AHEAD

Acute HEArt Failure Database

prof. MUDr. J.Špinar, PhD[1] ,
MUDr. J.Parenica, PhD[1]
for AHEAD investigators

Data processing and analysis:
MSc. D. Tomčíková[2], J. Jarkovský, PhD[2]
& assoc. prof. L. Dušek[2]

[1] University hospital, Brno

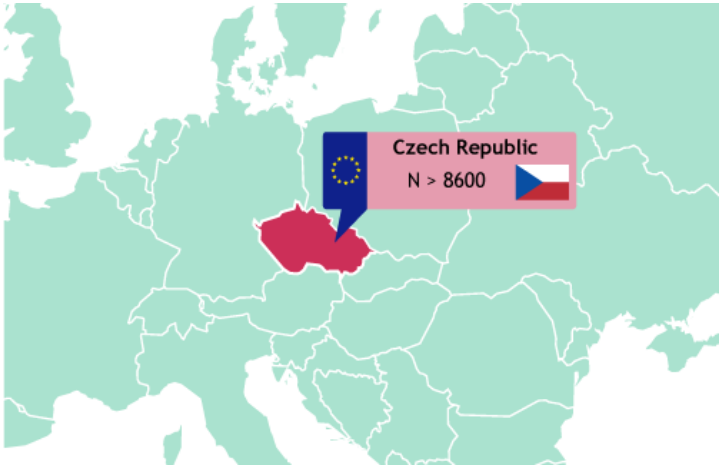
[2] Institute of Biostatistics and Analyses, MU, Brno

AHEAD database

- AHEAD (Acute HEArt Failure Database)* is database aimed on the monitoring of the ways of diagnosis and treatment of acute heart failure in the Czech Republic
- The data were collected between 2006-2012 and the database consist of two parts with more than 8600 records of Czech patients, 5 859 were first hospitalisation
  - The AHEAD main registry includes consecutive patients in seven centres with a 24-h Cath Lab service and centralized care for patients with acute coronary syndromes (ACS) from a region of about 3 million inhabitants.
  - The AHEAD network also includes five regional hospitals without a Cath Lab service.

* Spinar,; Parenica, J; Vitovec, J; Widimsky, P; Linhart, A; Fedorco, M; Malek, F; Cihalik, C; Spinarova, L; Miklik, R; Felsoci, M; Bambuch, M; Dusek, L; Jarkovsky, J. Baseline characteristics and hospital mortality in the Acute Heart Failure Database (AHEAD) Main registry. CRITICAL CARE Volume: 15 Issue: 6 Article Number: R291 DOI: 10.1186/cc10584 Published: 2011

http://ahead.registry.cz/



AHEAD

Acute Heart Failure Database

OK

Project AHEAD | Involved centres | Technology | Results | Subprojects | Contacts | Sitemap | Registry entry

About the project

The acute heart failure is a clinical syndrome which can be a result of many diseases. The symptoms can occur in patients with or without a previous heart disease. The heart failure can be systolic, diastolic or mixed; the impaired heart function can be manifested even by heart rhythm disorders. This condition is often life-threatening and requires an immediate medical intervention.

The treatment methods are mostly based on empirical knowledge and are not supported by extensive mortality studies. Registries and databases which were developed in the United States (e.g. ADHERE[1]) and in Europe (e.g. EHFS[2]) demonstrate a big diversity of this syndrome and differ significantly in the most important parameter - the mortality.

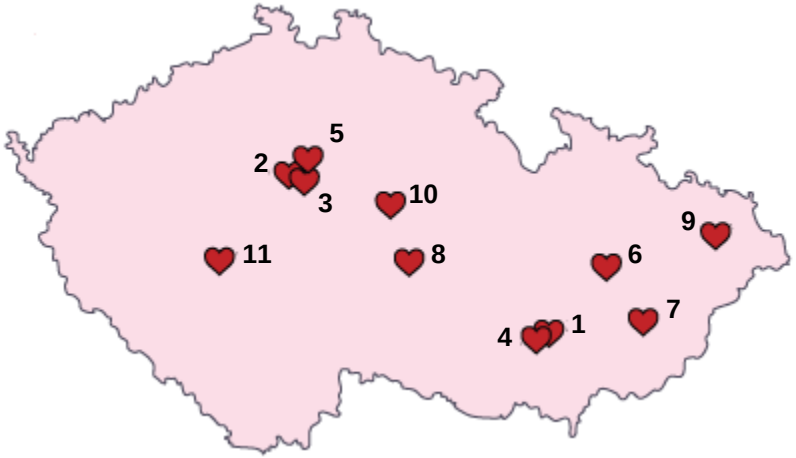
We have decided to monitor the ways of diagnosis and treatment of acute heart failures in the Czech Republic. We have established the database AHEAD (Acute HEArt Failure Database) which is progressively filled with the patients' records from five big clinical centres: General University Hospital in Prague, IKEM Prague, St Anne's University Hospital Brno, University Hospital Brno and University Hospital Olomouc. This produces a pilot registry of health care facilities having an angiography unit and concentrating the acute coronary syndrome. The registry includes both heart transplant centres as well.

Prof. MUDr. Jindřich Špinar, CSc.
Head of the Department of Internal Medicine - Cardiology
University Hospital Brno
Czech Republic

1.2 Included centers

AHEAD

Acute Heart Failure Database



2 900/milion AHF hospit.
2 800/milion ACS hospit.

Site
1. Faculty Hospital Brno
2. IKEM Prague
3. Faculty Hospital Kralovske Vinohrady, Prague
4. St Anne Faculty Hospital, Brno
5. General Faculty Hospital, Prague
6. Faculty Hospital, Olomouc
7. Zlín
8. Havlíčkův Brod
9. Frýdek Místekn
10. Čáslav
11. Příbram

Spinar *et al. Critical Care* 2011, **15**:R291
http://ccforum.com/content/15/6/R291

CRITICAL CARE

RESEARCH Open Access

Baseline characteristics and hospital mortality in the Acute Heart Failure Database (AHEAD) Main registry

Jindrich Spinar[1,2], Jiri Parenica[1,2*], Jiri Vitovec[2,3], Petr Widimsky[4], Ales Linhart[5], Marian Fedorco[6], Filip Malek[7], Cestmír Cihalik[6], Lenka Spinarová[2,3], Roman Miklik[1], Marian Felsoci[1], Miroslav Bambuch[8], Ladislav Dusek[9] and Jiri Jarkovsky[9]

Abstract

Introduction: The prognosis of patients hospitalized with acute heart failure (AHF) is poor and risk stratification may help clinicians guide care. The objectives of the Acute Heart Failure Database (AHEAD) registry are to assess patient characteristics, etiology, treatment and outcome of AHF.

Český registr AHEAD bodoval v Mnichově hned čtyřikrát

Na evropském kardiologickém kongresu v Mnichově byly hned čtyři české práce založeny na datech z registru AHEAD (Accute HEArt failure Database), který popisuje reálnou praxi péče o pacienty s akutním srdečním selháním. Spravuje jej Institut biostatistiky a analýz Masarykovy univerzity.

U zrodu registru AHEAD stála především Fakultní nemocnice Brno, v současnosti na něm participuje jedenáct nemocnic z celé České republiky. Tato databáze sleduje v každém záznamu asi sto parametrů důležitých pro krátkodobou a dlouhodobou prognózu nemocných.

Mezi ústními sděleními zazněly v Mnichově dvě takové práce, první přednesla RNDr. Simona Littnerová z Institutu biostatistiky a analýz. Týkala se především metodologie, konkrétně pak propensity score u tzv. obezitologického paradoxu. Ačkoli je obezita potvrzena jako nezávislý prognostický faktor progrese srdečního selhání, podle řady recentních studií je u obézních pacientů riziko úmrtí nižší. Propensity score představuje statistickou metodu, která dovede odlišit, do jaké míry je jeden parametr (tělesná hmotnost) ovlivnitelný parametrem jiným (např. pohlaví).

Prof. MUDr. Lenka Špinarová, Ph.D., z I. interní kardioangiologické kliniky FN u sv. Anny se zaměřila na jiný takový paradox – cholesterolový. Ten ukazuje, že na rozdíl od zdravé populace nebo populace hypertoniků pacienti se srdečním selháním a nízkým cholesterolem mají mnohem horší prognózu než pacienti s cholesterolem vysokým, a to nejen pokud jde o krátkodobou hospitalizační mortalitu, ale i o mortalitu dlouhodobou. Unikátní na sdělení prof. Špinarové byla jednak velikost souboru, jednak délka sledování. Ta u některých pacientů dosahuje až sedm let, prezentace na ESC pracovala s daty nemocných z let 2006 až 2009.

Cholesterolový paradox je popsán poměrně dobře, stále však nejsou jasné jeho klinické implikace. „V žádném případě by to nemělo vést k tomu, abychom nemocným se srdečním selháním vysazovali statiny. Nezdá se také, že by to byla pouze otázka kachexie. Nepodařilo se prokázat, že by pacienti s nízkým cholesterolem měli body mass index například pod dvacet. Takže zatím jde opravdu o paradox," komentuje to prof. MUDr. Jindřich Špinar, CSc., přednosta Interní kardiologické kliniky FN Brno.

On sám se svým týmem v posterové sekci prezentoval hlavní závěry plynoucí z registru AHEAD: „Nejsou překvapující, jde spíše o rozvíjení známých faktů, že hodnoty natriuretických peptidů, ejekční frakce, renální funkce a věk jsou základní rizikové faktory."

V posterové sekci MUDr. Jan Václavík, Ph.D., z I. interní kliniky FN Olomouc využil data z registru AHEAD k analýze, jaké nálezy na EKG predikují špatnou prognózu u srdečního selhání. Nejsilnějšími negativními prognostickými faktory byly prodloužení QRS komplexu a junkční rytmus, které oba nezávisle predikovaly jak hospitalizační, tak dlouhodobou mortalitu.

Délka sledování je obrovskou devízou registru i do budoucna. „Víceméně se potvrzuje, že prognóza pacientů se srdečním selháním je mnohdy horší než u nemocných s malignitou. Registr je nástrojem, jenž nám může pomoci s tímto stavem něco dělat. Pořád se zdůrazňuje, že kardiologie je vítězný, úspěšný obor. Tito nemocní dostávají pět šest léků, a přesto jich do roka 30 % zemře. Když člověk sleduje vlastní pacienty, má pocit, že situace není tak zlá. Když se však vezme neselektovaná populace úplně všech, kteří jsou pak předáváni mimo kliniku (většinou starší a polymorbidní), zjistí se, že třetina do roka zemřela," uvedl prof. Špinar.

Ion

Results and publications

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- Lassus J, Gayat E, Mueller C, Peacock WF, Spinar J, Harjola VP, van Kimmenade R, Pathak A, Mueller T, Disomma S, Metra M, Pascual-Figal D, Laribi S, Logeart D, Nouira S, Sato N, Potocki M, Parenica J, Collet C, Cohen-Solal A, Januzzi JL Jr, Mebazaa A; GREAT-Network. Incremental value of biomarkers to clinical variables for mortality prediction in acutely decompensated heart failure: the Multinational Observational Cohort on Acute Heart Failure (MOCA) study. *International Journal of Cardiology* 2013; 168(3): 2186–2194.
- Málek F, Ošťádal P, Pařenica J, Jarkovský J, Vítovec J, Widimský P, Linhart A, Fedorco M, Coufal Z, Miklík R, Krűger A, Vondraková D, Špinar J. Uric acid, allopurinol therapy, and mortality in patients with acute heart failure--results of the Acute HEart FAilure Database registry. *Journal of Critical Care* 2012; 27(6): 737.e11–737.e24. doi: 10.1016/j.jcrc.2012.03.011.
- Zeman K, Pohludková L, Spinar J, Jarkovský J, Littnerová S, Dušek L, Miklík R, Felšöci M, Pařenica J. Short-term prognosis and treatment of patients hospitalized for acute heart failure in a regional hospital without a cardiocentre. [Article in Czech] *Vnitrni lekarstvi* 2012; 58(4): 273–279.
- Spinarova L1, Spinar J, Vitovec J, Linhart A, Widimsky P, Fedorco M, Malek F, Cihalik C, Miklik R, Dusek L, Zidova K, Jarkovsky J, Littnerova S, Parenica J. Gender differences in total cholesterol levels in patients with acute heart failure and its importance for short and long time prognosis. *Biomedical Papers* 2012; 156(1):21–28.
- Spinar J, Ludka O, Sepsi M, Ajibona OA, Parenica J, Jarkovsky J. Atrial fibrillation as prognostic factor of myocardial infarction and/or acute heart failure. *Interventional Medicine & Applied Science* 2011; 3(3): 104–107.
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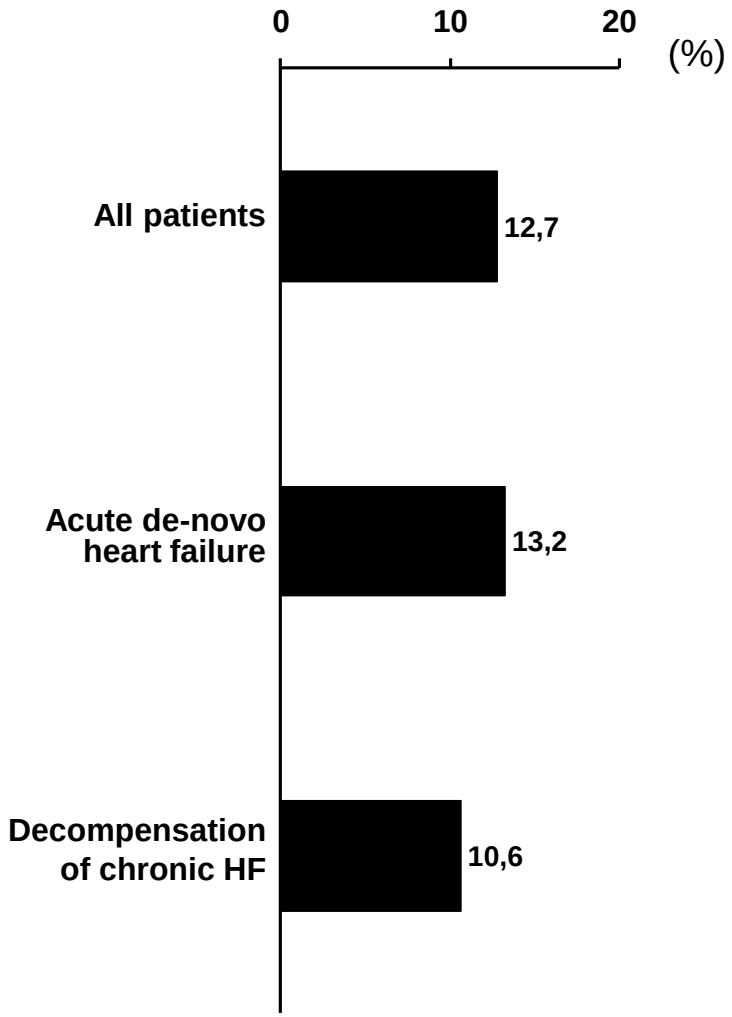
- Felšöci M, Pařenica J, Spinar J, Vítovec J, Widimský P, Linhart A, Fedorco M, Málek F, Číhalík C, Miklík R, Jarkovský J. Does previous hypertension affect outcome in acute heart failure? *European Journal of Internal Medicine* 2011; 22(6): 591–596.

3.1 Key parameters: in-hospital mortality and length of hospital stay

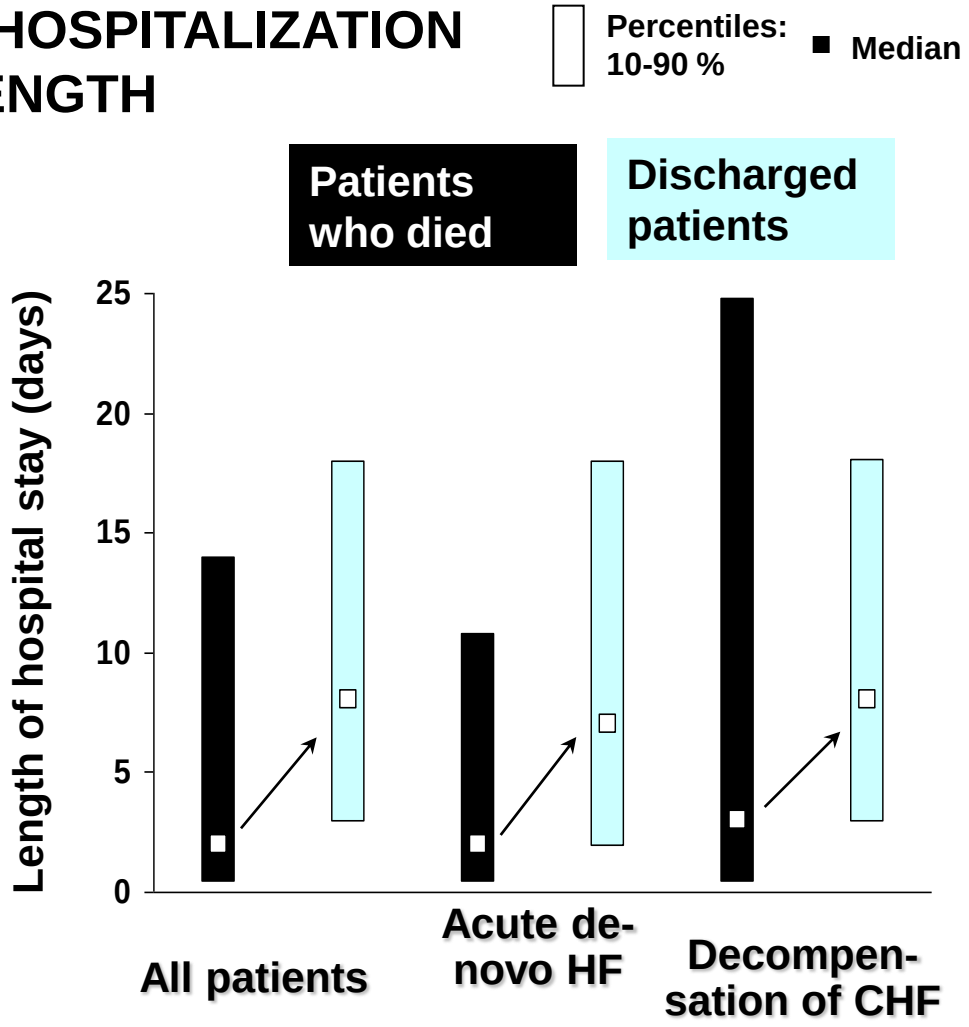
AHEAD

Acute Heart Failure Database

❖ TOTAL MORTALITY



❖ HOSPITALIZATION LENGTH

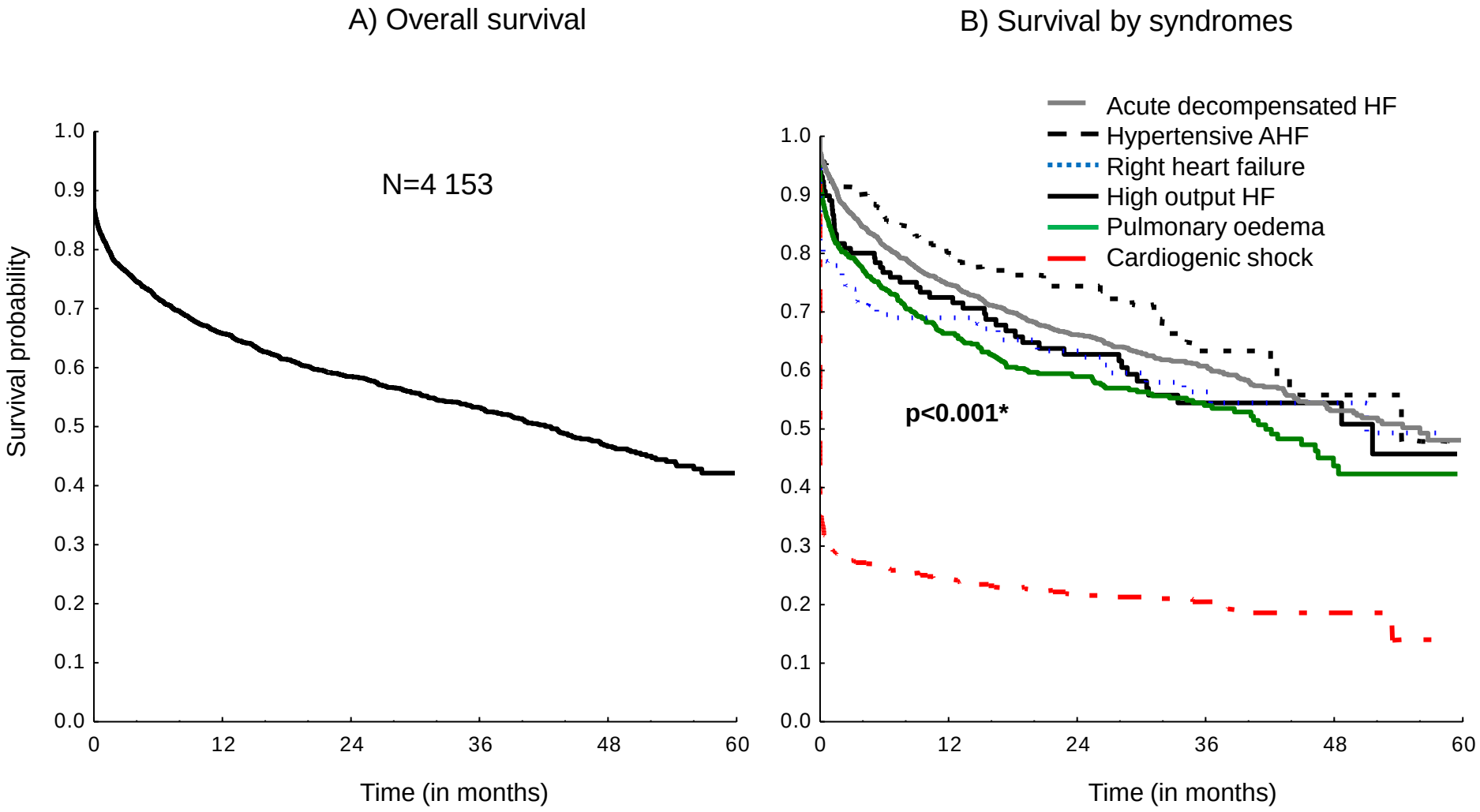


Median of hospital stay was 2 days by patients who died during hospitalization and 8 days by discharged patients (p<0.001).

6.1 Overall long-term survival stratified by syndromes in the whole dataset.

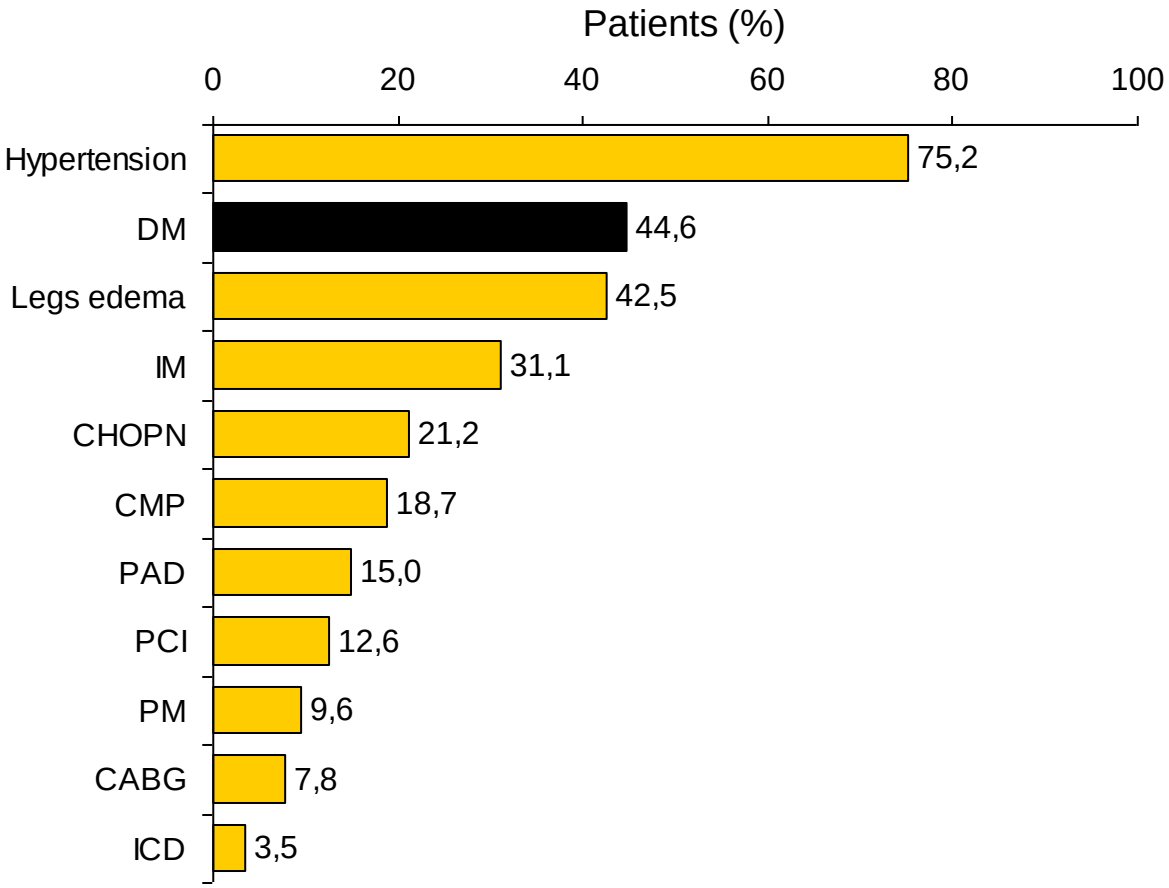
AHEAD

Acute Heart Failure Database



Medical history

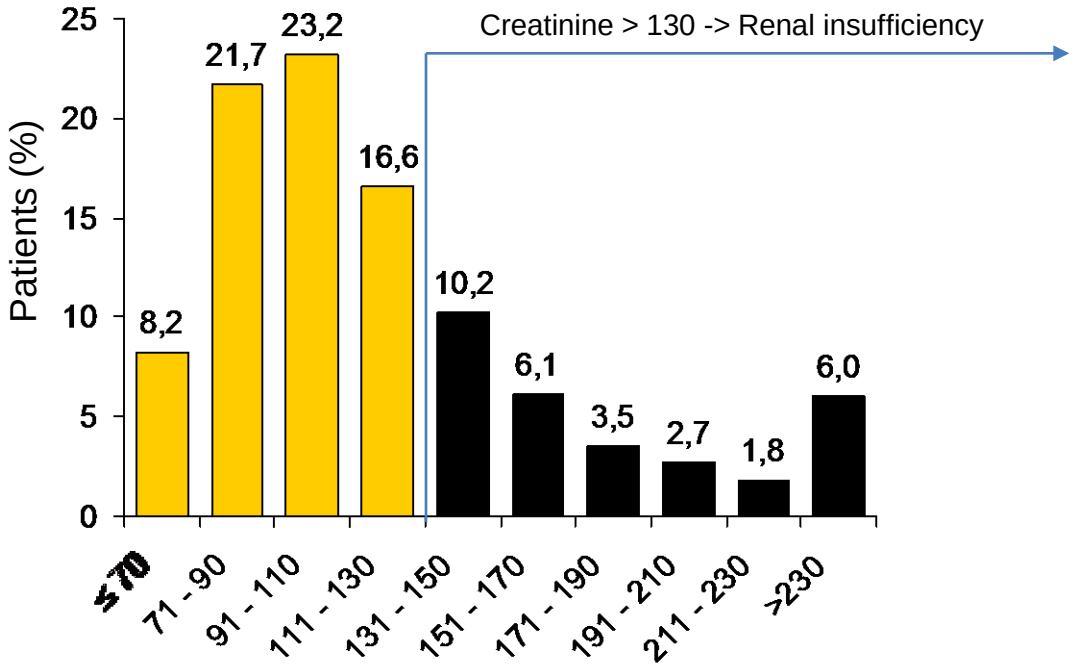
N=5859



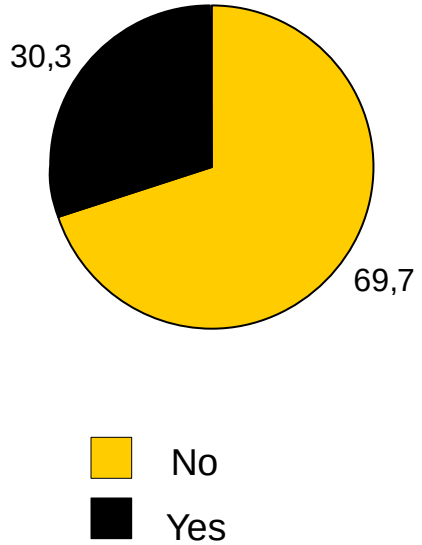
Creatinine and kidney function

N=5859

Creatinine at admission

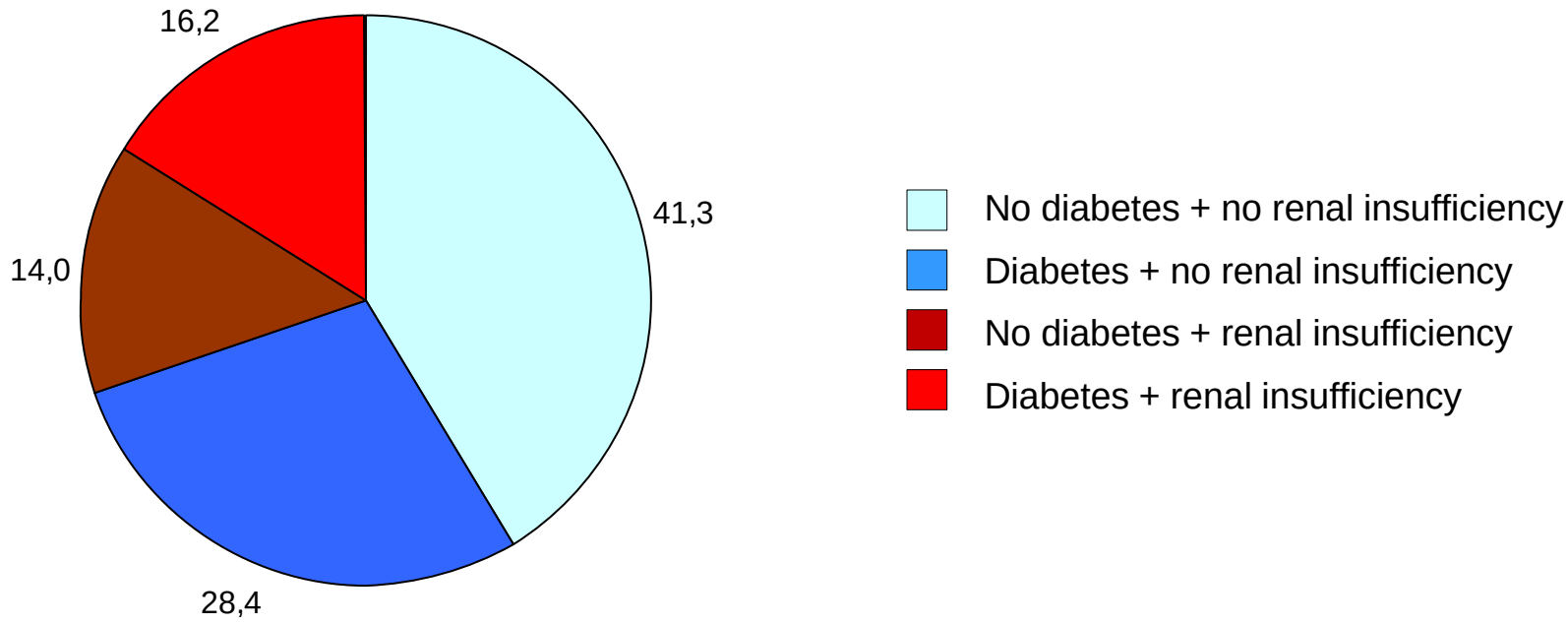


Renal insufficiency



Diabetes and renal insufficiency

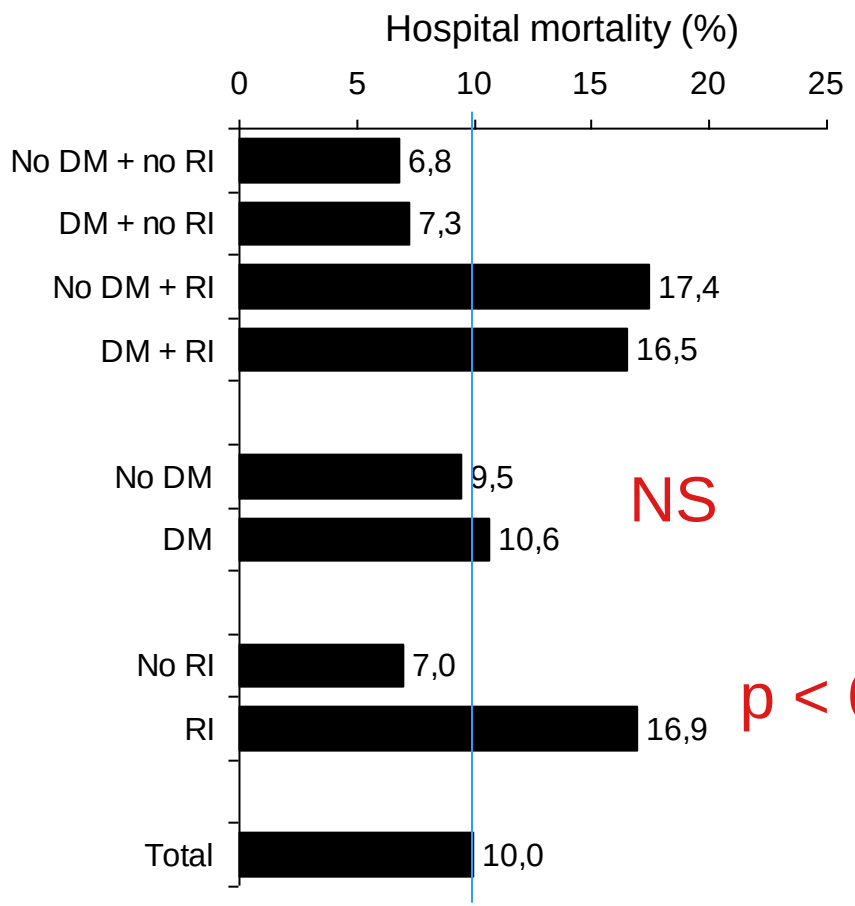
N=5859



Hospitalisation and 30th day mortality according to diabetes and renal insufficiency

N=5859

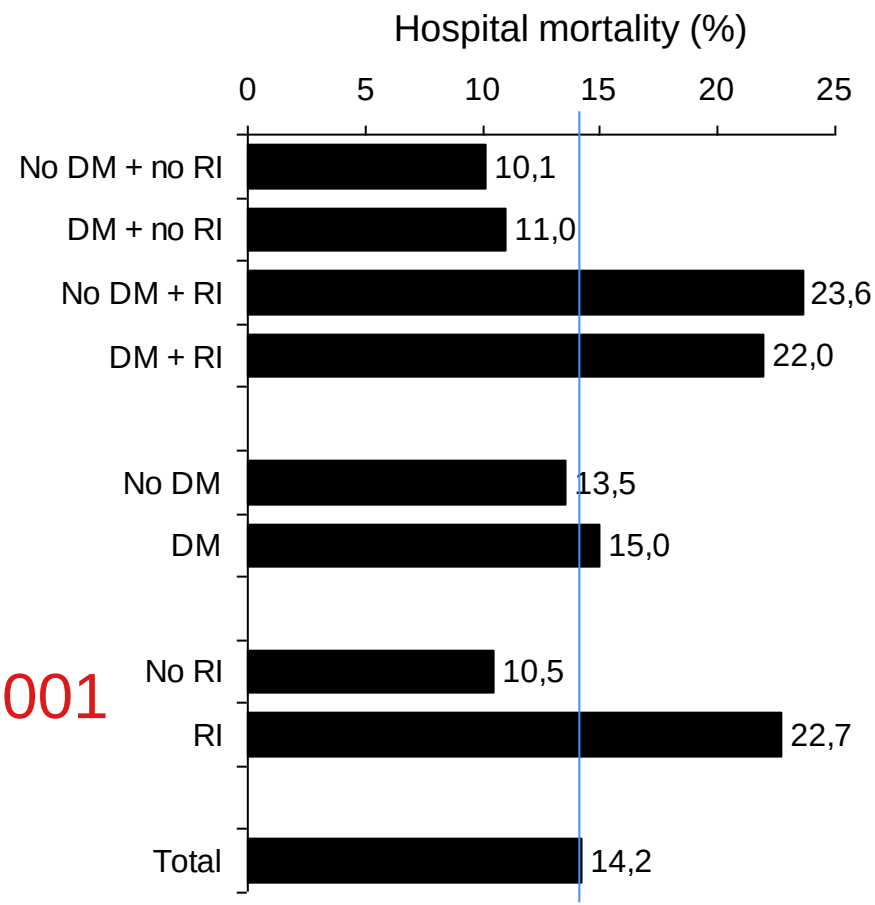
Hospital mortality



NS

p < 0,001

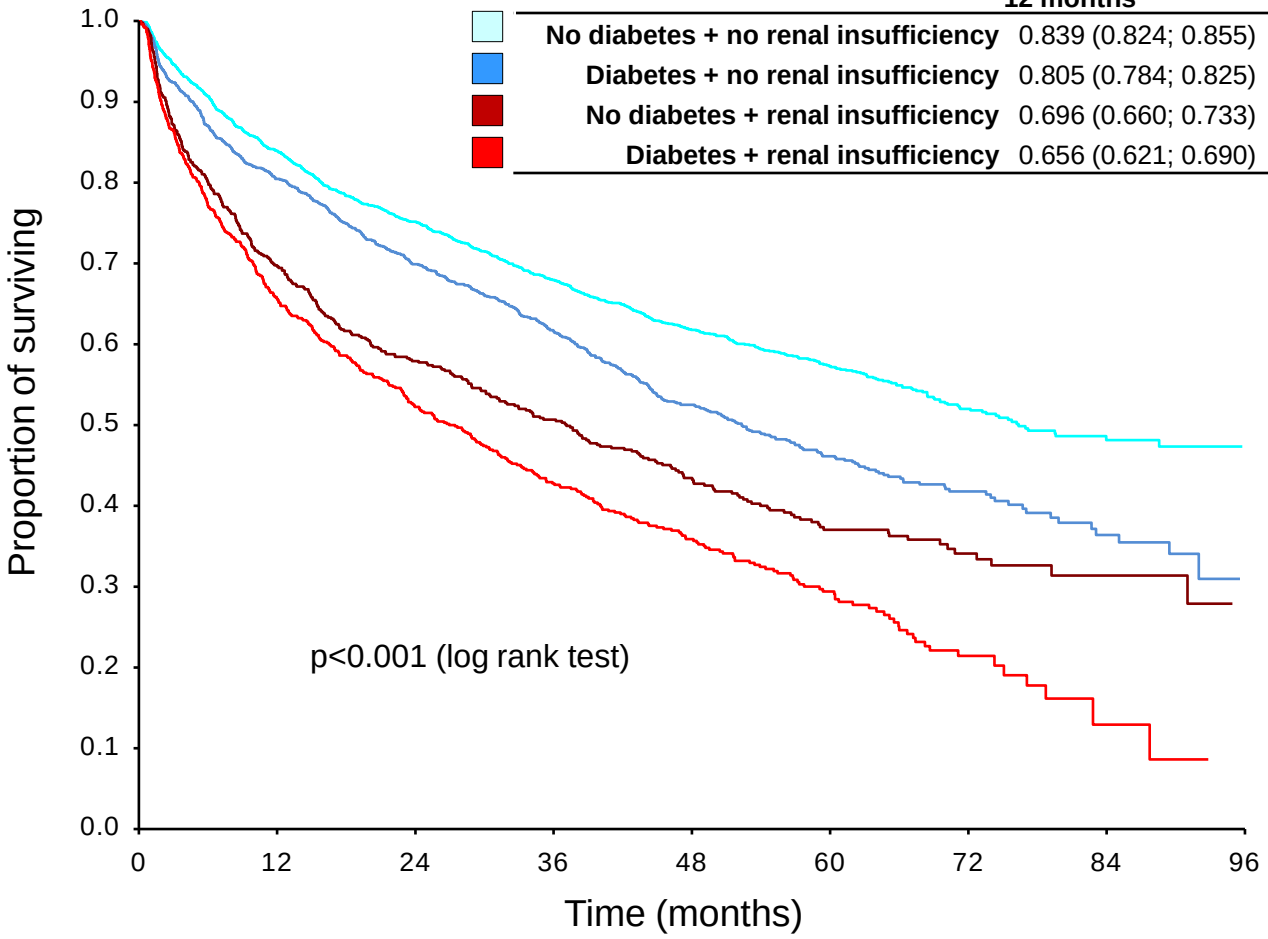
30th day mortality



Survival after 30th day according to diabetes and renal insufficiency

N=5028 (patients surviving after 30th day)

	12 months	36 months	60 months
No diabetes + no renal insufficiency	0.839 (0.824; 0.855)	0.680 (0.659; 0.700)	0.573 (0.550; 0.596)
Diabetes + no renal insufficiency	0.805 (0.784; 0.825)	0.617 (0.591; 0.642)	0.461 (0.432; 0.491)
No diabetes + renal insufficiency	0.696 (0.660; 0.733)	0.507 (0.467; 0.547)	0.370 (0.328; 0.413)
Diabetes + renal insufficiency	0.656 (0.621; 0.690)	0.428 (0.391; 0.465)	0.294 (0.256; 0.332)



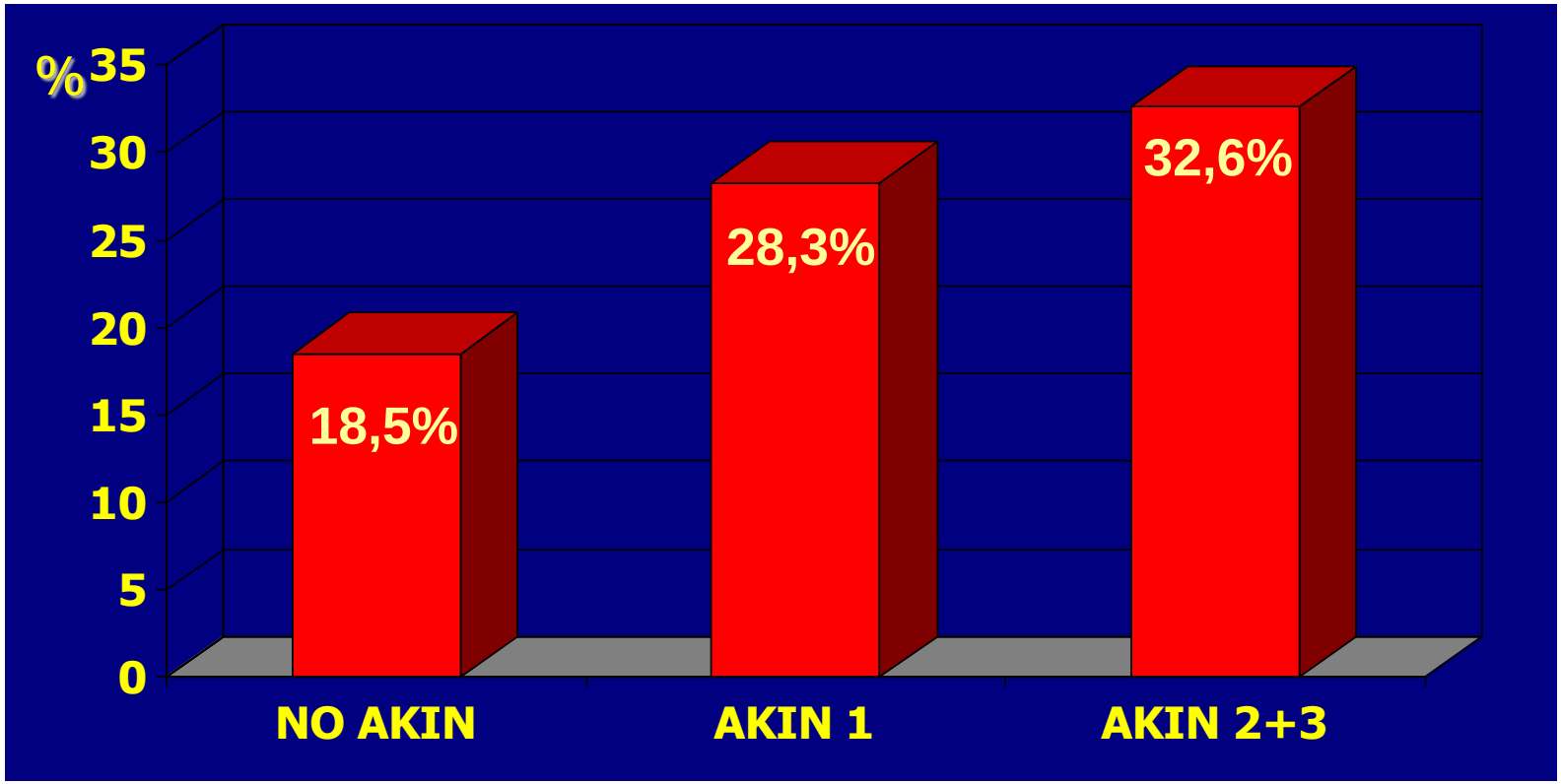
AKIN

Definition and classification/staging system for acute kidney injury (AKI)*.

AKI stage	Creatinine criteria	Urine output criteria
AKI stage I	Increase of serum creatinine by ≥ 0.3 mg/dl (≥ 26.4 µmol/L) or increase to ≥ 150% – 200% from baseline	Urine output < 0.5 ml/kg/hour for > 6 hours
AKI stage II	Increase of serum creatinine to > 200% – 300% from baseline	Urine output < 0.5 ml/kg/hour for > 12 hours
AKI stage III	Increase of serum creatinine to > 300% from baseline or serum creatinine ≥ 4.0 mg/dl (≥ 354 µmol/L) after a rise of at least 44 µmol/L or treatment with renal replacement therapy	Urine output < 0.3 ml/kg/hour for > 24 hours or anuria for 12 hours

Diagnostic criteria for AKI includes an abrupt (within 48 hours) reduction in kidney function defined as an absolute increase in serum creatinine of either 0.3 mg/dl or more (≥ 26.4 µmol/L) or a percentage increase of 50% or more (1.5 fold from baseline) or a reduction in urine output.
*according to Mehta and colleagues [3]

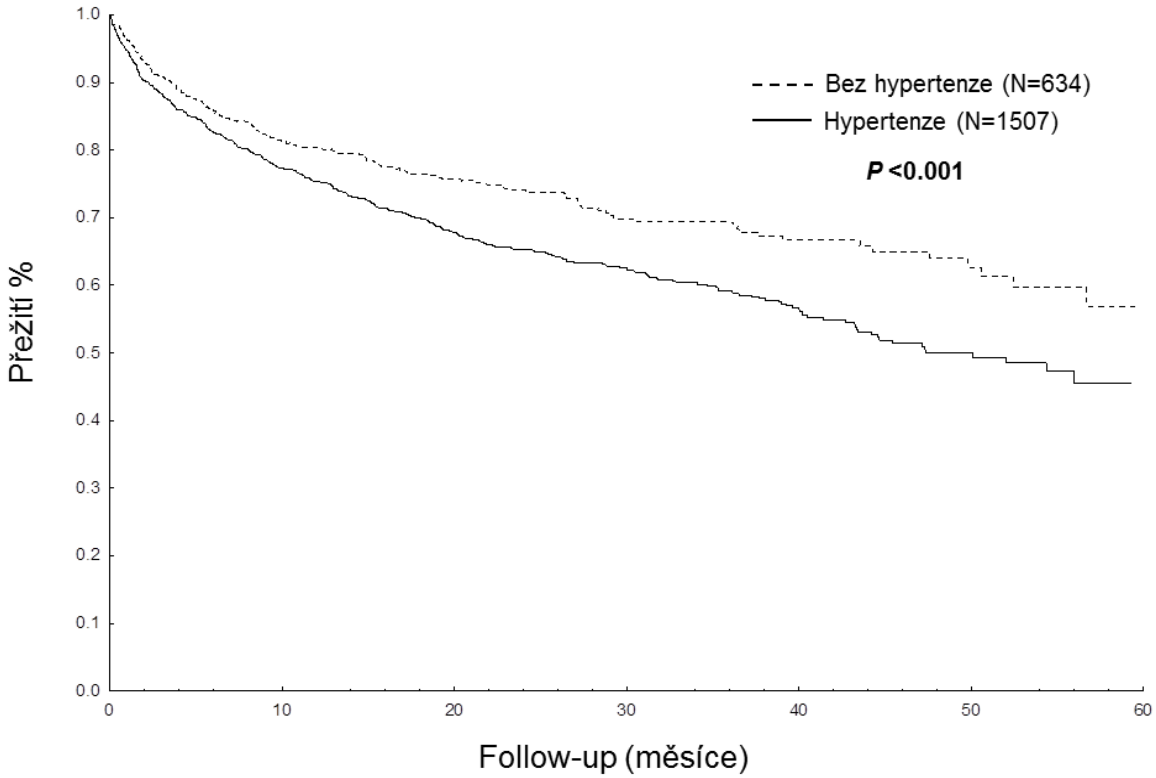
AHEAD (n = 3 941)
(One year mortality)



Spinar, Critical Care 2012

HYPERTENZE

- Střednědobé (1, 2, 3-leté) přežívání – **Killip II**



non-HT

80.7% / 74.2% / 69.8%

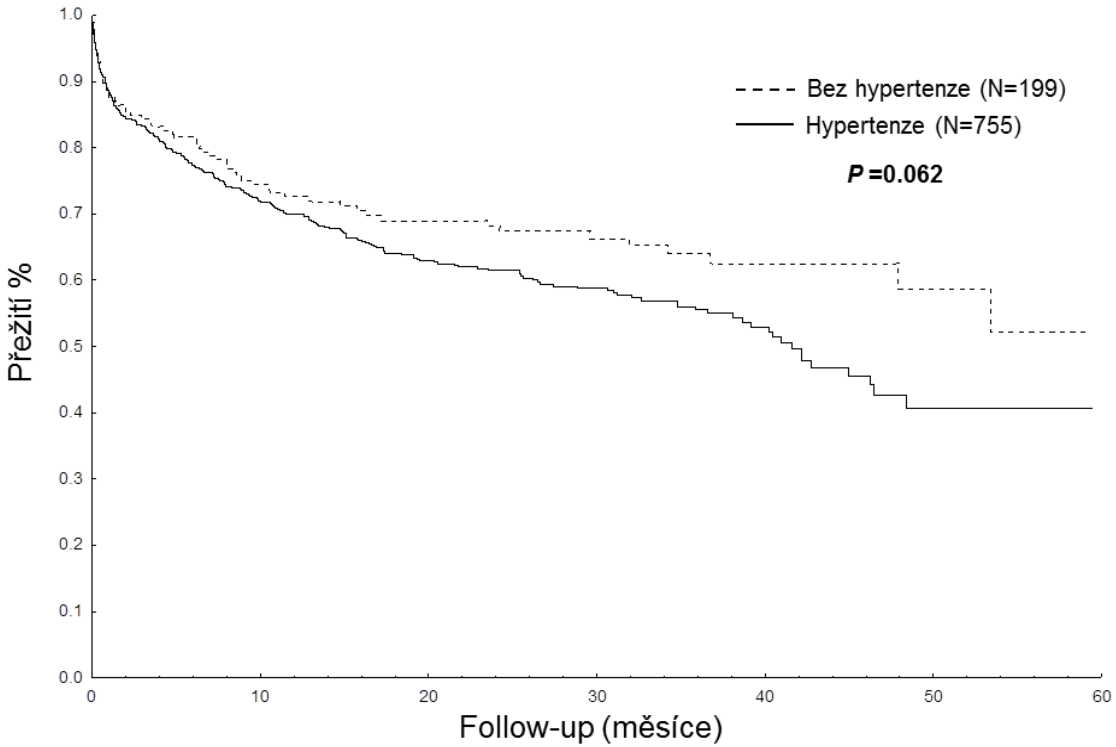
HT

75.6% / 65.9% / 58.7%

***P*<0.001**

HYPERTENZE

- Střednědobé (1, 2, 3-leté) přežívání – **Killip III+IV**



non-HT

72.6% / 68.2% / 64.0%

HT

70.0% / 61.5% / 55.5%

***P*=0.062**

AHEAD

Prediktory mortality Killip II

	30 denní mortalita		Středně-dobá mortalita	
	OR (95% CI)	P	HR (95% CI)	P
Věk > 70 let	1.64 (1.12 - 2.40)	0.012	1.86 (1.51 - 2.28)	<0.001
BMI ≥ 25 (kg/m^2)	-	-	0.68 (0.56 - 0.83)	<0.001
De novo akutní SS	-	-	0.62 (0.51 - 0.75)	<0.001
Diabetes mellitus	-	-	1.45 (1.20 - 1.74)	<0.001
Systolický TK při přijetí ≤ 100 (mmHg)	1.70 (0.97 - 2.95)	0.062	1.54 (1.14 - 2.07)	0.005
Diastolický TK při přijetí ≤ 60 (mmHg)	1.90 (1.15 - 3.14)	0.012	-	-
Ejekční frakce levé kormory ≤ 30%	-	-	1.28 (1.04 - 1.56)	0.017
Kreatinin při přijetí ≥ 120 (µmol/l)	1.44 (1.01 - 2.06)	0.044	1.634 (1.35 - 1.98)	<0.001
Vstupní Na^+ ≤ 130 (mmol/l)	4.52 (2.64 - 7.76)	<0.001	1.78 (1.20 - 2.61)	0.004
Vstupní hemoglobin < 120 (ženy) /130 (muži) (g/l)	-	-	1.40 (1.16 - 1.70)	<0.001
Přítomnost dlouhodobé hypertenze v anamnéze	***1.32 (0.87 – 2.01)***	***0.197***	***1.20 (0.81 – 1.76)***	***0.366***

AHEAD

Prediktory mortality Killip III+IV

	30 denní mortalita		Středně dobá mortalita	
	OR (95% CI)	P	HR (95% CI)	P
Věk > 70 let	2.27 (1.65 - 3.12)	<0.001	1.68 (1.28 - 2.21)	<0.001
De-novo akutní srdeční selhání	-	-	0.71 (0.55 - 0.92)	0.009
Tepová frekvence při příjmu > 100 (úderů/min)	0.65 (0.47 - 0.89)	0.007		
Fibrilace nebo flutter síní na vstupním EKG	-	-	1.36 (1.02 - 1.82)	0.036
Vstupní kreatinin ≥ 120 (µmol/l)	1.95 (1.44 – 2.64)	<0.001	1.79 (1.39 - 2.31)	<0.001
Vstupní hemoglobin < 120 (ženy) /130 (muži) (g/l)	-	-	1.59 (1.23 – 2.05)	<0.001
Ejekční frakce levé komory ≤ 30%	1.71 (1.26 – 2.33)	<0.001	-	-
Umělá plicní ventilace za hospitalizace	4.03 (2.92 - 5.57)	<0.001	-	-
Noradrenalin/dobutamin/dopamin/levosimendan za hospitalizace	4.80 (3.45 - 6.69)	<0.001	-	-
Přítomnost dlouhodobé hypertenze v anamnéze	***0.88 (0.62 – 1.26)***	***0.496***	***1.08 (0.78 – 1.50)***	***0.642***

HYPERTENZE

- Pacienti s dlouhodobou hypertenzí jsou **starší**, s vyšším zastoupením **žen**, i přes lepší systolickou funkci LK jsou v horší funkční třídě **NYHA**
- vyšší výskyt **přidružených onemocnění**, horší laboratorní profil (↓renální funkce)
- agresivnější farmakoterapie
- hypertenze není **nezávislý** prognostický faktor

5.
Comorbidities: AHEAD score

International Journal of CARDIOLOGY

Article in Press

AHEAD score – Long-term risk clasification in acute heart failure☆

Jindrich Spinar[1], Jiri Jarkovsky[1], Lenka Spinarova, Alexandre Mebazaa, Etienne Gayat, Jiri Vitovec, Ales Linhart, Petr Widimsky, Roman Miklik, Kamil Zeman, Jan Belohlavek, Filip Malek, Marian Felsoci, Jiri Kettner, Petr Ostadal, Cestmir Cihalik, Jan Vaclavik, Miloš Táborský, Ladislav Dusek, Simona Littnerova, Jiri Parenica

[1] These authors contributed equally to the article.

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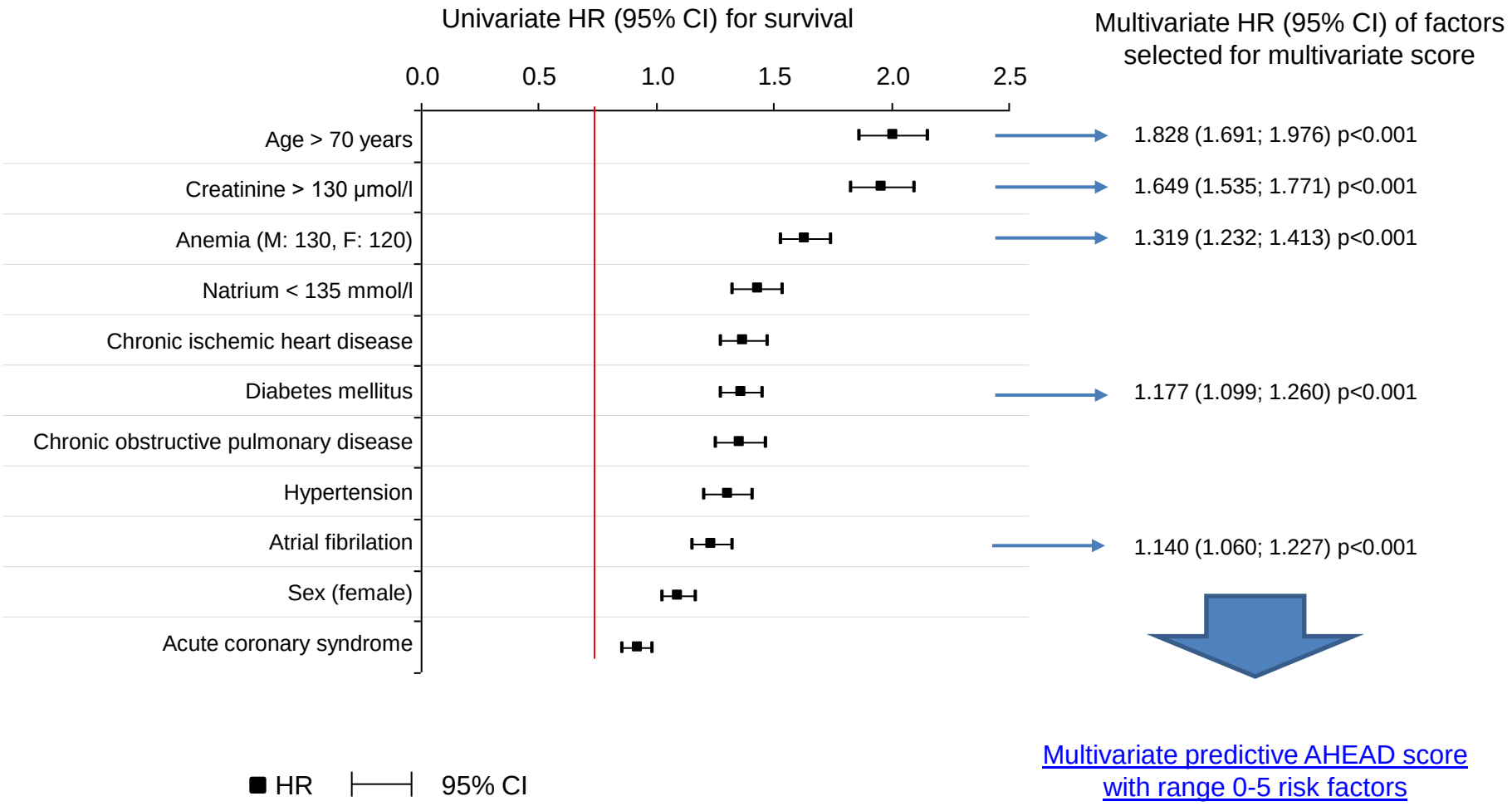
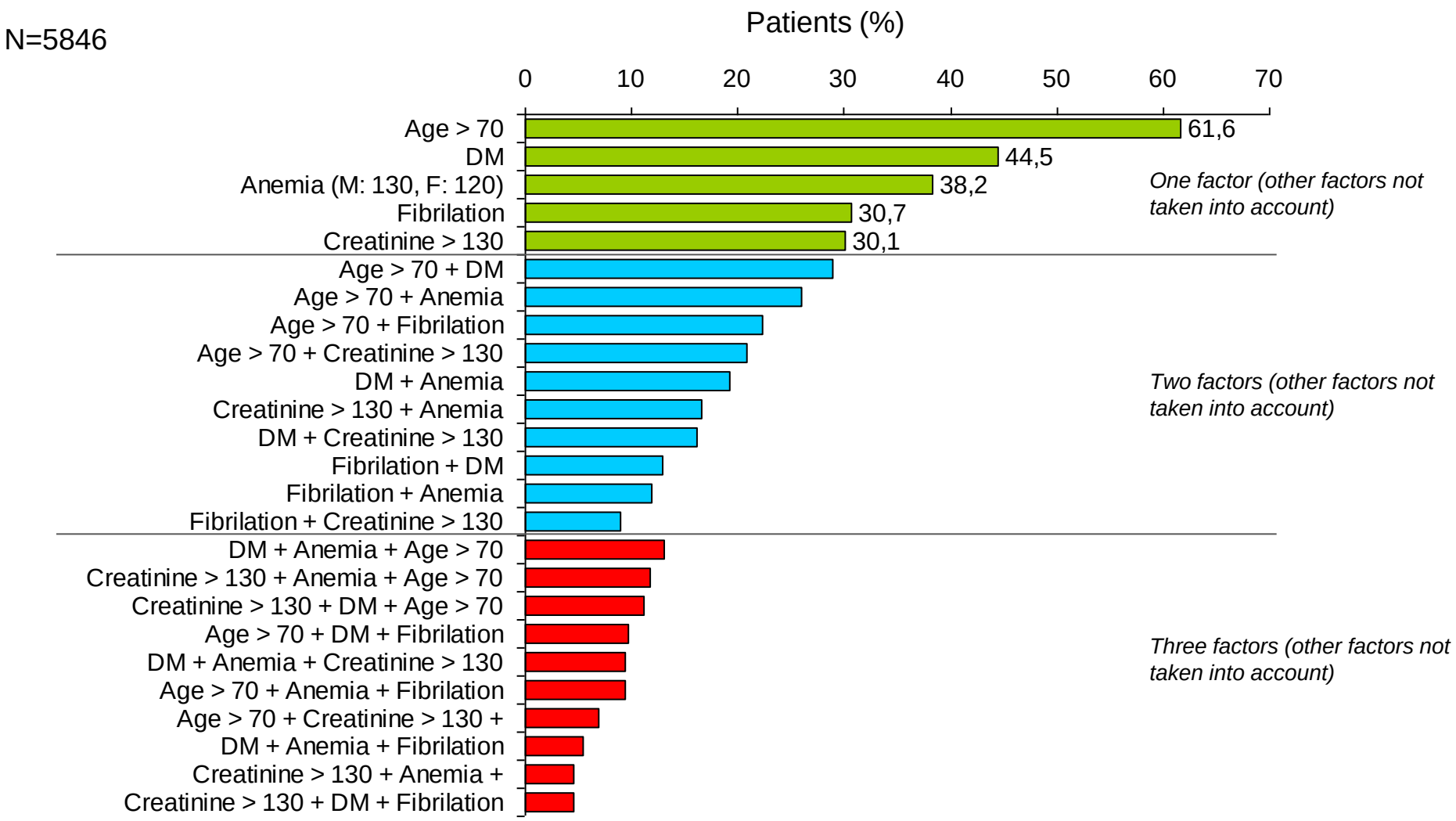
Identification of independent risk factors

N=5846



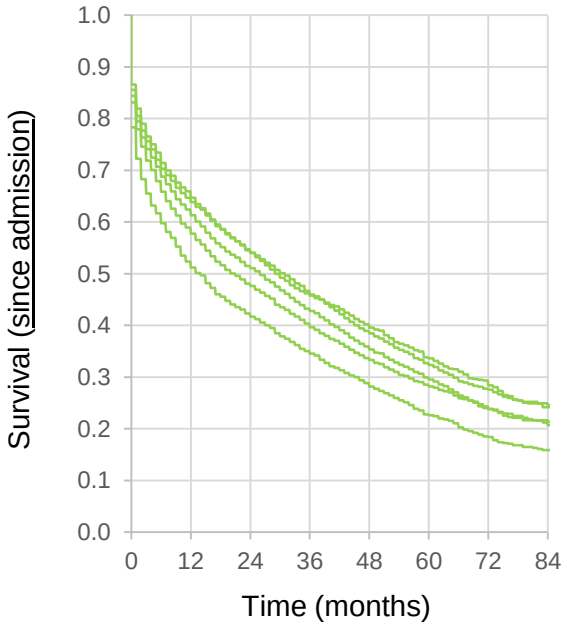
Multivariate predictive AHEAD score with range 0-5 risk factors

Frequency of selected risk factors combinations



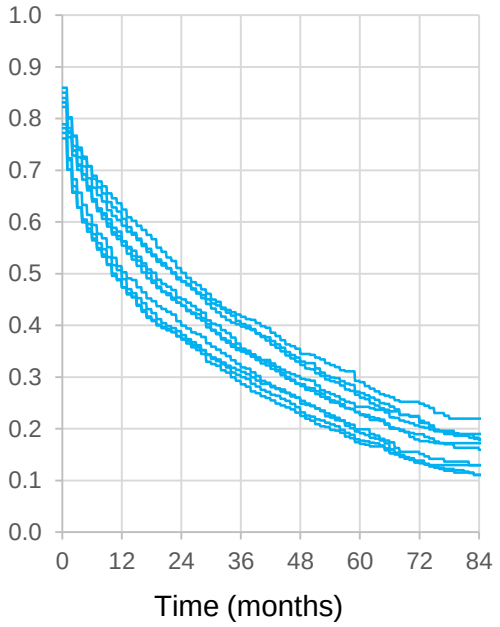
Survival of patients according to risk factors combinations I

One factor (other factors not taken into account)



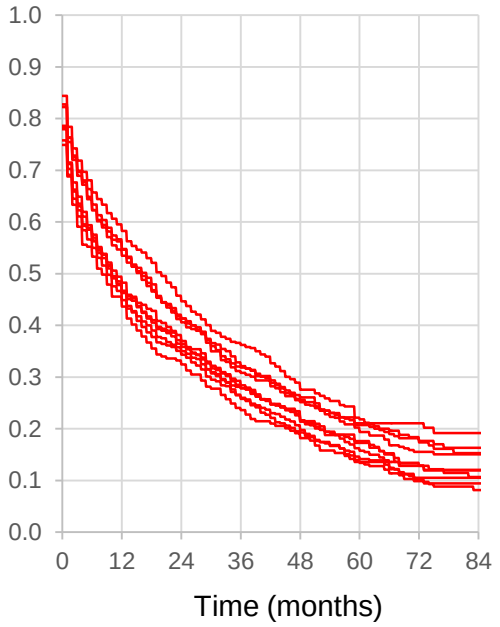
Fibrilation
DM
Age > 70
Anemia
Creatinine > 130

Two factors (other factors not taken into account)



Fibrilation + DM
Age > 70 + Fibrilation
Age > 70 + DM
DM + Anemia
Fibrilation + Anemia
Age > 70 + Anemia
DM + Creatinine > 130
Fibrilation + Creatinine > 130
Creatinine > 130 + Anemia
Age > 70 + Creatinine > 130

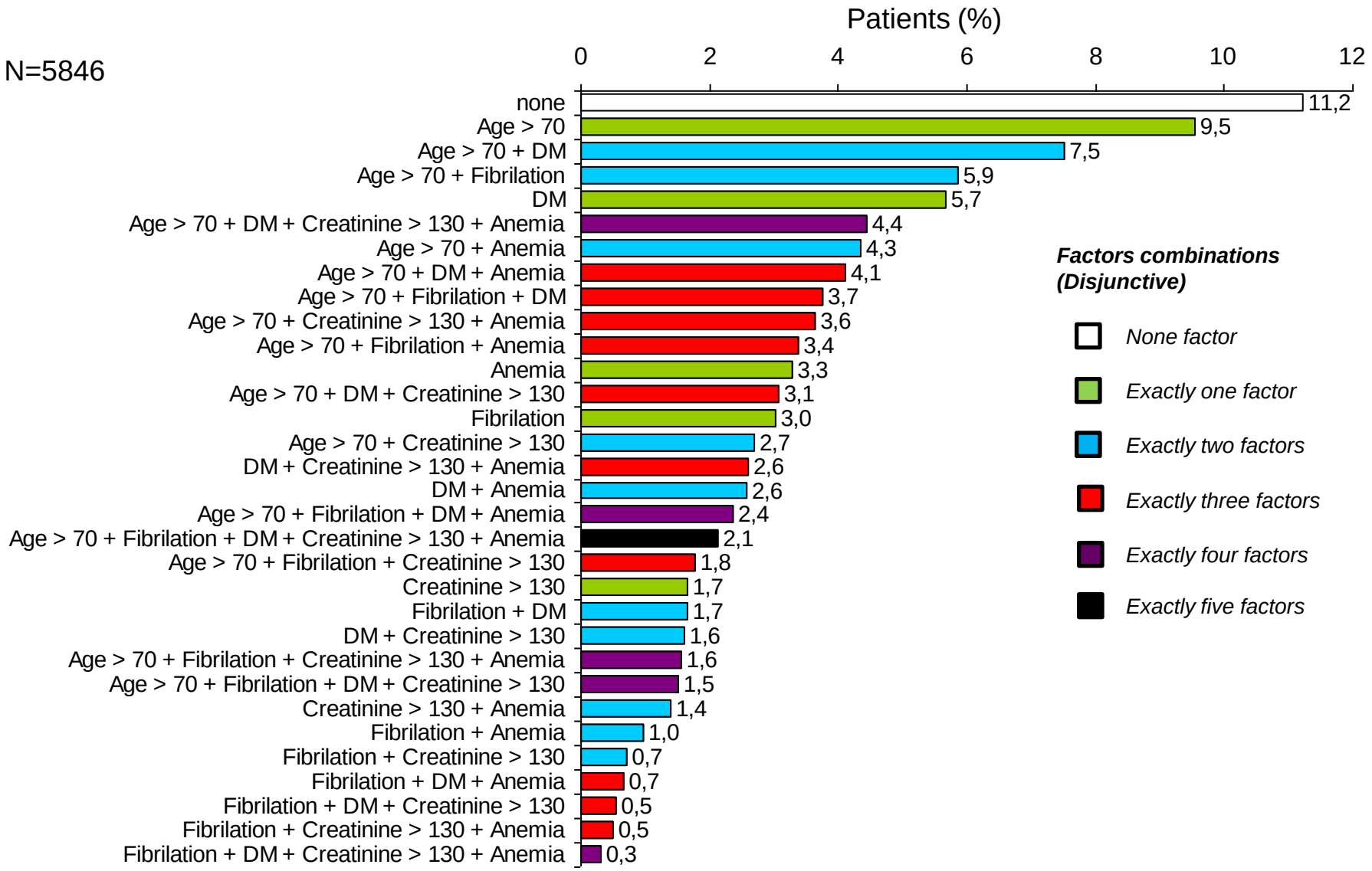
Three factors (other factors not taken into account)



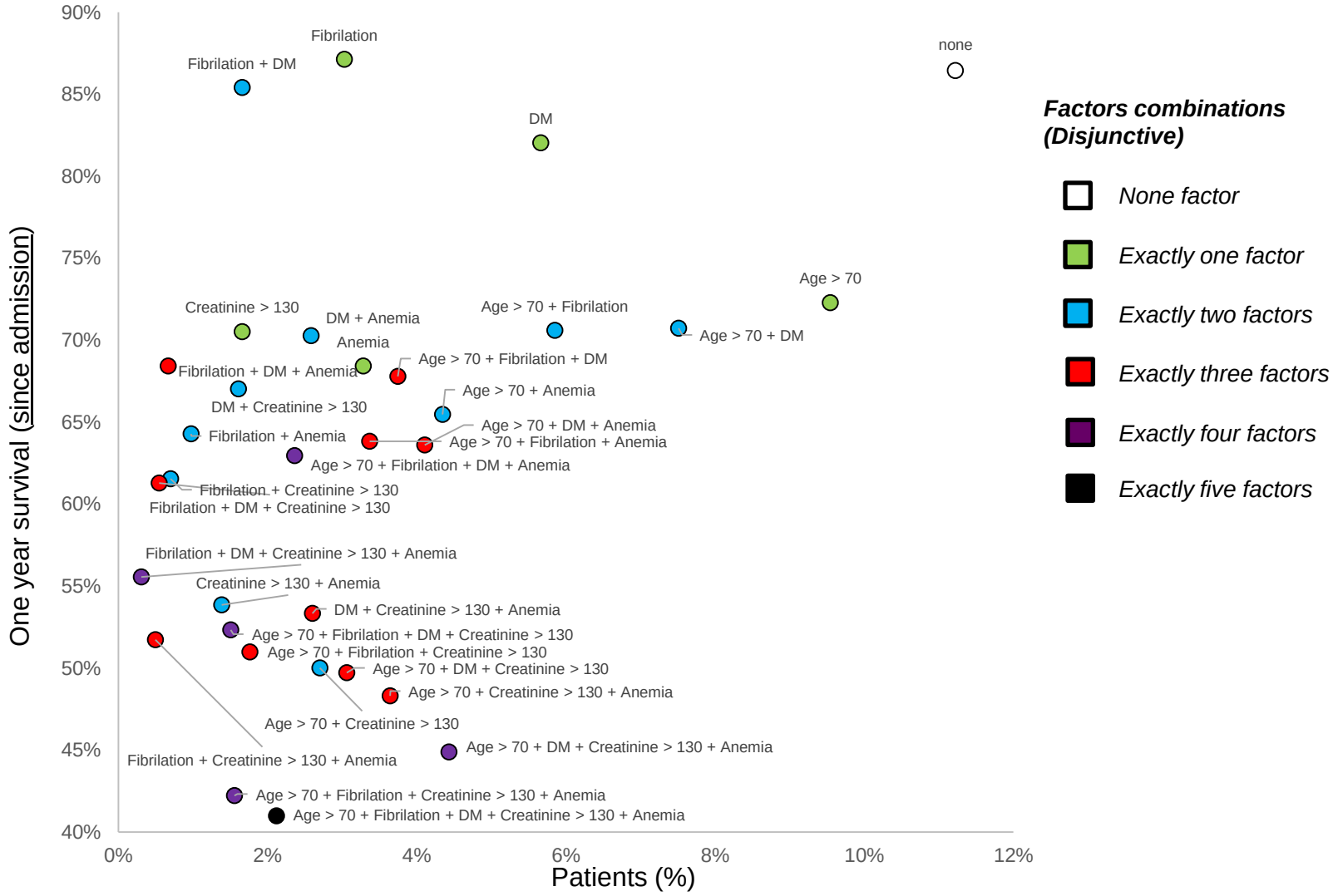
Age > 70 + DM + Fibrilation
Age > 70 + Anemia + Fibrilation
DM + Anemia + Fibrilation
DM + Anemia + Age > 70
Creatinine > 130 + DM + Fibrilation
DM + Anemia + Creatinine > 130
Creatinine > 130 + DM + Age > 70
Age > 70 + Creatinine > 130 + Fibrilation
Creatinine > 130 + Anemia + Age > 70
Creatinine > 130 + Anemia + Fibrilation

Factors combinations ordered according to 1 year survival

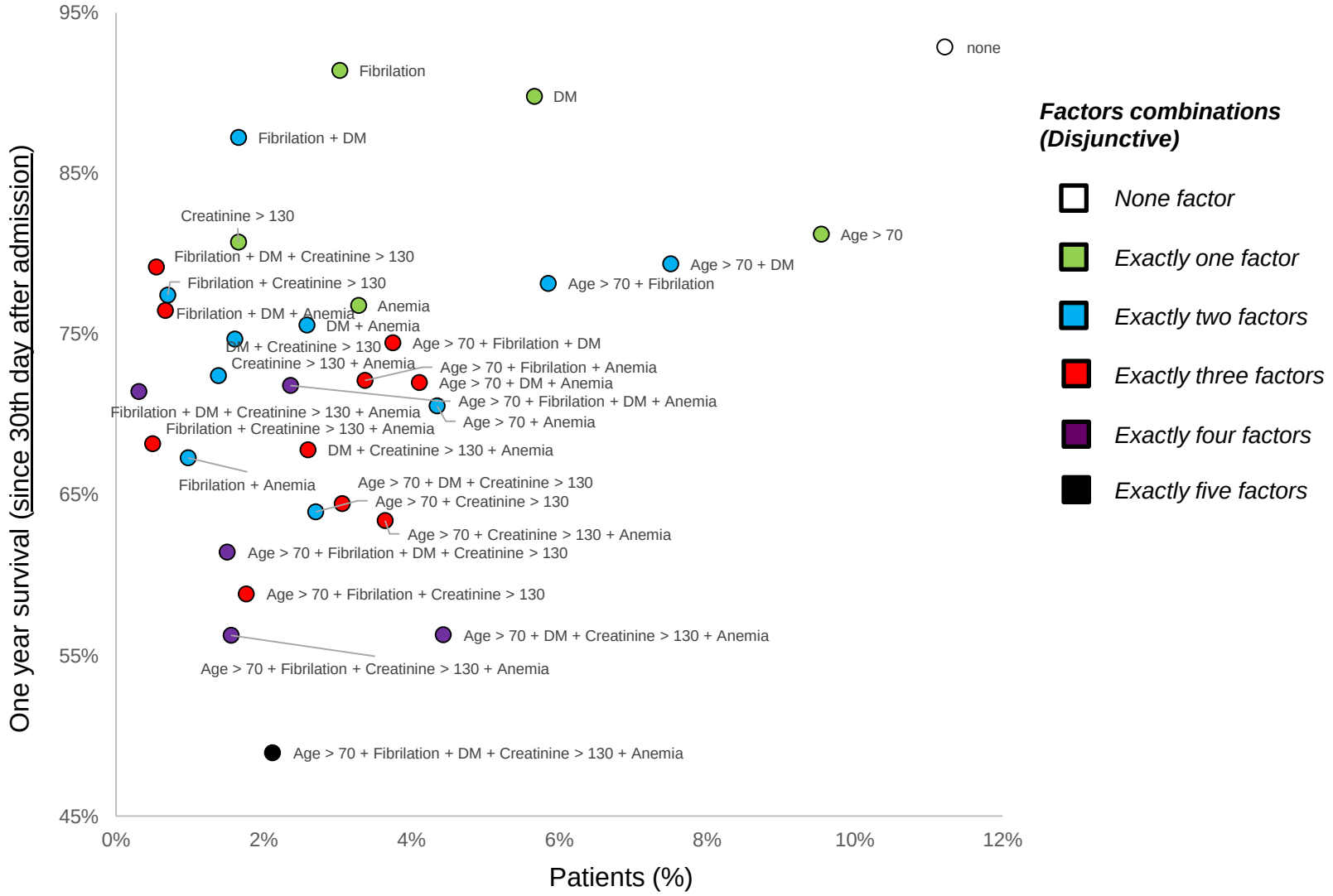
Frequency of selected risk factors combinations



Survival and frequency of patients according to risk factors combinations I



Survival and frequency of patients according to risk factors combinations II



AHEAD

A A = atrial fibrilation

H H = haemoglobin (< 120g/l F, < 130g/l M)

E E = elderly > 70 years

A A = abnorm. renal func. (creatinin > 130 umol/l)

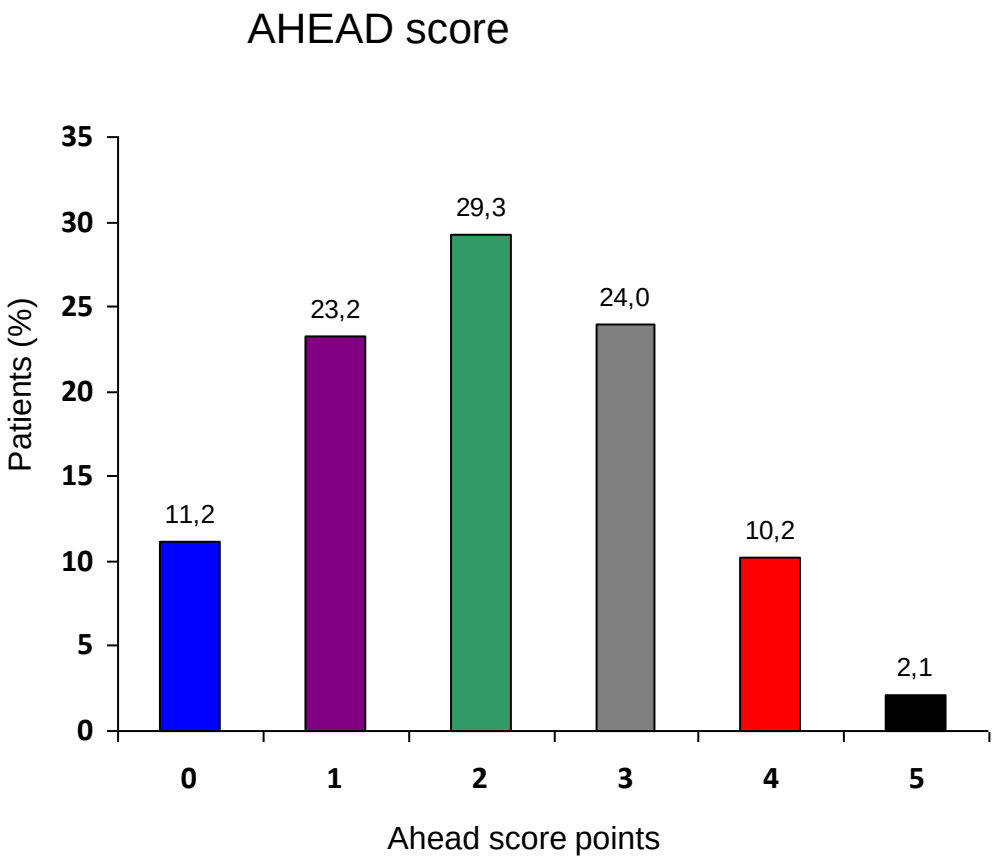
D D = diabetes mellitus

AHEAD score

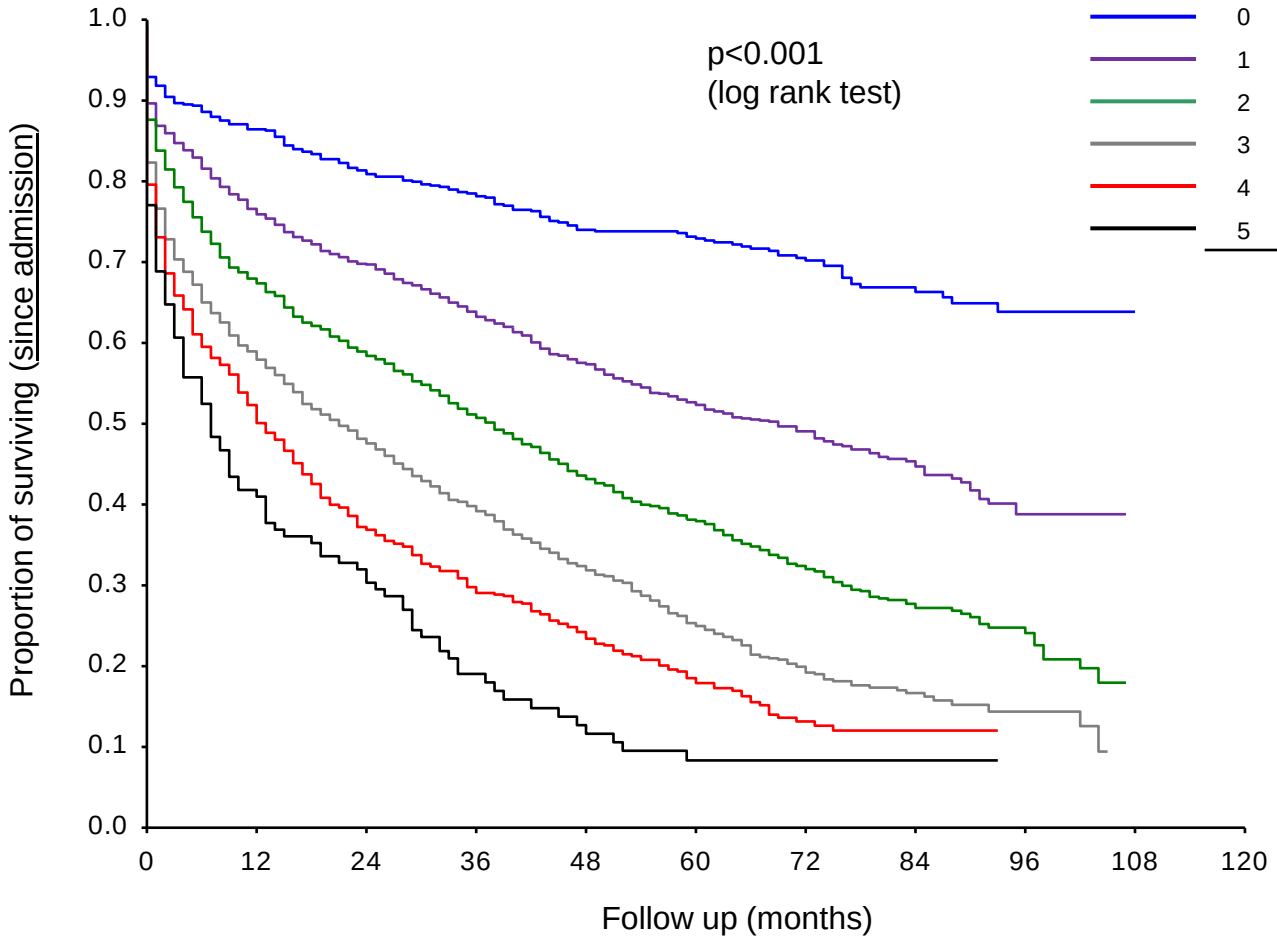
The multivariate analysis identified 5 independent risk factors, for each risk factors the patient receive 1 point for the risk score computation:

A = Atrial fibrilation
H = Heamoglobin < 120 g/l (F)
130 g/l (M)
E = Elderly > 70 years
A = Abnormal renal functions
(creat > 130 umol/l)
D = Diabetes mellitus

Ahead score is computed as a sum of points of risk factors in patients; its range is 0 (patients with no risk factors) to 5 points (all risk factors present).

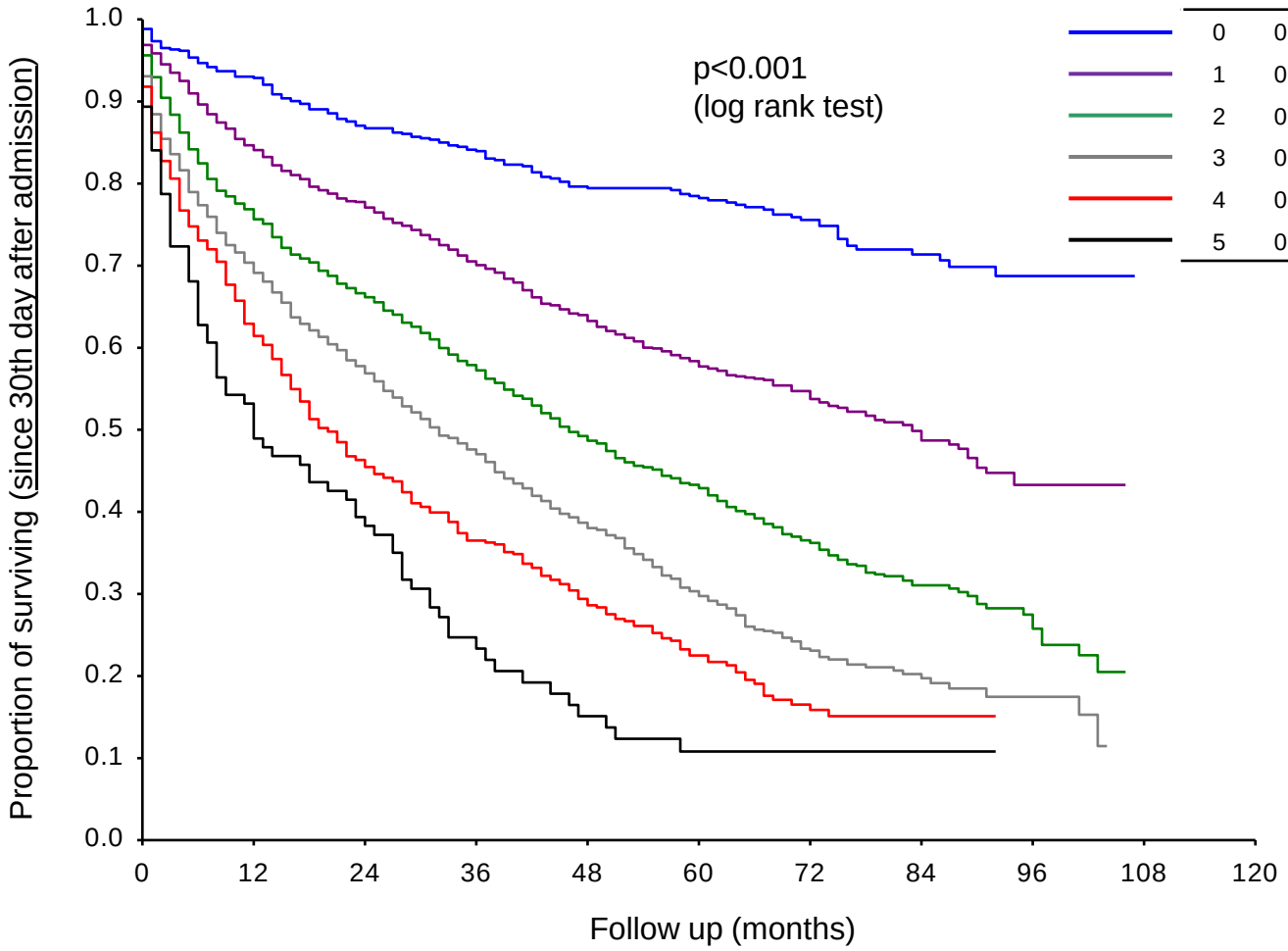


Survival of patients according to AHEAD score I



AHEAD Score	Survival (in given month) 1	12	36	60	90
0	0.918	0.864	0.782	0.729	0.649
1	0.869	0.759	0.632	0.523	0.418
2	0.838	0.674	0.507	0.379	0.261
3	0.766	0.579	0.392	0.250	0.152
4	0.731	0.501	0.290	0.179	0.120
5	0.689	0.410	0.190	0.083	0.083

Survival of patients according to AHEAD score II



AHEAD Score	Survival (in given month) 1	12	36	60	90
0	0.973	0.929	0.839	0.782	0.699
1	0.959	0.841	0.701	0.577	0.454
2	0.930	0.756	0.572	0.429	0.288
3	0.885	0.691	0.470	0.297	0.185
4	0.862	0.614	0.365	0.225	0.151
5	0.840	0.489	0.233	0.108	0.108

AHEAD

AHEAD score VD studies
TRUE AHF - ularitide
RELAX - serelaxin

NO ACS

BPs > 110mmHg

N = 1648

AHEAD score AHEAD VD

The multivariate analysis identified 5 independent risk factors, for each risk factors the patient receive 1 point for the risk score computation:

A = Atrial fibrilation
H = Heamoglobin < 120 g/l (F)
130 g/l (M)
E = Elderly > 70 years
A = Abnormal renal functions
(creat > 130 umol/l)
D = Diabetes mellitus

Ahead score is computed as a sum of points of risk factors in patients; its range is 0 (patients with no risk factors) to 5 points (all risk factors present).

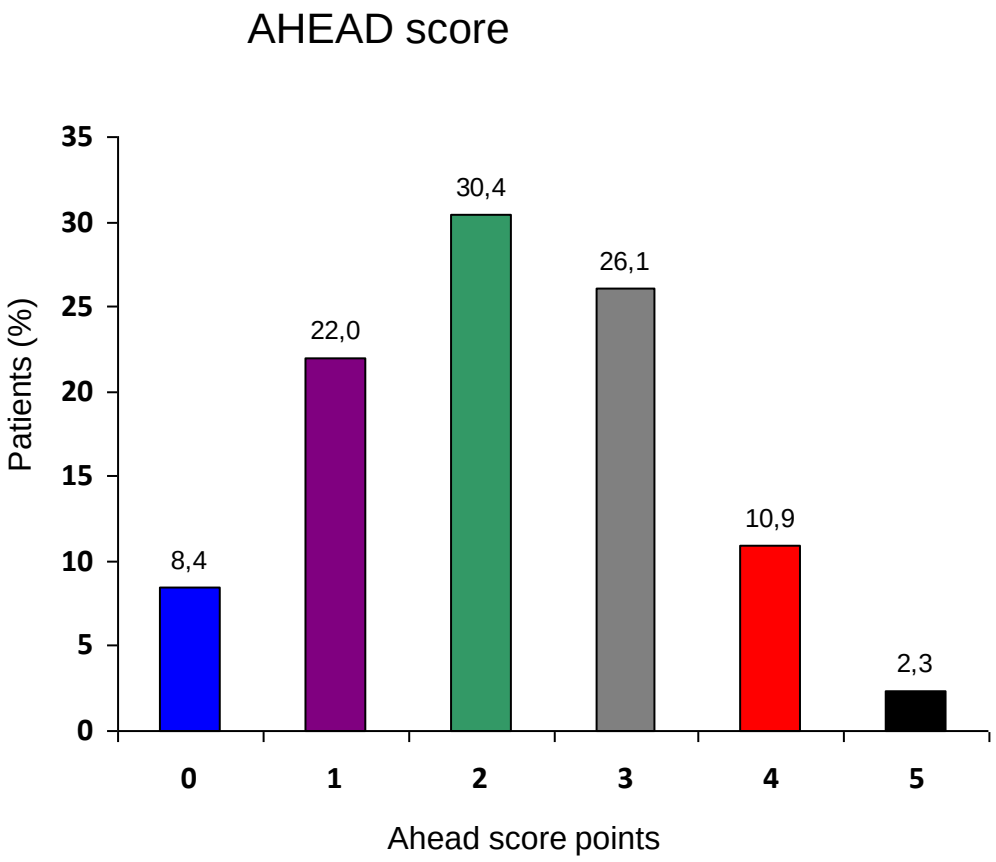


Figure 1 Analysis flowchart

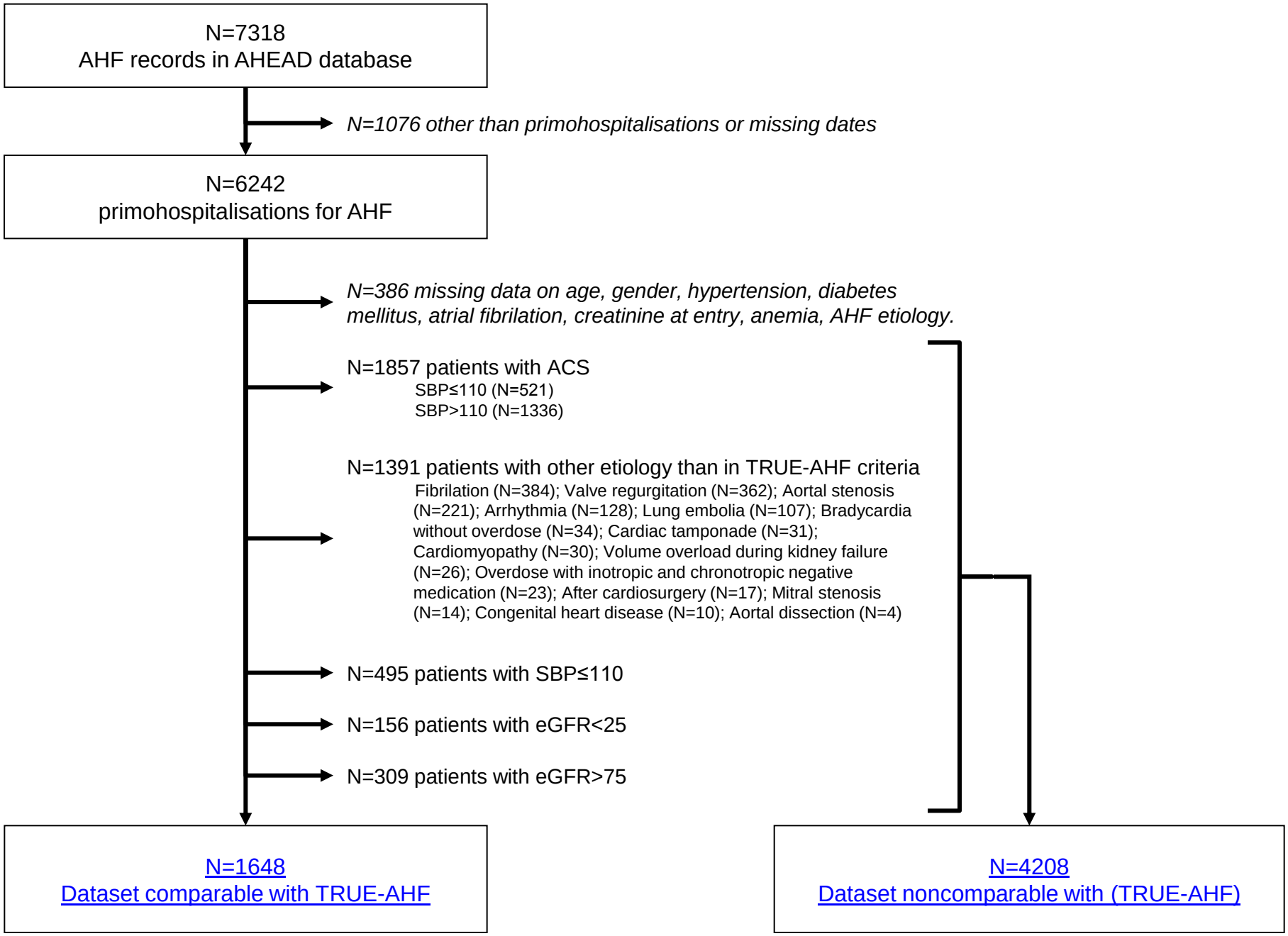


Figure 2 Survival since admission according to comparability with TRUE AHF study

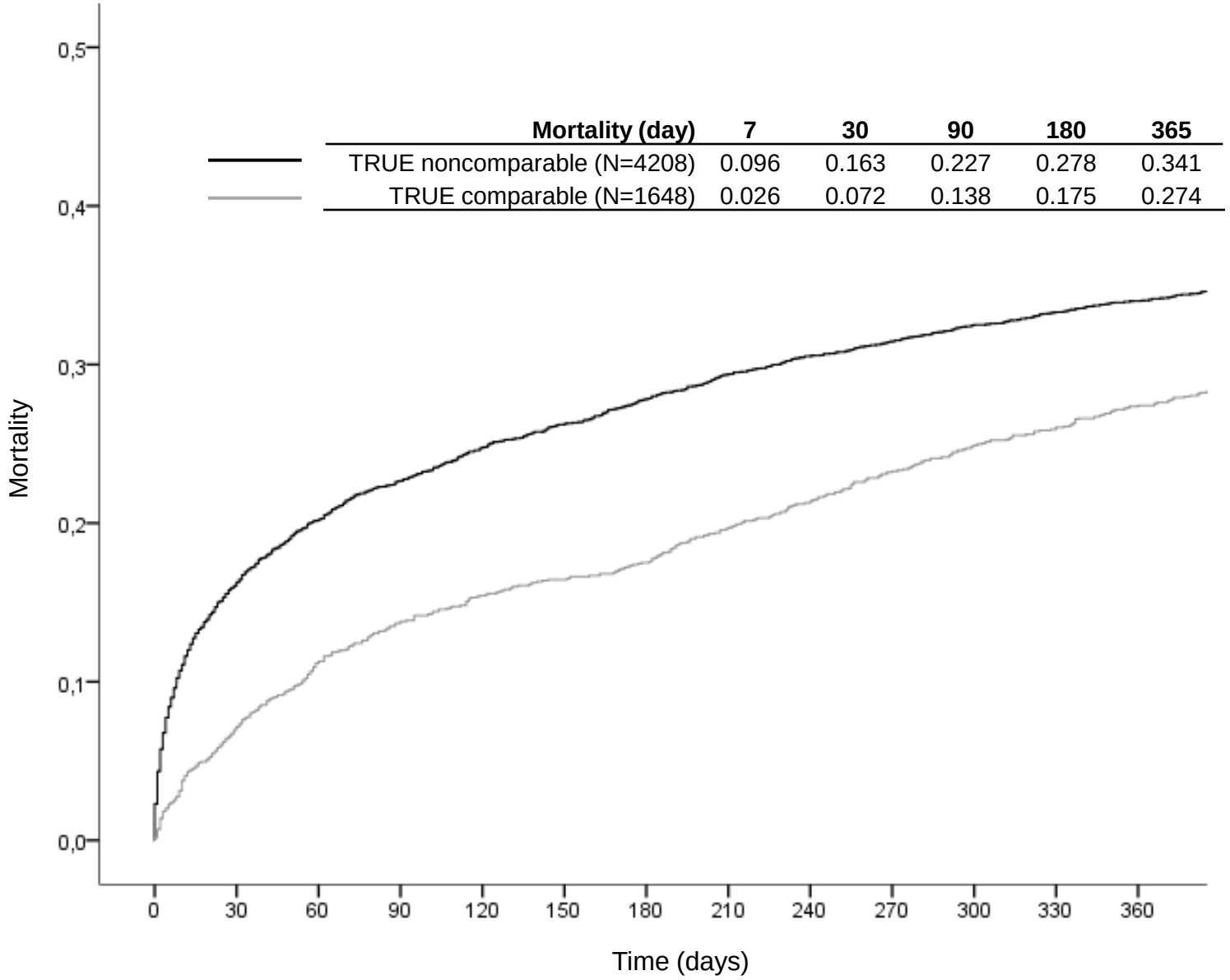
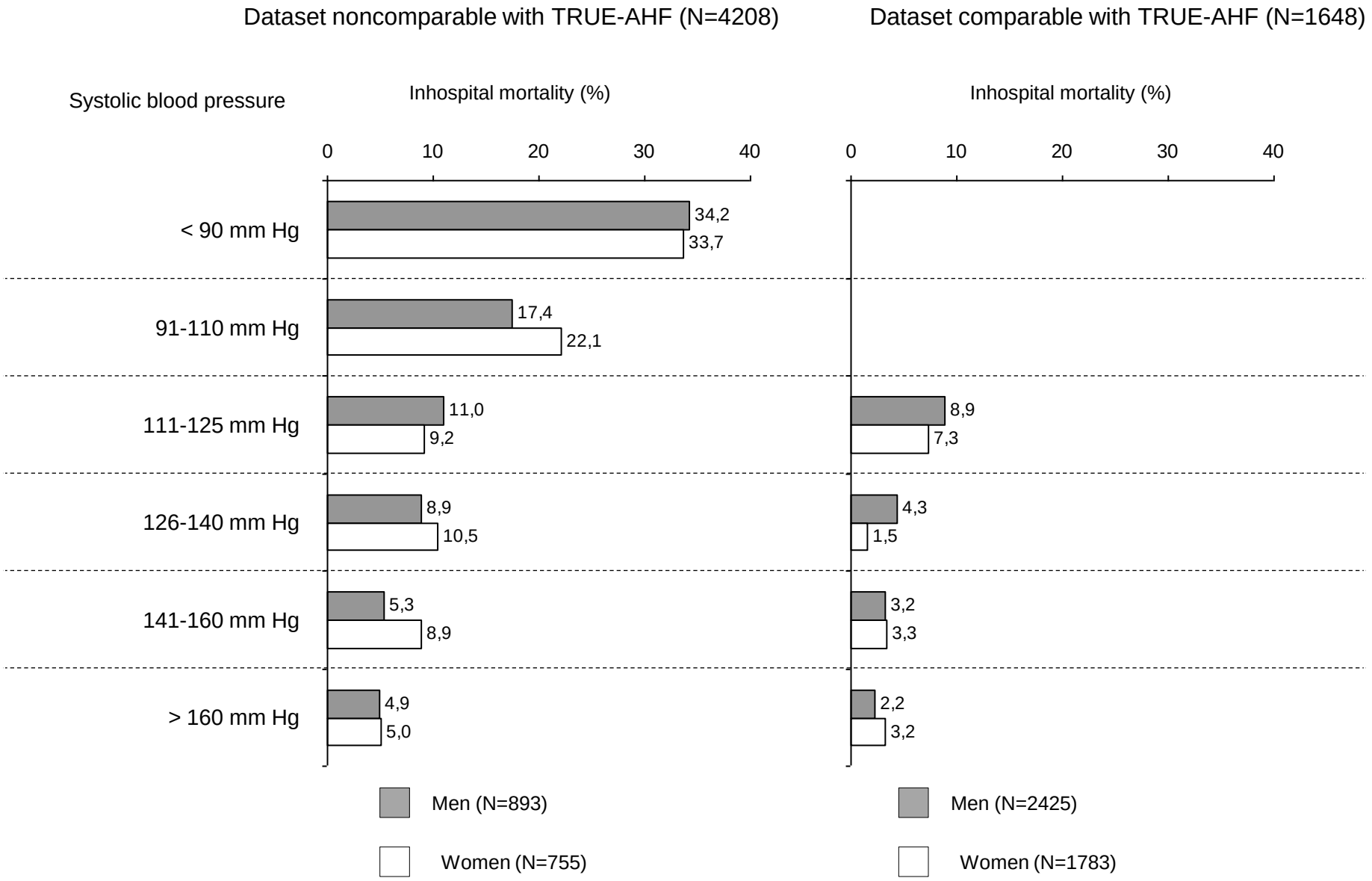
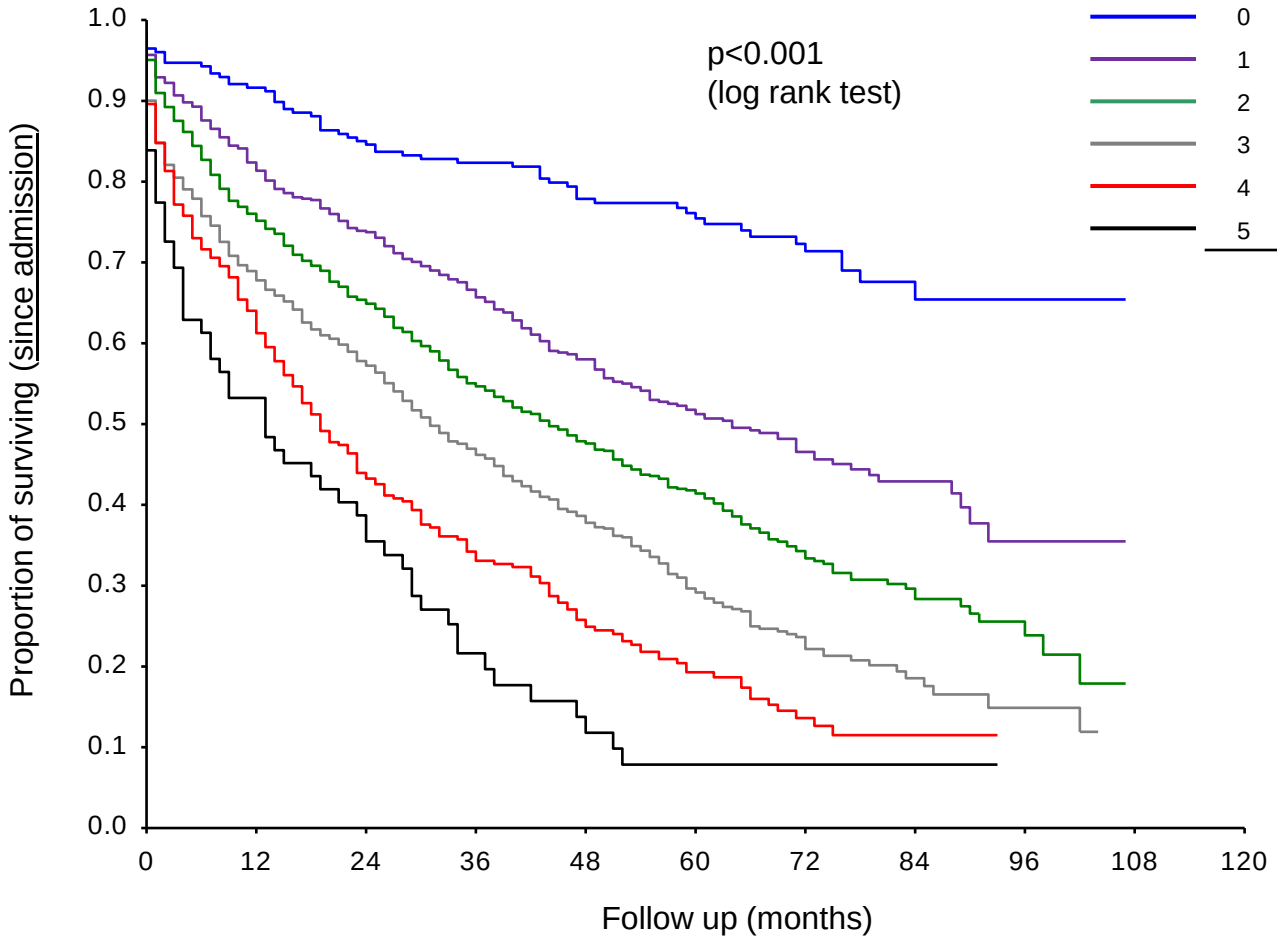


Figure 4 Systolic blood pressure as risk factor for in-hospital mortality



Survival of patients according to AHEAD score I

AHEAD TRUE AHF

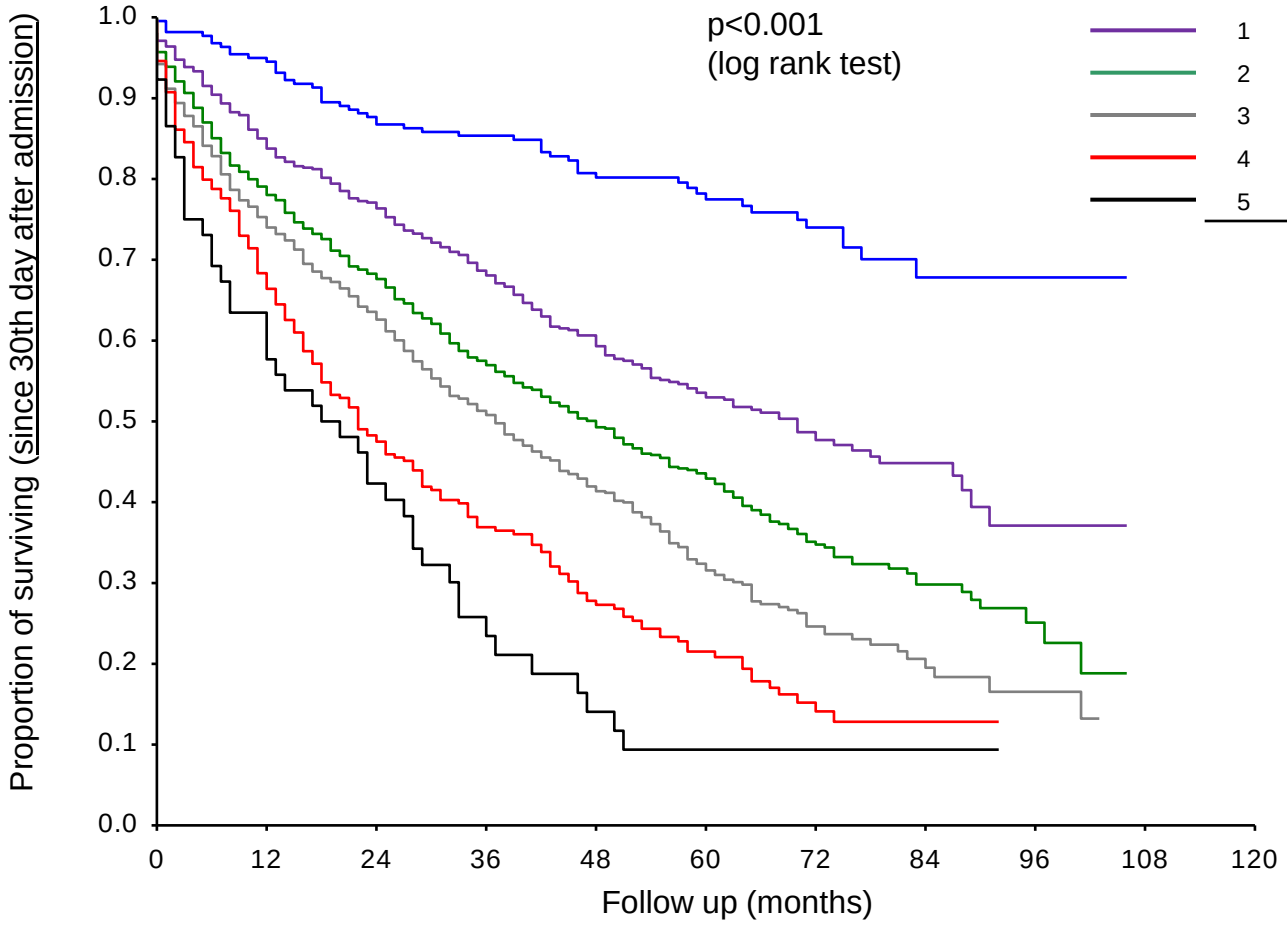


Survival (in given month)

AHEAD Score	1	12	36	60	90
0	0.960	0.916	0.823	0.754	0.654
1	0.929	0.813	0.657	0.512	0.377
2	0.910	0.752	0.547	0.414	0.265
3	0.848	0.678	0.462	0.292	0.165
4	0.848	0.612	0.331	0.193	0.115
5	0.774	0.532	0.216	0.079	0.079

Survival of patients according to AHEAD score II

AHEAD TRUE AHF



AHEAD Score	Survival (in given month)				
	1	12	36	60	90
0	0.982	0.945	0.854	0.775	0.678
1	0.964	0.838	0.681	0.530	0.394
2	0.939	0.780	0.570	0.429	0.269
3	0.912	0.740	0.508	0.316	0.184
4	0.907	0.664	0.369	0.215	0.128
5	0.865	0.577	0.234	0.094	0.094

Děkuji za pozornost