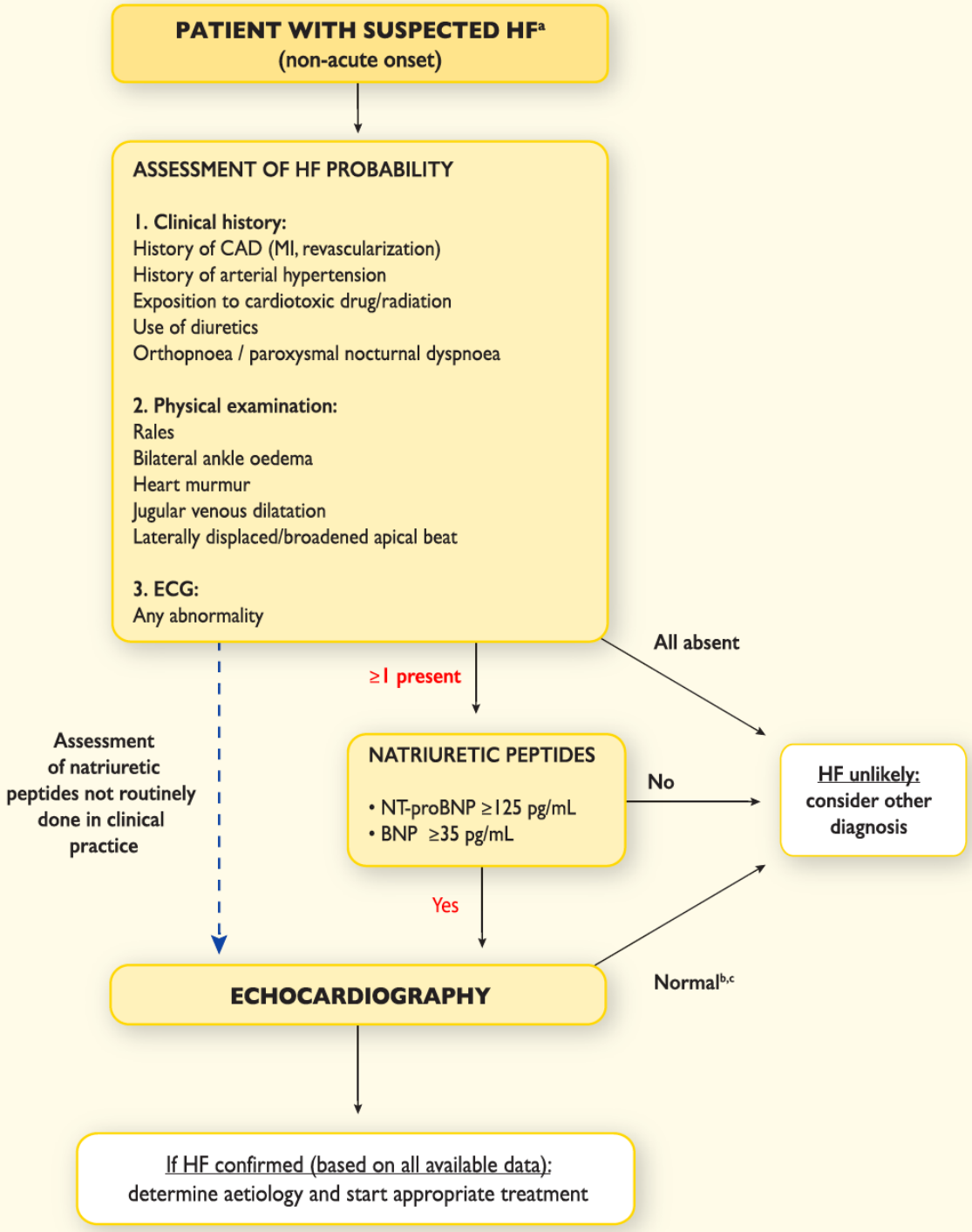
Dysfonction VG chronique

Dyspnée aiguë



Différents seuils d'un marqueur quantitatif

Stratégie de dépistage de la cardiomyopathie



EUROPEAN SOCIETY OF CARDIOLOGY®

European Journal of Heart Failure (2016) **18**, 891–975
doi:10.1002/ejhf.592

PATIENT WITH SUSPECTED HF[a]
(non-acute onset)

ASSESSMENT OF HF PROBABILITY

1. Clinical history:
History of CAD (MI, revascularization)
History of arterial hypertension
Exposition to cardiotoxic drug/radiation
Use of diuretics
Orthopnoea / paroxysmal nocturnal dyspnoea

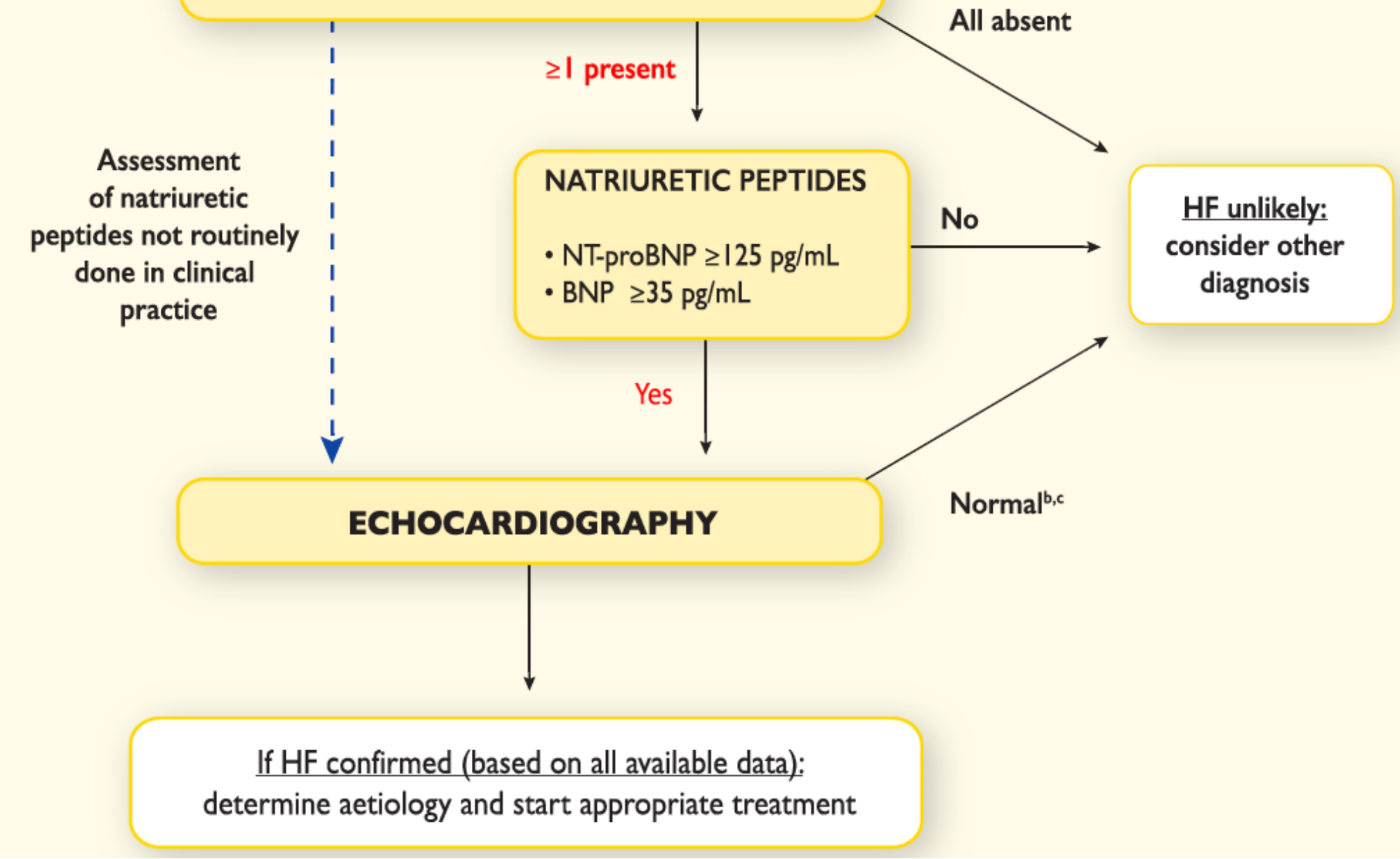
2. Physical examination:
Rales
Bilateral ankle oedema
Heart murmur
Jugular venous dilatation
Laterally displaced/broadened apical beat

3. ECG:
Any abnormality

All absent

≥1 present

European Journal of Heart Failure (2016) **18**, 891–975
doi:10.1002/ejhf.592



European Journal of Heart Failure (2016) **18**, 891–975
doi:10.1002/ejhf.592

Table 12.3 Causes of elevated concentrations of natriuretic peptides[522–524]

Cardiac	Heart failure Acute coronary syndromes Pulmonary embolism Myocarditis Left ventricular hypertrophy Hypertrophic or restrictive cardiomyopathy Valvular heart disease Congenital heart disease Atrial and ventricular tachyarrhythmias Heart contusion Cardioversion, ICD shock Surgical procedures involving the heart Pulmonary hypertension
Non-cardiac	Advanced age Ischaemic stroke Subarachnoid haemorrhage Renal dysfunction Liver dysfunction (mainly liver cirrhosis with ascites) Paraneoplastic syndrome Chronic obstructive pulmonary disease Severe infections (including pneumonia and sepsis) Severe burns Anaemia Severe metabolic and hormone abnormalities (e.g. thyrotoxicosis, diabetic ketosis)

HFpEF = heart failure with preserved ejection fraction; HFrEF = heart failure with reduced ejection fraction; ICD = implantable cardioverter defibrillator.

Diabète : beaucoup de cas de cardiomyopathie ignorée

605 DT2
60 ans+
Clin + echo + ECG

28% des diabétiques avec IC ignorée

Newly detected heart failure (n=161)	No heart failure (n=420)

Possible cause/NYHA class	HFREF (n=28)	HFPEF (n=133)	All HF (n=161)
Prior myocardial infarction	13 (46.4)	24 (18.0)	37 (23.0)
Other ischaemic heart disease[a]	14 (50)	50 (37.6)	64 (39.8)
Hypertension	18 (64.3)	114 (85.7)	132 (82.0)
Hypertension with left ventricular hypertrophy	13 (46.4)	82 (61.7)	95 (59.0)
Atrial fibrillation	2 (7.1)	15 (11.3)	17 (10.6)
Other rhythm and/or conduction disturbances	3 (10.7)	5 (3.8)	8 (5.0)
Valvular disease	8 (28.6)	30 (22.6)	38 (23.6)
Diabetic cardiomyopathy	12 (42.9)	36 (27.1)	48 (29.8)
Chronic obstructive pulmonary disease	5 (17.9)	9 (6.8)	14 (8.7)
Other	3 (10.7)	9 (6.8)	12 (7.5)
NYHA class			
II	22 (78.6)	98 (73.7)	120 (74.5)
III	4 (14.3)	35 (26.3)	39 (24.2)
IV	2 (7.1)	0	2 (1.2)

Boonman-de Winter Diabetologia 2012 2154

Détection d'une dysfonction ventriculaire gauche par le NT-proBNP chez les diabétiques de type 2 : étude SICA-Diabetes

Population : 1224 patients, non insuffisants cardiaques ou rénaux

Echocardiographie des patients avec NT-proBNP > 500 pg/mL

- dysfonction systolique VG (FE < 50 %) : 24 %
- dilatation OG (DOG > 38 mm) : 78 %
- HTAP (PAPS > 40 mmHg) : 30 %

} Dysfonction diastolique ?

Heart 2014; 100 (Suppl 3) : A25
J Cachexia Sarcopenia Muscle 2010; 1 : 187-94

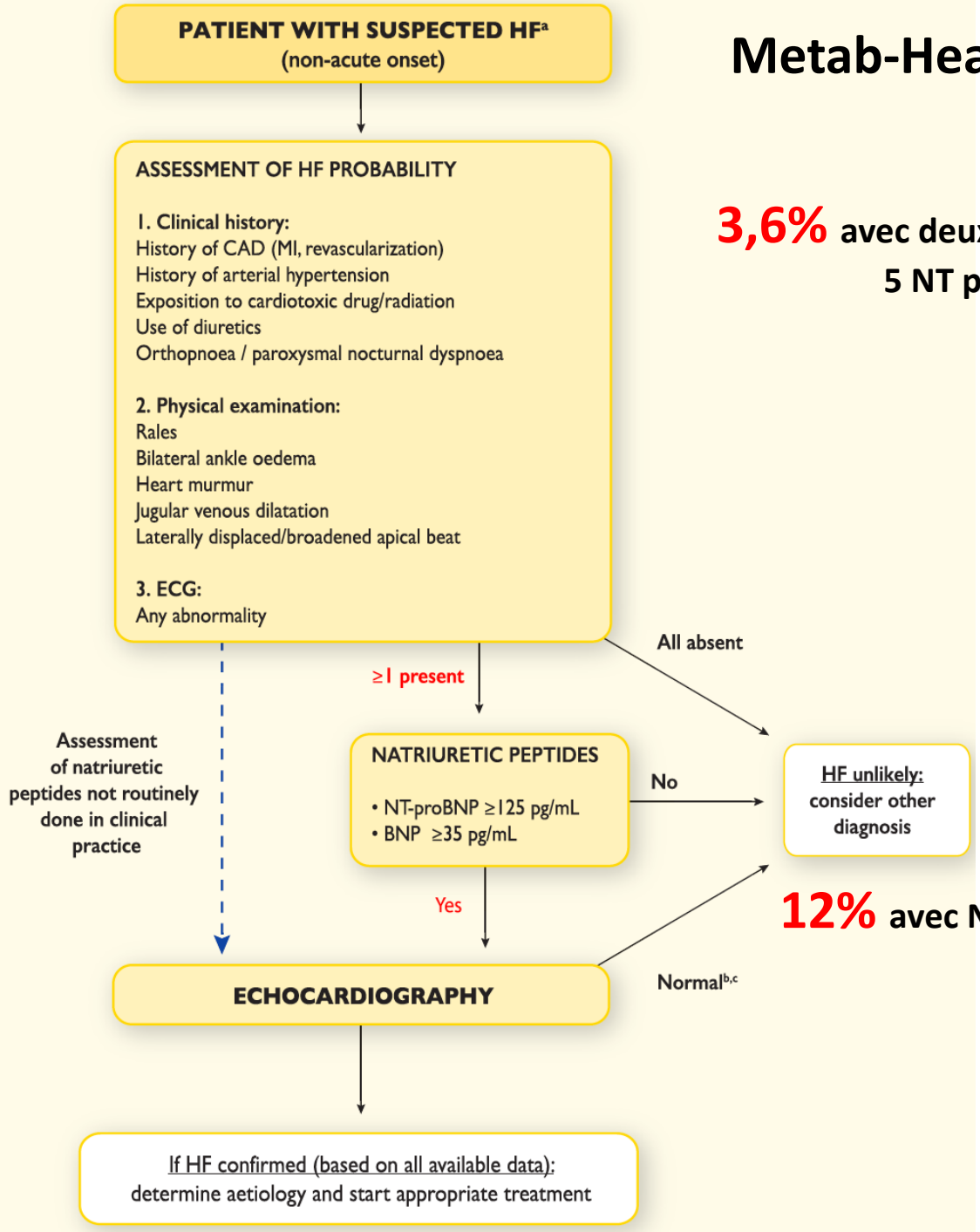
Metab-Heart : résultats 2022

- **Participants :**

213 personnes vivant avec un diabète fin 2022

Asymptomatiques

Prévention I



3,6% **avec deux SC (n=8)**

5 NT proBNP normal

14,3% **:**

échographie indiquée (n=32)

12% **avec NT proBNP > 125 pg/ml**

Merci Astra Zeneca et Roche diagnostics

Peptides natriurétiques : Evaluation du risque CV

DIABETICMedicine

DOI: 10.1111/j.1464-5491.2009.02788.x

Original Article: Complications

N-terminal pro-B-type natriuretic peptide: an independent marker for coronary artery disease in asymptomatic diabetic patients

E. Cosson, M. T. Nguyen, I. Pham*, M. Pontet†, A. Nitenberg* and P. Valensi

AP-HP, Jean Verdier Hospital, Department of Endocrinology-Diabetology-Nutrition and Paris-Nord University, CRNH-IdF, Bondy, France, *AP-HP, Jean Verdier Hospital, Department of Physiology, and Paris-Nord University, Bondy, France, and †AP-HP, Jean Verdier Hospital, Laboratory of Biochemistry, Bondy, France

Accepted 18 June 2009

Pronostic selon le NT-proBNP chez les diabétiques de type 2 : étude SICA-Diabetes

Population : 1224 patients, non insuffisants cardiaques ou rénaux

NT-proBNP (pg/mL)	< 50	50-125	125-250	250-500	> 500
Patients (%)	451 (37)	424 (34)	212 (17)	83 (7)	54 (4)
Evènement CV 436 j (%)	8%	8%	13%	19%	28%
Mortalité (%)	0,6%	0,6%	1,2%	3,9%	9,8%

Heart 2014; 100 (Suppl 3) : A25
J Cachexia Sarcopenia Muscle 2010; 1 : 187-94

NT-proBNP prédit mieux que l'HbA1c les événements CV chez les diabétiques de type 2

- Prospective observational study
- 544 patients with diabetes
- NT-proBNP and HbA1c measured at baseline and after 1 year with mean follow-up 40 months
- Endpoints: all-cause mortality and hospitalizations for all-causes, cardiac and CV events

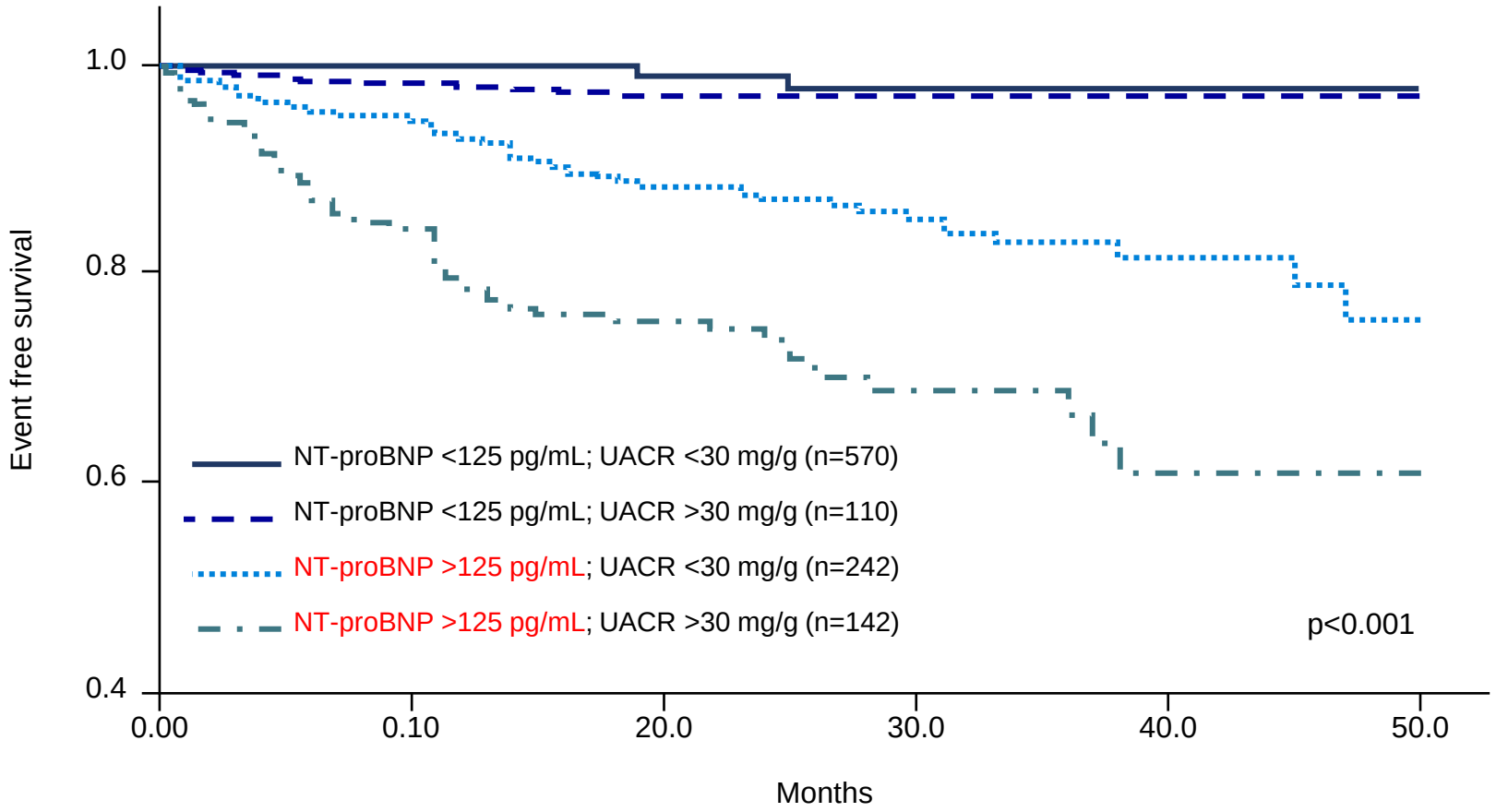
Endpoints	NT-proBNP			HbA1c		
	HR	CI	p	HR	CI	p
Baseline values						
All-cause mortality	1.0010	1.0005–1.0014	<0.001	1.0028	0.7415–1.3562	n.s.
Cardiac hospitalization	1.0007	1.0003–1.0011	<0.001	1.2517	1.0131–1.3609	0.038
CV-hospitalization	1.0006	1.0003–1.0009	<0.001	1.1393	0.9538–1.3609	n.s.
All-cause hospitalization	1.0004	1.0001–1.0007	0.003	1.2028	1.0573–1.3684	0.005
Absolute change						
All-cause mortality	0.9994	0.9987–1.0002	n.s.	0.8818	0.6089–1.2770	n.s.
Cardiac hospitalization	0.9983	0.9977–0.9990	<0.001	1.2872	0.9992–1.6583	n.s.
CV-hospitalization	0.9987	0.9981–0.9994	0.003	1.1069	0.8872–1.3809	n.s.
All-cause hospitalization	0.9991	0.9986–0.9996	<0.001	1.0852	0.9514–1.2378	n.s.

Neuhold et al. Eur J Clin Invest. 2011;41:1292-98.

NT-proBNP prédit avec l'albuminurie les événements CV chez les diabétiques de type 2

- Prospective observational study
- 1071 patients with diabetes
- NT-proBNP and albuminuria measured at baseline
- Primary endpoint: unplanned hospitalization for cardiac event or death
- Mean follow-up: 33.1 months

Kaplan-Meier curves for the risk of CV events with different concentrations of NT-proBNP and with or without albuminuria‡

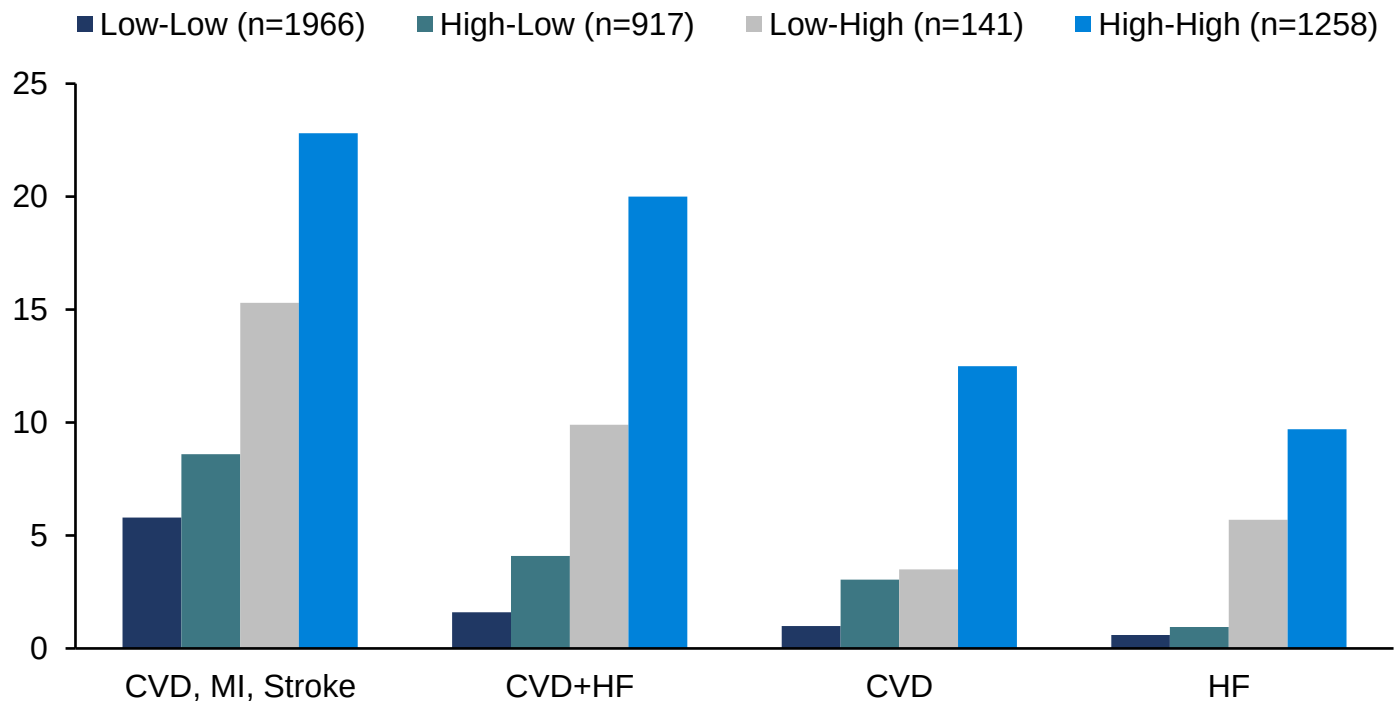


Clodi et al. Eur J Prev Cardiol. 2012;19:944-51

Evolution NT-proBNP et risque CV

- Randomized Phase 3 study
- 5224 patients with T2D and CAD
- NT-proBNP measured at baseline and at 6 months
- Primary endpoint: CV death or hospitalization for HF
- Median follow-up 597 days

Rates for CV outcomes at 24 months* stratified by change in NT-proBNP category (high/low) between baseline and 6 months



Low → Low

HIGH → Low

Low → HIGH

HIGH → HIGH

Jarolim et al. Diab Care. 2018;41:1510-15. .

ESC European Society of Cardiology
European Heart Journal (2020) 41, 255–323
doi:10.1093/eurheartj/ehz486
ESC GUIDELINES

2019 ESC Guidelines on diabetes, pre-diabetes, and cardiovascular diseases developed in collaboration with the EASD

The Task Force for diabetes, pre-diabetes, and cardiovascular diseases of the European Society of Cardiology (ESC) and the European Association for the Study of Diabetes (EASD)

Recommendations for the use of laboratory testing for CV risk assessment in asymptomatic patients with diabetes

Recommendation	Class of recommendation	Level of evidence
Routine assessment of **circulating biomarkers** is **not recommended** for CV risk stratification	**III**	**B**

The addition of circulating biomarkers for cardiovascular risk assessment has limited clinical value; however, the potential role of NT-proBNP is acknowledged within the guidelines

CV, cardiovascular; EASD, European Association for the Study of Diabetes; ESC, European Society of Cardiology
Cosentino et al. Eur Heart J. 2020;41:255-323.

Implications thérapeutiques

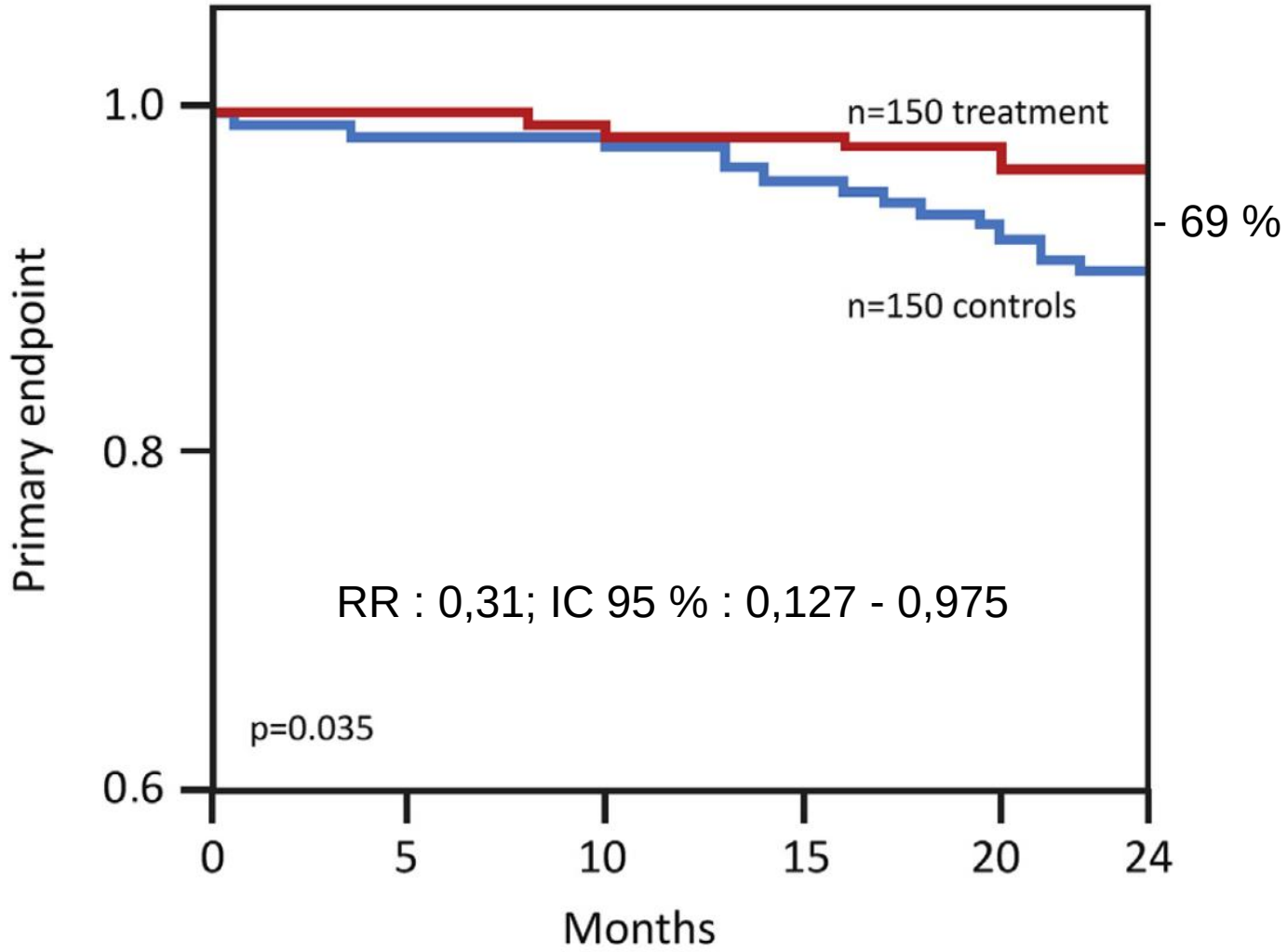
Sélection pour des interventions médicamenteuses

Sélection des diabétiques de type 2 à risque par le NT-proBNP et prévention des évènements cardiaques : essai PONTIAC

Résultats

Critère de jugement : hospitalisations et décès de causes cardiaques à 2 ans

- **NT-proBNP > 125 pg/mL**
- **Absence de maladie cardiaque**



Red line = intensified group. Blue line = control group

J Am Coll Cardiol 2013;62:1365-72

PONTIAC II

U.S. National Library of Medicine
ClinicalTrials.gov

Study in progress

NT-proBNP selected prevention of cardiac events in a population of diabetic patients without a history of cardiac disease (Pontiac II); prospective randomised trial

Dr Martin Huelsmann, Medical University of Vienna

- Ongoing study to confirm findings of PONTIAC I in a larger patient cohort, with participants from Austria, Spain, the Netherlands, UK and New Zealand
- Eligible patients: Patients with T2D without known history or signs of cardiac disease

Study objective: To assess the superiority of high dose treatment with RAS antagonists and β-blockers compared to conventional therapy to reduce unplanned cardiac hospitalization or cardiac death in type 2 diabetes patients with NT-proBNP >125 pg/mL

NT-proBNP, N-terminal pro-B-type natriuretic peptide; RAS, renin-angiotensin system.
Clinical trials.gov. Study identifier NCT02817360. Available at https://clinicaltrials.gov/ct2/show/NCT02817360. Accessed March 2020.

ADOPT study

NIH U.S. National Library of Medicine
ClinicalTrials.gov

Study in progress

Asian Diabetes Outcomes Prevention Trial (ADOPT); prospective randomised control trial

Carolyn S.P. Lam, MBBS, PhD, MRCP, FAMS, FESC, FACC
Senior Consultant Cardiologist, National Heart Centre Singapore
Professor, Duke-National University of Singapore
Director, Clinical & Translational Research Office at NHCS
Rosalind Franklin Fellow, University Medical Centre Groningen

Study objective: To assess whether intensive preventive therapy (high-dose RAS inhibitors, β-blockers and SGLT2 inhibitors) may be associated with reduced CV events compared with standard of care among high-risk type 2 diabetes patients (NT-proBNP >125 pg/mL) without pre-existing CVD

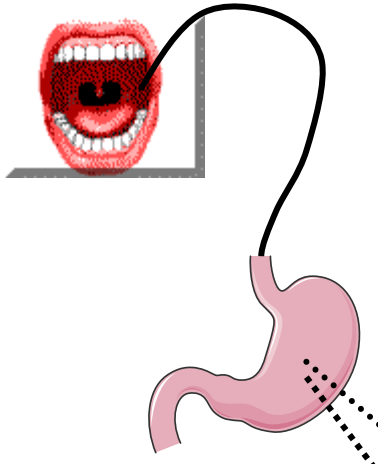
NT-proBNP, N-terminal pro-B-type natriuretic peptide; RAS, renin angiotensin system; SGLT2, sodium-glucose cotransporter 2.
Clinical trials.gov. Study identifier NCT04286399. Available at https://clinicaltrials.gov/ct2/show/NCT04286399. Accessed March 2020; Chandramouli et al. presented at Heart Failure 2019. Poster P537.

Implications thérapeutiques

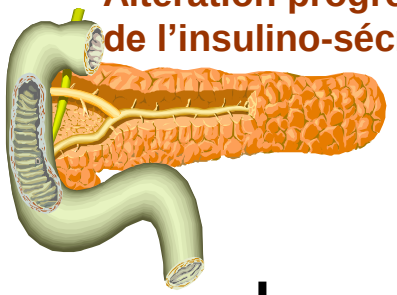
1. **Sélection pour des interventions médicamenteuses**

2. **iSGLT2 : nouvelle classe thérapeutique dans le DT2**

Pathogénie du diabète de type 2



Altération progressive
de l'insulino-sécrétion



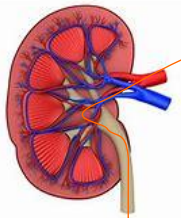
INSULINOPENIE

Insuline PP

Effet incrétine

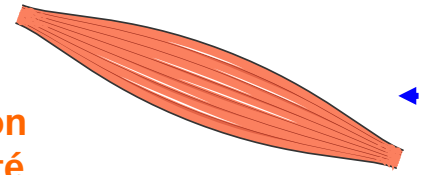
Glucagon PP

INSULINORESISTANCE

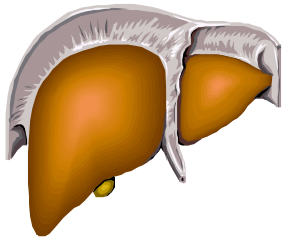


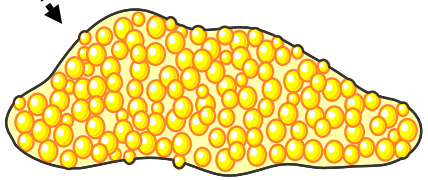
HYPERGLYCEMIE

Défaut de captation
insulino-dépendante
du glucose par le muscle



Production hépatique
du glucose inappropriée





Lipotoxicité (AGL)

Seuil rénal d'excrétion
du glucose augmenté

Synthèse d'expert

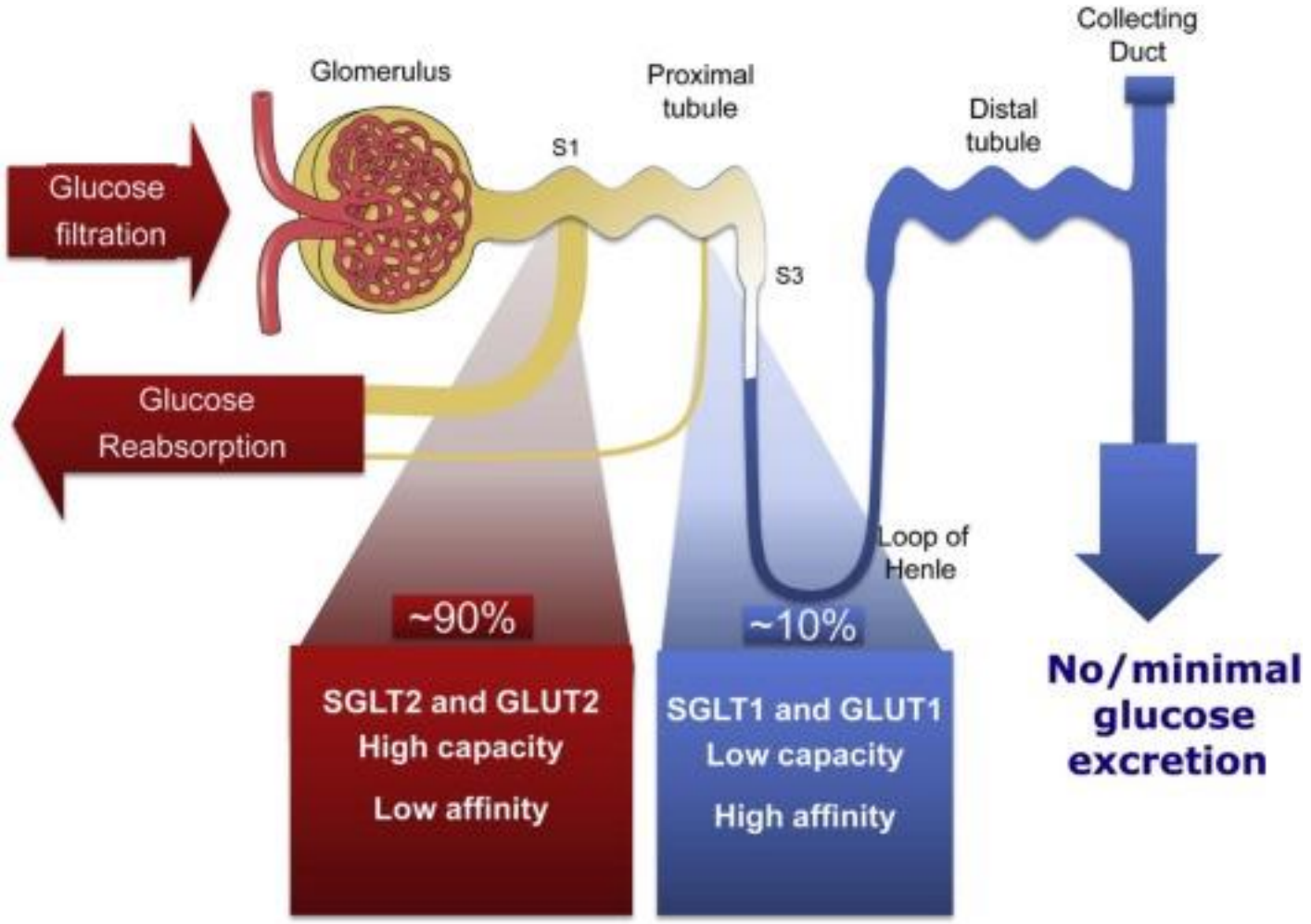


Figure 1. Renal glucose handling under healthy conditions

P.M. Katz, L.A. Leiter / Can J Diabetes 39 (2015) S167–S175

Inhibiteurs des SGLT2

Améliorent le contrôle glycémique en réduisant la réabsorption rénale du glucose du filtrat glomérulaire vers la circulation générale

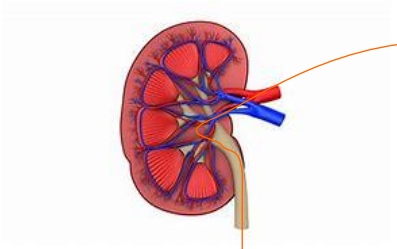
Efficacité HbA1c dépendante de glycémie

Bénéfice CV

Diminution IC

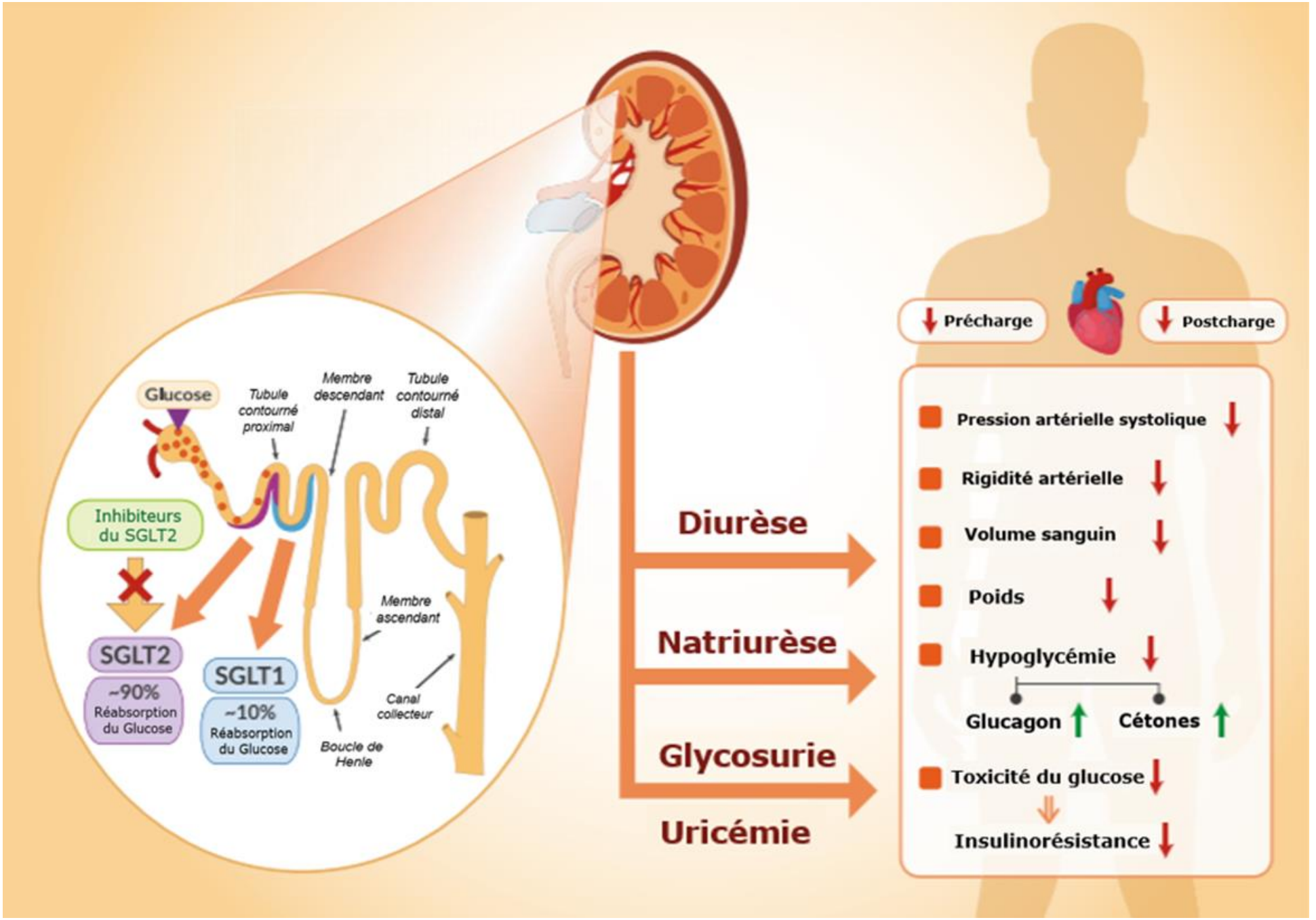
Néphroprotection

Diminution poids, PA



HYPERGLYCEMIE

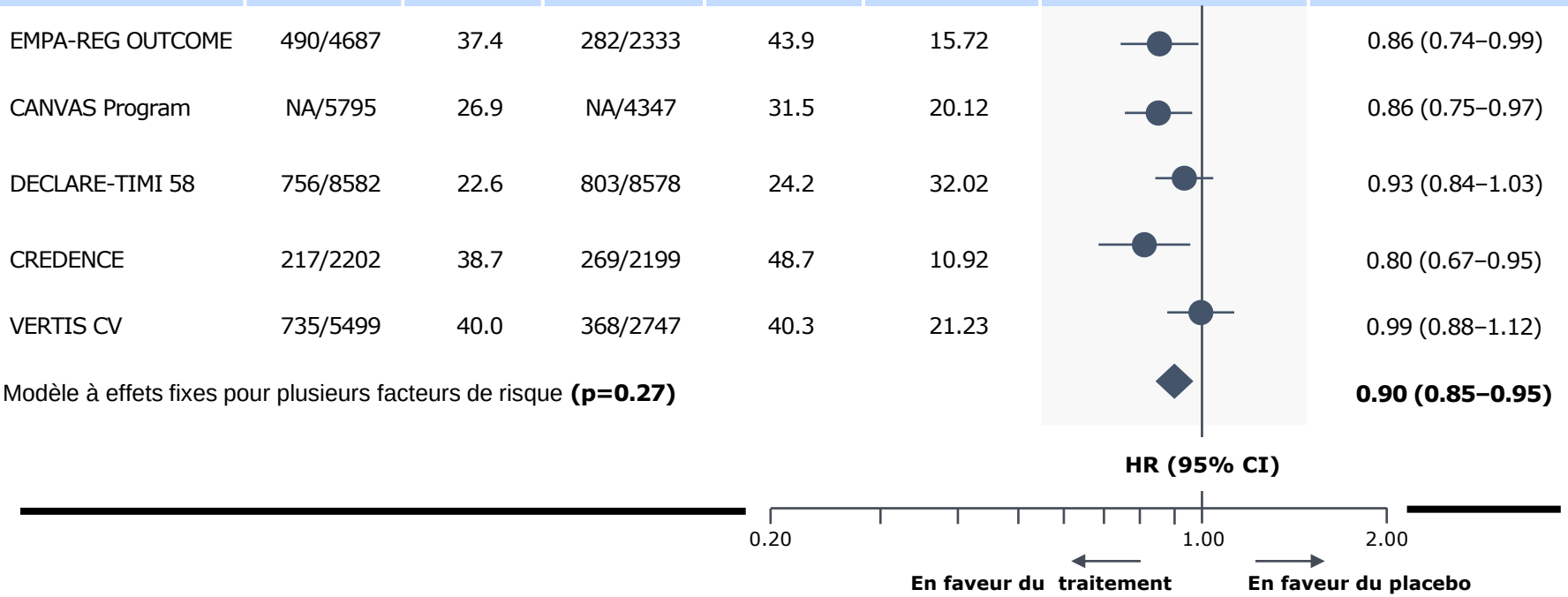
Seuil rénal d'excrétion du glucose augmenté



Dutka, M., Bobiński, R., Ulman-Włodarz, I. et al. Sodium glucose cotransporter 2 inhibitors: mechanisms of action in heart failure. Heart Fail Rev (2020).

Méta-analyse des études de sécurité CV portant sur les iSGLT-2 MACE-3 points

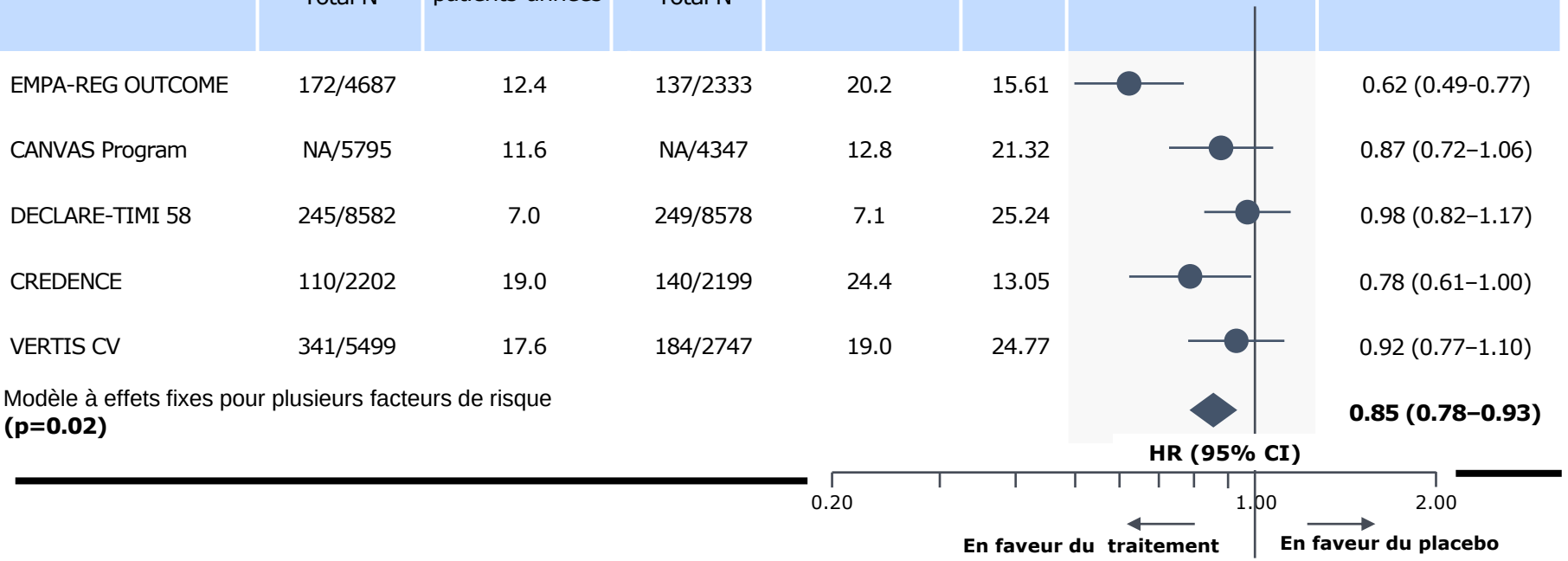
	Traitement		Placebo		Poids (%)	HR	HR (95% CI)
	No/ Total N	Taux/1000 patients-années	N/ Total N	Rate/1000 patients-years			
EMPA-REG OUTCOME	490/4687	37.4	282/2333	43.9	15.72		0.86 (0.74–0.99)
CANVAS Program	NA/5795	26.9	NA/4347	31.5	20.12		0.86 (0.75–0.97)
DECLARE-TIMI 58	756/8582	22.6	803/8578	24.2	32.02		0.93 (0.84–1.03)
CREDENCE	217/2202	38.7	269/2199	48.7	10.92		0.80 (0.67–0.95)
VERTIS CV	735/5499	40.0	368/2747	40.3	21.23		0.99 (0.88–1.12)
Modèle à effets fixes pour plusieurs facteurs de risque **(p=0.27)**							**0.90 (0.85–0.95)**



Darren K. McGuire, A Cardiol 2020 Oct 7;e204511

Méta-analyse des études de sécurité CV portant sur les iSGLT-2
Décès d'origine cardiovasculaire

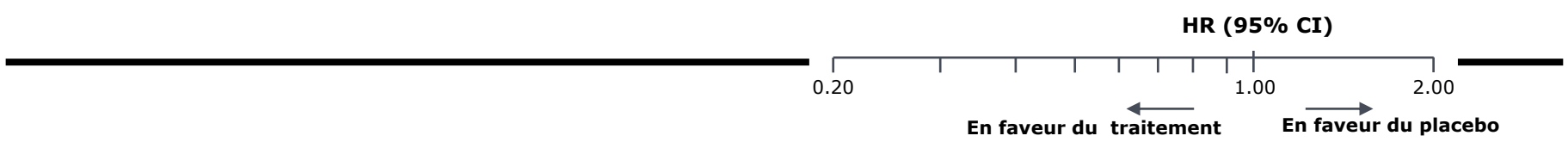
	Traitement		Placebo		Poids (%)	HR	HR (95% CI)
	N/ Total N	Taux/1000 patients-années	N/ Total N	Taux/1000 patients-years			
EMPA-REG OUTCOME	172/4687	12.4	137/2333	20.2	15.61		0.62 (0.49-0.77)
CANVAS Program	NA/5795	11.6	NA/4347	12.8	21.32		0.87 (0.72–1.06)
DECLARE-TIMI 58	245/8582	7.0	249/8578	7.1	25.24		0.98 (0.82–1.17)
CREDENCE	110/2202	19.0	140/2199	24.4	13.05		0.78 (0.61–1.00)
VERTIS CV	341/5499	17.6	184/2747	19.0	24.77		0.92 (0.77–1.10)
Modèle à effets fixes pour plusieurs facteurs de risque **(p=0.02)**							**0.85 (0.78–0.93)**



Darren K. McGuire, A Cardiol 2020 Oct 7;e204511

Méta-analyse des études de sécurité CV portant sur les iSGLT-2
Hospitalisation pour IC

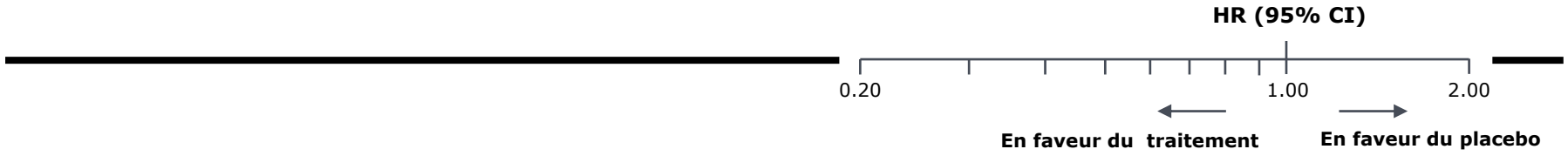
	Traitement		placebo		Poids (%)	HR	HR (95% CI)
	N/ Total N	Rate/1000 patients-years	N/ Total N	Rate/1000 patients-years			
EMPA-REG OUTCOME	126/4687	9.4	95/2333	14.5	16.09		0.65 (0.50-0.85)
CANVAS Program	NA/5795	5.5	NA/4347	8.7	17.10		0.67 (0.52–0.87)
DECLARE-TIMI 58	212/8582	6.2	286/8578	8.5	33.72		0.73 (0.61–0.88)
CREDENCE	89/2202	15.7	141/2199	25.3	16.01		0.61 (0.47–0.80)
VERTIS CV	139/5499	7.3	99/2747	10.5	17.08		0.70 (0.54–0.90)
Modèle à effets fixes pour plusieurs facteurs de risque (p=0.85)							**0.68 (0.61–0.76)**



Darren K. McGuire, A Cardiol 2020 Oct 7;e204511

Méta-analyse des études de sécurité CV portant sur les iSGLT-2
Risque d'événements rénaux

	Traitement		Placebo		Poids (%)	HR	HR (95% CI)
	N/ Total N	Taux/1000 patients-années	N/ Total N	Taux/1000 patients-années			
EMPA-REG OUTCOME	81/4687	6.3	71/2333	11.5	11.51		0.54 (0.40-0.75)
CANVAS Program	NA/5795	5.5	NA/4347	9.0	18.66		0.60 (0.47–0.77)
DECLARE-TIMI 58	127/8582	3.7	238/8578	7.0	24.77		0.53 (0.43–0.66)
CREDENCE	153/2202	27.0	224/2199	40.4	25.28		0.66 (0.53–0.81)
VERTIS CV	175/5499	9.3	108/2747	11.5	19.79		0.81 (0.64–1.03)
Modèle à effets fixes pour plusieurs facteurs de risque (p=0.09)							**0.62 (0.56–0.70)**



Darren K. McGuire, A Cardiol 2020 Oct 7;e204511

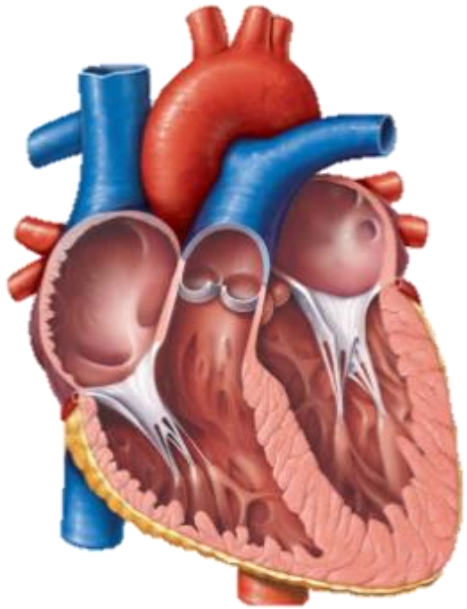
10H15
11H00

Atelier organisé par Roche

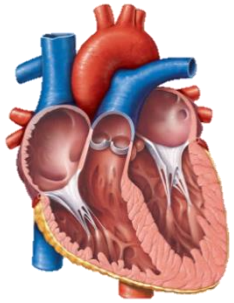
Salle 351

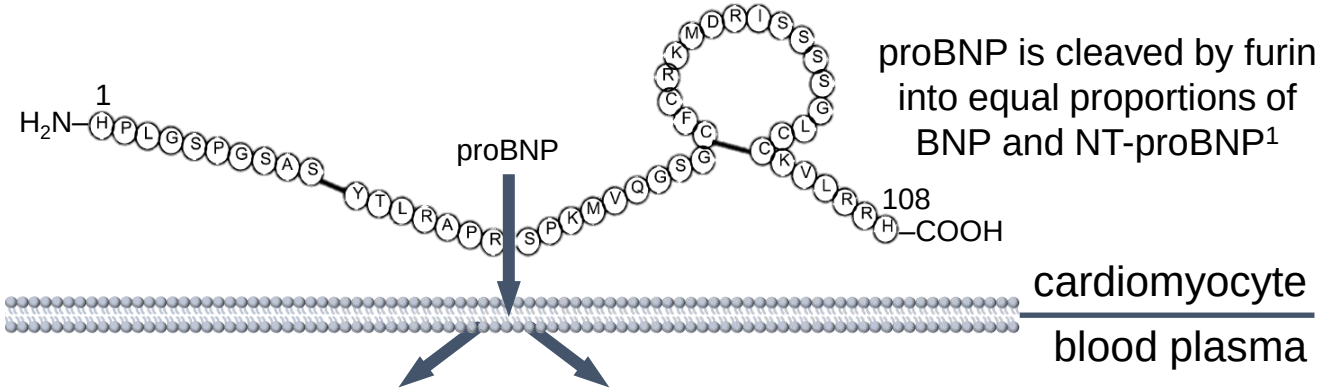
UTILISATION DU NT-PROBNP DANS LA DÉTECTION PRÉCOCE ET LE SUIVI D'UNE ATTEINTE CARDIAQUE CHEZ LES PATIENTS DIABÉTIQUES DE TYPE 2

Roche



Cardiomyopathie et diabète





proBNP is cleaved by furin into equal proportions of BNP and NT-proBNP[1]

Biologically inactive, 76 amino acid N-terminal fragment – **NT-proBNP**

Biologically active, 32 amino acid, C-terminal fragment – **BNP**

No physiological function[1]

demi-vie plus longue

Physiological functions[1]

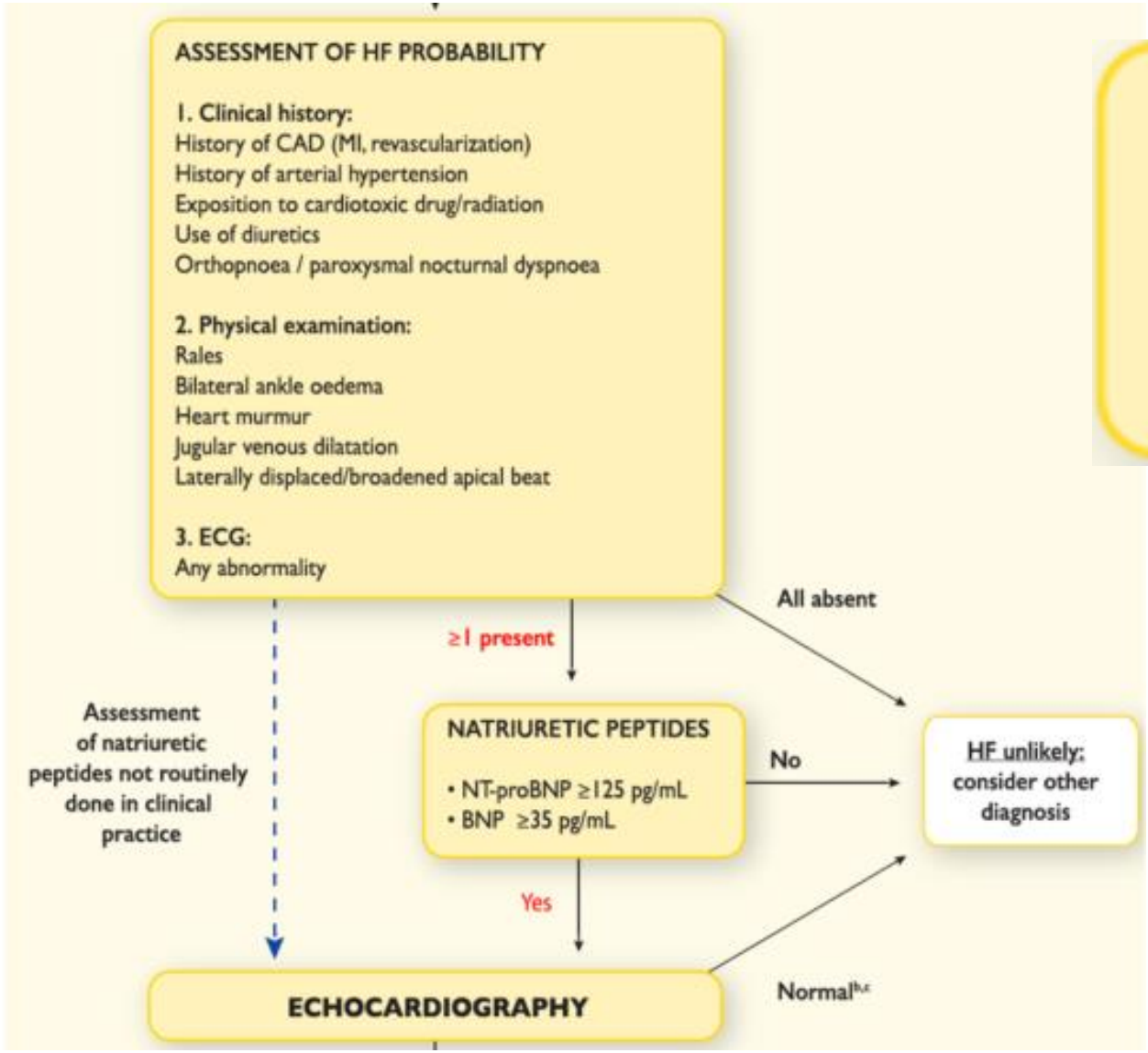
- Natriuresis/diuresis
- Peripheral vasodilatation,
- Inhibition of the renin–angiotensin–aldosterone and sympathetic nervous systems

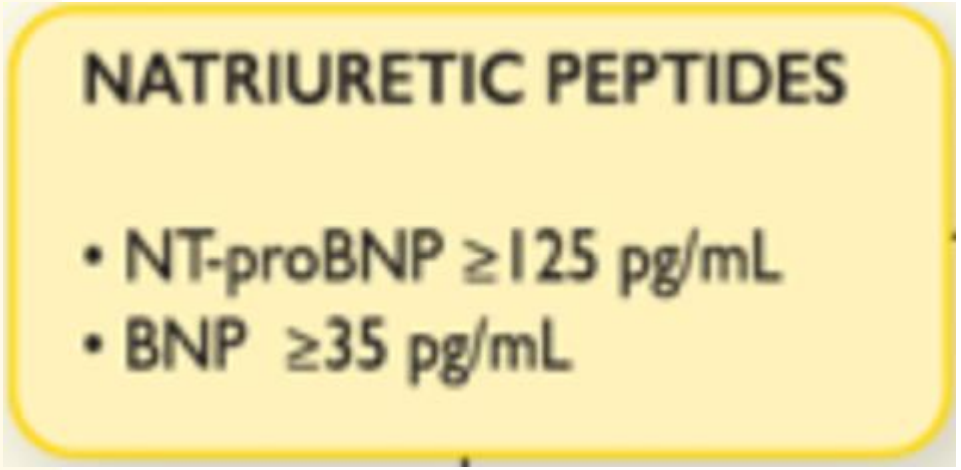
Table 12.3 Causes of elevated concentrations of natriuretic peptides[522–524]

Cardiac	Heart failure Acute coronary syndromes Pulmonary embolism Myocarditis Left ventricular hypertrophy Hypertrophic or restrictive cardiomyopathy Valvular heart disease Congenital heart disease Atrial and ventricular tachyarrhythmias Heart contusion Cardioversion, ICD shock Surgical procedures involving the heart Pulmonary hypertension
Non-cardiac	Advanced age Ischaemic stroke Subarachnoid haemorrhage Renal dysfunction Liver dysfunction (mainly liver cirrhosis with ascites) Paraneoplastic syndrome Chronic obstructive pulmonary disease Severe infections (including pneumonia and sepsis) Severe burns Anaemia Severe metabolic and hormone abnormalities (e.g. thyrotoxicosis, diabetic ketosis)

HFpEF = heart failure with preserved ejection fraction; HFrEF = heart failure with reduced ejection fraction; ICD = implantable cardioverter defibrillator.

Diagnostic → **Suivi**





→ **Pronostic cardiovasculaire**