



68° CONGRESSO NAZIONALE SIGG

Ritorno al futuro

FIRENZE, 13-16 DICEMBRE 2023
PALAZZO DEI CONGRESSI



CORSO 7 - LA CAPACITÀ INTRINSECA E LA CURA INTEGRATA ALL'ANZIANO

MARCATORI BIOLOGICI E MORFO-FUNZIONALI DELLA CAPACITÀ INTRINSECA

Sarcopenia e capacità intrinseca

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Università
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di Ferrara

Dipartimento
di Scienze Mediche

Scuola di Specializzazione in Geriatria



Outline

1

Relazione tra sarcopenia e capacità intrinseca

2

Implicazioni pratiche e di ricerca

3

Conclusioni



Outline

1

Relazione tra sarcopenia e capacità intrinseca

2

Implicazioni pratiche e di ricerca

3

Conclusioni



SARCOPENIA

CAPACITÀ INTRINSECA

**Sarcopenia
probabile**

Riduzione
forza muscolare

Riduzione
qualità/quantità muscolare

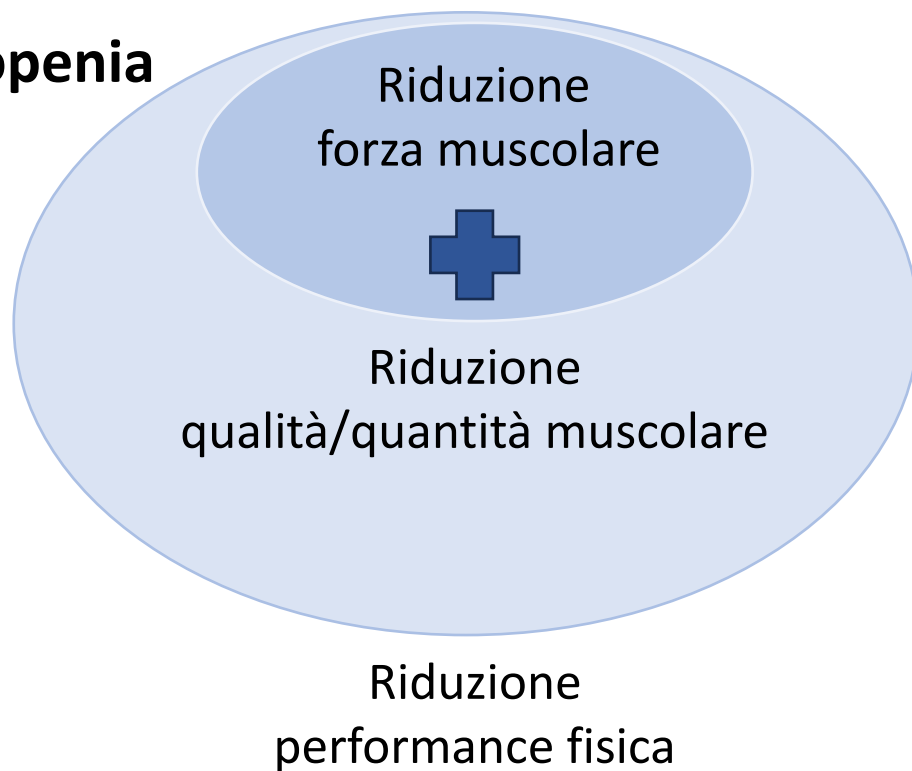
Riduzione
performance fisica



SARCOPENIA

CAPACITÀ INTRINSECA

Sarcopenia

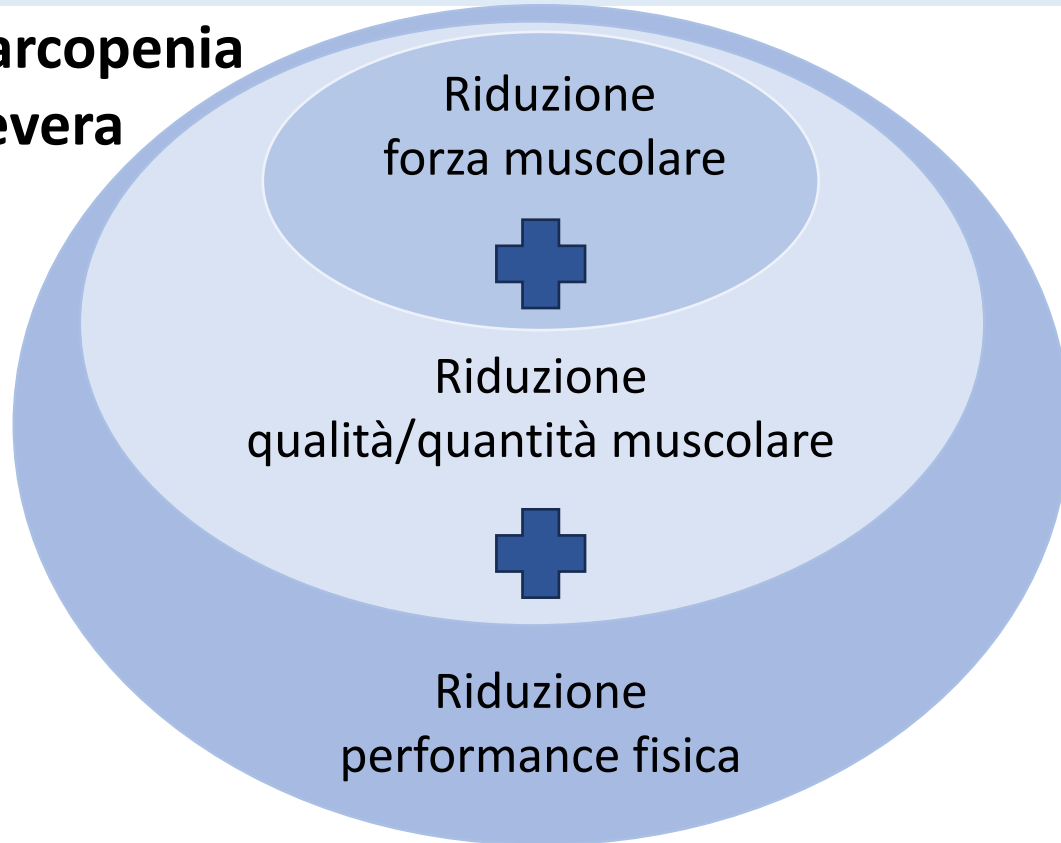




SARCOPENIA

CAPACITÀ INTRINSECA

**Sarcopenia
severa**

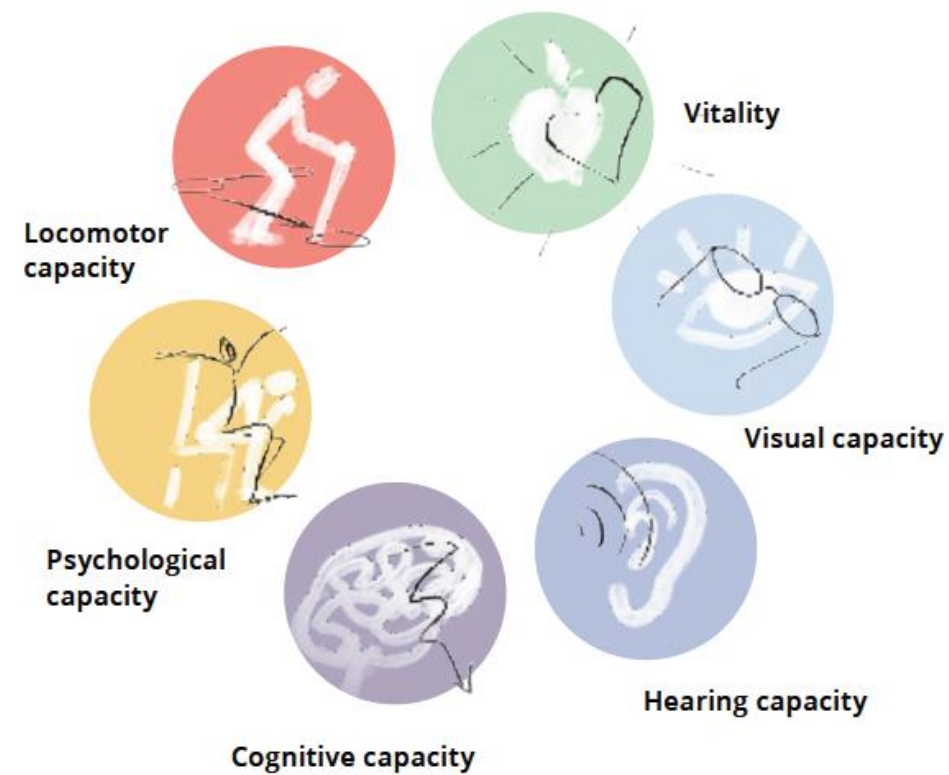
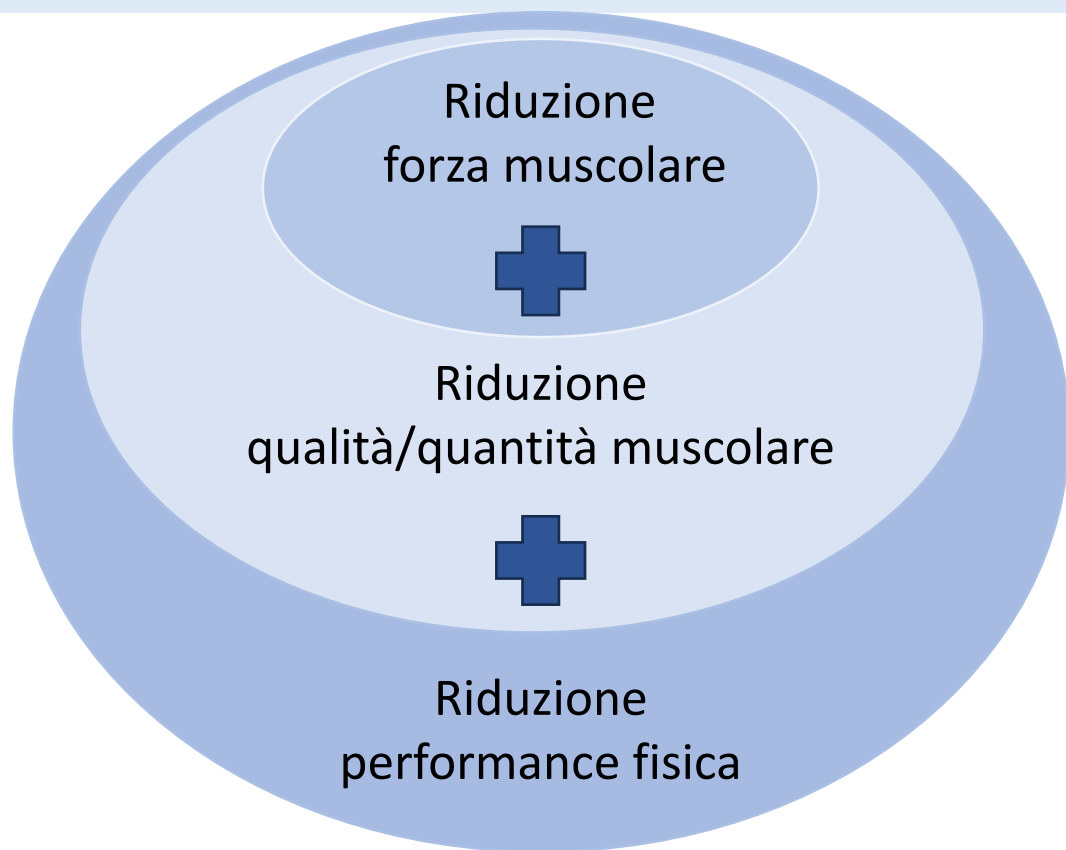




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CAPACITÀ INTRINSECA



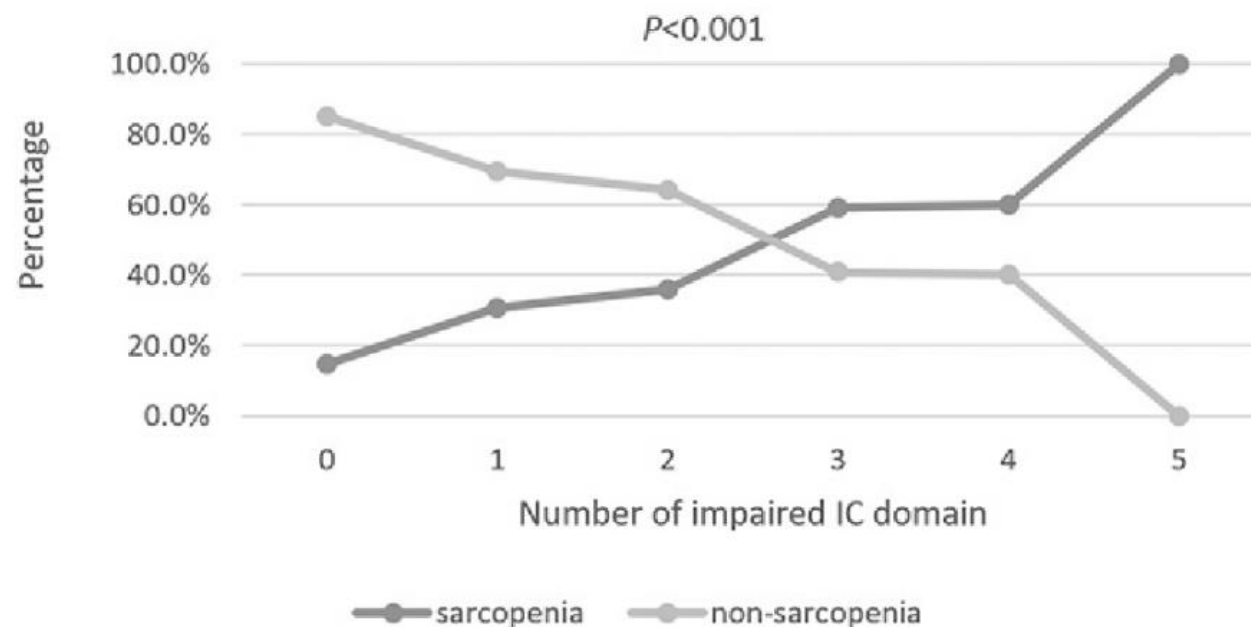


SARCOPENIA



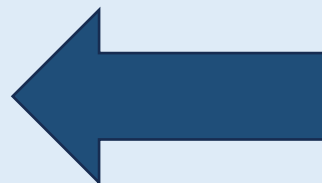
CAPACITÀ INTRINSECA

381 pazienti ricoverati in un reparto di Geriatria (Nanjing Medical University, China)
40.9% donne
Età ≥ 60 anni (media 81.95 ± 8.42)
Prevalenza di sarcopenia: 33.6%





SARCOPENIA



CAPACITÀ INTRINSECA

	Sarcopenia		Low ASMI		Low HGS		Low GS	
	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value
IC composite score	1.563 (1.247-1.958)	< 0.001	1.548 (1.239-1.935)	< 0.001	1.793 (1.395-2.303)	< 0.001	3.131 (1.725-5.685)	< 0.001

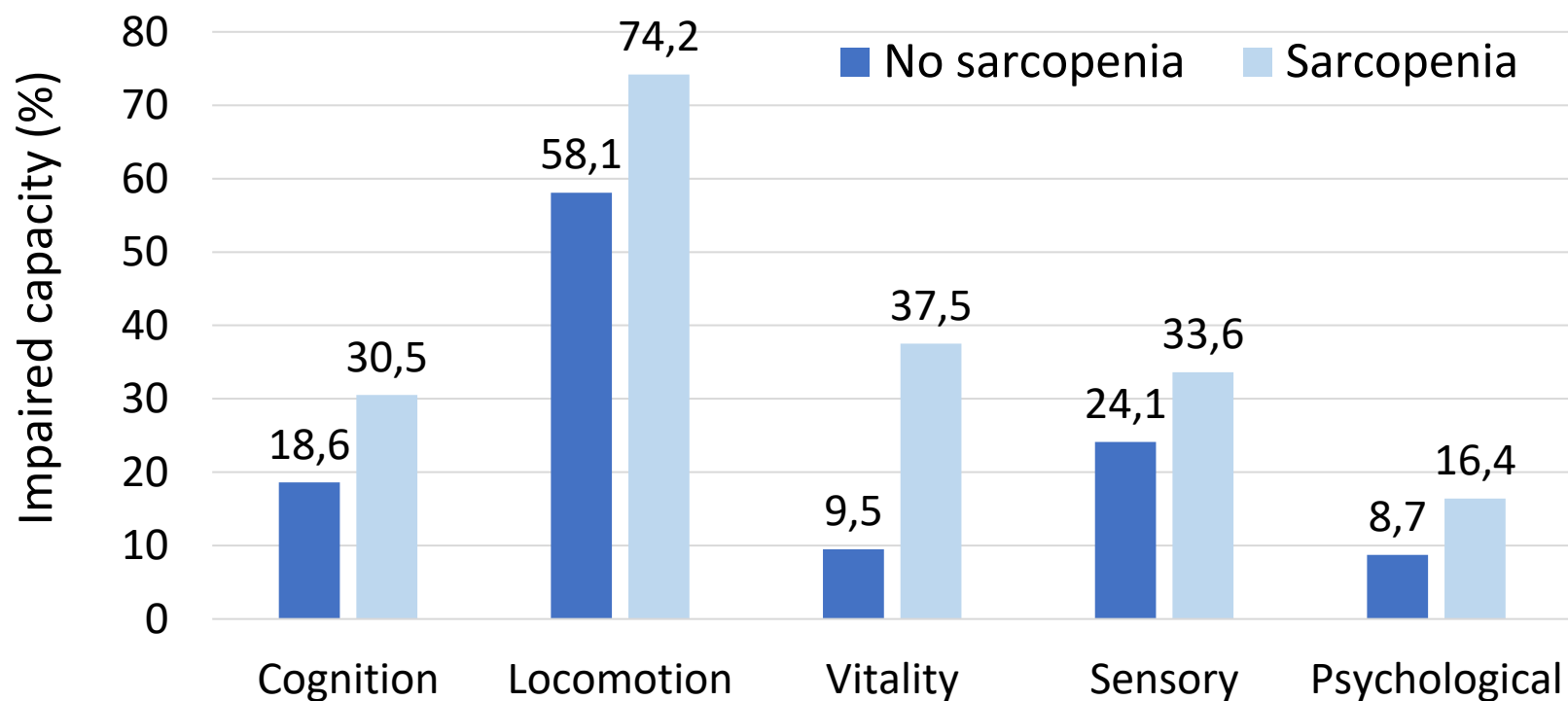
Abbreviations: OR, Odds ratio; CI, Confidence interval; IC, Intrinsic Capacity; ASMI, Appendicular skeletal muscle mass index; HGS, Handgrip strength; GS, Gait speed; Low ASMI is <7.0 kg/m² in men and <5.7 kg/m² in women. Low HGS is <28 kg in men and <18 kg in women. Low GS is <1.0 m/s. The model was adjusted for age, history of stroke, osteoporosis and anemia.



SARCOPENIA

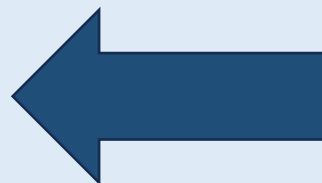


CAPACITÀ INTRINSECA





SARCOPENIA



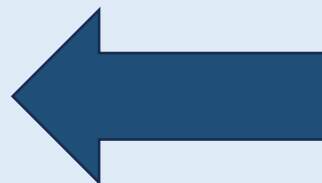
CAPACITÀ INTRINSECA

	ASMI			HGS			GS		
	β	SE	P-value	β	SE	P-value	β	SE	P-value
Cognition	0.082	0.015	0.099	0.158	0.099	0.001	0.011	0.002	0.325
Locomotion	-0.014	0.023	0.829	0.295	0.146	< 0.001	0.723	0.004	< 0.001
Vitality	0.342	0.032	< 0.001	0.093	0.204	0.044	0.007	0.005	0.205
Sensory	-0.036	0.094	0.453	0.002	0.589	0.968	0.018	0.014	0.597
Psychological	-0.011	0.064	0.830	-0.019	0.406	0.677	-0.037	0.010	0.284

Abbreviations: β , Beta regression coefficient; SE, Standard error; ASMI, Appendicular skeletal muscle mass index; HGS, Handgrip strength; GS, Gait speed. The model was adjusted for age, history of stroke, osteoporosis and anemia.



SARCOPENIA



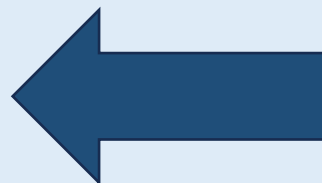
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SARCOPENIA



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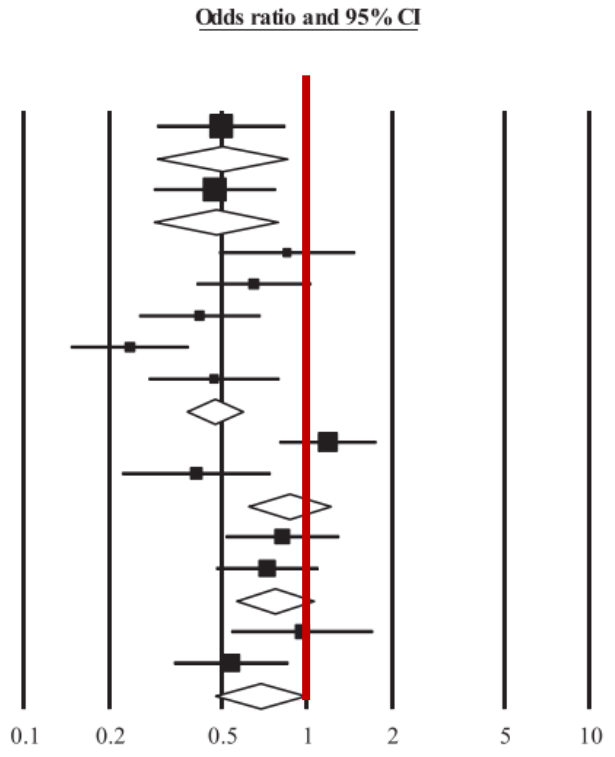
SARCOPENIA



CAPACITÀ INTRINSECA

Men (Panel A)

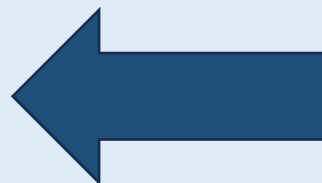
Adverse event	Outcome	Statistics for each study				
		Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
Cognitive impairment	Cognition	0.50	0.29	0.85	-2.58	0.010
		0.50	0.29	0.85	-2.58	0.010
Hospitalized > 24h last year	Hospitalization	0.47	0.29	0.78	-2.91	0.004
		0.47	0.29	0.78	-2.91	0.004
Sarcopenia	Locomotion	0.85	0.49	1.49	-0.56	0.578
Falls	Locomotion	0.65	0.40	1.04	-1.78	0.075
Functional impairment	Locomotion	0.42	0.25	0.69	-3.41	0.001
Difficulty walking 400 meters	Locomotion	0.24	0.15	0.39	-5.80	0.000
		0.47	0.28	0.81	-2.74	0.006
SPPB < 6 points	Locomotion	0.47	0.37	0.59	-6.51	0.000
Depression	Psychological	1.19	0.80	1.77	0.85	0.396
Mental problems	Psychological	0.41	0.22	0.75	-2.88	0.004
		0.86	0.62	1.21	-0.87	0.386
Visual problems	Sensory	0.82	0.51	1.31	-0.83	0.409
Hearing problems	Sensory	0.73	0.47	1.11	-1.49	0.136
		0.77	0.56	1.05	-1.66	0.097
Weight loss	Vitality	0.97	0.54	1.73	-0.12	0.905
Appetite loss	Vitality	0.54	0.34	0.87	-2.55	0.011
		0.68	0.47	0.98	-2.05	0.040
Pooled intrinsic capacity*		0.62	0.53	0.71	-6.68	<0.001



5237 soggetti di età ≥60 anni
58.5% F
Età media 70.5 ± 7.8 anni
Colombia - 'SABE Survey 2015'

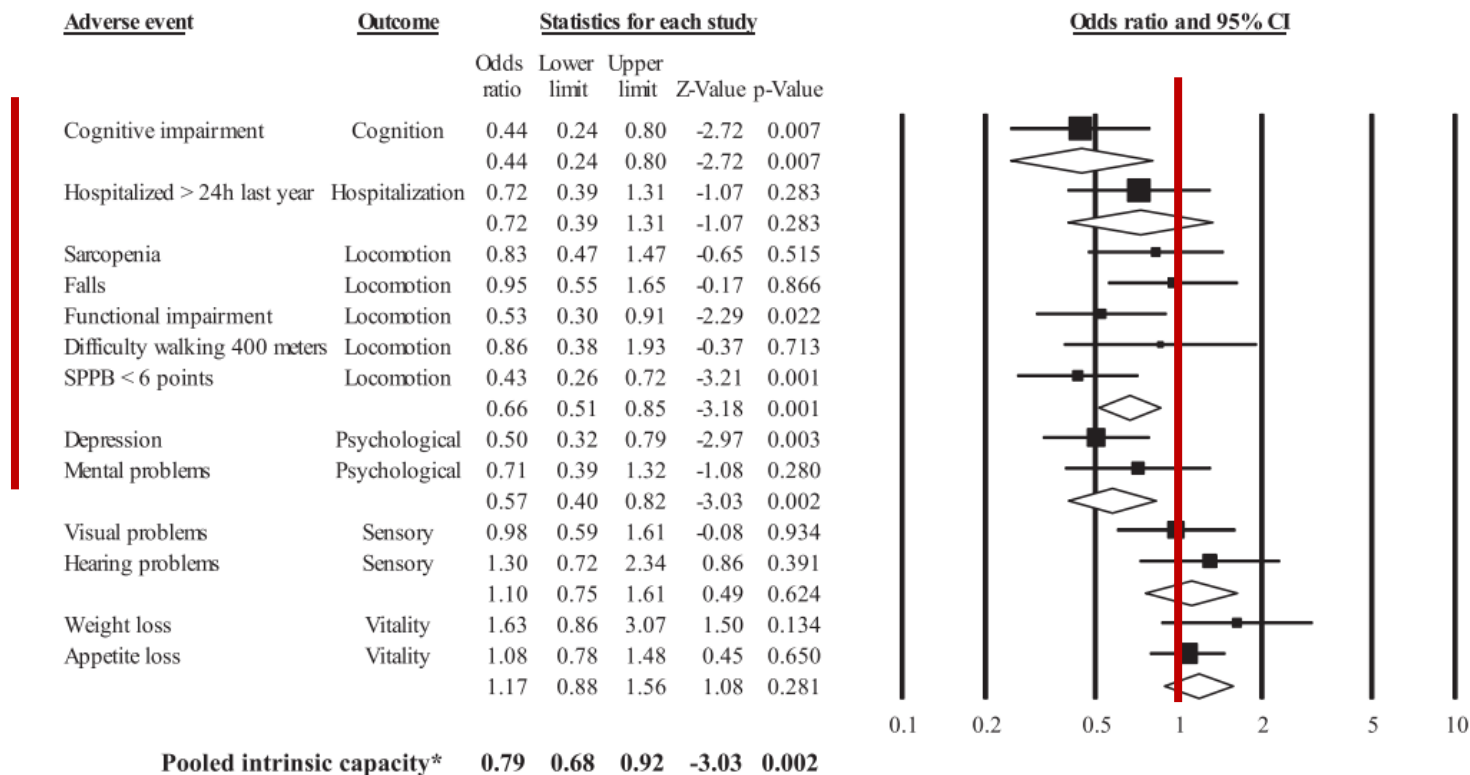


SARCOPENIA



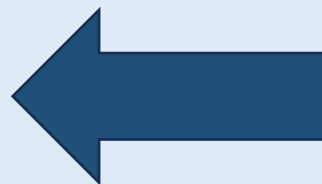
CAPACITÀ INTRINSECA

Women (Panel B)

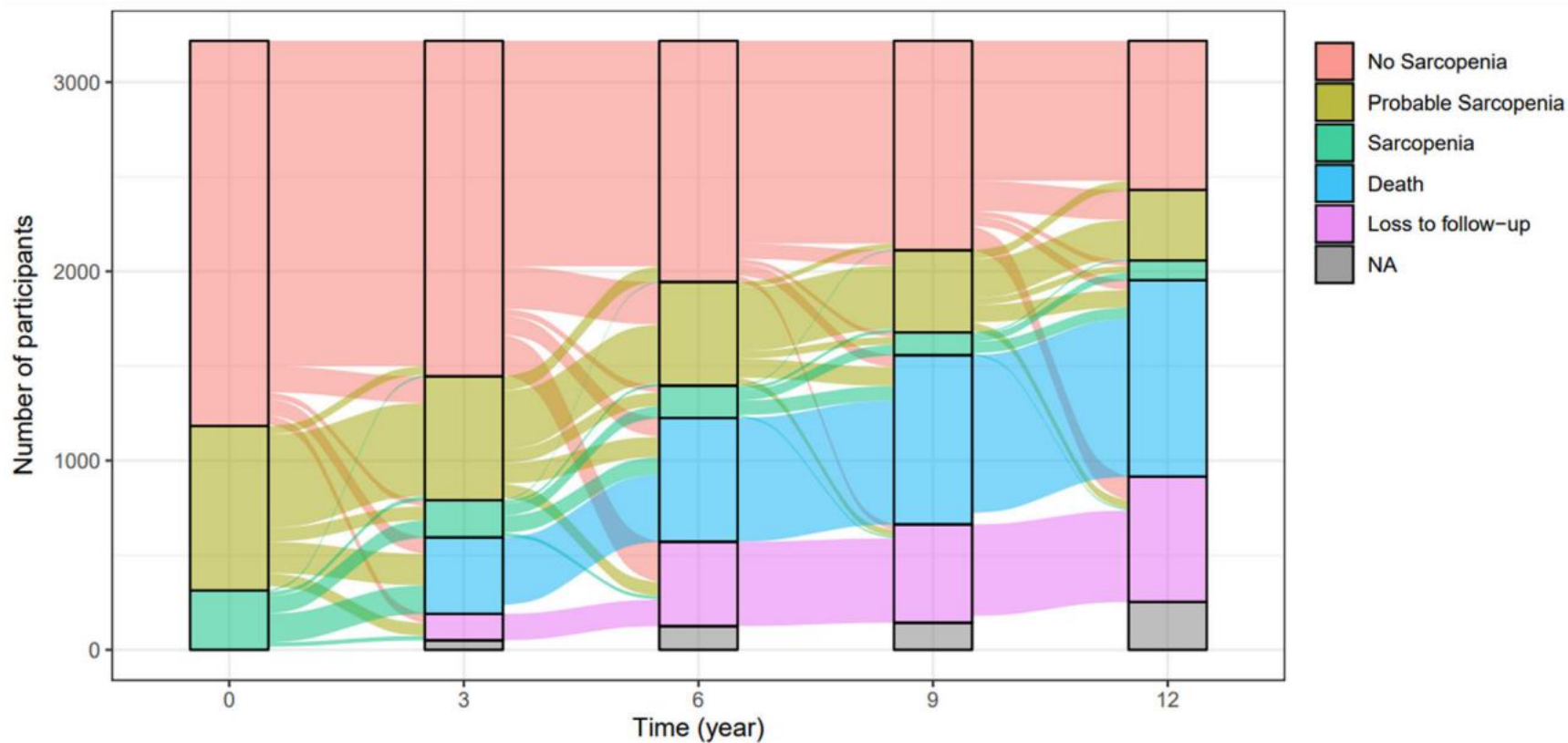




SARCOPENIA



CAPACITÀ INTRINSECA



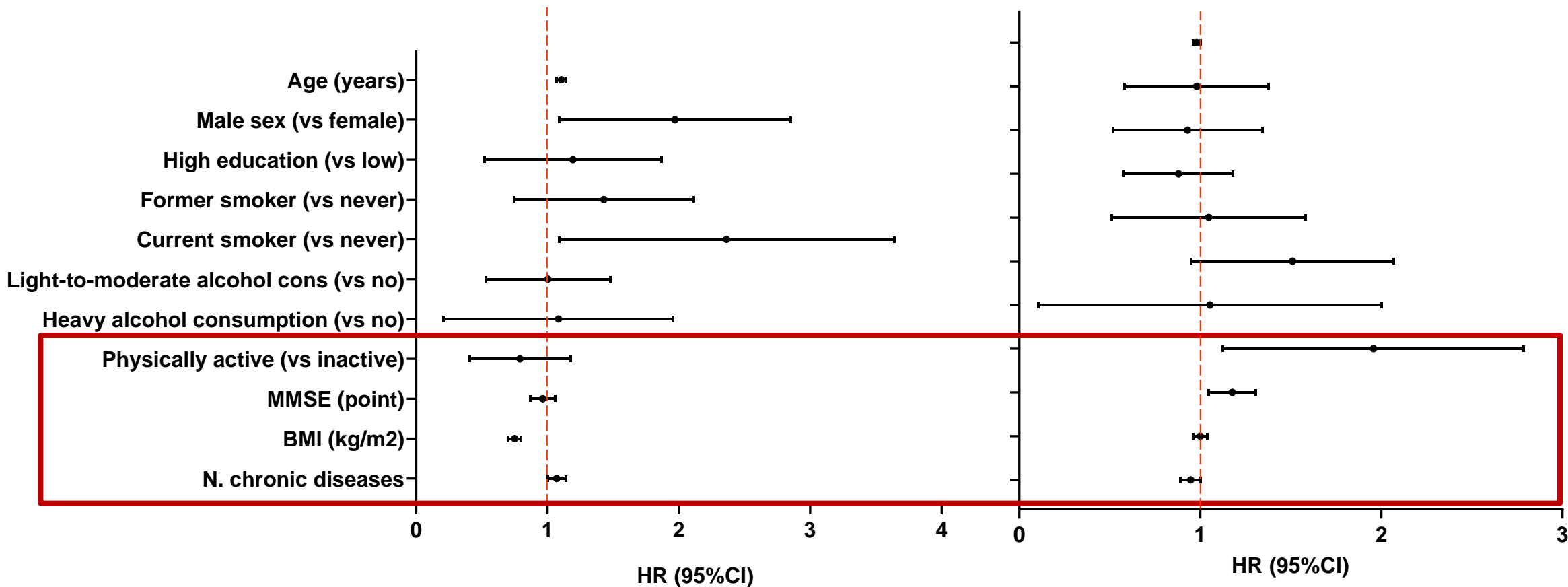
Transizioni tra stati di sarcopenia secondo EWGOP2 in 3363 soggetti con età ≥ 60 anni (studio SNAC-K) nell'arco di 12 anni



Determinanti di transizioni

Da no sarcopenia → sarcopenia

Da sarcopenia probabile → no sarcopenia

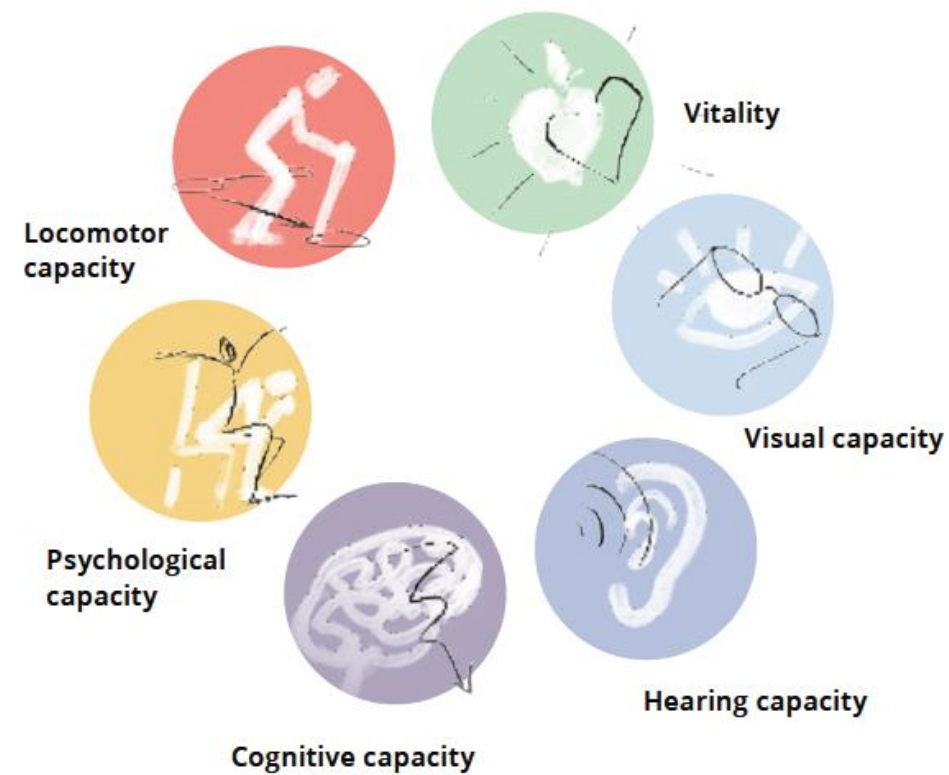
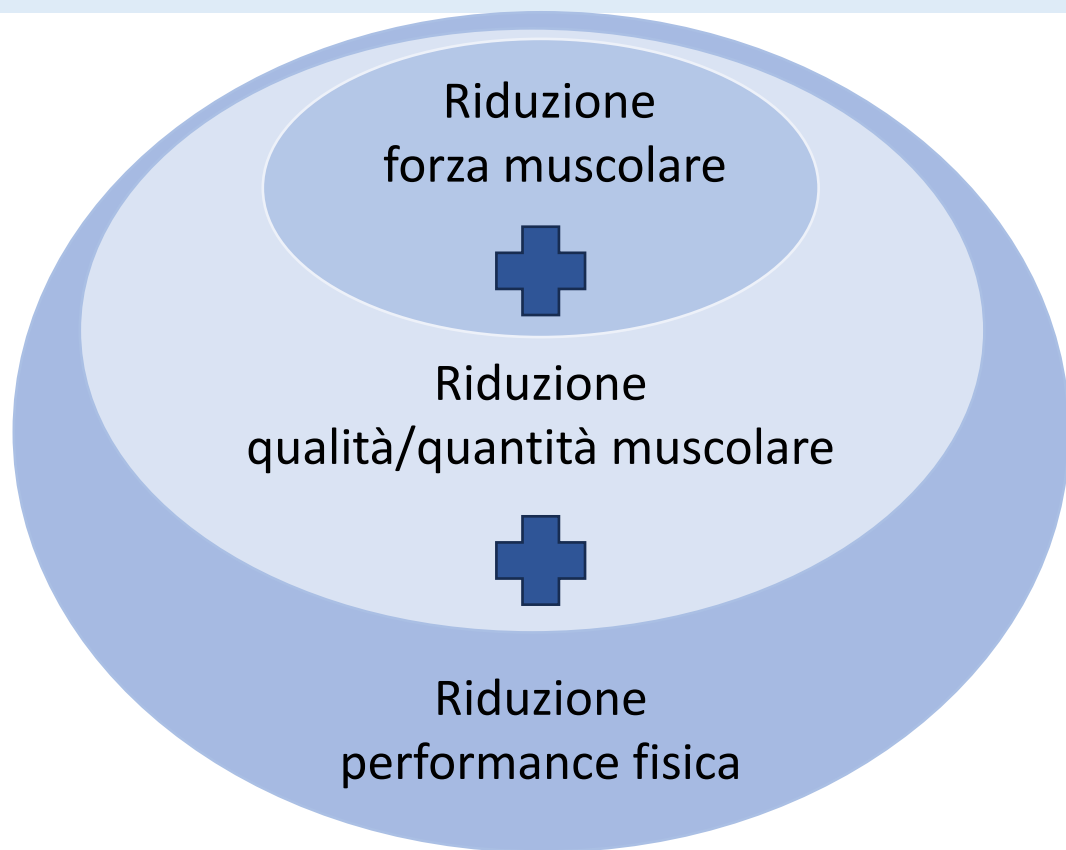




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CAPACITÀ INTRINSECA

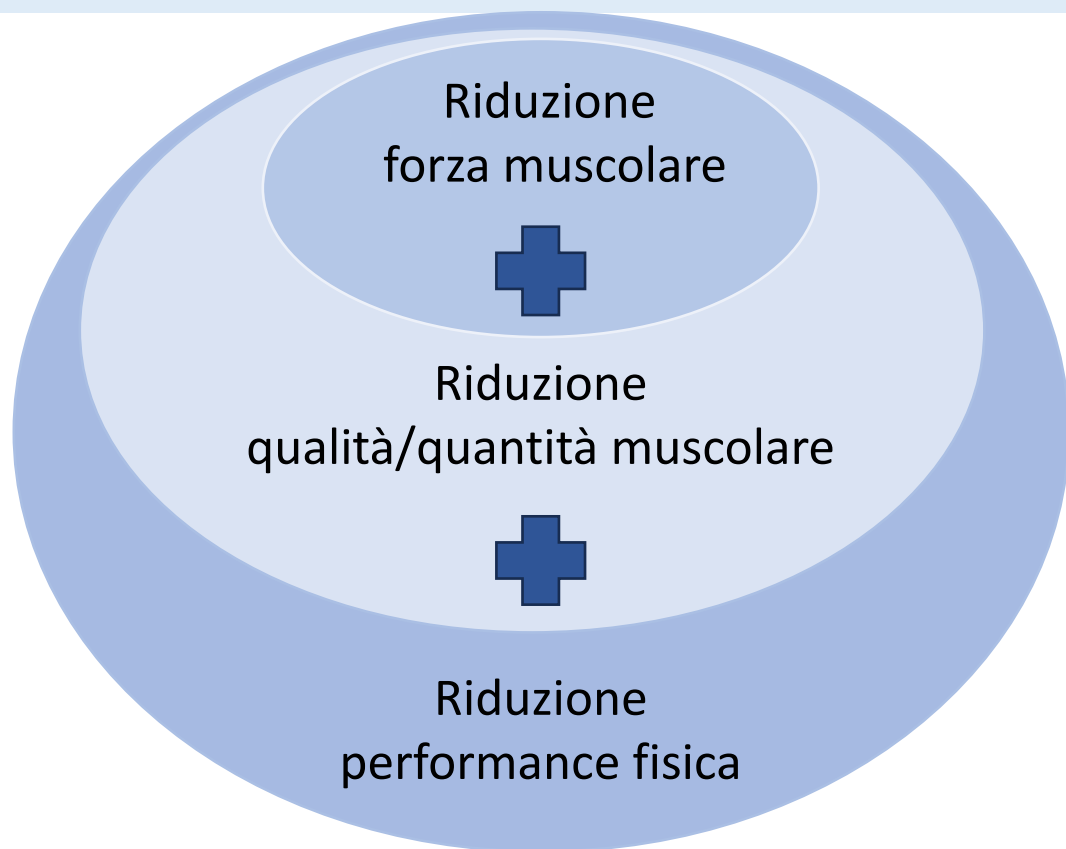




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COGNITIVE CAPACITY



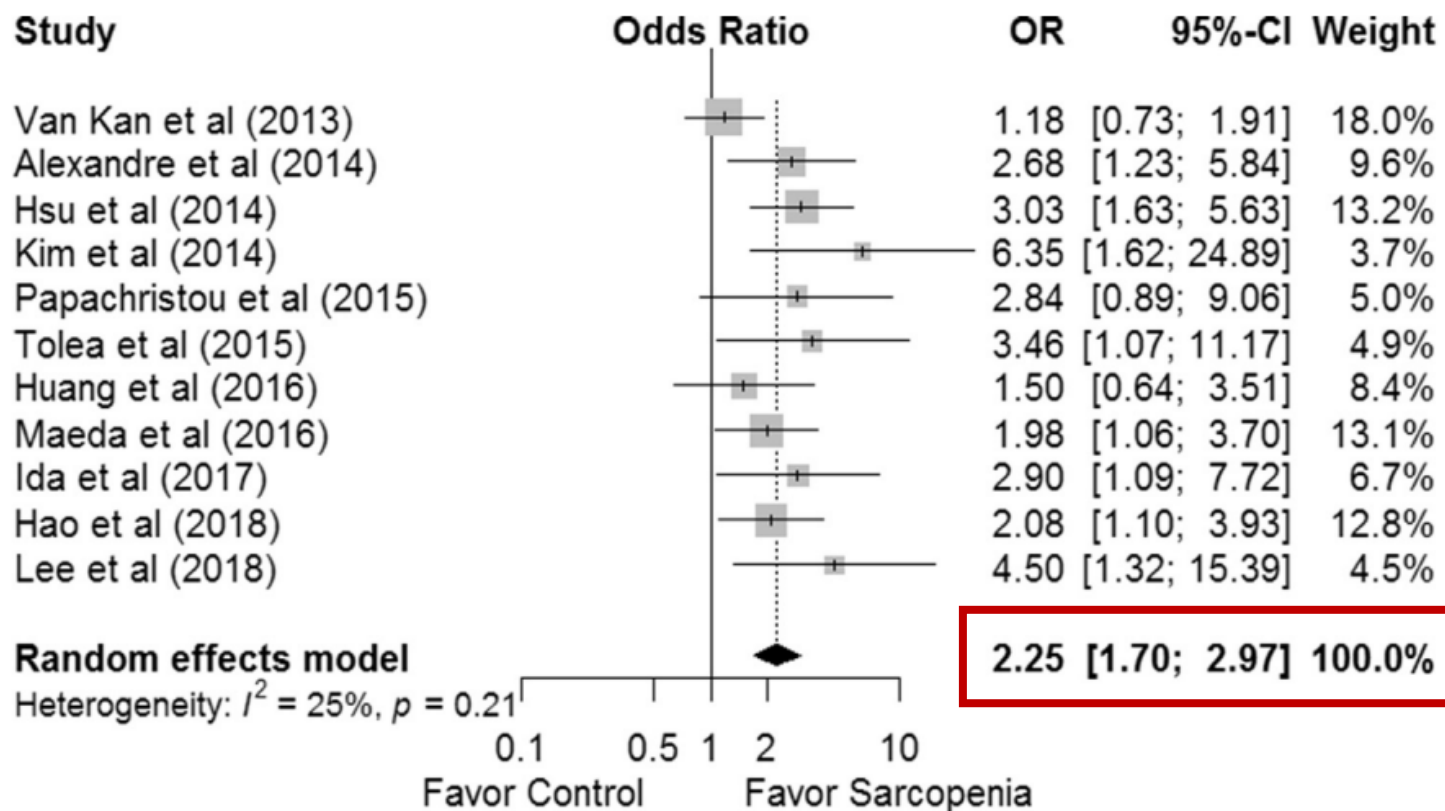
Cognitive capacity



SARCOPENIA



COGNITIVE CAPACITY



Associazione tra sarcopenia e decadimento cognitivo



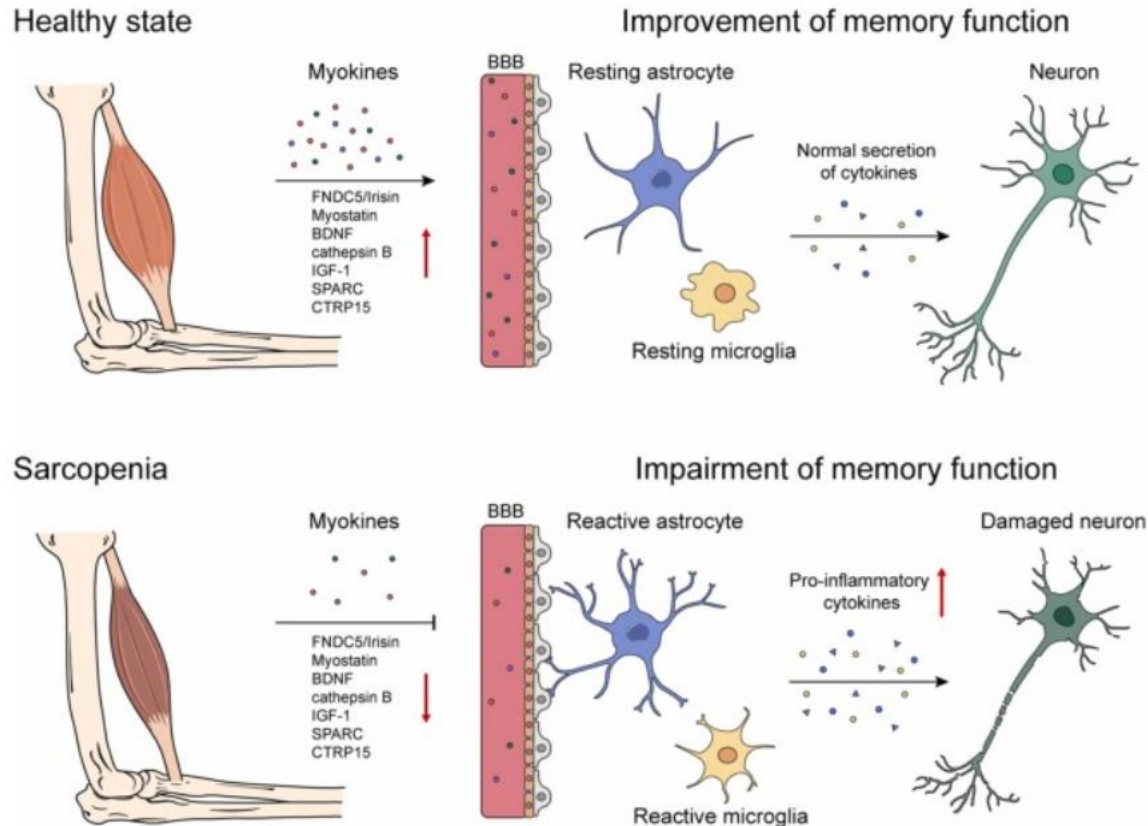
Cognitive capacity



SARCOPENIA



COGNITIVE CAPACITY



**Associazione tra
sarcopenia e
decadimento
cognitivo**



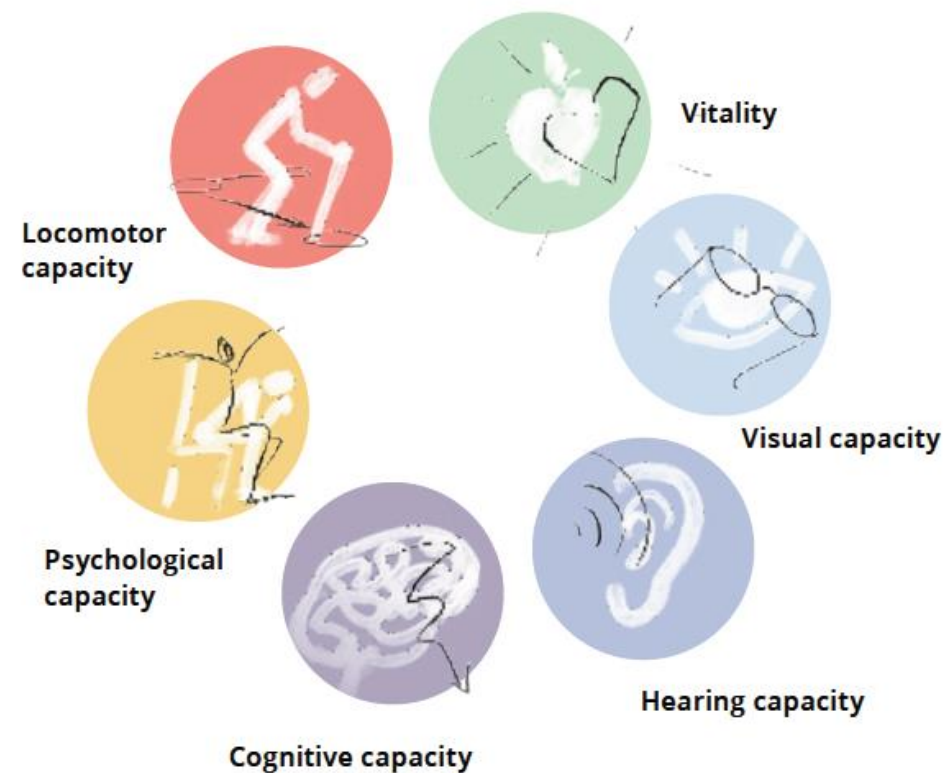
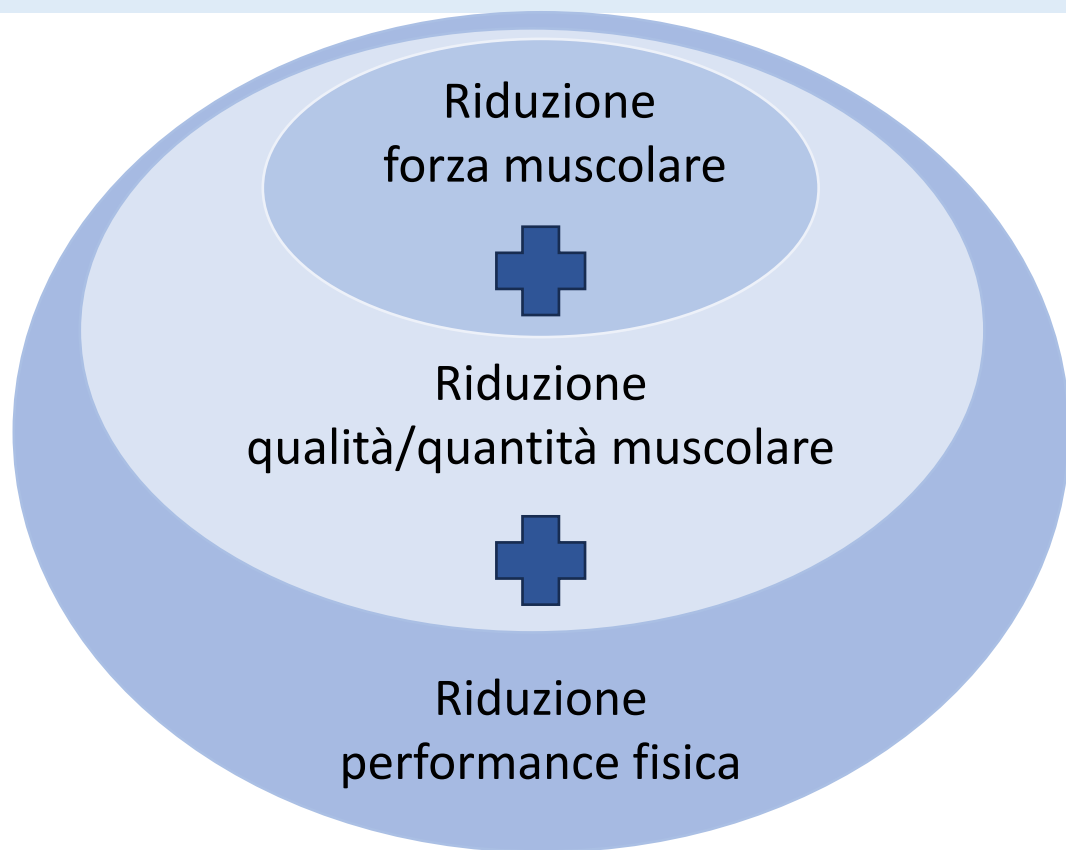
Cognitive capacity



SARCOPENIA



CAPACITÀ INTRINSECA

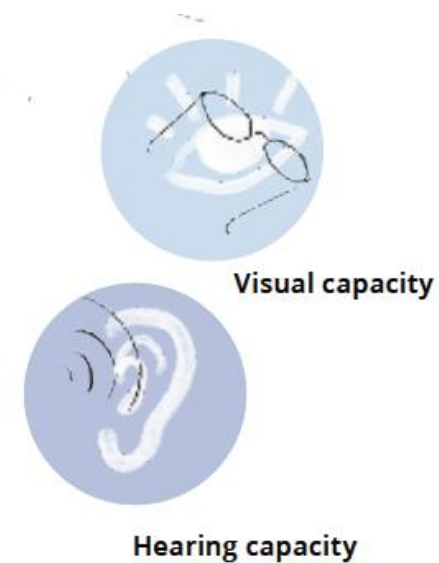
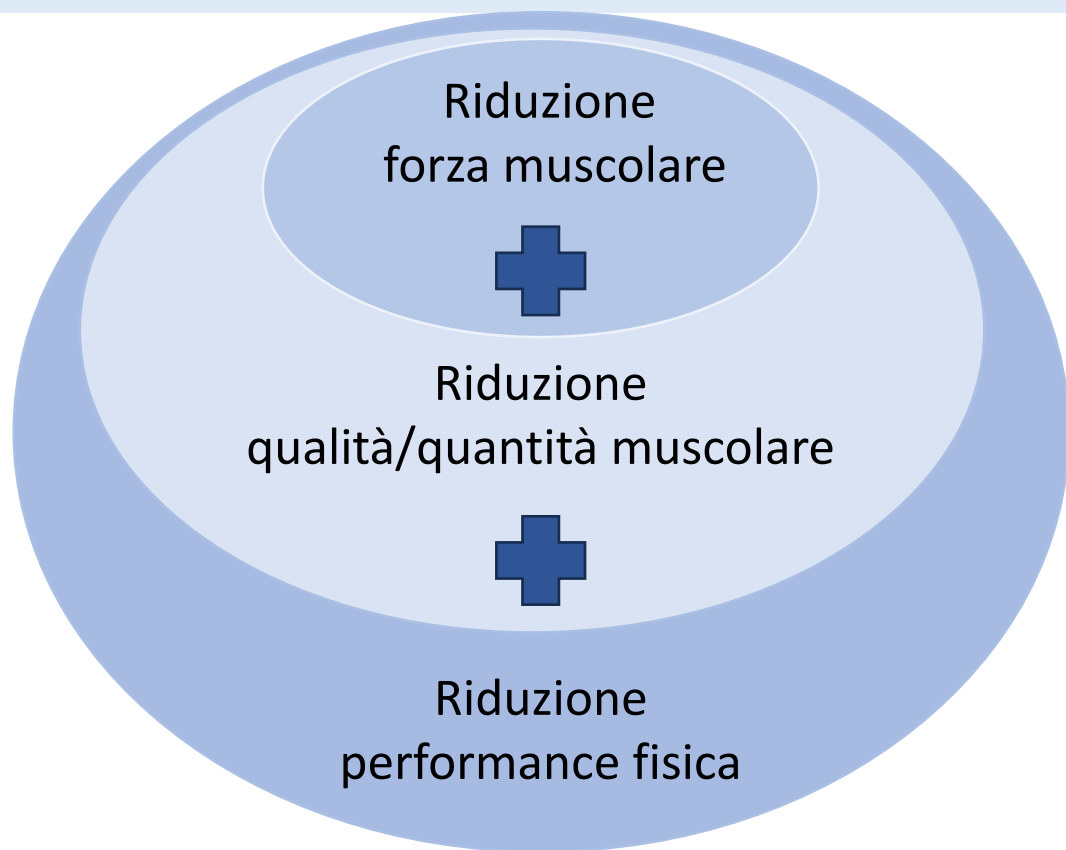




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SENSORY





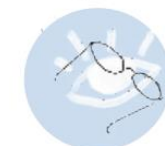
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SENSORY

Revisione sistematica 2022, 13 studi

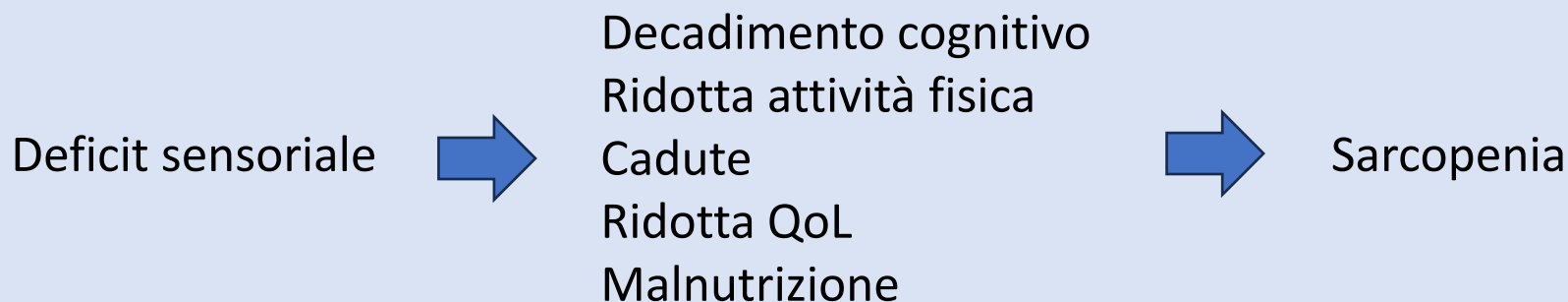
- Ipovisus e iposmia associati ad un aumentato odds di sarcopenia.
- Ipovisus e iposmia associati a ridotta massa muscolare.
- Ipovisus e ipoacusia associati a ridotta velocità del cammino.



Visual capacity



Hearing capacity





SARCOPENIA



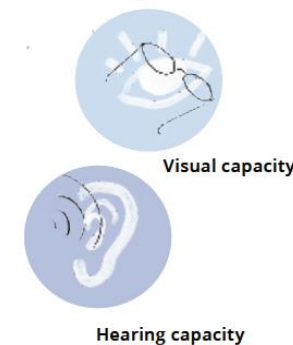
SENSORY

Sensory impairment	Adjusted mean handgrip strength (SE) in kg ^a		
	All (n = 947)	Women (n = 544)	Men (n = 403)
Hearing impairment			
None, n = 320	24.78 (0.35)	18.73 (0.34)	32.82 (0.67)
Any hearing loss, n = 376	24.63 (0.32)	17.99 (0.33)	33.40 (0.58)
p value	.76	.14	.53
Best corrected visual impairment			
None, n = 837	24.58 (0.20)	18.43 (0.21)	32.87 (0.37)
Any vision loss, n = 100	23.79 (0.62)	17.57 (0.57)	31.61 (1.30)
p value	.23	.16	.35
Olfactory impairment			
None, n = 598	25.66 (0.25)	18.39 (0.24)	33.11 (0.48)
Any olfactory loss, n = 329	24.23 (0.34)	18.23 (0.37)	32.48 (0.59)
p value	.31	.72	.42
Overall sensory impairment			
None, n = 369	24.46 (0.32)	18.59 (0.31)	32.44 (0.62)
One sensory impairment, n = 369	24.84 (0.31)	18.57 (0.31)*	33.32 (0.56)
Two/three sensory impairment, n = 209	23.89 (0.44)	17.47 (0.47)**	32.21 (0.76)

↑ numero di deficit sensoriali



↓ handgrip



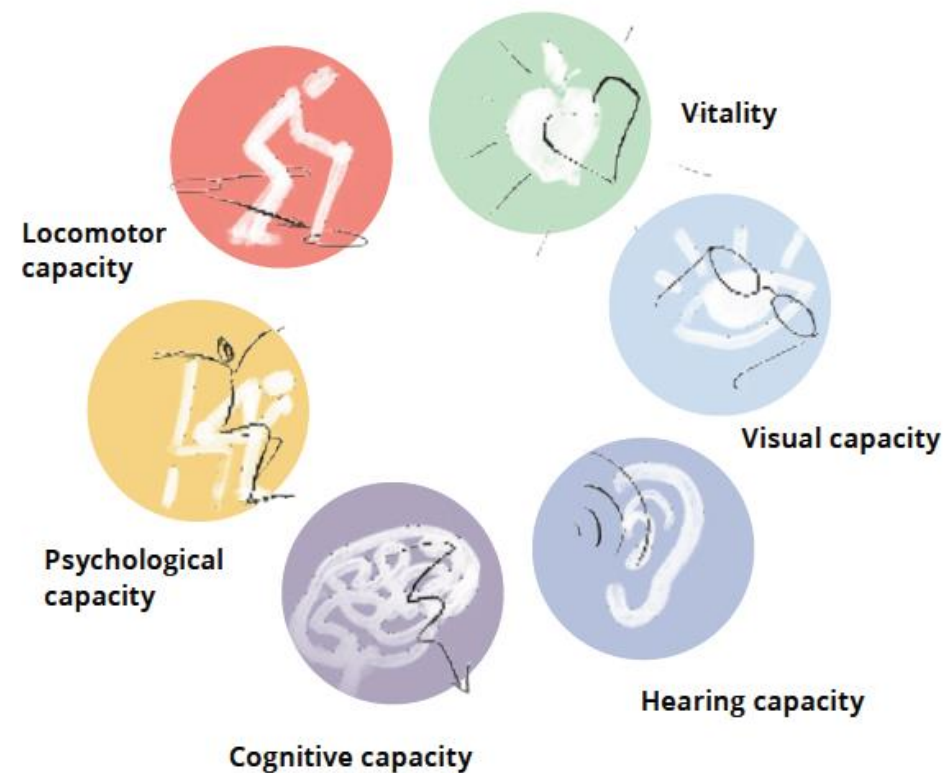
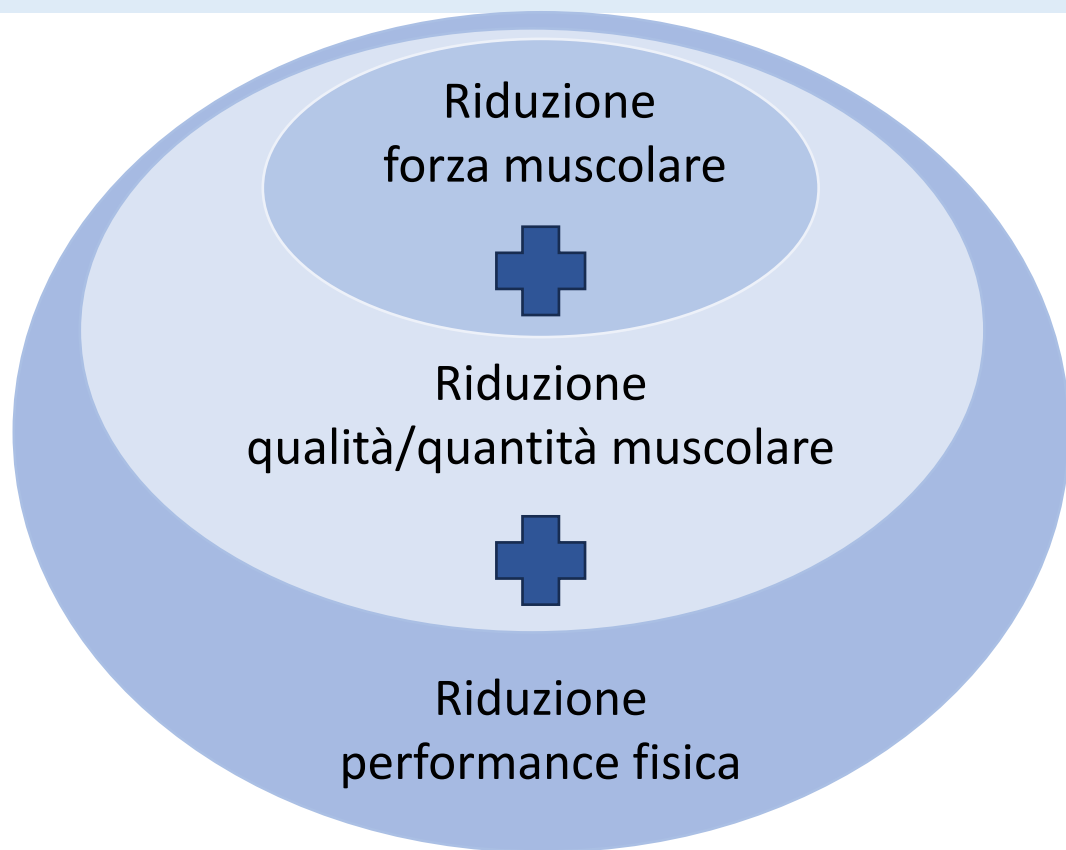
^aAdjusted for age, living alone, admission to hospitals, and walking disability. Sex was included in the model when assessing associations in the overall cohort and not when analyzing men and women separately.



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CAPACITÀ INTRINSECA

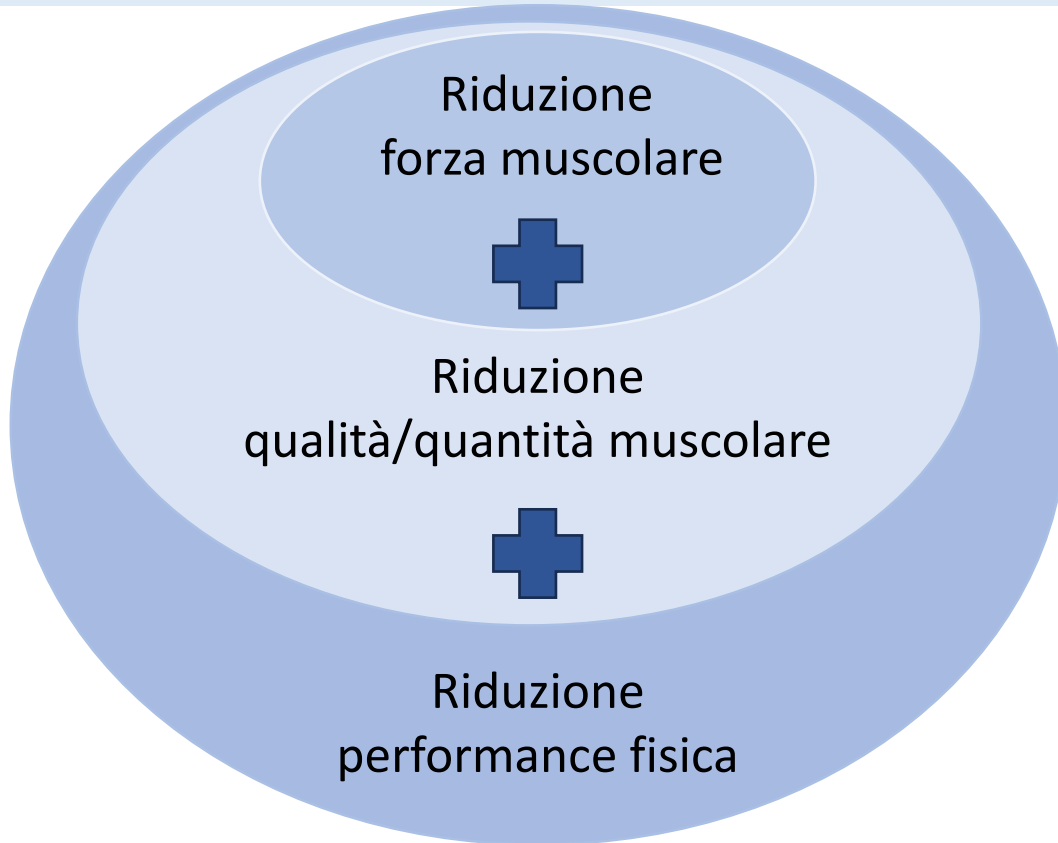




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PSYCHOLOGICAL CAPACITY



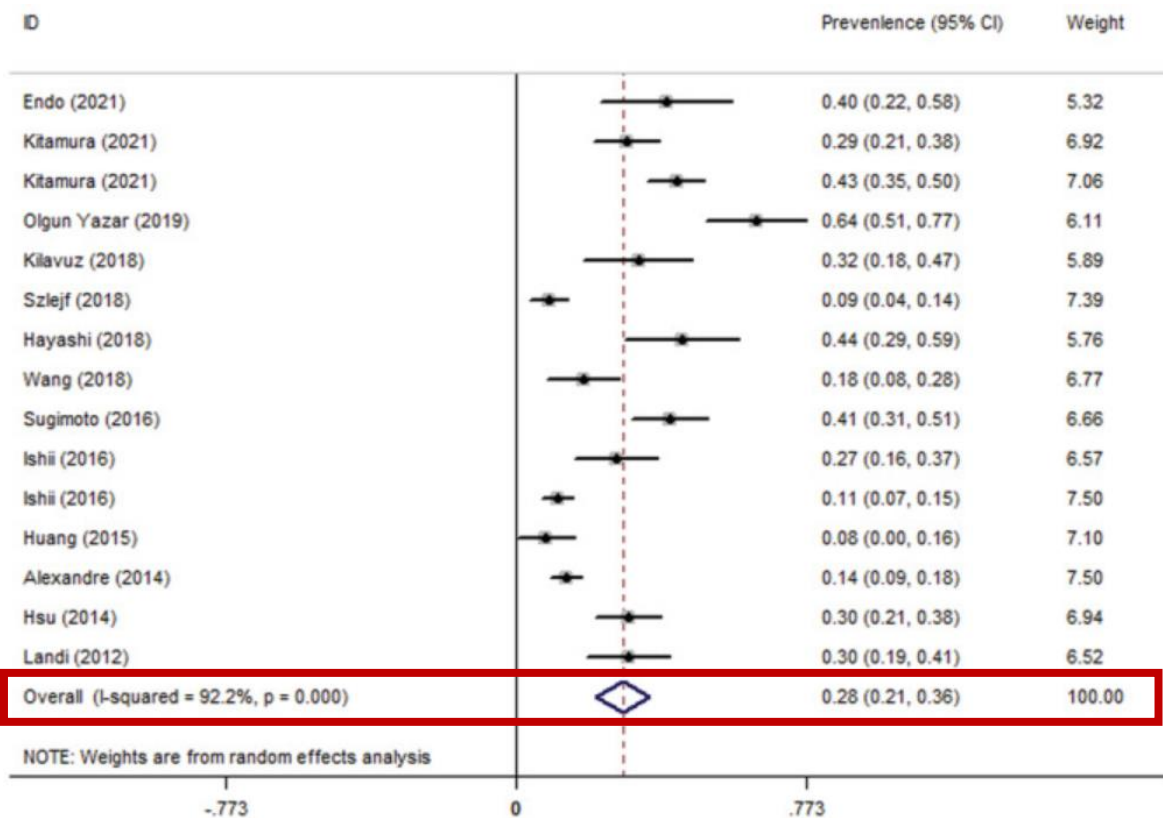
Psychological capacity



SARCOPENIA



PSYCHOLOGICAL CAPACITY



Psychological capacity

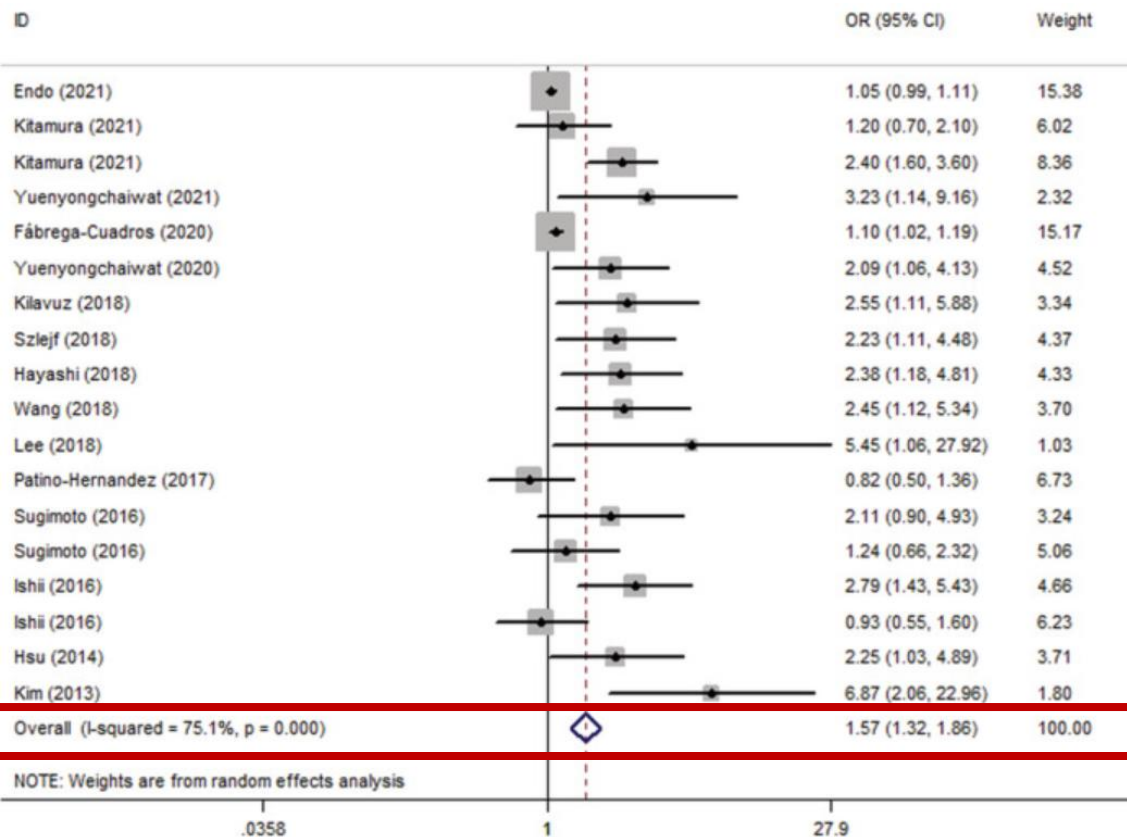
- Revisione sistematica e meta-analisi di 19 studi
- **Prevalenza di depressione in soggetti con sarcopenia: 28%**



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PSYCHOLOGICAL CAPACITY



Psychological
capacity

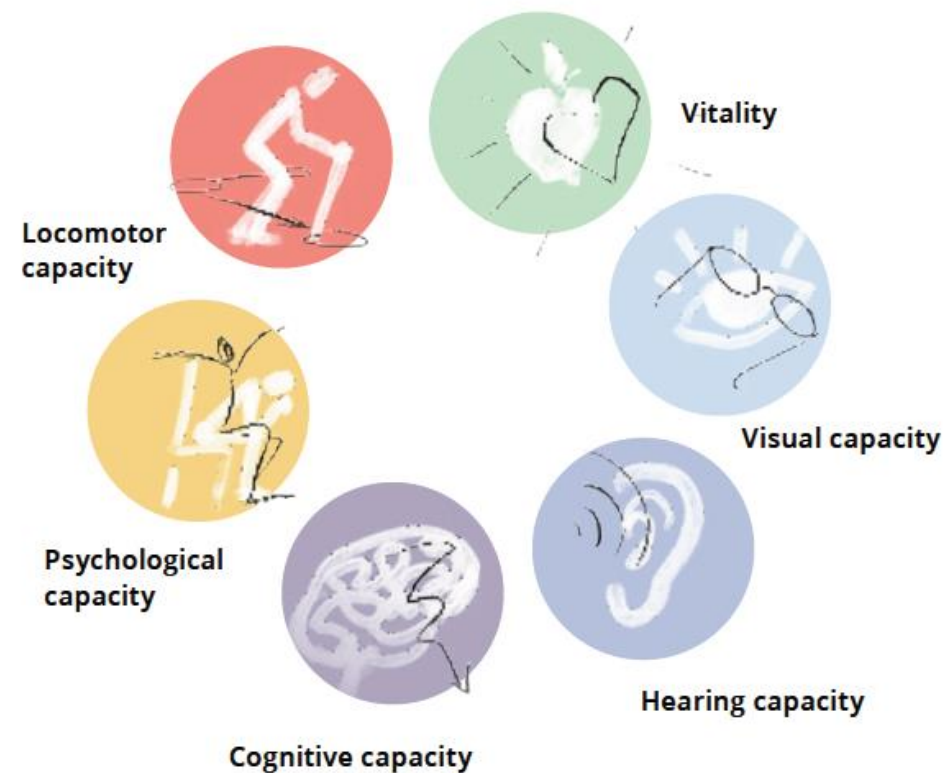
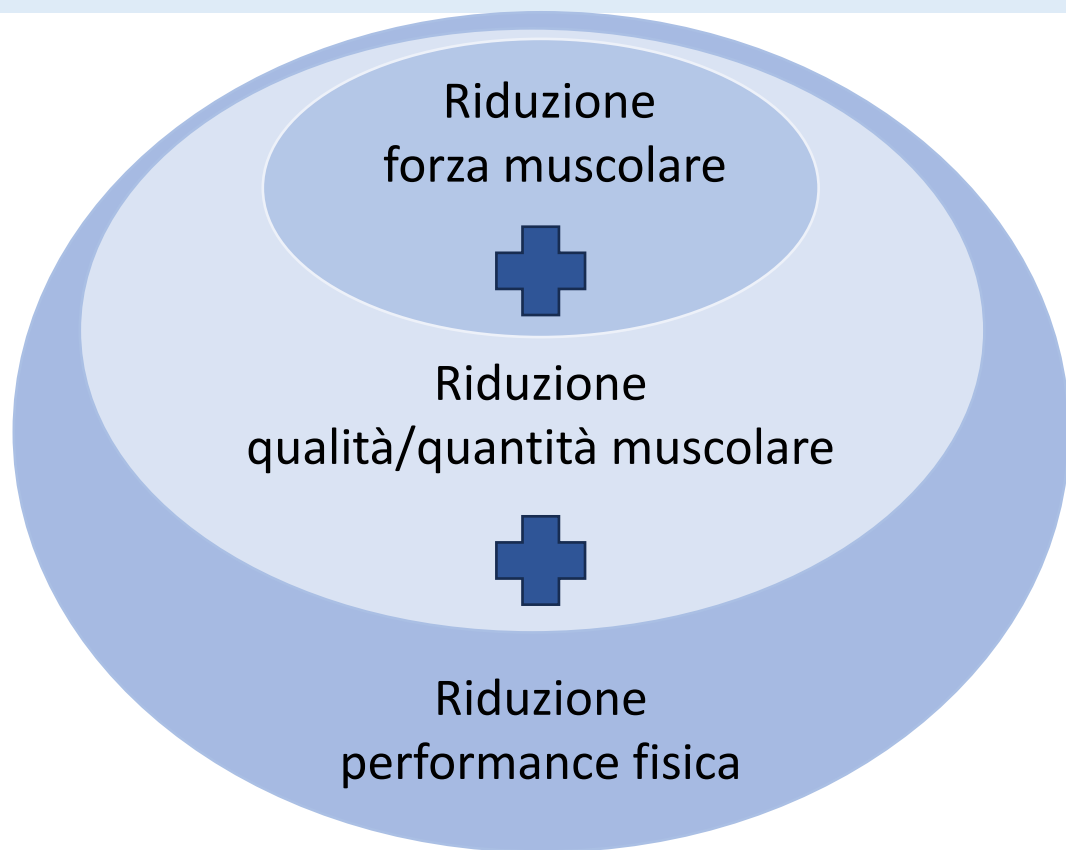
- Revisione sistematica e meta-analisi di 16,869 soggetti con età media 73 anni
- **Associazione tra depressione e sarcopenia: OR=1.57 (1.32-1.86)**



SARCOPENIA



CAPACITÀ INTRINSECA

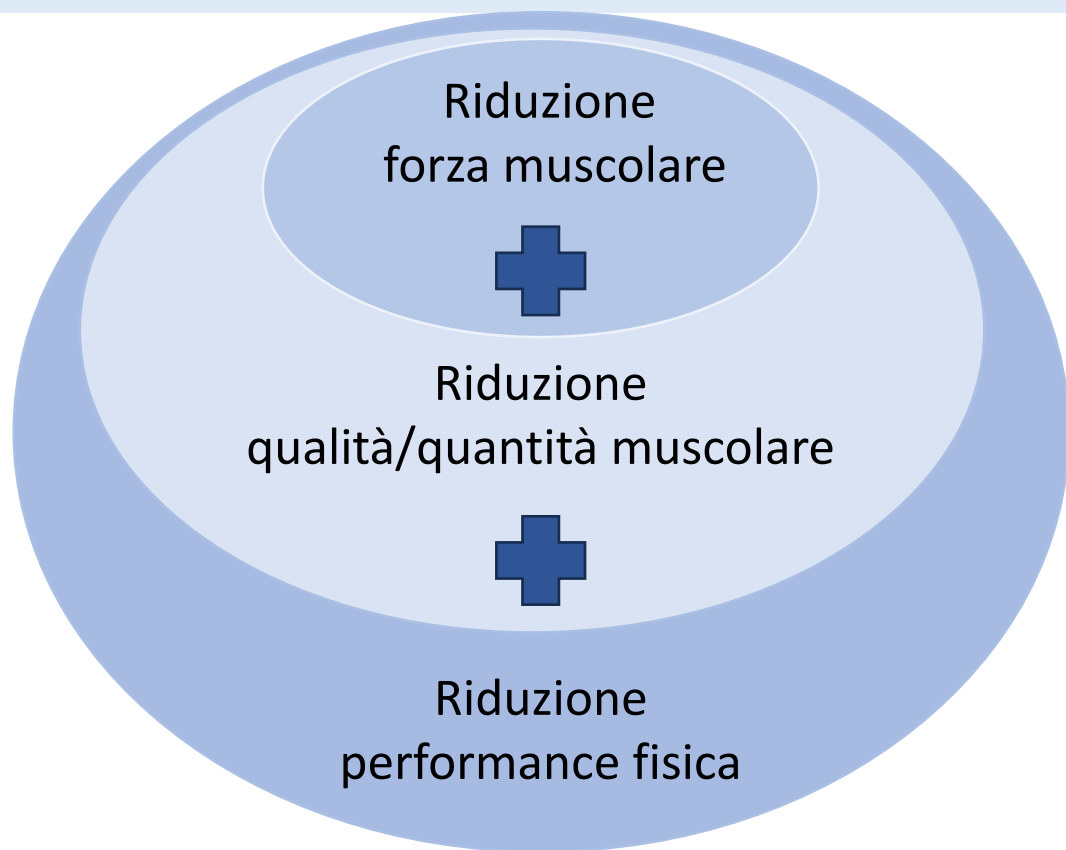




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CAPACITÀ INTRINSECA



Locomotor capacity





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CAPACITÀ INTRINSECA

i 1

CHAIR RISE TEST

A simple test can decide whether an older person needs further assessment for limited mobility.

Instructions: Ask the person, "Do you think it would be safe for you to try to stand up from a chair five times without using your arms?" (Demonstrate to the person.)

If YES, ask them to:

- sit in the middle of the chair
- cross and keep their arms over their chest
- rise to a full standing position and then sit down again
- repeat five times as quickly as possible without stopping.

Time the person taking the test - further assessment is needed if they **cannot stand up five times within 14 seconds.**



FIND CASES

SARC-F
or clinical
suspicion

NEGATIVE

No sarcopenia;
rescreen later

POSITIVE
OR PRESENT

ASSESS

Muscle strength
Grip strength,
Chair stand test

NORMAL

No sarcopenia;
rescreen later

LOW

Sarcopenia
probable*

In clinical practice,
this is enough to
trigger assessment of
causes and start
intervention

CONFIRM

Muscle quantity
or quality
DXA; BIA, CT, MRI

NORMAL

LOW

Sarcopenia
confirmed

SEVERITY

Physical
Performance
Gait speed, SPPB,
TUG, 400m walk

LOW

Sarcopenia
severe

i 2

SHORT PHYSICAL PERFORMANCE BATTERY (SPPB)

While a wide range of physical performance tests is available, the SPPB is recommended, as it has superior measurement properties and is useful across a range of abilities. The SPPB measures timed performance on three tasks, each scored out of four, to derive a score from zero (worst performance) to 12 (best performance).

First, describe each test and ask if the person feels able to do it. If not, score accordingly and move to the next step.

1. Balance tests: Stand for 10 seconds with feet in each of the following three positions. Use the sum of the scores from the three positions.

2. Gait speed test: Time to walk four metres.

Time for four-metre walk:	
< 4.82 seconds	4 points
4.82 - 6.20 seconds	3 points
6.21 - 8.70 seconds	2 points
> 8.70 seconds	1 point
Unable to complete	0 points

3. Chair rise test: Time to rise from a chair five times

< 11.19 seconds	4 points
11.2 - 13.69 seconds	3 points
13.7 - 16.69 seconds	2 points
16.7 - 59.9 seconds	1 point
> 60 seconds or unable to complete	0 points



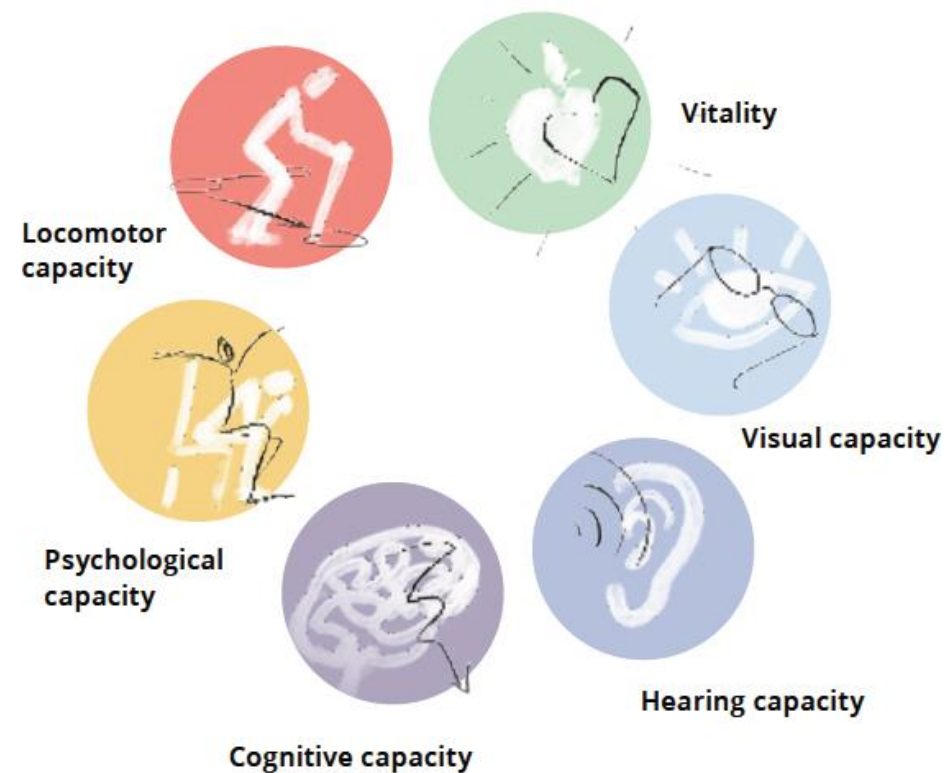
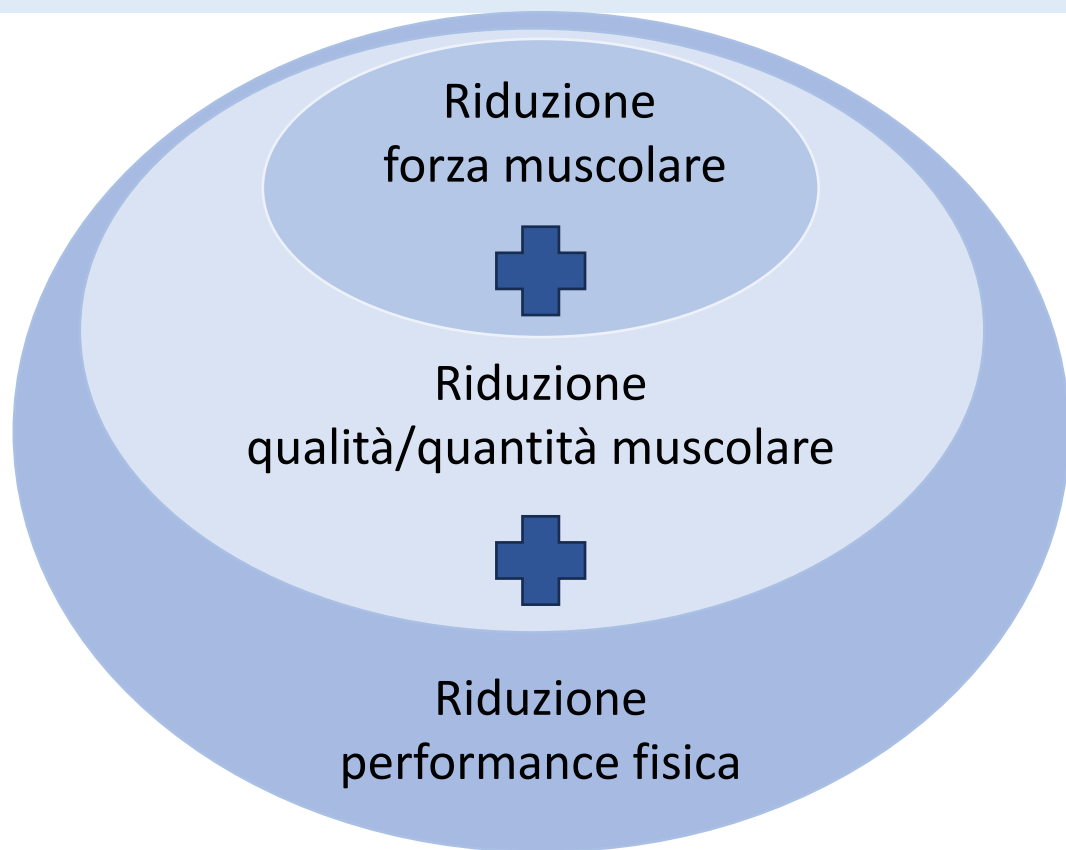
Locomotor
capacity



SARCOPENIA



CAPACITÀ INTRINSECA

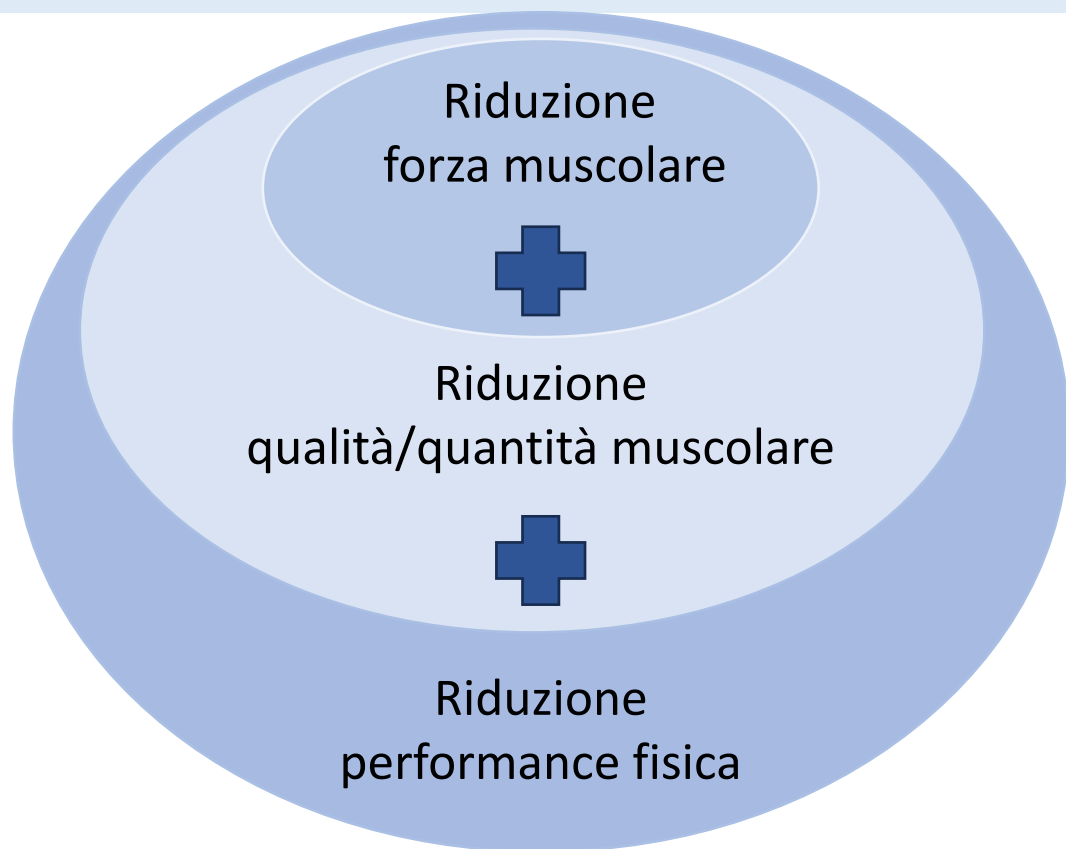




SARCOPENIA



VITALITY



“...a physiological state resulting from the interaction between multiple physiological systems, reflected in (the level of) **energy and metabolism, neuromuscular function, and immune and stress response functions** of the body...”



SARCOPENIA



VITALITY

Part B: Consensus on the top candidate attributes for vitality capacity

Energy and metabolism

- Self-perceived fatigue
- Muscle endurance
- Malnutrition or nutritional status
- Body composition
- Circulating biomarkers of metabolism (eg, HbA_{1c})

Neuromuscular function

- Knee extensor strength
- Handgrip strength
- Respiratory muscle strength

Immune and stress response

- Circulating biomarkers of inflammation
- Perceived immune status (ie, measured by immune status questionnaire)
- Oxygen saturation
- Autonomic function



“...a physiological state resulting from the interaction between multiple physiological systems, reflected in (the level of) **energy and metabolism, neuromuscular function, and immune and stress response functions** of the body...”

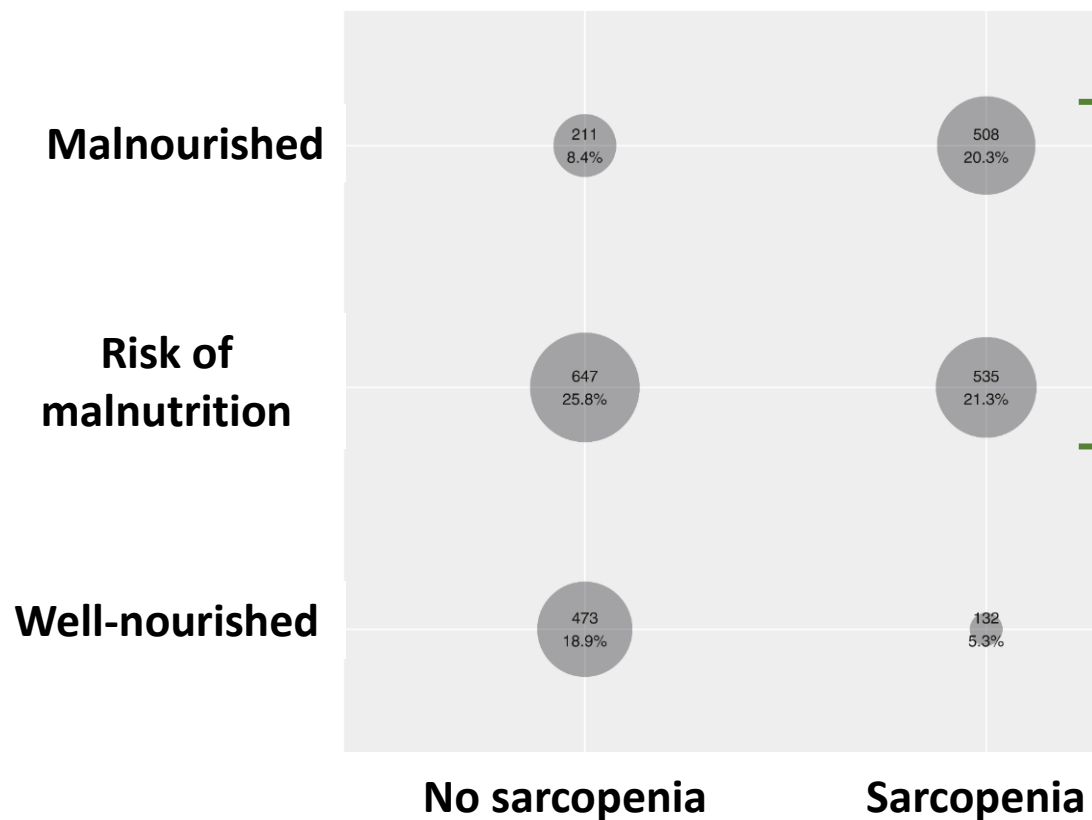
Bautmans et al, Lancet H Longev 2022



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VITALITY



41.6% di sovrapposizione tra sarcopenia e rischio di malnutrizione





SARCOPENIA



VITALITY

Associated Factors	Number of Studies	Heterogeneity		OR (95% CI)	
		I ²	p		
Sociodemographic factors	BMI Under weight	14	78.1	<0.001	3.78 (2.55, 5.60)
	Marital status	7	71.2	<0.001	1.57 (1.08, 2.28)
	ADL disability	7	84.7	<0.001	1.49 (1.15, 1.92)
	Age (years)	34	80.7	<0.001	1.12 (1.10, 1.13)
Behavioral factors	Sleeping time < 6 h	2	0.0	0.473	3.32 (1.86, 5.93)
	Malnutrition/malnutrition risk	10	46.7	0.029	2.99 (2.40, 3.72)
	Sleeping time ≥ 8 h	2	14.7	0.279	2.30 (1.37, 3.86)
	Physical inactivity	18	65.2	<0.001	1.73 (1.48, 2.01)
	Living alone	5	36.0	0.167	1.55 (1.00, 2.40)
	Smoking	29	49.5	<0.001	1.20 (1.10, 1.31)





Outline

1

Relazione tra sarcopenia e capacità intrinseca

2

Implicazioni pratiche e di ricerca

3

Conclusioni



Implicazioni pratiche e di ricerca

- I metodi di valutazione della sarcopenia e di alcuni domini della capacità intrinseca si sovrappongono → semplificazione nella pratica clinica ma collinearità nell'ambito di ricerca
- Il riscontro di sarcopenia deve indurre a una valutazione più estesa della capacità intrinseca dell'anziano, e viceversa



Outline

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Conclusioni

- Sarcopenia e capacità intrinseca sono associate in modo **bidirezionale**
- **Vitalità, capacità cognitive e motoria** sono i domini che più strettamente si associano a sarcopenia
- Promuovere un **approccio di cure integrato** all'anziano (ICOPE) significa preservare la capacità intrinseca dell'individuo ma anche prevenire lo sviluppo di sarcopenia