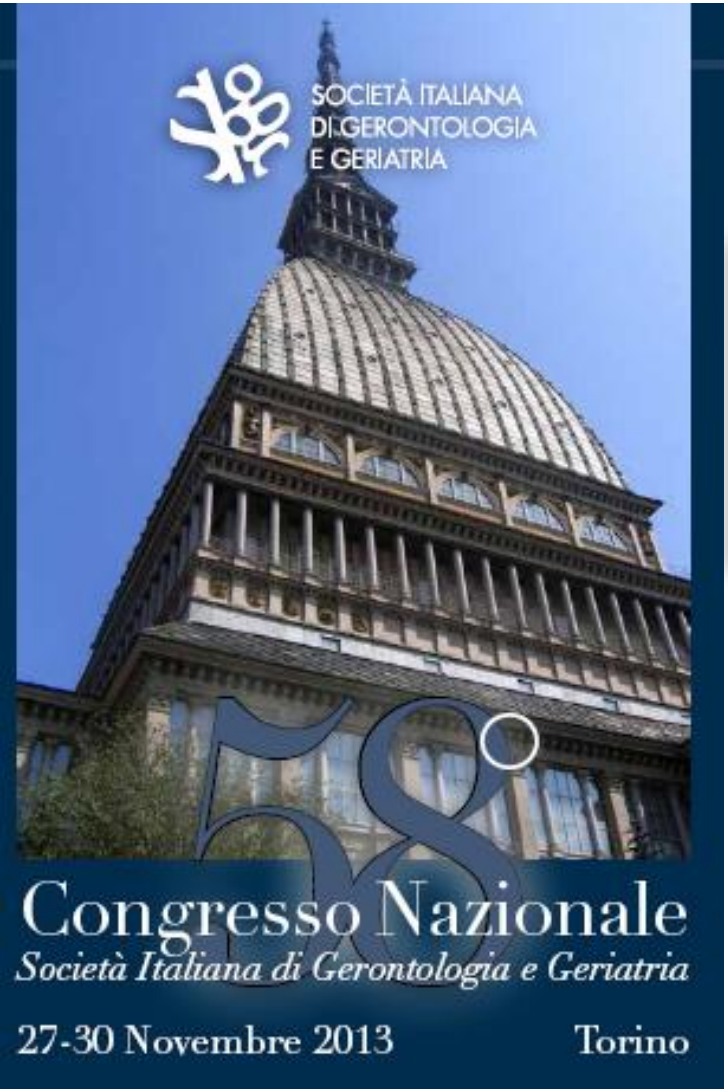

Simposio SIGG - SICGe
Approccio Clinico al cardiopatico ischemico ultraottantenne

[Cosa fa]
Il Cardiologo Interventista
[?]

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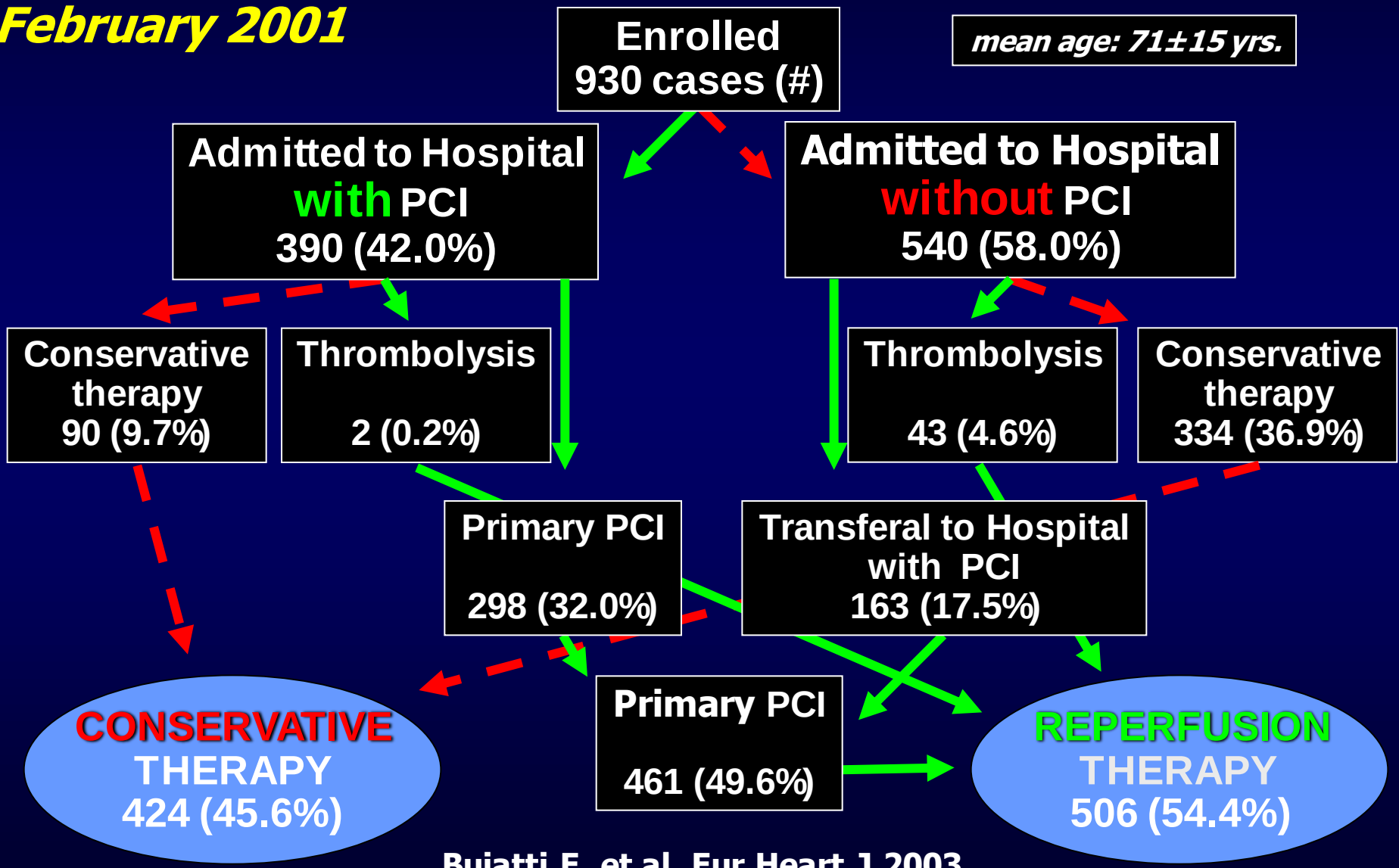
Società Italiana di Cardiologia Geriatrica (SICGe)

THE AMI-FLORENCE REGISTRY (analysis #1)

STE-MI: enrollment & treatment

March 2000 – February 2001



Buiatti E, et al. Eur Heart J 2003

THE AMI-FLORENCE REGISTRY (analysis #2)

Demographic & clinical characteristics, by age group

	Age (years)				
	< 65 (n: 290)	65-74 (n: 246)	75-84 (n: 246)	≥85 (n: 148)	p
Gender (males %)	85.9	71.5	58.1	43.9	<0.001
Comorbidities (n)					
cardiovascular	0.37	0.58	0.88	0.93	<0.001
non-cardiovascular	0.60	1.04	1.35	1.33	<0.001
AMI Characteristics (%)					
Killip class 1	90.0	74.4	54.1	43.9	0.036
Killip class 2	4.5	14.2	18.7	30.4	
Killip class 3-4	5.6	11.4	27.3	25.8	
non anterior, Q waves	54.5	44.3	40.2	25.2	0.008
non-Q	14.8	19.9	25.2	25.0	
Hospital admission (%)					
Directly to hosp. with PCI	52.8	43.1	34.6	31.1	<0.001
Transf. to hosp. with PCI	56.2	47.9	33.5	17.7	<0.001

Barchielli A, et al. J Am Geriatr Soc 2004; 52:1355-60

THE AMI-FLORENCE REGISTRY (analysis #2)

Multivariate predictors of coronary reperfusion therapy utilization, by age group

	Age (years)							
	<65		65-74		75-84		≥85	
Variable	OR	p	OR	p	OR	p	OR	p
Hospital with PCI *	5.10	**<0.001**	5.14	**<0.001**	3.18	**0.001**	3.23	**0.009**
Comorbidity ‡	0.76	0.21	0.67	**0.02**	0.63	**0.004**	0.46	**<0.001**
Killip class >1 #	0.19	0.10	0.18	**<0.001**	0.30	**0.02**	0.28	**0.01**
Non-Q waves AMI °	0.06	**<0.001**	0.03	**<0.001**	0.08	**<0.001**	0.05	**0.008**

*: Yes vs. No; ‡ N° of chronic diseases; #: vs. Killip class 1; °: vs. anterior location

Barchielli A, et al. J Am Geriatr Soc 2004

THE AMI-FLORENCE REGISTRY (analysis #3)

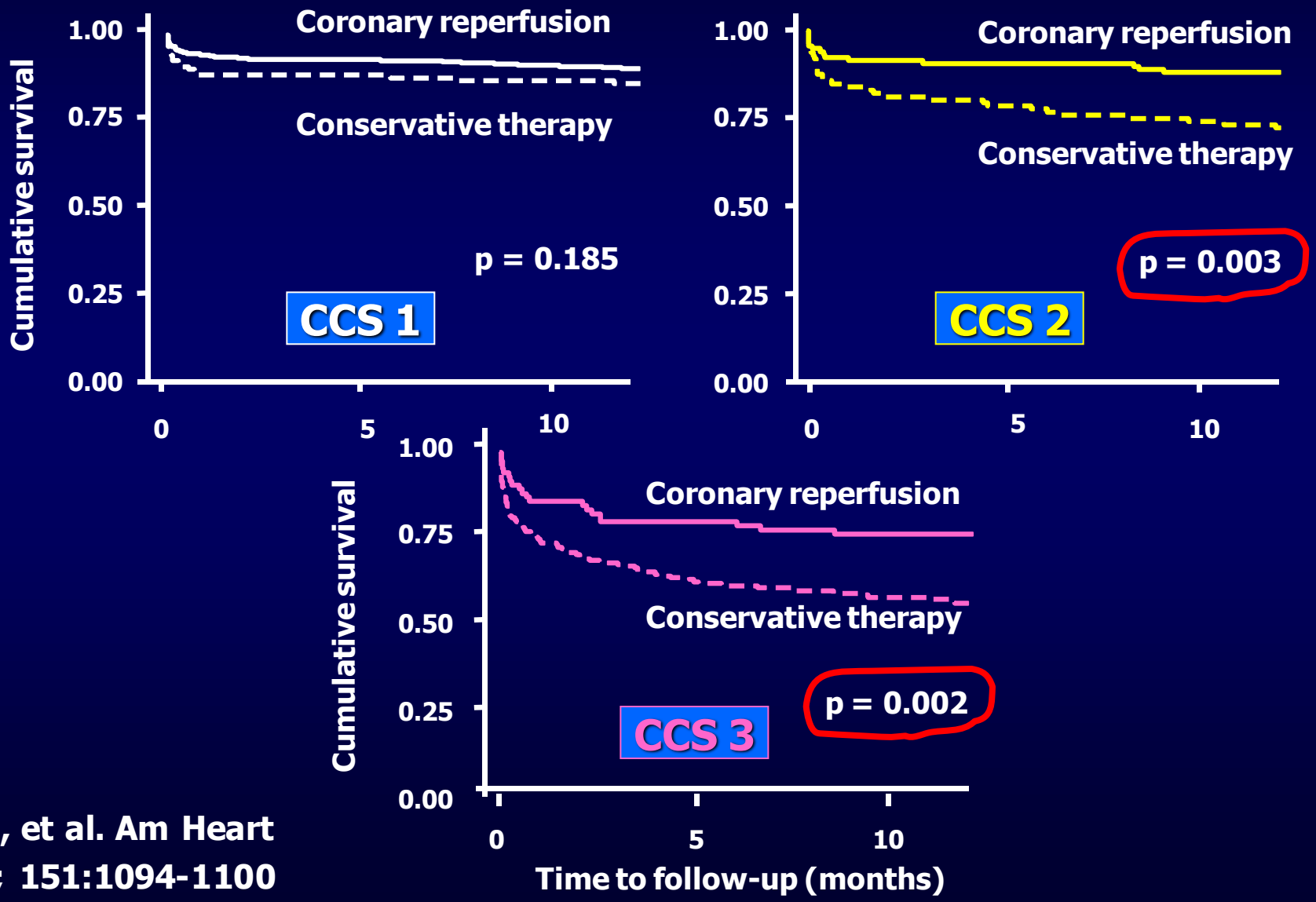
Clinical characteristics and management, by Chronic Comorbidity Score (CCS)

	CCS 1 n: 423	CCS 2 n: 229	CCS 3 n: 268	p
Age (years)	65.9 ± 13.0	71.9 ± 12.6	76.5 ± 9.5	<0.001
Killip class, n (%)				
1	343 (81.1)	162 (70.7)	132 (49.3)	<0.001
2	62 (14.7)	57 (24.9)	111 (41.0)	
3-4	18 (4. 3)	10 (4.4)	27 (9. 3)	
Hosp. admission, n (%)				
Directly to hosp. with PCI	205 (48.5)	99 (43.2)	82 (30.6)	<0.001
Transf. to hosp. with PCI	188 (44.5)	49 (21.5)	55 (20.4)	<0.001
Therapy, n (%)				
Conservative	122 (28.8)	112 (48.9)	182 (67.9)	<0.001
Coronary reperfusion	301 (71.2)	117 (51.1)	86 (32.1)	

Balzi D, et al. Am Heart J 2006; 151:1094-1100

THE AMI-FLORENCE REGISTRY (analysis #3)

1-year survival, by Chronic Comorbidity Score (CCS) & treatment



Balzi D, et al. Am Heart J 2006; 151:1094-1100

Prognostic Stratification of Older Persons Based on Simple Administrative Data: Development and Validation of the "Silver Code," To Be Used in Emergency Department Triage

Mauro Di Bari,[1] Daniela Balzi,[2] Anna T. Roberts,[1] Alessandro Barchielli,[2] Stefano Fumagalli,[1] Andrea Ungar,[1] Stefania Bandinelli,[3] Walter De Alfieri,[4] Luciano Gabbani,[5] and Niccolò Marchionni[1]

Di Bari M, et al. J Gerontol A Biol Sci Med Sci. 2009

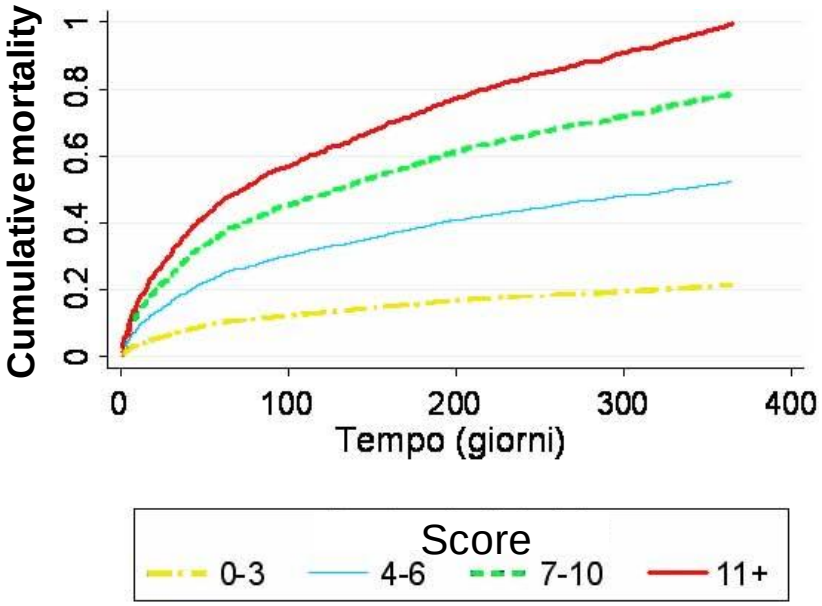
The idea

- Identifying elderly "at risk" using only administrative data
- **Advantages:**
  - Prognostic stratification rapid, low-cost, objective, virtually pre-hospital
  - Risk adjustment in horizontal (across facilities or units) and vertical (across time) comparisons
- **To assess possible advantages, risk-adjusted, of admission of older, complex patients to an Acute Geriatrics versus Internal Medicine Unit**

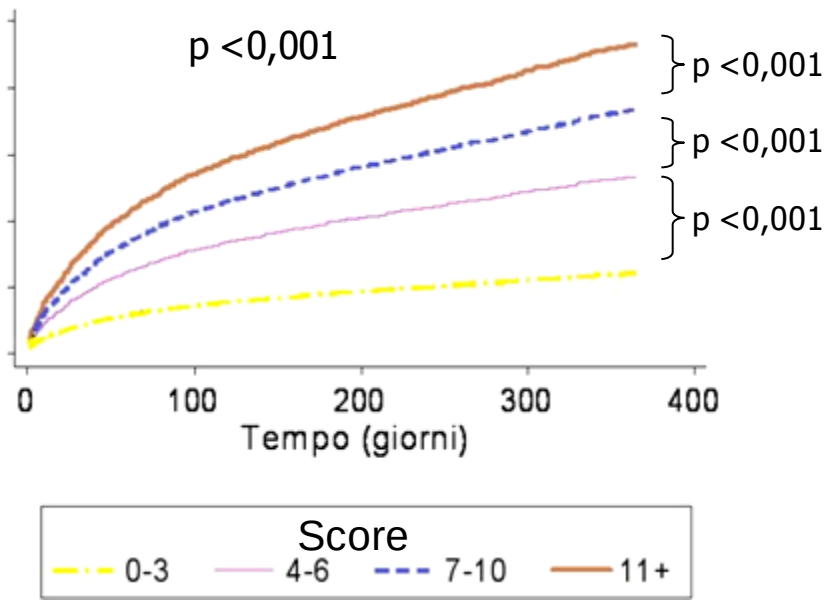
the Journals of gerontology
BIOLOGICAL SCIENCES AND MEDICAL SCIENCES

One-year mortality, by Silver Code class

"Development" subsample



"Validation" subsample



Di Bari M, et al. *J Gerontol Med Sc* 2009

AMI Florence 2 – Silver Code in Acute Coronary Syndromes (ACS)

BACKGROUND

- Incidence of, and fatality from, ACS increase markedly with advancing age
- Percutaneous coronary intervention (PCI) is recommended as the first-line treatment of ACS irrespective of age, but is systematically underused in older, frail individuals

AIMS

- **To verify whether Silver Code predicts application of PCI during ACS**
- **To assess whether, within Silver Code classes, application of PCI improves survival …in 698 participants aged 75+ years**

Di Bari M, et al. Submitted

Multivariable analysis of factors predicting 1-year mortality

Variable	HR (95% CI)	p value
PCI (Yes vs. No)	0.38 (0.27-0.53)	<0.001
Silver Code score	**1.10 (1.07-1.14)**	**<0.001**
History of heart failure (Yes vs. No)	1.46 (1.02-2.08)	0.039
Comorbidity score	1.08 (0.99-1.18)	0.086
Type of infarction (NSTEMI vs. STEMI)	0.61 (0.43-0.85)	0.003
Killip class on admission (II-IV vs. I)	1.44 (1.13-1.84)	0.003
GFRc <30 ml/min/1.73 m^2 (Yes vs. No)	1.39 (0.95-2.02)	0.086
Peak troponin tertile (III vs. I-II)	1.45 (1.08-1.95)	0.014

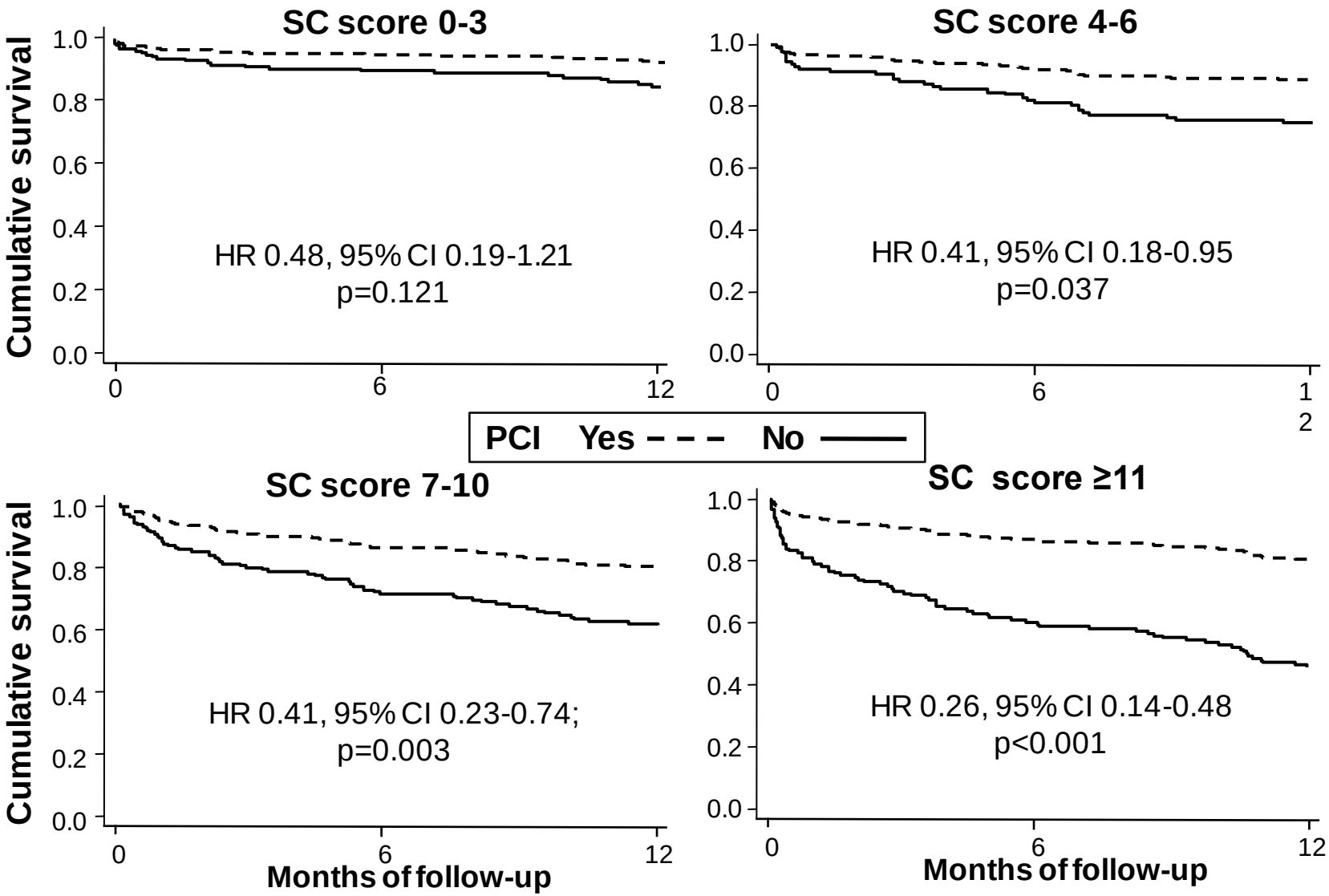
Di Bari M, et al. Submitted

Multivariable analysis of factors predicting application of PCI

Variable	OR (95% CI)	p value
History of CAD (Yes vs. No)	1.72 (1.22-2.43)	0.002
History of heart failure (Yes vs. No)	0.47 (0.27-0.79)	0.005
Silver Code score	**0.89 (0.86-0.93)**	**<0.001**
Admission to hospital with PCI (Yes vs. No)	2.09 (1.45-3.01)	<0.001
Type of infarction (NSTEMI vs. STEMI)	0.34 (0.22-0.51)	<0.001
Killip class in admission (II-IV vs. I)	0.65 (0.47-0.89)	0.008
Hemoglobin <9 g/dl (Yes vs. No)	0.11 (0.02-0.48)	0.003
GFRc <30 ml/min/1.73 m^2 (Yes vs. No)	0.37 (0.21-0.67)	0.001

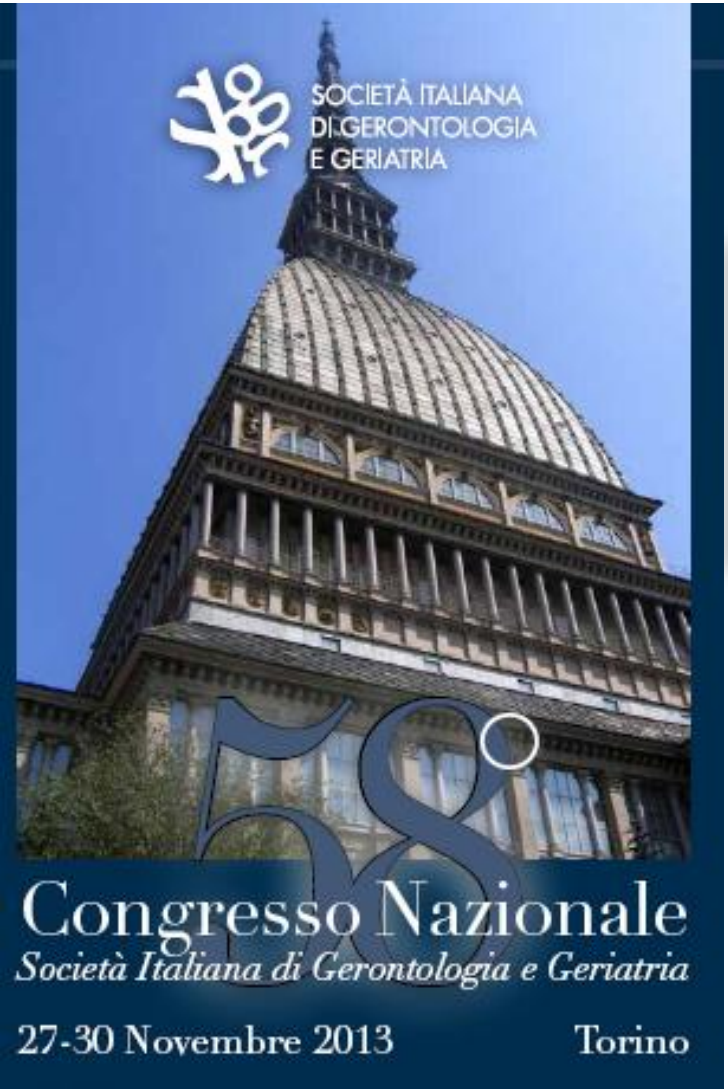
Di Bari M, et al. Submitted

Effectiveness of PCI on 1-year mortality, within Silver Code strata



Di Bari M, et al. Submitted

Adjusted for comorbidity, STEMI vs. NSTEMI, Killip class, low GFR, and peak TpI tertile



Simposio SIGG - SICGe
Approccio Clinico al cardiopatico ischemico ultraottantenne

Il Parere del Geriatra

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Società Italiana di Cardiologia Geriatrica (SICGe)

La Fragilità:
nuovo tema di ricerca in cardiologia

Role of Frailty in Patients With Cardiovascular Disease

Jonathan Afilalo, MD[a,*], Sathya Karunananthan, MSc[b], Mark J. Eisenberg, MD, MPH[c,d], Karen P. Alexander, MD[e], and Howard Bergman, MD[b]

The American Journal of Cardiology

2009

Frail Patients Are at Increased Risk for Mortality and Prolonged Institutional Care After Cardiac Surgery

Dana H. Lee, Karen J. Buth, Billie-Jean Martin, Alexandra M. Yip and Gregory M. Hirsch

Circulation

2010

Evaluation of Multidimensional Geriatric Assessment as a Predictor of Mortality and Cardiovascular Events After Transcatheter Aortic Valve Implantation

Frailty index

Stefan Stortecky, MD,* Andreas W. Schoenenberger, MD,† André Moser, PhD,‡ Bindu Kalesan, PhD,‡ Peter Jüni, MD,‡ Thierry Carrel, MD,§ Seraina Bischoff, RN,* Christa-Maria Schoenenberger, RN,* Andreas E. Stuck, MD,† Stephan Windecker, MD,* Peter Wenaweser, MD*

JACC cardiovascular Interventions

2012

EDITORIAL COMMENT

Frailty Scores and the Writing on the Wall*

Todd M. Dewey, MD

Fragilità: definizione

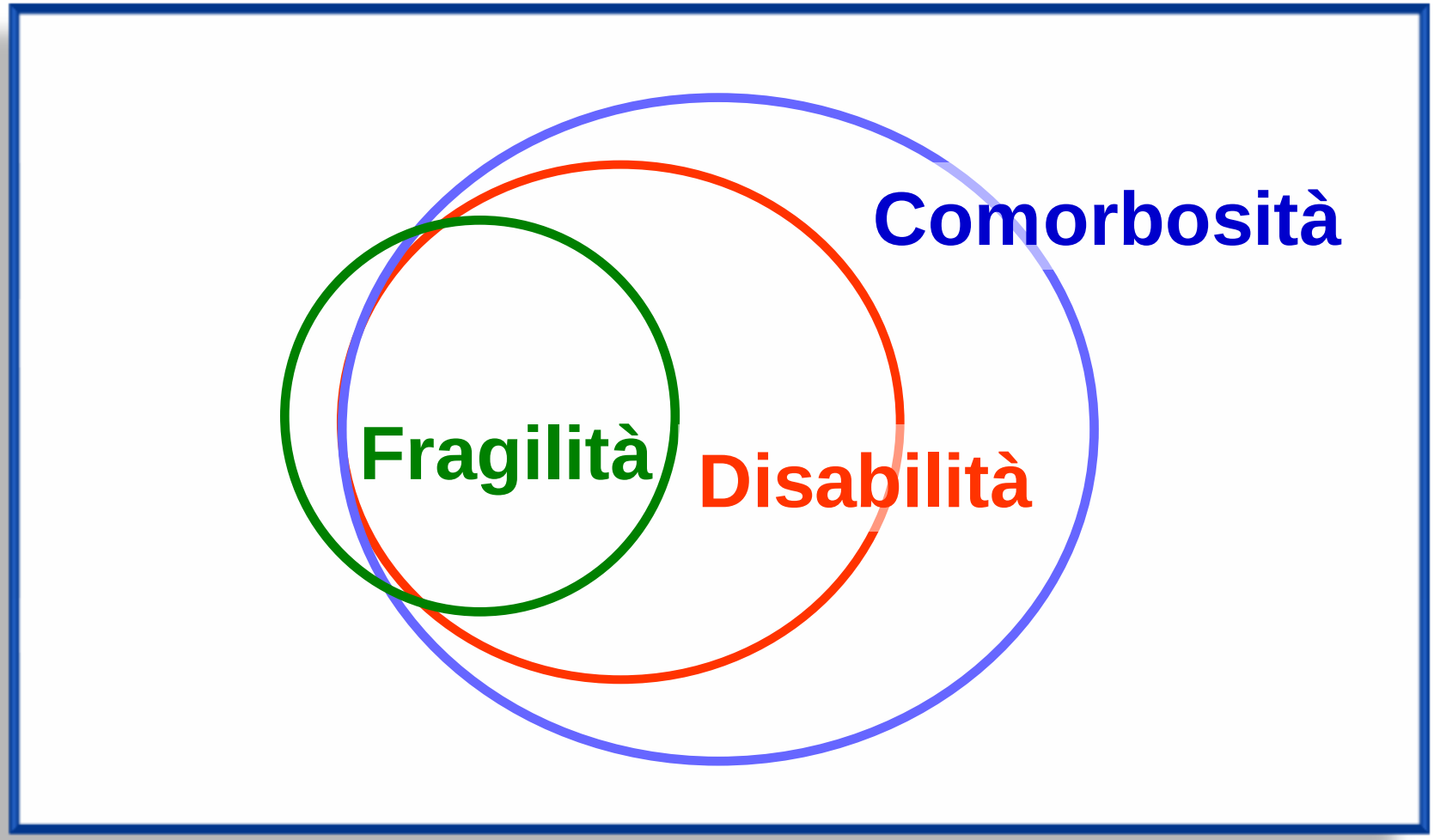
- Sindrome multifattoriale, determinata dalla riduzione della fisiologica riserva funzionale e della capacità di resistere a eventi stressanti ambientali (capacità di omeostasi)
- Comporta un aumentato rischio di eventi clinici: disabilità, ospedalizzazione, istituzionalizzazione, morte
- Condizione complessa e dinamica, della quale si sono proposti numerosi modelli

Definizione operativa di fragilità secondo il Deficit Index - *Canadian Study of Health and Aging*

1. **Very fit** — robust, active, energetic, well motivated and fit; these people commonly exercise regularly and are in the most fit group for their age
2. **Well** — without active disease, but less fit than people in category 1
3. **Well, with treated comorbid disease** — disease symptoms are well controlled compared with those in category 4
4. **Apparently vulnerable** — although not frankly dependent, these people commonly complain of being "slowed up" or have disease symptoms
5. **Mildly frail** — with limited dependence on others for instrumental activities of daily living
6. **Moderately frail** — help is needed with both instrumental and non-instrumental activities of daily living
7. **Severely frail** — completely dependent on others for the activities of daily living, or terminally ill

Rockwood K et al, CMAJ 2005

Relazione fra fragilità, disabilità e comorbosità secondo il Deficit Index



Rockwood K et al, CMAJ 2005

Definizione operativa di fragilità in popolazione anziana generale: Cardiovascular Health Study

1. Forza (handgrip) nel quintile inferiore
2. Velocità del cammino nel quintile inferiore
3. Perdita di peso non intenzionale ≥4,5 kg nell'ultimo anno
4. Facile esauribilità
5. Livello di attività fisica nel quartile inferiore

PHENOTYPE FRAILTY INDEX

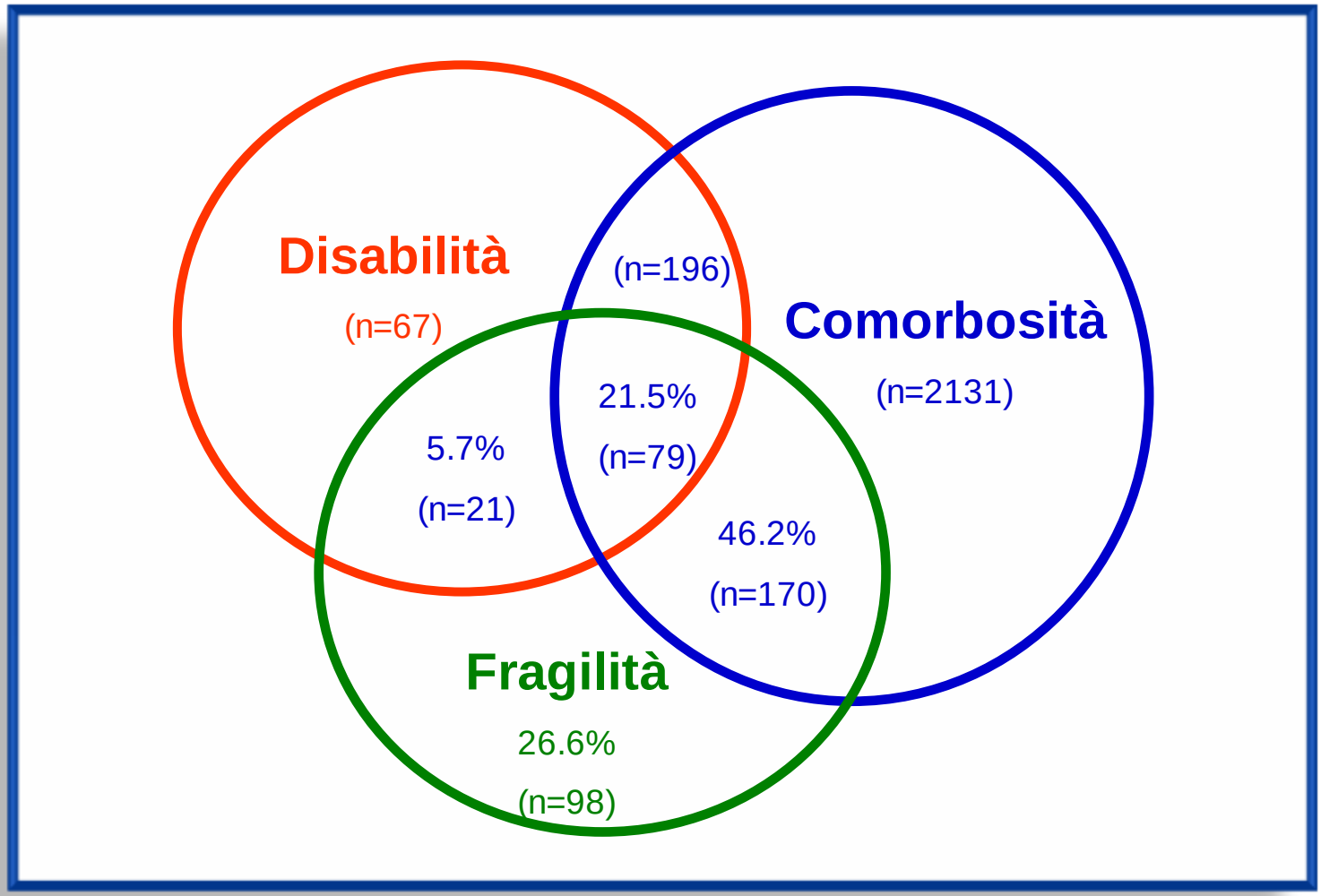
Fragile: ≥3 componenti

Intermedio (prefragile): 1 o 2 componenti

Non fragile (robusto): 0 componenti

Fried L, et al. *J Gerontol* 2001

Relazione fra fragilità, disabilità e comorbosità secondo il Phenotype Frailty Index



Fried L, et al. *J Gerontol* 2001

Short Physical Performance Battery (SPPB)

Test dell'equilibrio

Posizione piedi uniti
per 10 sec → 1 punto

NO → tempo:____ sec
<10 secondi → 0 punti

SI

Posizione semitandem
per 10 sec → 1 punto

NO → tempo:____ sec
<10 secondi → 0 punti

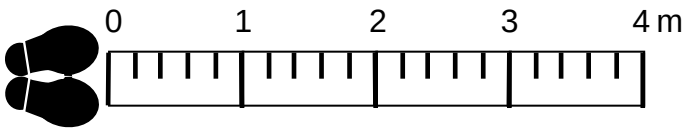
SI

Posizione tandem
tempo:____ sec
per 10 sec → 2 punti
3-9.9 sec → 1 punto
<3 sec → 0 punti

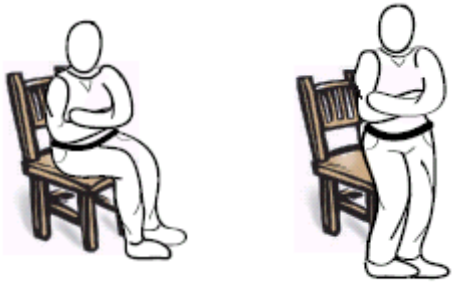
Test della marcia

Tempo per percorrere 4 metri di passo normale: ____sec
(tempo migliore di 2 prove)

<4.8 sec	→ 4 punti
4.8-6.2 sec	→ 3 punti
6.3-8.7 sec	→ 2 punti
>8.7 sec	→ 1 punto
incapace	→ 0 punti



Test della sedia



Capace

Alzarsi e sedersi per 5 volte più velocemente possibile a braccia incrociate

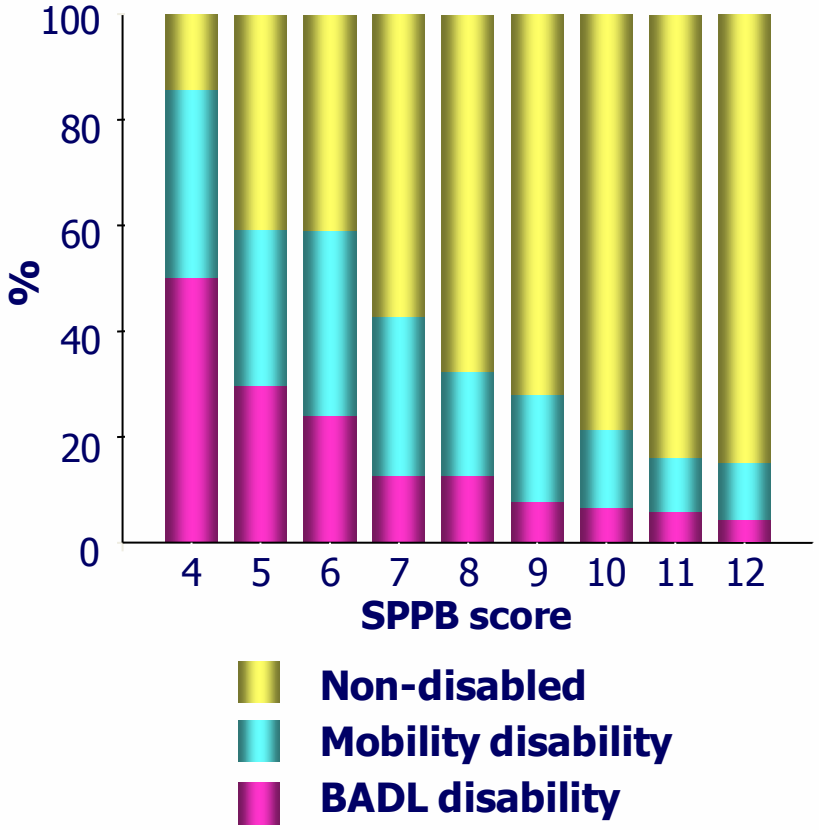
<11.2 sec	→ 4 punti
11.2-13.7 sec	→ 3 punti
13.8-16.7 sec	→ 2 punti
16.8-60 sec	→ 1 punto
>60 sec o incapace	→ 0 punti

Punteggio totale: 0-12

Guralnik et al, *J Gerontol 1994*

Valore prognostico dell'SPPB nell'anziano: studi di popolazione

N= 1122, FU 4 yrs.



Guralnik J, et al. *N Engl J Med* 1995

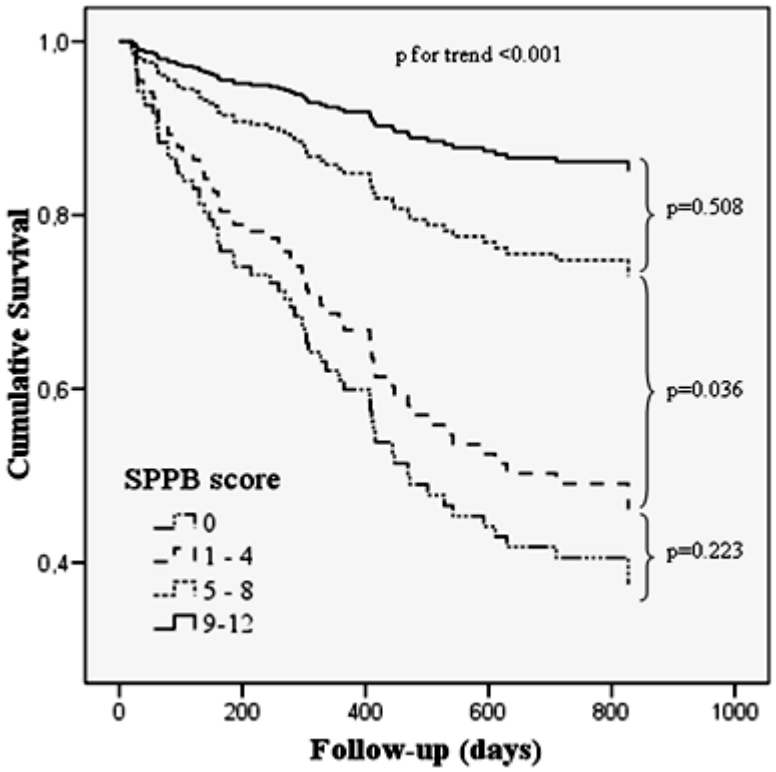
N= 688, FU 8 yrs.

Table 4. Final Parsimonious Cox Proportional Hazard Models Predicting Death, Obtained Using Backward Deletion of Redundant Variables

Models and Variables	Hazard Ratio (95% Confidence Interval)	*P*-value
Model 3		
Index of Coexistent Diseases		.01*
Level 1	1	
Level 2	1.5 (0.9–2.4)	.10
Level 3	1.8 (1.1–3.1)	.02
Level 4	2.2 (1.3–3.6)	.002
Age	1.12 (1.11–1.15)	<.001
Sex (female vs male)	0.5 (0.4–0.6)	<.001
SPPB score	0.93 (0.88–0.99)	.008
MMSE	0.98 (0.94–0.996)	.03

Di Bari M, et al. *JAGS* 2006

Valore prognostico dell'SPPB nell'anziano dopo ospedalizzazione per scompenso cardiaco



MMSE, depression, drug therapy and previous functional status deleted stepwise

	HR (95% CI)	p value
SPPB		0.001*
0	6.1 (2.2-16.8)	0.001
1-4	4.8 (1.6-14.0)	0.004
5-8	2.0 (0.7-5.7)	0.223
9-12	Ref.	–
Sex (M vs. F)	1.2 (0.7-2.0)	0.583
Age (years)	0.98 (0.94-1.02)	0.355
Site (Ferrara *vs.* Florence)	1.9 (0.7-5.4)	0.216
LVEF (%)	0.97 (0.95-0.99)	0.005
CIRS-C	1.5 (1.1-1.98)	0.004
NYHA class	1.5 (1.1-2.2)	0.022

* For trend

Chiarantini D, et al. *J Card Fail* 2010

Lo studio CAPE HORN - (Comprehensive Assessment of Prognosis in Elderly HOspitalized patients ReturNing home)

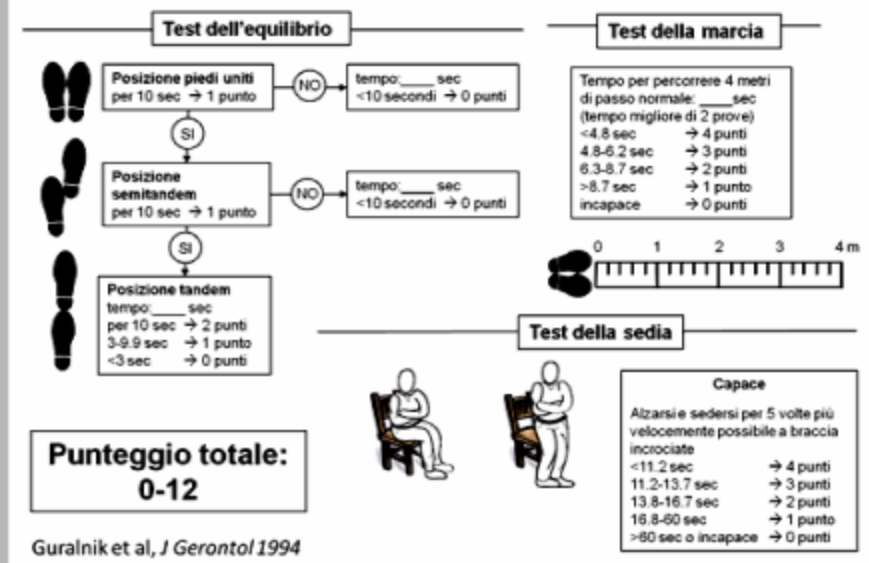
- Studio di coorte prospettico su pazienti anziani in fase di dimissione dall'AOU Careggi (attualmente in corso)
- Stima il valore prognostico di:
  - Valutazione multidimensionale geriatrica con test di performance fisica
  - Marker infiammatori
  - Dati amministrativi (Codice Argento)

Criteri di esclusione

- Decadimento cognitivo moderato-grave (MMSE < 18)
- Impossibilità di camminare per 4 m senza ausilio nelle due settimane precedenti il ricovero
- Diagnosi di SCA e/o aritmie ventricolari con instabilità emodinamica nelle 48 ore precedenti l'arruolamento

Performance Fisica

Short Physical Performance Battery (SPPB)



Guralnik et al, *J Gerontol 1994*

Handgrip Strength (HS) test

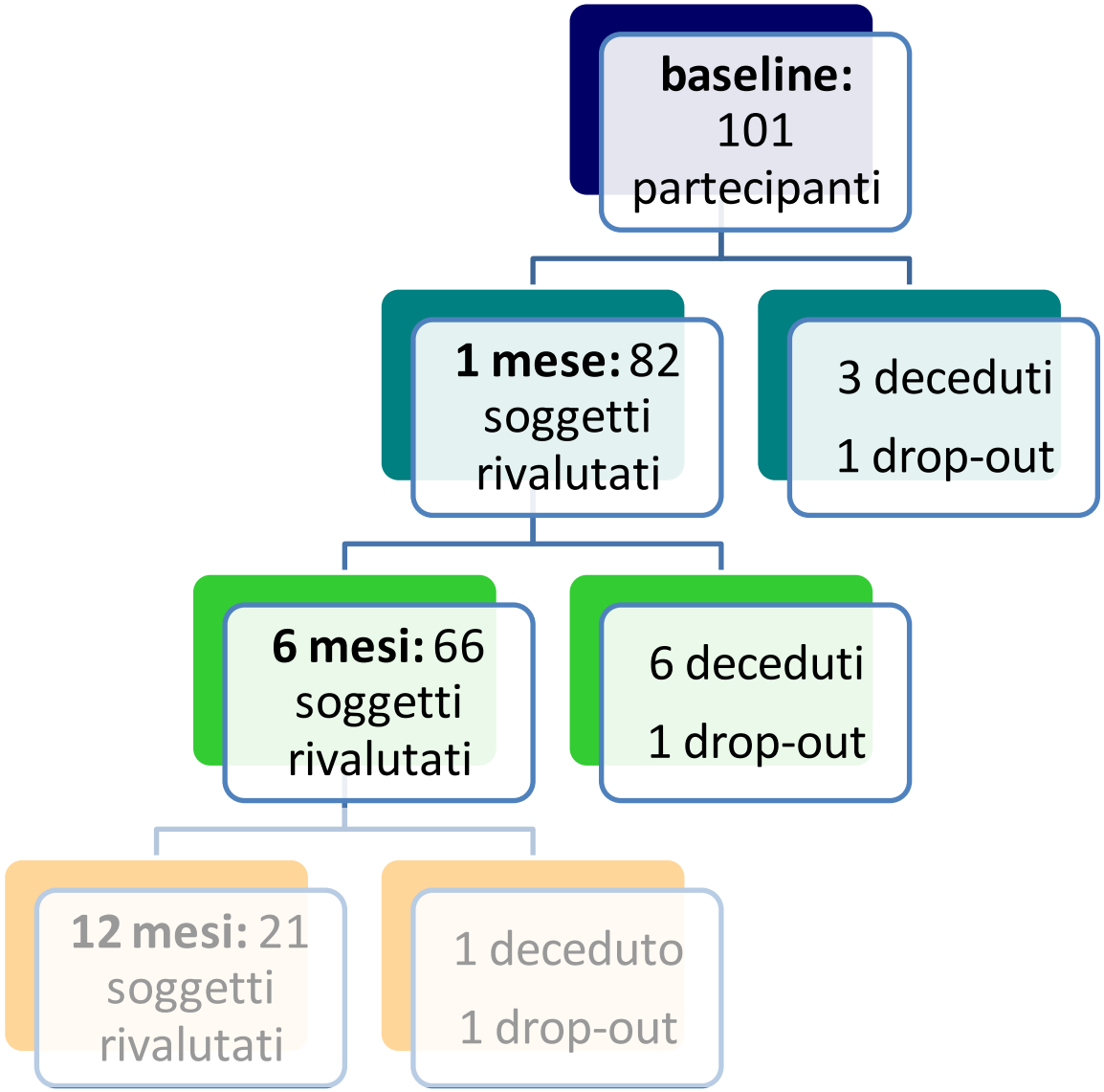
Valutazione della forza di presa della mano dominante mediante dinamometro.

Hillman et al, *Clin Nutr 2005*

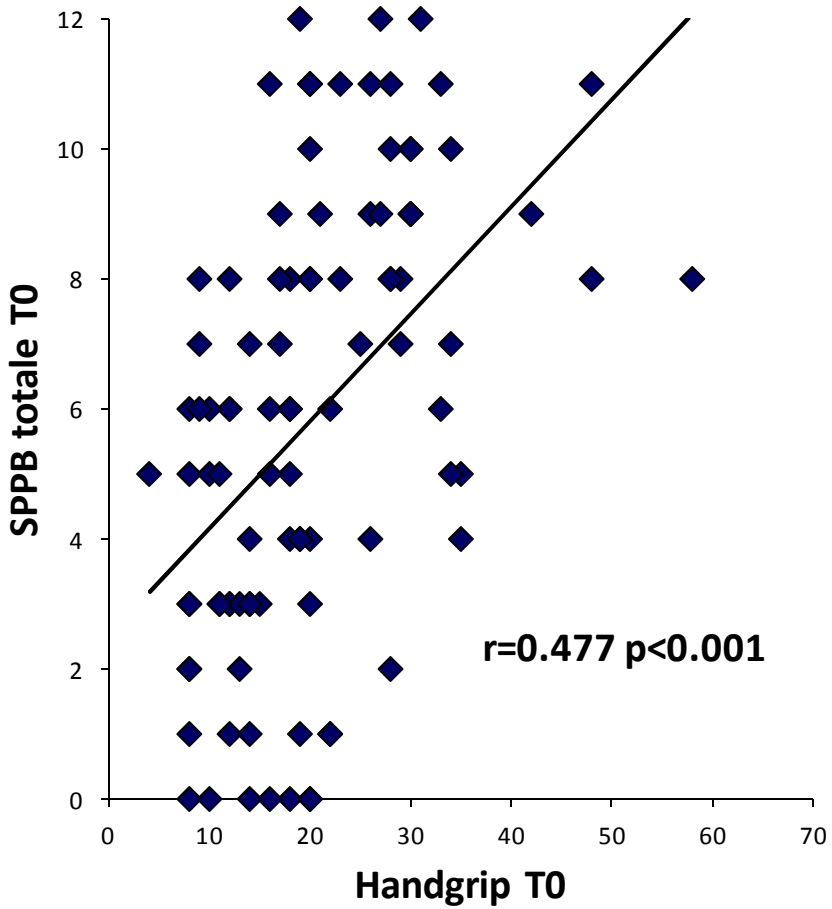
Scopo dello Studio

Confrontare SPPB e HS come predittori delle variazioni dello stato funzionale globale e della prognosi a breve e lungo termine in pazienti anziani in dimissione da un reparto per acuti dopo ricovero per cause mediche

CAPE HORN: Flow-chart al 24.09.2013



Correlazione tra HS ed SPPB



Regressione lineare multipla

SPPB=0.14 x HS – 0.08 x età – 0.27 x sesso – 0.25 x ICED + 12.38

R^2= 0.41, p<0.001

Ulteriori predittori esclusi dal modello: MMSE, CDT, GDS, N. farmaci

Fattori associati alla variazione di stato funzionale, baseline - 1 mese

	IADL peggiorate		P	Mobilità peggiorata		P
	No (n=37)	Sì (n=45)		No (n=47)	Sì (n=35)	
Età	82.9±0.9	82.4±0.8	0.687	82.4+0.7	82.9+1.0	0.710
Donne, n (%)	13 (33)	26 (67)	0.041	17 (44)	22 (56)	0.017
gg di ricovero	8.5±1.5	8.2±0.9	0.875	7.6+1.2	9.4+1.1	0.286
MMSE corretto	26.7±0.5	25.5±0.4	0.064	26.4+0.4	25.6+0.5	0.271
CDT	2.9±0.3	3.5±0.3	0.107	2.9+0.2	3.7+0.3	0.036
GDS	5.3±0.5	4.5±0.5	0.230	4.8+0.5	5.0+0.5	0.815
SPPB	6.8±0.5	5.3±0.5	0.058	7.0+0.4	4.6+0.6	0.001
HS (Kg)	23.5±1.9	18.1±1.5	0.024	22.3+1.7	18.0+1.5	0.066

Nessuno dei fattori valutati era associato al peggioramento **BADL**

In un modello logistico multivariato, SPPB era l'unico predittore indipendente di declino nella mobilità: OR 1.34, 95% CI 1.10-1.63, p=0.003.

Fattori associati alla variazione di stato funzionale, baseline - 6 mesi

	IADL peggiorate		P	Mobilità peggiorata		P
	No (n=28)	Sì (n=38)		No (n=27)	Sì (n=39)	
Età	81.2±0.9	83.7±1.1	0.065	81.6±0.8	83.4±0.9	0.164
⇨ Donne, n (%)	7 (23)	23 (77)	0.004	6 (20)	24 (80)	0.002
gg di ricovero	8.5±2.0	7.4±0.8	0.569	8.1±2.0	7.7±0.7	0.862
MMSE corretto	26.6±0.4	25.8±0.5	0.251	26.3±0.5	26.0±0.5	0.734
CDT	3.0±0.3	3.2±0.3	0.507	2.6±0.3	3.4±0.3	0.070
GDS	5.0±0.6	5.3±0.5	0.711	5.0±0.7	5.2±0.5	0.776
⇨ SPPB	7.6±0.5	5.3±0.5	0.003	7.8±0.5	5.2±0.5	0.001
⇨ HS (Kg)	25.8±2.2	17.0±1.3	0.001	25.0±2.2	17.9±1.5	0.007

Nessuno dei fattori valutati era associato al peggioramento **BADL**

Il punteggio SPPB basale prediceva indipendentemente il peggioramento a sei mesi sia nelle IADL (per ogni punto: OR 1.22, 95% CI 1.00-1.50; p=0.051) **che nella mobilità** (per ogni punto: OR 1.30, 95% CI 1.04-1.62; p=0.019).

Il sesso femminile era l'unica altra covariata associata a questi esiti (p = 0.024 e 0.010)

Outcome "hard" a 6 mesi

In sei mesi:

- Cadute: 29%
- Nuovo accesso al PS o ricovero ospedaliero : 42%
- Exitus: 12%

} Esito combinato: 60% (45/75).

✓ Il **punteggio SPPB** si è dimostrato l'**unico predittore indipendente dell'esito combinato** (per ogni punto : OR 1.19, 95% CI 1.01-1.39; p=0.034) e prediceva separatamente anche il rischio di nuovo accesso in PS o di ri-ammissione in ospedale (OR 1.40, 95% CI 1.07-1.82; p=0.013)

✓La **comorbosità** (punteggio ICED) prediceva in modo indipendente il **decesso** (p=0.041)

Gait Speed as an Incremental Predictor of Mortality and Major Morbidity in Elderly Patients Undergoing Cardiac Surgery

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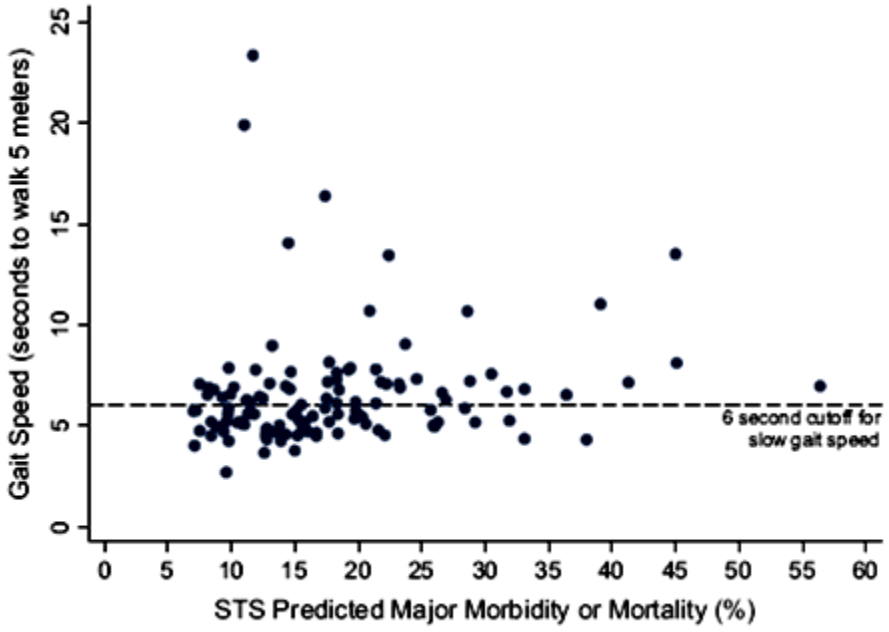
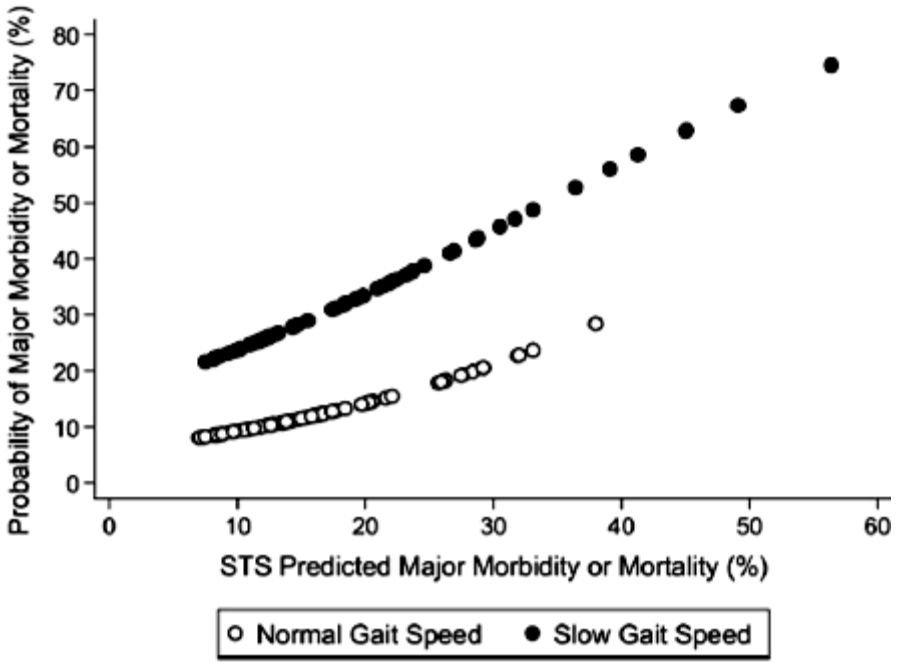
- Age >70 years
- **slow** gait speed: time taken to walk 5 meters of ≥ 6 sec





STS: Society of Thoracic Surgeons score

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Table 3 Incremental Value of Gait Speed Above Core Risk Factors to Predict Mortality or Major Morbidity

	Model Without Gait Speed	Model With Gait Speed
Variables entered in model*		
Age ≥80 yrs	4.22 (1.55–11.47)	3.98 (1.43–11.12)
Female sex	2.25 (0.89–5.71)	1.90 (0.72–5.01)
Previous cardiac surgery	8.1 (1.49–44.09)	7.93 (1.34–47.02)
LVEF <40%	2.17 (0.67–7.05)	1.81 (0.54–6.03)
Left main stenosis ≥50%	0.60 (0.18–1.99)	0.75 (0.22–2.56)
Urgent surgery	1.11 (0.41–3.01)	0.91 (0.33–2.55)
Nonisolated CABG	1.99 (0.70–5.63)	2.15 (0.76–6.07)
Slow gait speed	—	3.17 (1.17–8.59)
Model performance		
AUC†	0.78 (0.69–0.87)	0.81 (0.73–0.89)

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Table 4 Incremental Value of Gait Speed Above the STS Risk Score to Predict Mortality or Major Morbidity

Variables Entered in Model	Model Without Gait Speed	Model With Gait Speed
Variables entered in model*		
STS risk score	1.06 (1.02–1.11)	1.05 (1.004–1.10)
Slow gait speed	—	3.05 (1.23–7.54)
Model performance		
AUC‡	0.70 (0.60–0.80)	0.74 (0.64–0.84)

Conclusioni

- ✓ Di fronte alla crescente popolazione anziana con indicazioni a CABG, PCI, TAVI, è necessario migliorare gli strumenti cardiologici/cardiochirurgici di stratificazione prognostica
- ✓ La performance dei tradizionali strumenti di stratificazione (es.: STS score) migliora con l'inclusione di elementi propri della Valutazione Multidimensionale Geriatrica
- ✓ Il "miglior pacchetto" (parsimonioso ma accurato) di stratificazione – ancora da definire – deve includere almeno un indice di comorbosità e test di performance