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## LA SINCOPE NELL'ANZIANO

# Sincopi e cadute nell'anziano: le “truly unexplained falls”



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SYSTEMATIC REVIEW

Open Access



# Global prevalence of falls in the older adults: a comprehensive systematic review and meta-analysis

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**In the review of 104 studies with a total sample size of 36,740,590, the prevalence of falls in the older people of the world was 26.5% (95% CI 23.4–29.8%). 3**

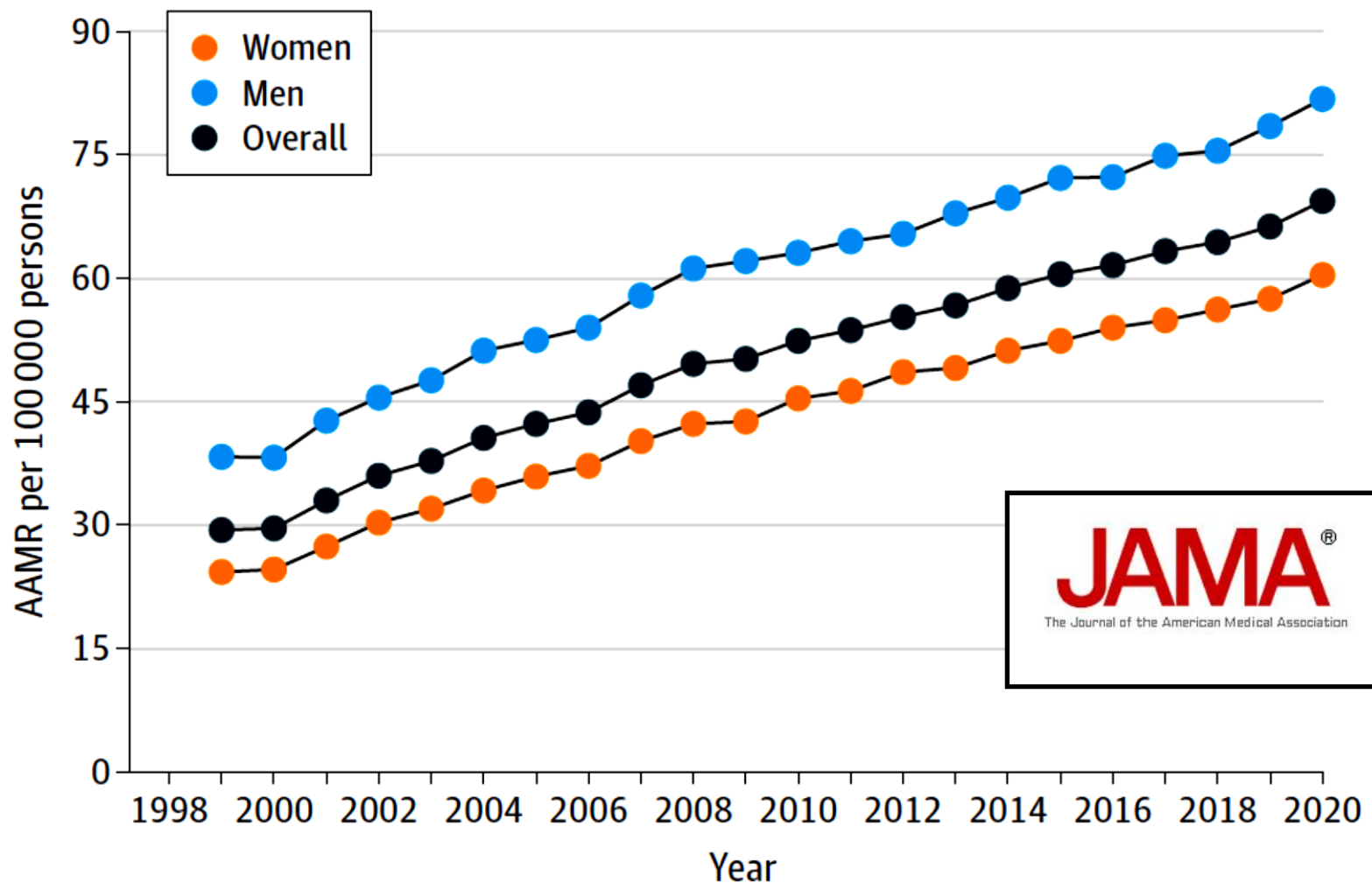
and Google Scholar, Magiran and Scientific Information Database (SID) without any time limit until August 2020. To analyze the eligible studies, the stochastic effects model was used, and the heterogeneity of the studies with the  $I^2$  index was investigated. Data analysis was conducted with Comprehensive Meta-Analysis software (Version 2).

**Results:** In the review of 104 studies with a total sample size of 36,740,590, the prevalence of falls in the older people of the world was 26.5% (95% CI 23.4–29.8%). The highest rate of prevalence of falls in the older people was related to Oceania with 34.4% (95% CI 29.2–40%) and America with 27.9% (95% CI 22.4–34.2%). The results of meta-regression indicated a decreasing trend in the prevalence of falls in the older people of the world by increasing the sample size and increasing the research year ( $P < 0.05$ ).

**Conclusion:** The problem of falls, as a common problem with harmful consequences, needs to be seriously considered by policymakers and health care providers to make appropriate plans for preventive interventions to reduce the rate of falls in the older people.

**Keywords:** Fall, Prevalence, Accident, Systematic review, Meta-analysis

# Age-Adjusted Mortality Rates for Falls Among Adults Aged 65 Years or Older, 1999-2020



AAMR indicates age-adjusted mortality rate

Santos-Lozada AR, JAMA 2023



LA SINCOPE NELL'ANZIANO

## **Sincopi e cadute nell'anziano: le "truly unexplained falls"**

- 
- **Definition**
  - **Clinical findings**
    - *SYD study*
    - *Bermuda triangle*
  - **Diagnostic approach**
  - **Prognosis**
  - **Conclusions**
-



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# World guidelines for falls prevention and management for older adults: a global initiative

Fall	An unexpected event in which an individual comes to rest on the ground, floor, or lower level
Recurrent falls	Two or more falls reported in the previous 12 months
<b>Unexplained fall</b>	<b><u>When no apparent cause has been found for a fall on performing a multifactorial falls risk assessment and it cannot be explained by a failure to adapt to an environmental hazard or by any other gait or balance abnormality</u></b>
Severe fall	Fall with injuries that are severe enough to require a consultation with a physician; result in the person lying on the ground without capacity to get up for at least one hour; prompt a visit to the emergency room (ER); associated with loss of consciousness

# Differential diagnosis between 'unexplained' fall and syncopal fall: a difficult or impossible task

Paolo Alboni<sup>a</sup>, Paola Coppola<sup>b</sup>, Nicola Stucci<sup>b</sup> and Vassiliki Tsakiridu<sup>b</sup>

Falls may be accidental (because of slipping, tripping or environmental hazards) or 'unexplained', when there is no apparent cause. Syncope is a transient loss of consciousness (LOC) and, if it occurs when the person is in the upright position, may lead to a fall. The differential diagnosis between 'unexplained' fall and syncopal fall can be difficult, if not impossible, because many patients have retrograde amnesia after syncope, that is they do not remember their prodromal symptoms. Based on the results of many randomized studies, the international guidelines on falls suggest multifactorial assessment and multifactorial treatment. Unfortunately, however, the vast majority of studies have been carried out on a mixed population of patients who have suffered accidental and 'unexplained' falls. As 'unexplained' falls account for a minority of cases, we really do not know the efficacy of multifactorial treatment in patients with this type of fall. Very recent data seem to prove that many older patients with 'unexplained' falls are

actually affected by reflex syncope with retrograde amnesia, as they experience LOC during tilt testing or carotid sinus massage. Although these data make an important contribution to our knowledge of the mechanism of 'unexplained' falls, the therapeutic problems remain largely unsolved.

J Cardiovasc Med 2015, 16:82–89

**Keywords:** carotid sinus massage, fall, syncope, tilt testing

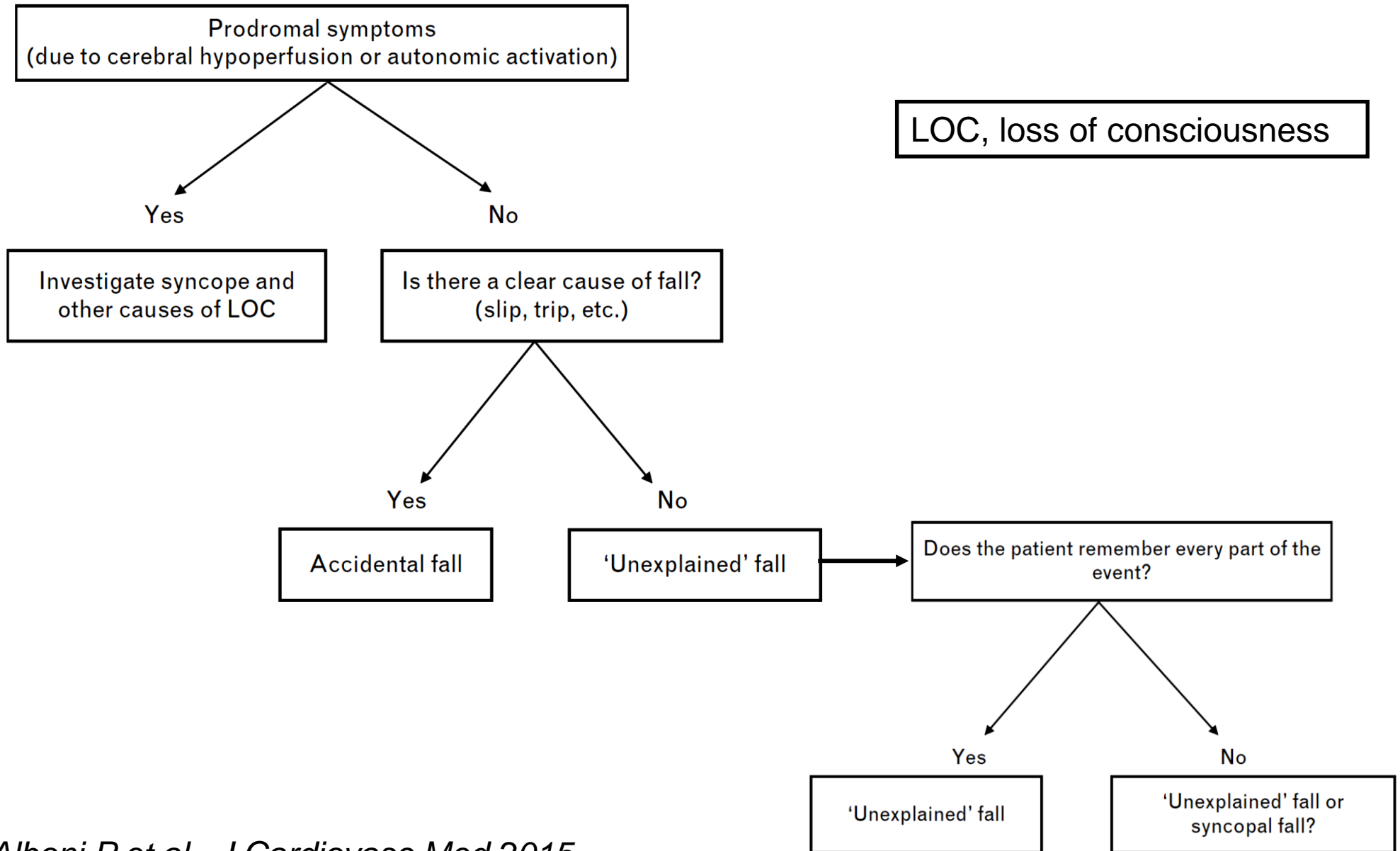
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Correspondence to Dr Paolo Alboni, Section of Cardiology, Ospedale Privato Quisisana, Viale Cavour 128, 44121 Ferrara, Italy  
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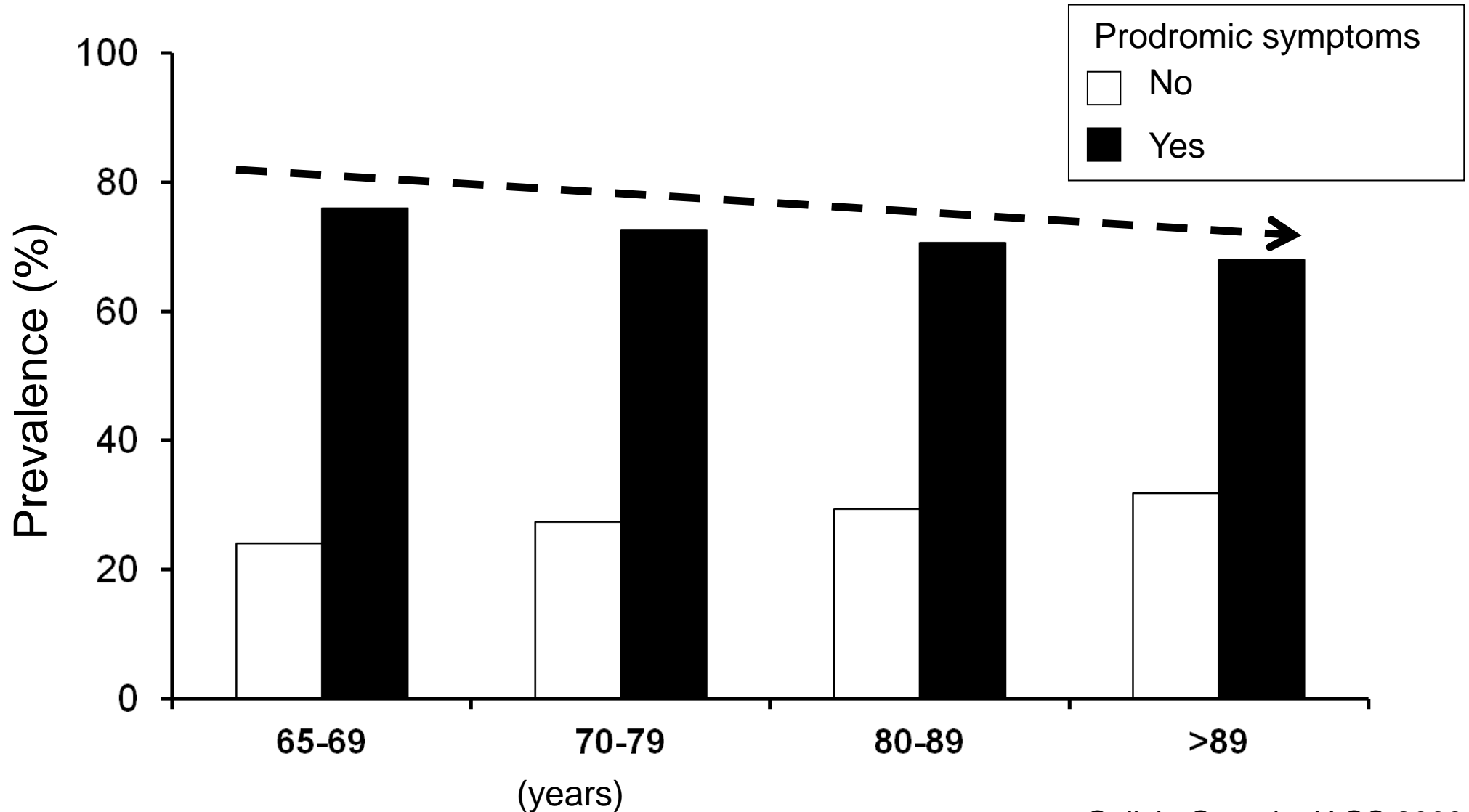
**A difficult or impossible task !!**

# Investigative pathway in patients with falls of uncertain origin

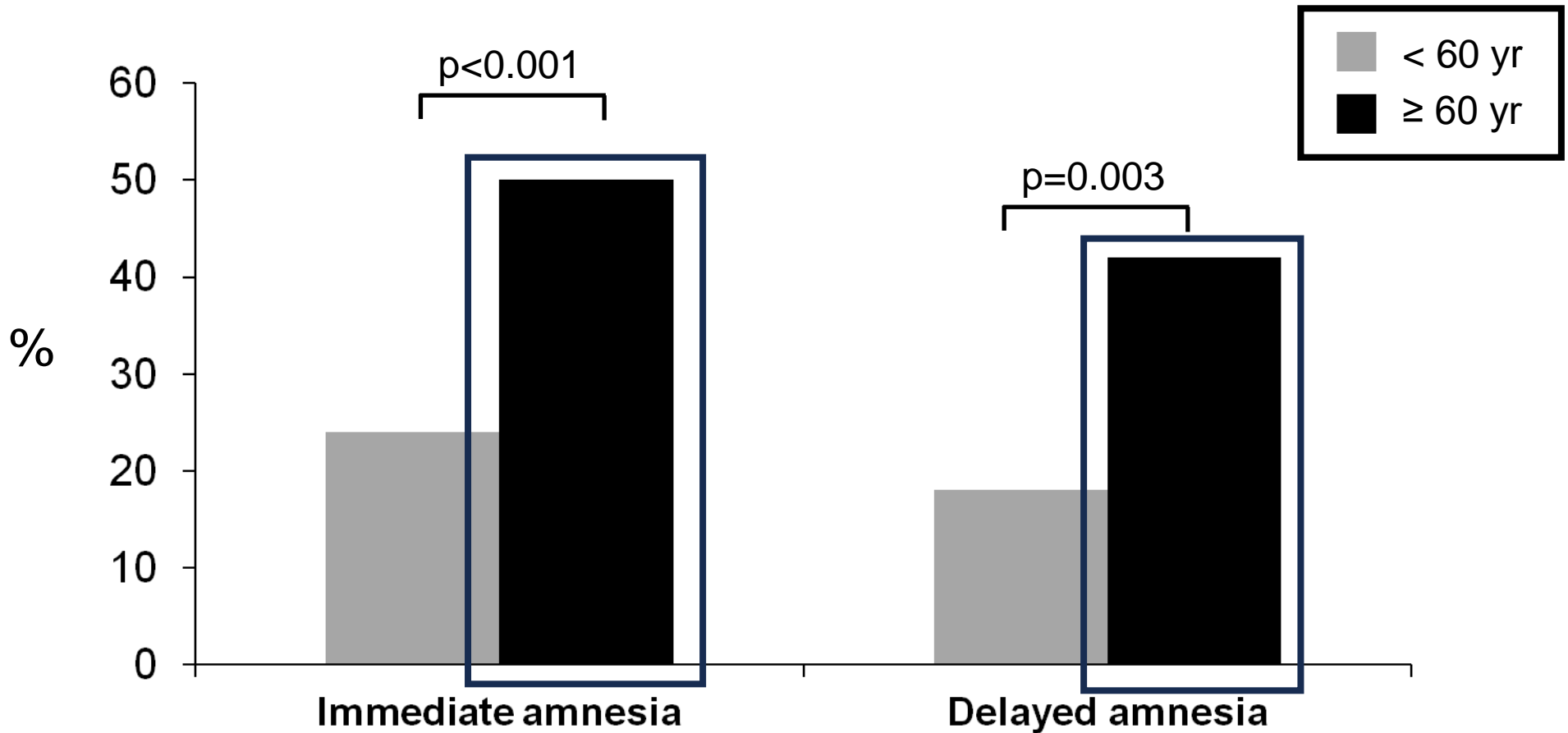




# Prevalence of syncope and prodromic symptoms stratified for age

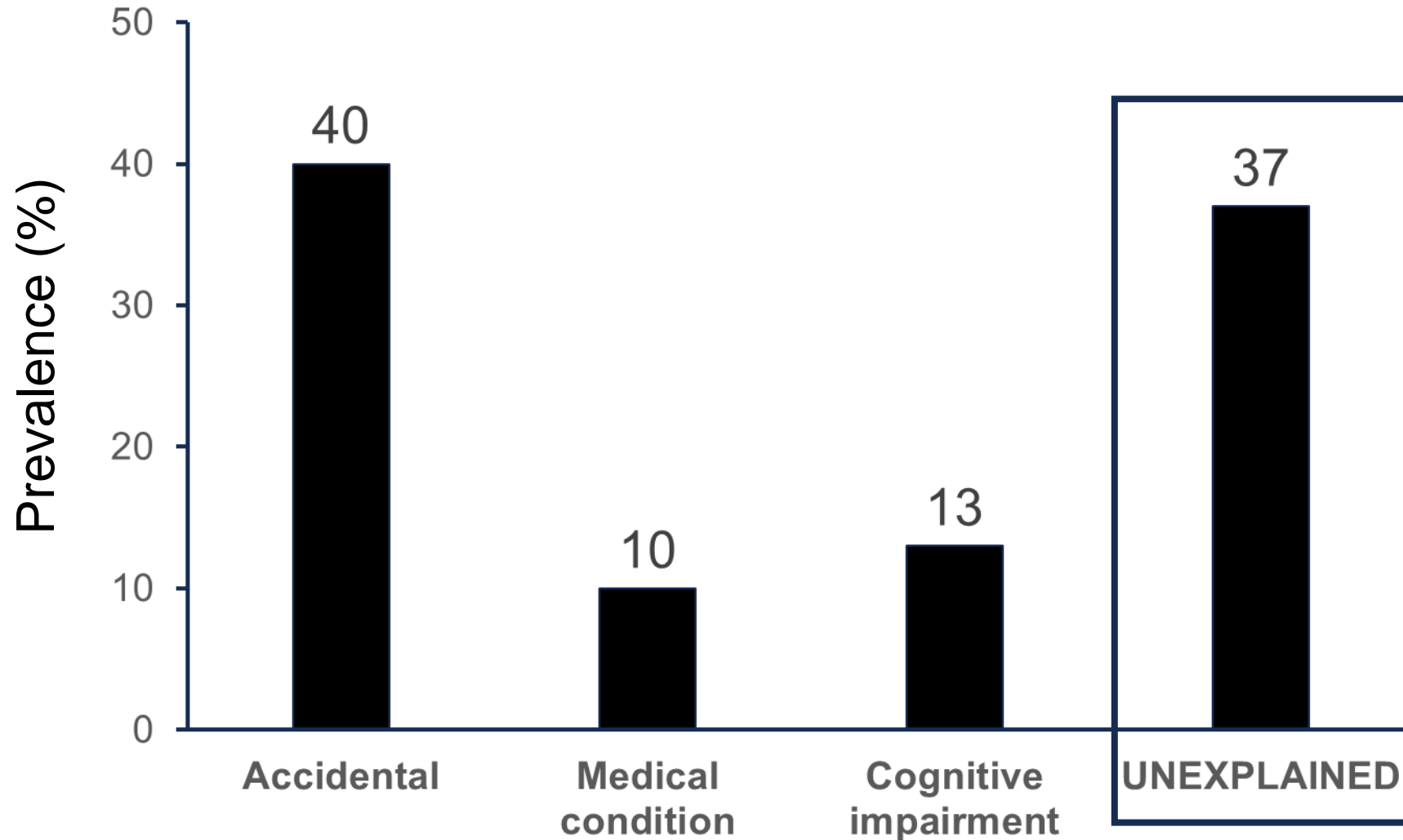


# Age-related difference of amnesia for loss of consciousness is common in vasovagal syncope



# Unexplained Falls Are Frequent in Patients with Fall-Related Injury Admitted to Orthopaedic Wards

## The UFO Study (Unexplained Falls in Older Patients)





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## European Journal of Internal Medicine

journal homepage: [www.elsevier.com/locate/ejim](http://www.elsevier.com/locate/ejim)



Original article

### Truly unexplained falls after evaluation for syncope: A new diagnostic entity with severe prognosis

Andrea Ungar<sup>a,\*</sup>, Alice Ceccofiglio<sup>a</sup>, Chiara Mussi<sup>b</sup>, Mario Bo<sup>c</sup>, Giulia Rivasi<sup>a</sup>,  
Martina Rafanelli<sup>a</sup>, Anna Maria Martone<sup>d,k</sup>, Giuseppe Bellelli<sup>e</sup>, Franco Nicosia<sup>f</sup>,  
Daniela Riccio<sup>g</sup>, Virginia Boccardi<sup>h</sup>, Elisabetta Tonon<sup>i</sup>, Francesco Curcio<sup>j</sup>, Francesco Landi<sup>l</sup>,  
Pasquale Abete<sup>j</sup>, Enrico Mossello<sup>a</sup>



# Main characteristics of the population by syncope diagnostic workup result - 1

	Truly Unexplained Fall (n=108)	Syncopal Fall (n=116)	<i>P</i>
Age (mean $\pm$ DS)	84.4 $\pm$ 5.8	83.2 $\pm$ 6.5	0.268
Women (n, %)	67 (62.0)	73 (62.9)	0.913
ADL (mean $\pm$ DS)	3.3 $\pm$ 1.9	2.5 $\pm$ 2.0	0.019
IADL (mean $\pm$ DS)	6.4 $\pm$ 2.3	5.9 $\pm$ 2.4	0.187
SBP, mmHg (mean $\pm$ DS)	128.5 $\pm$ 17.1	128.2 $\pm$ 16.7	0.542
HR, bpm (mean bpm $\pm$ DS)	78.3 $\pm$ 16.0	73.8 $\pm$ 13.2	<0.001
MMSE (mean $\pm$ DS)	15.8 $\pm$ 5.7	18.2 $\pm$ 5.0	0.004
CIRS (mean $\pm$ DS)	3.3 $\pm$ 1.7	3.2 $\pm$ 1.9	0.698
Drugs number (mean $\pm$ DS)	6.4 $\pm$ 3.0	6.2 $\pm$ 2.8	0.873
Pathological ECG (n, %)	34 (31.5)	31 (26.7)	0.463

## Main characteristics of the population by syncope diagnostic workup result - 2

	<b>Truly Unexplained Fall (n=108)</b>	<b>Syncopal Fall (n=116)</b>	<i>P</i>
<b>Injuries (n, %)</b>	<b>77 (71.3)</b>	<b>71 (61.2)</b>	<b>&lt;0.001</b>
Alzheimer disease (n, %)	54 (50.0)	50 (43.1)	0.480
Vascular dementia (n, %)	40 (37.0)	59 (50.9)	0.063
Major depression (n, %)	7 (6.5)	8 (6.9)	0.977
Hypertension (n, %)	82 (75.9)	84 (72.4)	0.818
Coronary Artery disease (n, %)	23 (21.39)	24 (20.7)	0.840
Herat Failure (n, %)	9 (8.3)	11 (9.5)	0.887
Atrial fibrillation (n, %)	25 (23.1)	30 (25.9)	0.679
Diabetes (n, %)	30 (27.8)	24 (20.7)	0.377

## RESEARCH PAPER

# The ‘Bermuda Triangle’ of orthostatic hypotension, cognitive impairment and reduced mobility: prospective associations with falls and fractures in The Irish Longitudinal Study on Ageing

DESMOND O. DONNELL<sup>1,3</sup>, ROMAN ROMERO-ORTUNO<sup>1,3</sup>, SEAN P. KENNELLY<sup>2,3</sup>, DESMOND O’NEILL<sup>2,3</sup>, PATRICK O. DONOGHUE<sup>1,3</sup>, AMANDA LAVAN<sup>1,3</sup>, CONAL CUNNINGHAM<sup>1,3</sup>, PAUL MCELWAIN<sup>2,3</sup>, ROSE ANNE KENNY<sup>1,3</sup>, ROBERT BRIGGS<sup>1,3</sup>

<sup>1</sup>Mercer’s Institute for Successful Ageing, St James’s Hospital, Dublin 8, Ireland

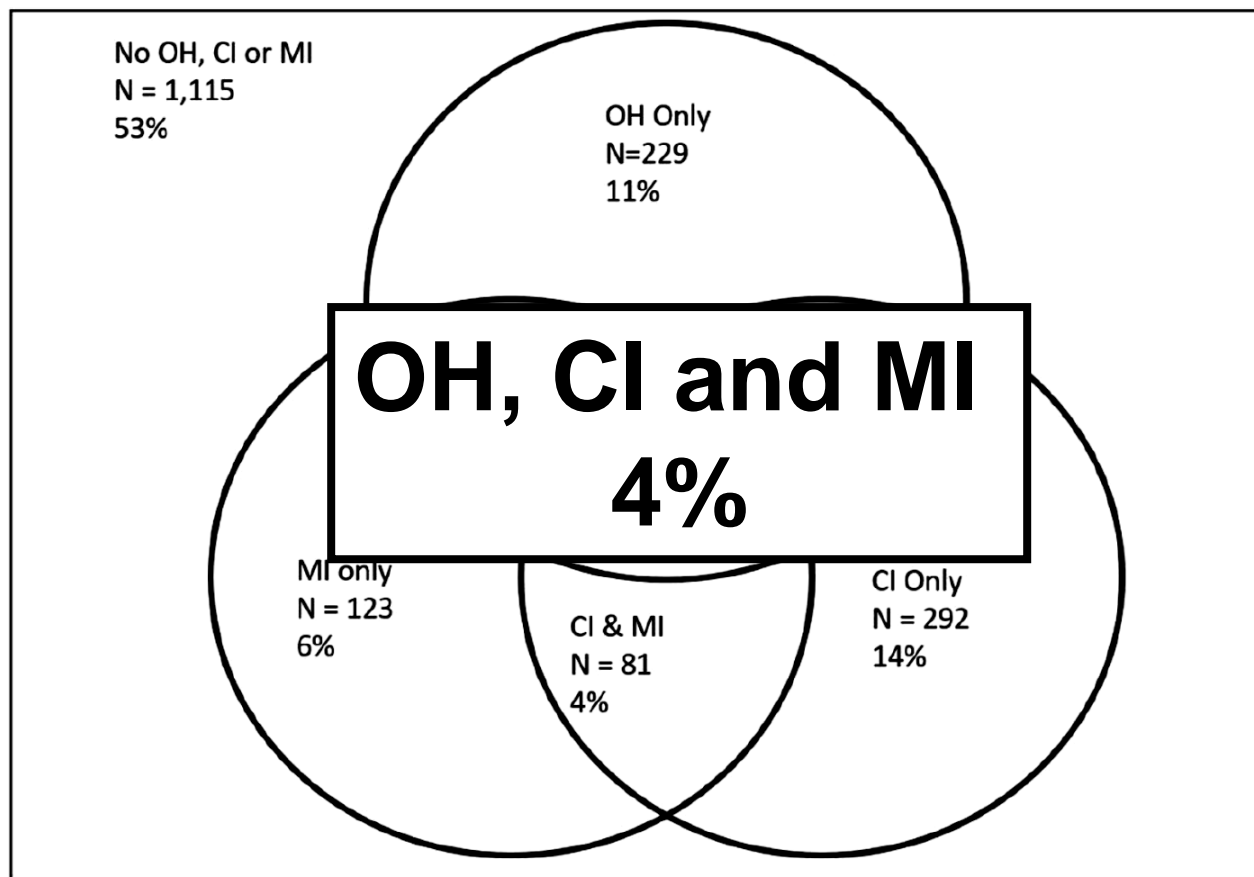
<sup>2</sup>Age-Related Health Care, Tallaght University Hospital, Dublin 24, Ireland

<sup>3</sup>Discipline of Medical Gerontology, Trinity College Dublin, Dublin 2, Ireland



# Clustering of Orthostatic Hypotension (OH), Cognitive Impairment (CI) and Mobility Impairment (MI).

## *The Irish Longitudinal Study on Ageing*



- CI was defined as an MMSE Score  $\leq 24$  and/or self reporting memory as fair or poor.
- MI was defined as a Timed Up and Go Score  $\geq 12$ s.

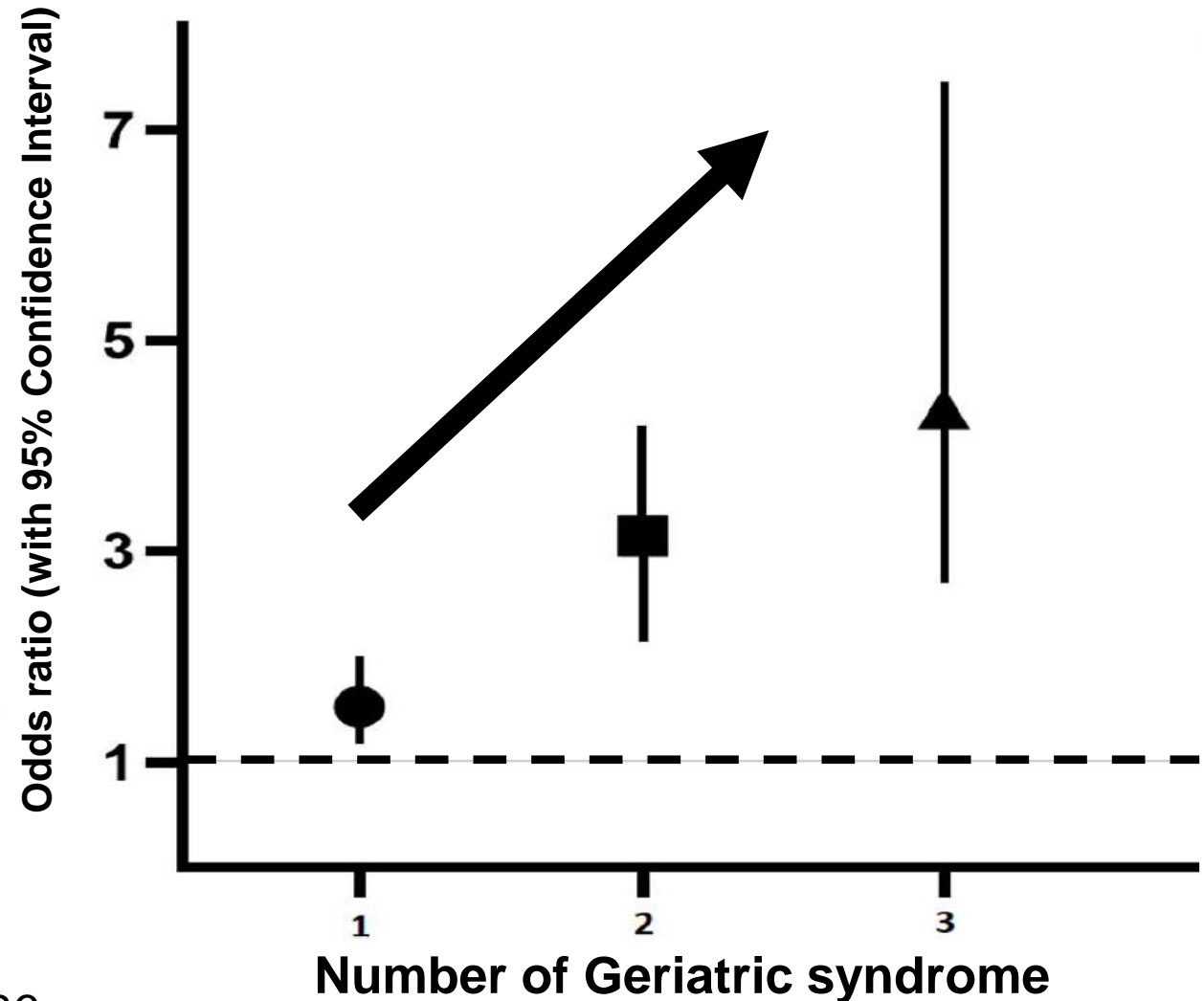
# OR with 95% confidence intervals with unexplained falls as dependent variables by number of geriatric syndromes

## *The Irish Longitudinal Study on Ageing*

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### Analysis adjusted for:

- follow up time
- Age
- Sex
- educational attainment
- alcohol excess
- heart disease
- Polypharmacy
- chronic disease burden.





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## European Journal of Internal Medicine

journal homepage: [www.elsevier.com/locate/ejim](http://www.elsevier.com/locate/ejim)



Original Article

### Differential diagnosis of unexplained falls in dementia: Results of “Syncope & Dementia” registry



Enrico Mossello<sup>a</sup>, Alice Ceccofiglio<sup>a</sup>, Martina Rafanelli<sup>a</sup>, Angela Riccardi<sup>a</sup>, Chiara Mussi<sup>b</sup>, Giuseppe Bellelli<sup>c</sup>, Franco Nicosia<sup>d</sup>, Mario Bo<sup>e</sup>, Daniela Riccio<sup>f</sup>, Anna Maria Martone<sup>g</sup>, Assunta Langellotto<sup>h</sup>, Elisabetta Tonon<sup>i</sup>, Gabriele Noro<sup>j</sup>, Pasquale Abete<sup>k</sup>, Andrea Ungar<sup>a,\*</sup>

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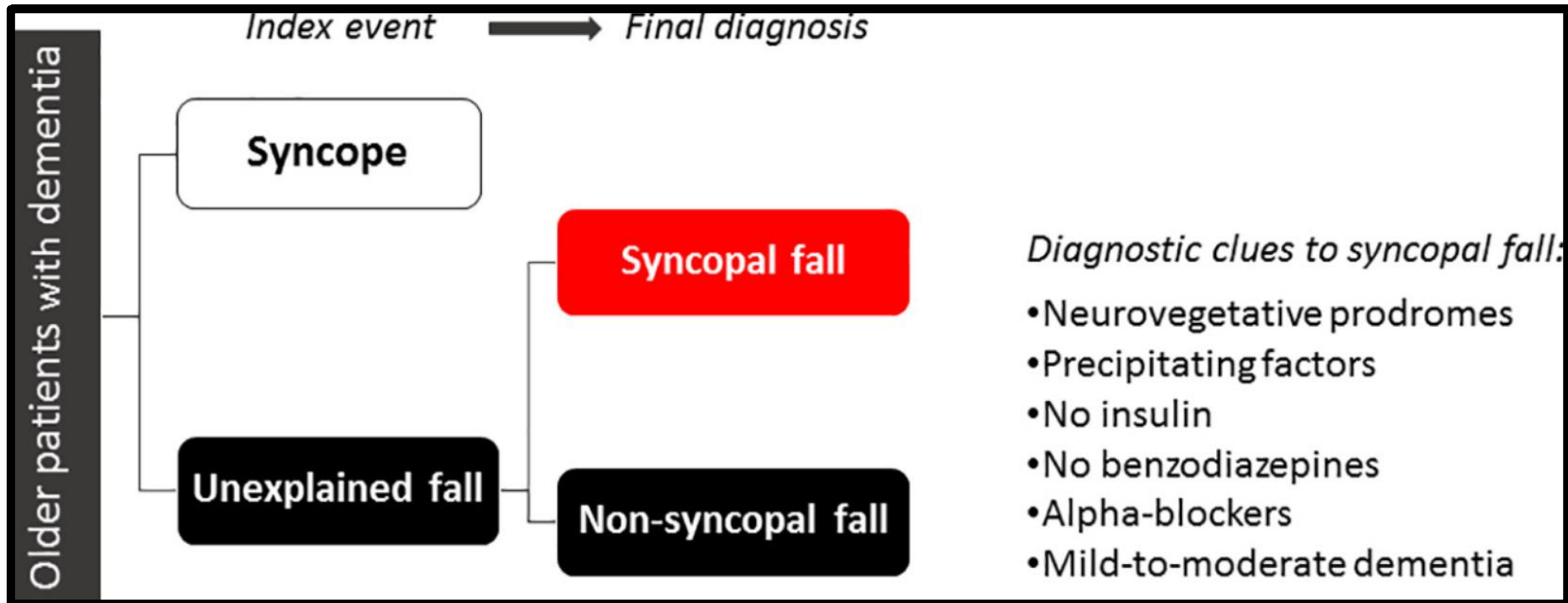
# Development of Syncopal Fall Score in Syncope-Dementia study

*Weights of factors differentiating syncopal from non-syncopal falls*

	b	Weight	Score
Neurovegetative prodromes	2.354	3.085190039	3
Precipitating factors	0.763	1	1
No benzodiazepines	1.021	1.338138925	1
No insulin	1.631	2.137614679	2
Alpha blockers	0.966	1.266055046	1
Mini mental state examination > 16/30	0.8	1.048492792	1
Total			0-9

# Development of Syncopal Fall Score in Syncope-Dementia study

*Weights of factors differentiating syncopal from non-syncopal falls*



Aging Clin Exp Res (2014) 26:33–37

DOI 10.1007/s40520-013-0124-8

ORIGINAL ARTICLE

## **Clinical aspects and diagnostic relevance of neuroautonomic evaluation in patients with unexplained falls**

**M. Rafanelli · E. Ruffolo · V. M. Chisciotti ·  
M. A. Brunetti · A. Ceccofiglio · F. Tesi ·  
A. Morrione · N. Marchionni · A. Ungar**



# Clinical aspects and diagnostic relevance of neuro-autonomic evaluation in patients with unexplained falls

## *Demographic and clinical characteristics of study population*

	Unexplained falls (n = 298)	Unexplained syncope (n = 989)	p value
Age (years)	75.3 ± 11.1	63.2 ± 19.2	0.0001
Falls (n)	2.7 ± 3.2	1.5 ± 0.8	0.0001
Hypertension (n, %)	197 (66.1)	448 (47.2)	0.0001
Diabetes (n, %)	74 (24.8)	111 (11.7)	0.0001
Orthostatic hypotension (n, %)	104 (34.9)	189(19.9)	0.0001
Varicose veins (n, %)	138 (46.3)	222 (23.3)	0.0001
Heart disease (n, %)	70 (23.4)	174 (18.3)	0.050
Major trauma (n, %)	231 (77.5)	281 (29.6)	0.0001
Abnormal ECG (n, %)	71 (23.8)	231 (24.3)	0.856

**Hyp-Hyp phenomenon?**



# Clinical aspects and diagnostic relevance of neuro-autonomic evaluation in patients with unexplained falls

## *Demographic and clinical characteristics of study population*

	Unexplained falls (n = 298)	Unexplained syncope (n = 989)	p value
Anti-hypertensive drugs (n, %)	186 (62.4)	463 (48.7)	0.001
ACEi/ARB (n, %)	143 (47.9)	354 (37.3)	0.001
Beta blockers (n, %)	48 (16.1)	108 (11.3)	0.031
Calcium channel blockers (n, %)	41 (13.7)	116 (12.2)	0.480
Alpha receptor blockers (n, %)	21 (7.0)	61 (6.4)	0.700
Benzodiazepines (n, %)	47 (15.7)	101 (10.6)	0.016
Nitrates (n, %)	14 (4.7)	57 (6.0)	0.395
Diuretics (n, %)	57 (19.1)	169 (17.8)	0.606
Antiarrhythmics (n, %)	18 (6.0)	52 (5.4)	0.713
Anticonvulsants (n, %)	24 (8.0)	79 (8.3)	0.882
Antidepressants (n, %)	101 (33.8)	115 (12.1)	0.001

# Characteristic of patients with unexplained fall and carotid sinus syndrome

	CSM + ( <i>n</i> = 42)	CSM – ( <i>n</i> = 236)	<i>p</i> value
Male ( <i>n</i> , %)	19 (45)	65 (25)	0.008
Age (years)	79 ± 6	75 ± 12	0.000
Prodromal symptoms ( <i>n</i> , %)	10 (24)	97 (38)	0.06
Orthostatic hypotension ( <i>n</i> , %)	20 (48)	82 (33)	0.05
Abnormal ECG ( <i>n</i> , %)	16 (38)	55 (22)	0.02

In this table patients with carotid sinus hypersensitivity were excluded  
*CSM+* patients with carotid sinus syndrome, *CSM–* patients without carotid sinus syndrome, *ECG* electrocardiogram

# Tilt testing results in patients with unexplained falls and syncope

	Unexplained falls ( <i>n</i> = 298)	Unexplained syncope ( <i>n</i> = 989)	<i>p</i> value
Performed ( <i>n</i> , %)	275 (92.2)	944 (99.4)	0.001
Diagnostic ( <i>n</i> , %)	99 (36.0)	485 (51.3)	0.001
VASIS 1 ( <i>n</i> , %)	25 (25.2)	115 (23.7)	0.743
VASIS 2A ( <i>n</i> , %)	1 (1.0)	17 (3.5)	0.190
VASIS 2B ( <i>n</i> , %)	7 (7.0)	72 (14.8)	0.039
VASIS 3 ( <i>n</i> , %)	60 (60.6)	261 (53.6)	0.202
Disautonomic ( <i>n</i> , %)	6 (6.0)	20 (4.1)	0.394

Circulation

**PERSPECTIVE**

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# Abolish the Tilt Table Test for the Workup of Syncope!

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Circulation 2020

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Nitin Kulkarni, MD  
Purav Mody, MD  
Benjamin D. Levine, MD

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# **Usefulness of the tilt table test: A “geriatric” point of view**

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**KEYWORDS:** old people, orthostatic hypotension, syncope, tilt table test, unexplained fall



# Usefulness of the Tilt Table Test (TTT): a “geriatric” point of view

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## *TTT as diagnostic tool*

Used appropriately, it can yield the presence of syncope in about 40% of older patients with unexplained fall who had no apparent history of syncope.

In these cases, the underlying mechanism - after excluding cardiac causes of presumptive syncope - may be orthostatic hypotension or neurally-mediated syncope.

**Hence, the usefulness of TTT in unexplained fall specifically applies to older people.**

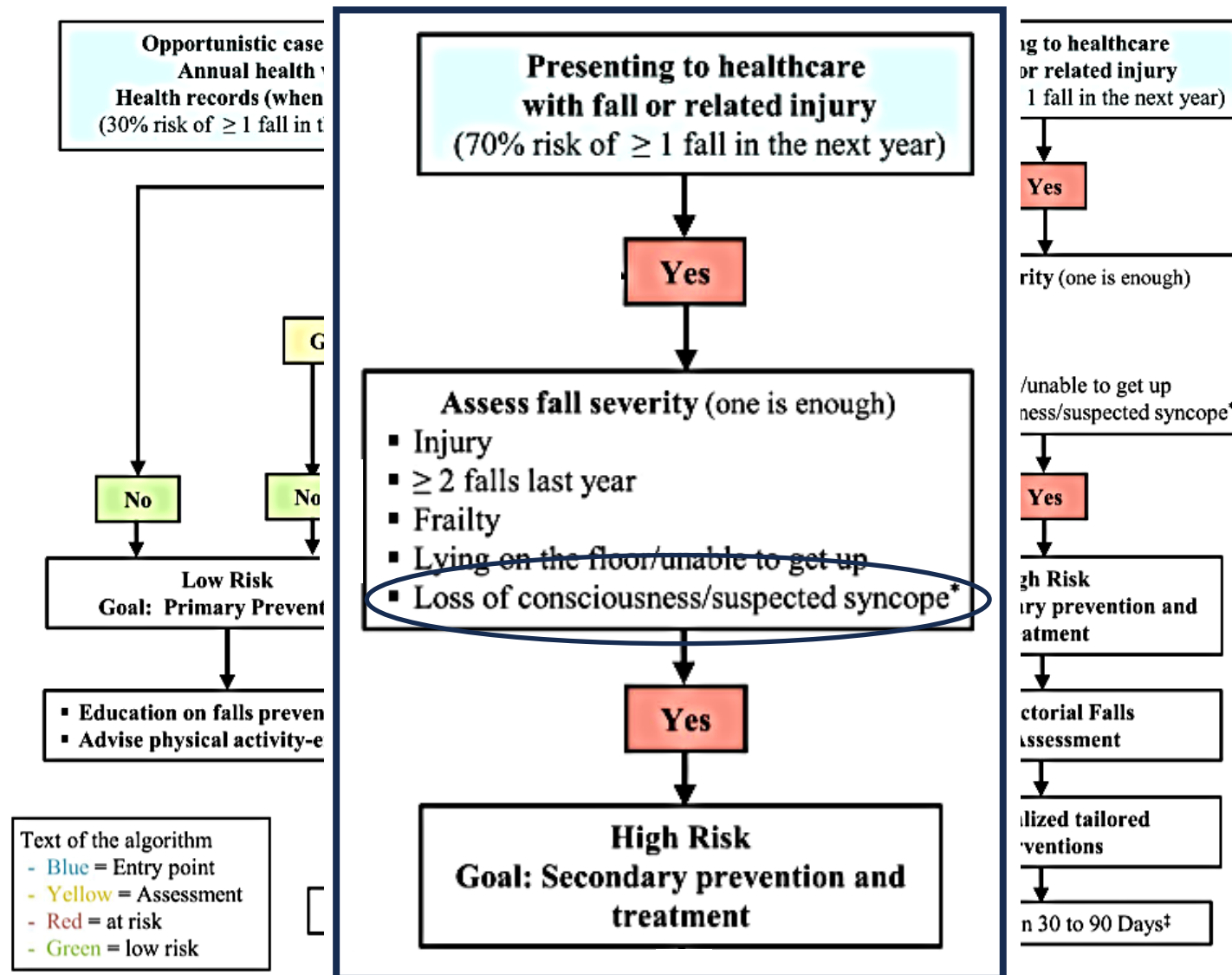


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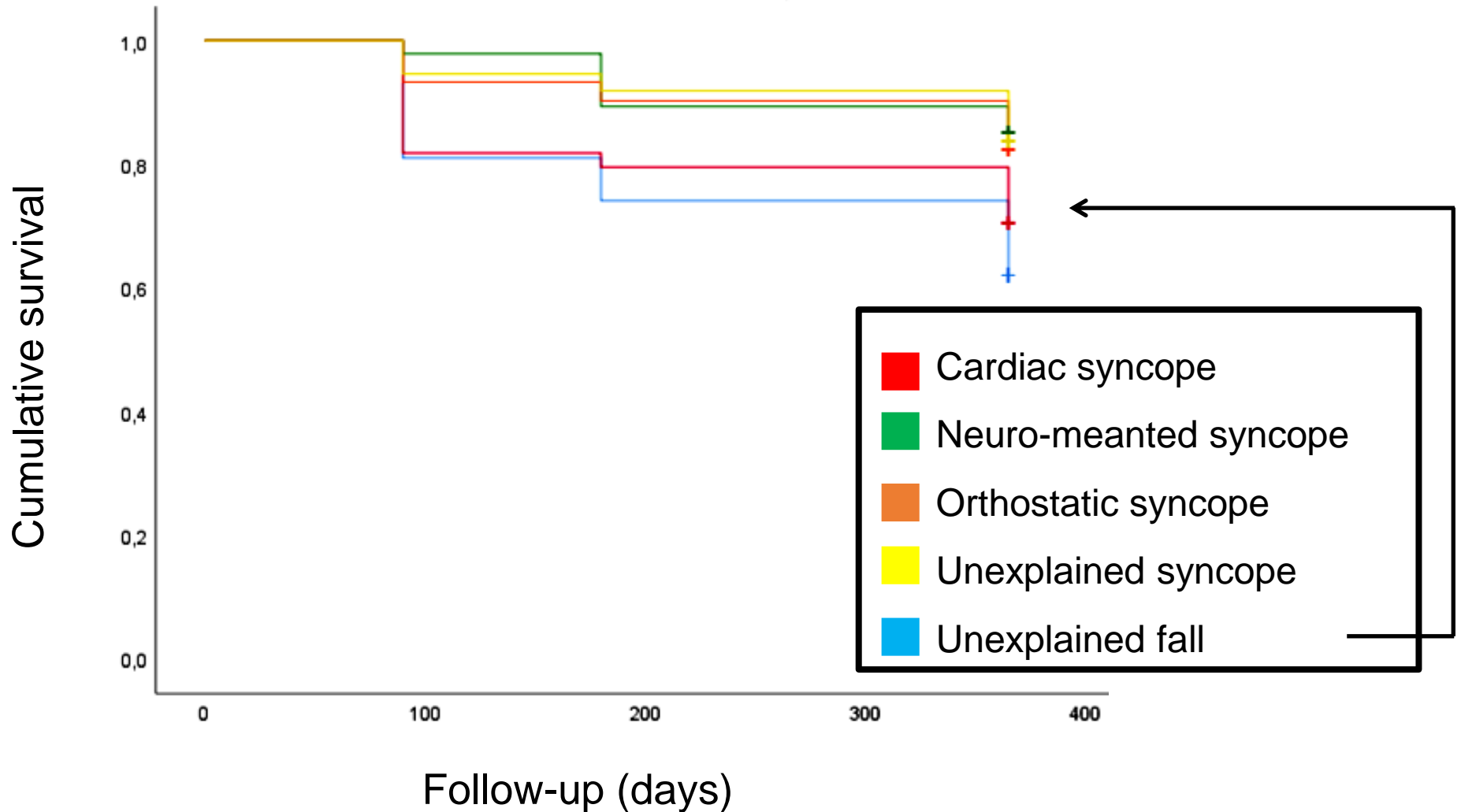
# Falls' algorithm for risk stratification, assessments and management/interventions





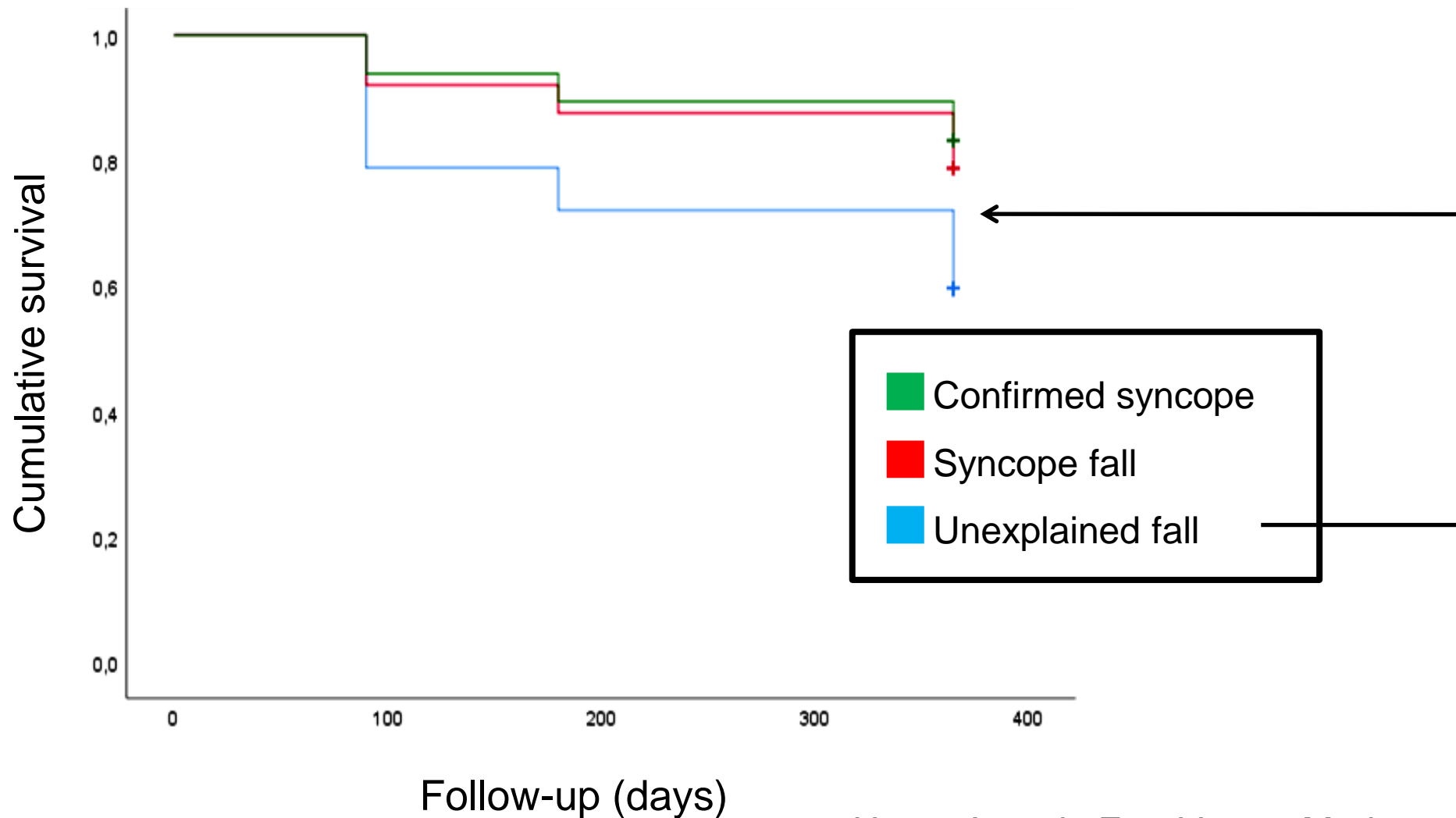
# MORTALITY

## and etiologic causes of syncope and fall in SYD study

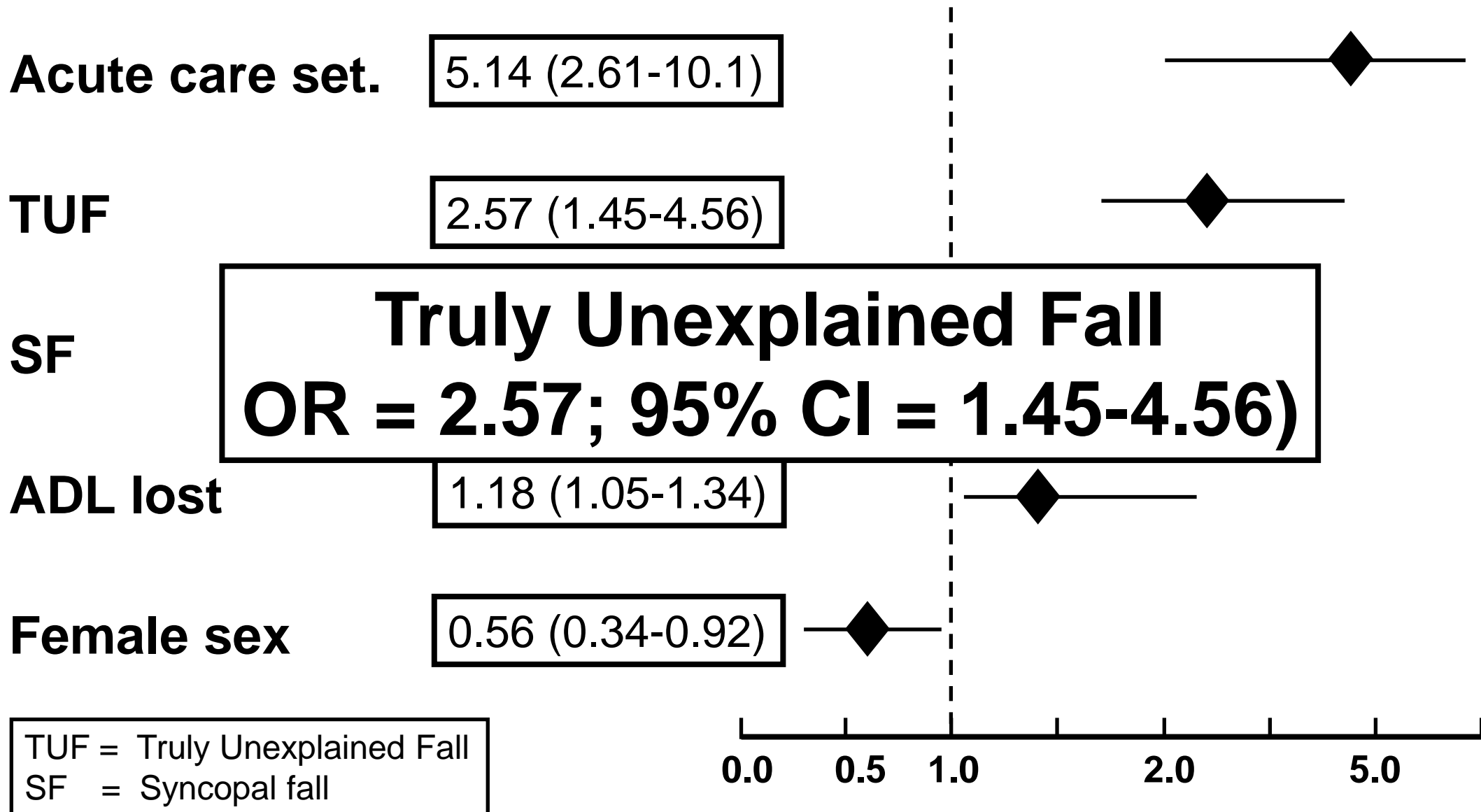


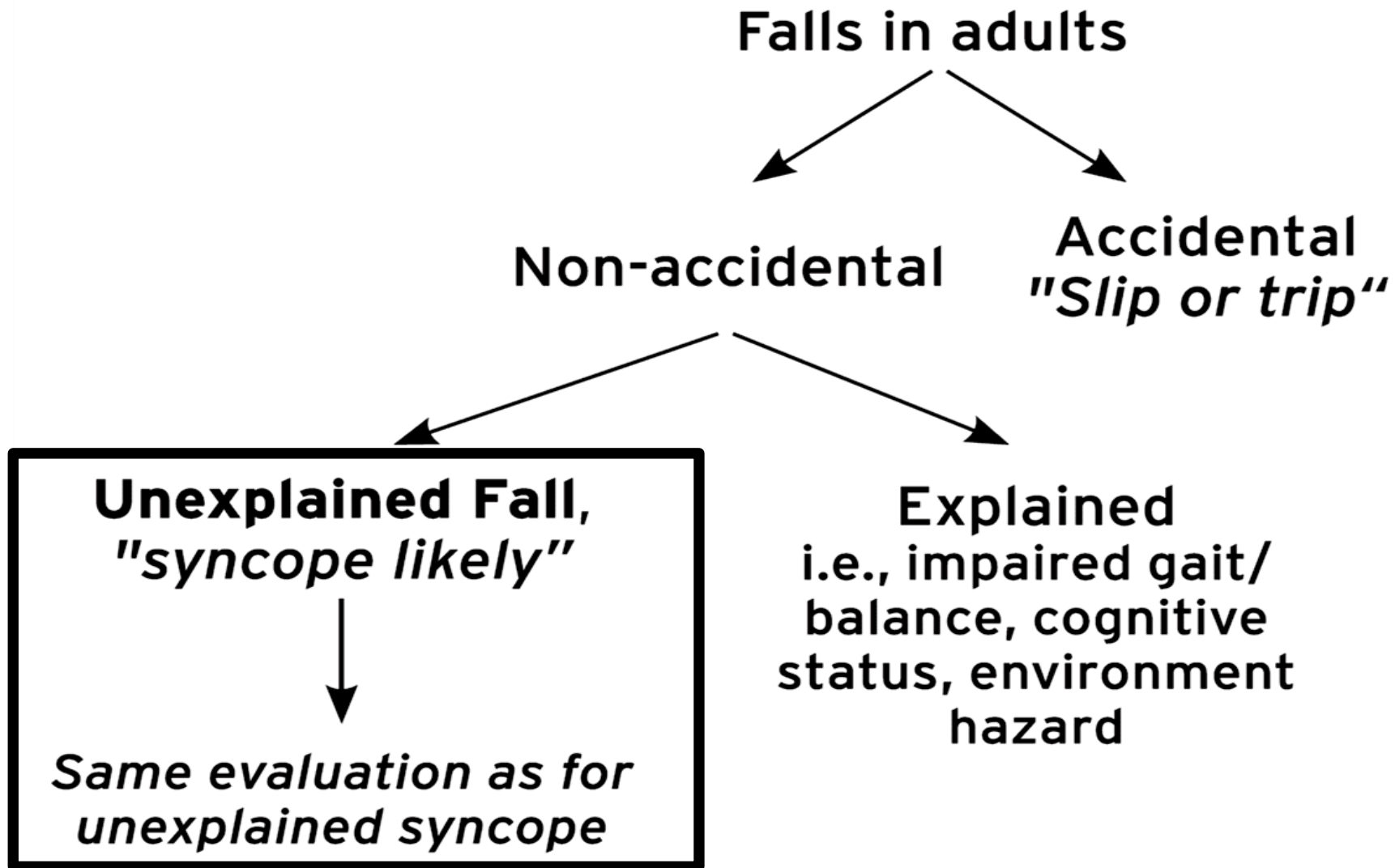
# MORTALITY

## and diagnosis of syncope and fall in SYD study



# Independent predictor of time to survival: results of Cox multiple regression model





# Syncope in patients with comorbidity and frailty

<b>Recommendations</b>	<b>Class<sup>a</sup></b>	<b>Level<sup>b</sup></b>
Multifactorial evaluation and intervention is recommended in older patients because more than one possible cause for syncope and unexplained fall may be present. <sup>33,3</sup>	<b>I</b>	<b>B</b>
Cognitive assessment and physical performance tests are indicated in older patients with syncope or unexplained fall. <sup>37,3</sup>	<b>I</b>	<b>C</b>
Modification or discontinuation of possible culprit medications, particularly hypotensive drugs and psychotropic drugs, should be considered in older patients with syncope or unexplained fall.	<b>IIa</b>	<b>B</b>
In patients with unexplained fall, the same assessment as for unexplained syncope should be considered. <sup>191,</sup>	<b>IIa</b>	<b>C</b>

# CONCLUSIONS

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- Unexplained falls represent in the elderly **a frequent clinical event and difficult to diagnose.**
- The clinical phenotype is not well defined but **cognitive impairment and orthostatic hypotension** play a key role.
- **Clinical history, dysautonomic testing, and tilt testing** are very helpful in identifying the etiology of the unexplained fall.
- The **prognosis is poor** but the diagnostic classification in the syncope algorithm can be very useful in improving it.