AGeSPI
LIGURIA

CISEF

Convegno
Anziani e disabili: per un approccio riabilitativo alla non autosufficienza

La risposta della cultura medica di fronte all'incremento della fragilità dei pazienti ricoverati nelle strutture residenziali

G. Regesta

Genova, 23 Ottobre 2012
Badia Benedettina della Castagna

Frailty

More commonly used than defined

Rockwood, 2002

Anonimous. *Br Med J, 1968, 1:723-4*

Old and Frail

One of the miracles of our time is the increase in the average length of life. In England and Wales, for instance, the expectation of life at birth has risen by 20 years since 1900, from about 50 to about 70 years.[1] Eileen M. Brooke[2] puts it another way when she says that in 1963 in England and Wales one in every eight persons was aged 65 or more, and if the trend is continued by 1982 the ratio will be one in six. Not only will the ratio of retired to working people be adversely affected, but the number of old people in absolute terms will have reached the formidable total of 7.4 millions in 1982. There will be proportionately fewer persons capable of looking after their aged kin, and for a variety of socio-economic reasons there will probably be fewer still able to do so even if they wished.

Two recent papers, one complementing the other, highlight the present inadequacies for the care of the aged and under-

Msgr. Charles J Fahey, born Baltimore (MD), 13.4.1933

Nel 1974 il *Federal Council on the Aging* istituisce una *Task Force sull'Anziano Fragile* la cui direzione e affidata a Monsignor Charles Fahey, che per primo introduce a livello istituzionale il termine ***frail elderly***.

Tale denominazione rispondeva alla "*necessità di un termine che sintetizzasse la drammatica condizione di un gruppo di soggetti anziani*" le cui caratteristiche principali erano la presenza di "*disabilità fisica, compromissione affettiva, in un ambiente strutturalmente e socialmente sfavorevole".*

Il Federal Council of Aging adotta la metodologia del *care plan* e *case management,* articolate in funzione del bisogno

Frailty

Definition

A condition in which a person has difficulty with ADL and is vulnerable to various assaults upon his person both from within (organ failure) or without (falls).

It continues in a progressive fashion until the person becomes dependent and dies.

C. Fahey, 1974

Quarterly Journal of Medicine, New Series 68, No. 255, pp. 505-506, July 1988

Editorial

Who are the Frail Elderly?

K. W. WOODHOUSE, HILARY WYNNE, SHELAGH BAILLIE,
O. F. W. JAMES, and M. D. RAWLINS

From the Geriatric Pharmacology Research Group, Departments of Medicine (Geriatrics) and Pharmacological Sciences (Wolfson Unit of Clinical Pharmacology), The University, Newcastle upon Tyne NE1 7RU

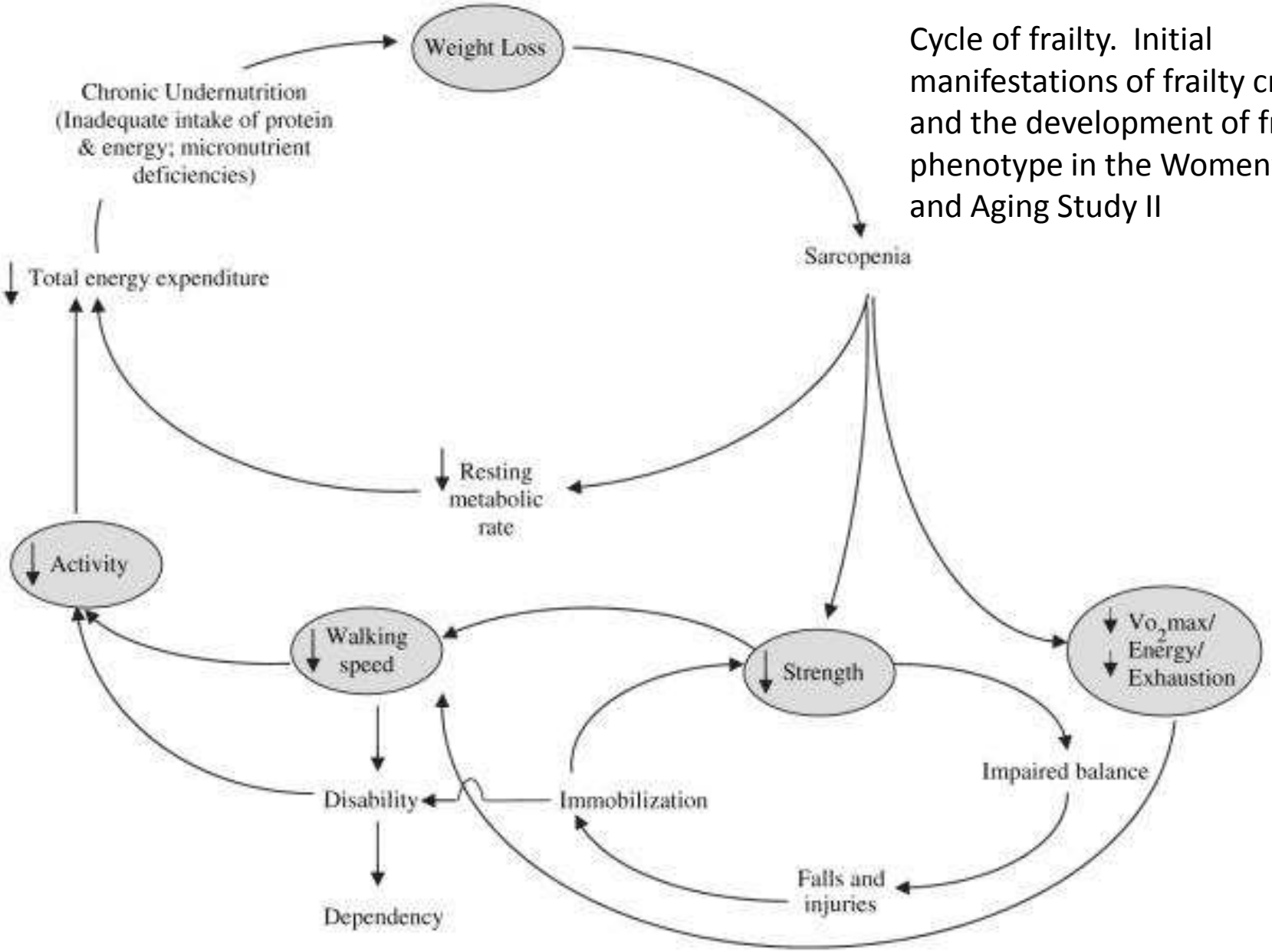
The frail elderly are individuals, over 65 years of age, dependent on others for activities of daily living, and often in institutional care. They are not independently mobile - whilst they do not have overt cardiac, respiratory, hepatic, renal or metabolic disease, minor abnormalities may be revealed on laboratory investigation. They may require regular prescribed drug therapy. Conditions contributing to frailty commonly include Alzheimer's disease, multiinfarct cerebrovascular disease, Parkinsonism, osteoporosis, osteoarthritis, and healed fracture events.

Definition and screening for frailty

- **General practitioners.** Screening tool short and simple to use, predicts a decline in functional status, and is linked to quality-of-care measures for “vulnerable” elders.
- **Those interested** in **researching the biology** of frailty.
  A definition based on a biologically plausible model (Fried)
- **Administrators** involved in planning services.
  A tool that predicts hospital admission, or alternatively a frailty scale.

Sternberg, 2011

Fig. L'anziano fragile: i domini della fragilità.



Cycle of frailty. Initial manifestations of frailty criteria and the development of frailty phenotype in the Women's Health and Aging Study II

Xue QL. *Clin Geriatr Med, 2011*

Frailty in Older Adults: Evidence for a Phenotype

Table 1. Operationalizing a Phenotype of Frailty

A. *Characteristics of Frailty*	B. *Cardiovascular Health Study Measure*[*]
Shrinking: Weight loss (unintentional) Sarcopenia (loss of muscle mass)	Baseline: >10 lbs lost unintentionally in prior year
Weakness	Grip strength: lowest 20% (by gender, body mass index)
Poor endurance; Exhaustion	"Exhaustion" (self-report)
Slowness	Walking time/15 feet: slowest 20% (by gender, height)
Low activity	Kcals/week: lowest 20% males: <383 Kcals/week females: <270 Kcals/week
	C. Presence of Frailty
	Positive for frailty phenotype: ≥3 criteria present
	Intermediate or prefrail: 1 or 2 criteria present

Fried LP, 2001

Frailty in Older Adults: Evidence for a Phenotype

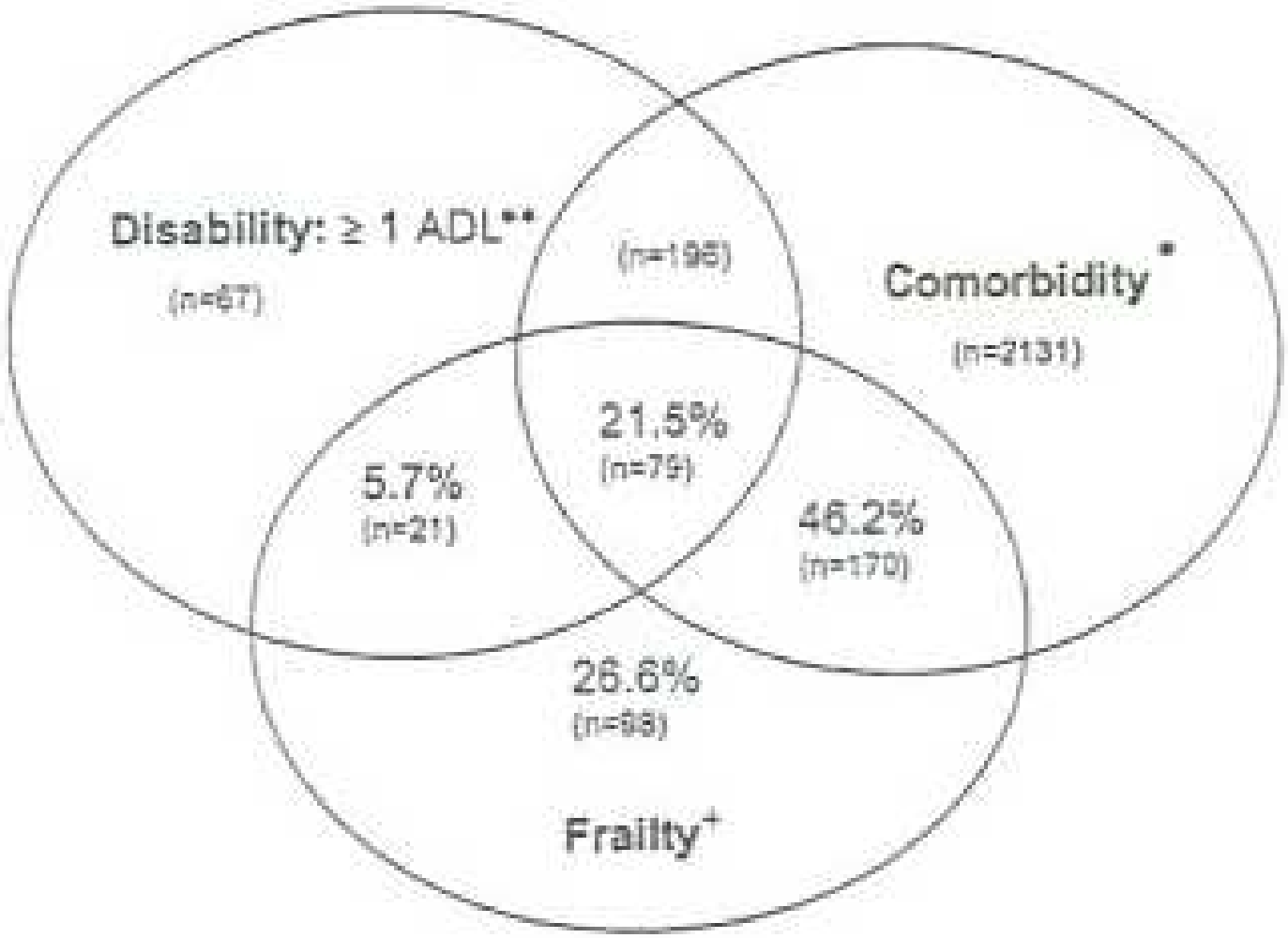


Figure 3. Venn diagram displaying extent of overlap of frailty with ADL disability and comorbidity (≥2 diseases).

Fried LP, 2001

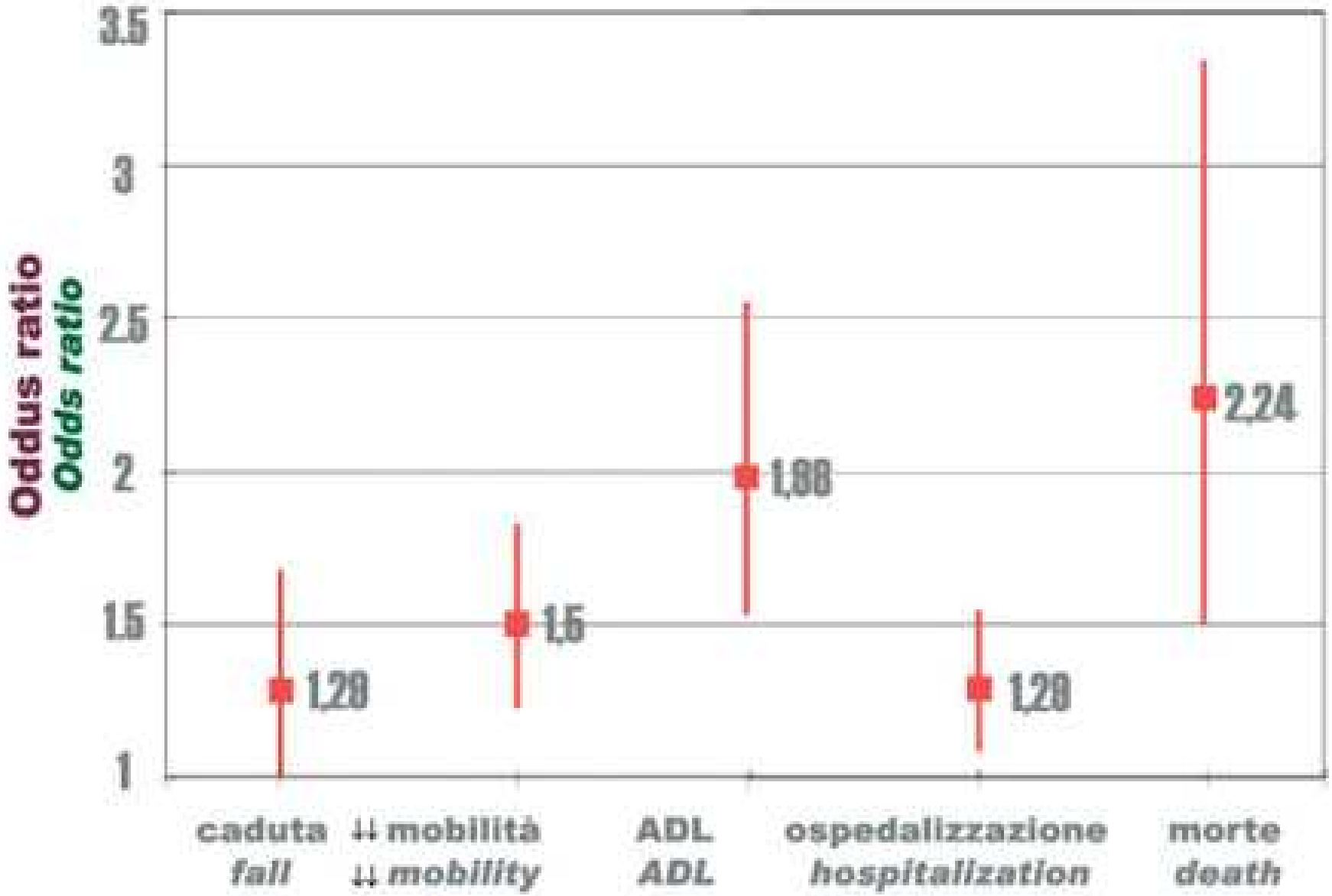


Fig. Rischio di eventi avversi nell'anziano fragile rispetto al non fragile al termine di 3 anni di osservazione longitudinale (Fried LP. 2001).

Frailty as a phenotype
Expanded models

Physical characteristics of the phenotype plus:

- Dysability (ADL)
- Cognitive impairment
- QoL and socio-economics

Abellan van Kan, 2010

The multidomain phenotype of frailty

- Comprehensive geriatric assessment (4-level Frailty Index)
- Social vulnerability
  - Canadian Study of Health and Aging (CSHA)
  - National Population Health Survey (NPHS)

Abellan van Kan, 2010

Frailty

Definition

Frailty is a term to denote a multidimensional loss of reserves (energy, physical ability, cognition, health) that gives rise to vulnerability.

It appears to be a valid construct, but how exactly define it remains unclear.

Rockwood, 2005

Appendix 1: List of variables used by the Canadian Study of Health and Aging to construct the 70-item CSHA Frailty Index

- Changes in everyday activities
- Head and neck problems
- Poor muscle tone in neck
- Bradykinesia, facial
- Problems getting dressed
- Problems with bathing
- Problems carrying out personal grooming
- Urinary incontinence
- Toileting problems
- Bulk difficulties
- Rectal problems
- Gastrointestinal problems
- Problems cooking
- Sucking problems
- Problems going out alone
- Impaired mobility
- Musculoskeletal problems
- Bradykinesia of the limbs
- Poor muscle tone in limbs
- Poor limb coordination
- Poor coordination, trunk
- Poor standing posture
- Irregular gait pattern
- Falls
- Mood problems
- Feeling sad, blue, depressed
- History of depressed mood
- Tiredness all the time
- Depression (clinical impression)
- Sleep changes
- Restlessness
- Memory changes
- Short-term memory impairment
- Long-term memory impairment
- Changes in general mental functioning
- Onset of cognitive symptoms
- Clouding or delirium
- Paranoid features
- History relevant to cognitive impairment or loss
- Family history relevant to cognitive impairment or loss
- Impaired vibration
- Tremor at rest
- Postural tremor
- Intention tremor
- History of Parkinson's disease
- Family history of degenerative disease
- Seizures, partial complex
- Seizures, generalized
- Syncope or blackouts
- Headache
- Cerebrovascular problems
- History of stroke
- History of diabetes mellitus
- Arterial hypertension
- Peripheral pulses
- Cardiac problems
- Myocardial infarction
- Arrhythmia
- Congestive heart failure
- Lung problems
- Respiratory problems
- History of thyroid disease
- Thyroid problems
- Skin problems
- Malignant disease
- Breast problems
- Abdominal problems
- Presence of snout reflex
- Presence of the palmomental reflex
- Other medical history

Rockwood K et al, *CMAJ 2005*

Frailty Index (FI)

FI is a count of 70 clinical deficits (score 0-1) of current disease ability in ADL, physical and neurological signs.

e.g., 7 deficits = 7/70 FI = 0.10

Rockwood et al, 2007

Box 1: The CSHA Clinical Frailty Scale

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

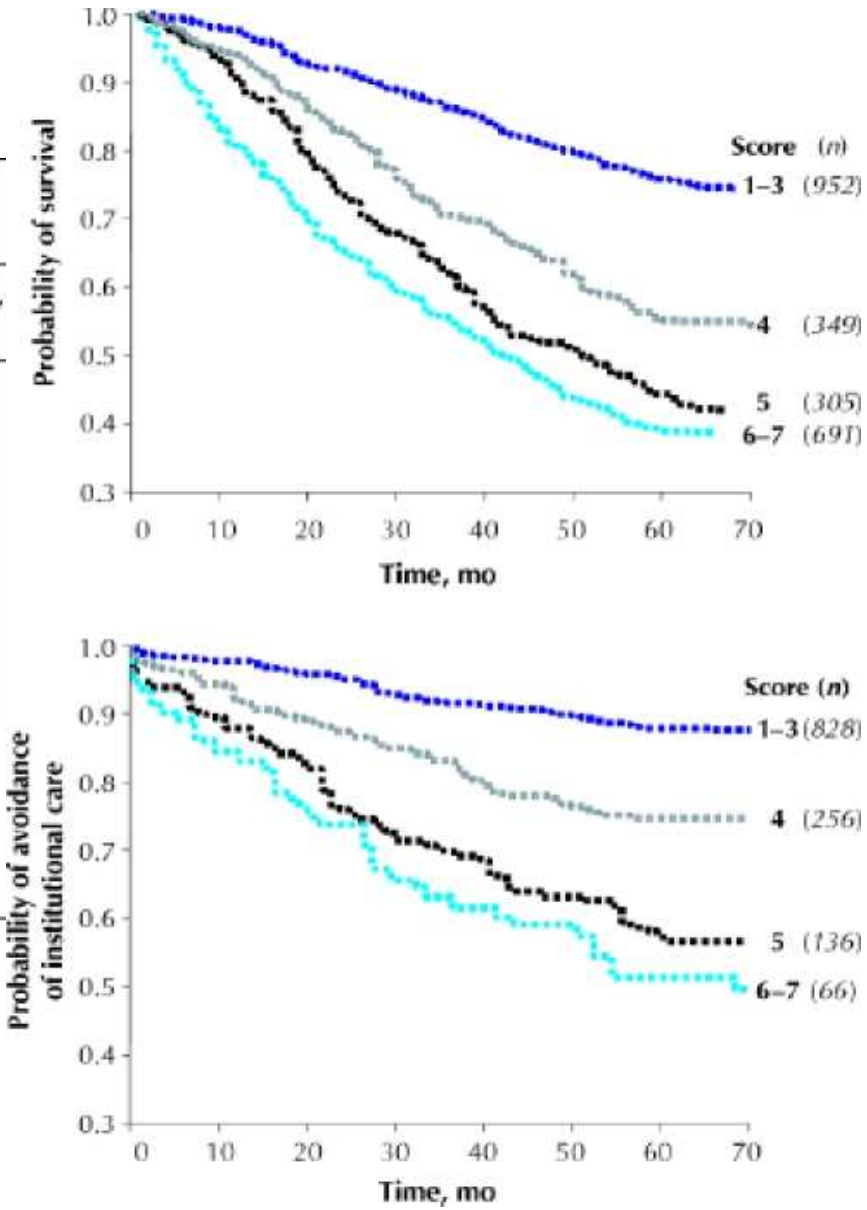
Note: CSHA = Canadian Study of Health and Aging.

Rockwood K et al,
CMAJ 2005

Table 2: Cox proportional hazard ratios (HR) for time until death and until the requirement for institutional care

Factor	Death, HR (95% CI)	Entry into institution, HR (95% CI)
Age	1.08 (1.07–1.08)	1.15 (1.10–1.13)
Sex	0.83 (0.78–0.89)	1.38 (1.21–1.58)
Education level*	0.98 (0.97–0.99)	0.98 (0.97–0.99)
Modified Mini-Mental State Examination	0.84 (0.82–0.86)	0.65 (0.60–0.70)
Cumulative Illness Rating Scale	1.14 (1.11–1.17)	1.22 (1.16–1.27)
CSHA measuring tools		
Rules-based definition of frailty	1.17 (1.13–1.20)	1.27 (1.19–1.35)
Frailty Index	1.26 (1.24–1.29)	1.56 (1.48–1.65)
Function Scale	1.16 (1.13–1.20)	1.29 (1.20–1.39)
Clinical Frailty Scale	1.30 (1.27–1.33)	1.46 (1.39–1.53)

Note: CI = confidence interval, CSHA = Canadian Study of Health and Aging.
All scales were adjusted for age, sex and number of years of education, and recategorized into 7-level) scales to compare with the Clinical Frailty Scale.
*Univariate estimate.



Rockwood K et al, *CMAJ 2005*

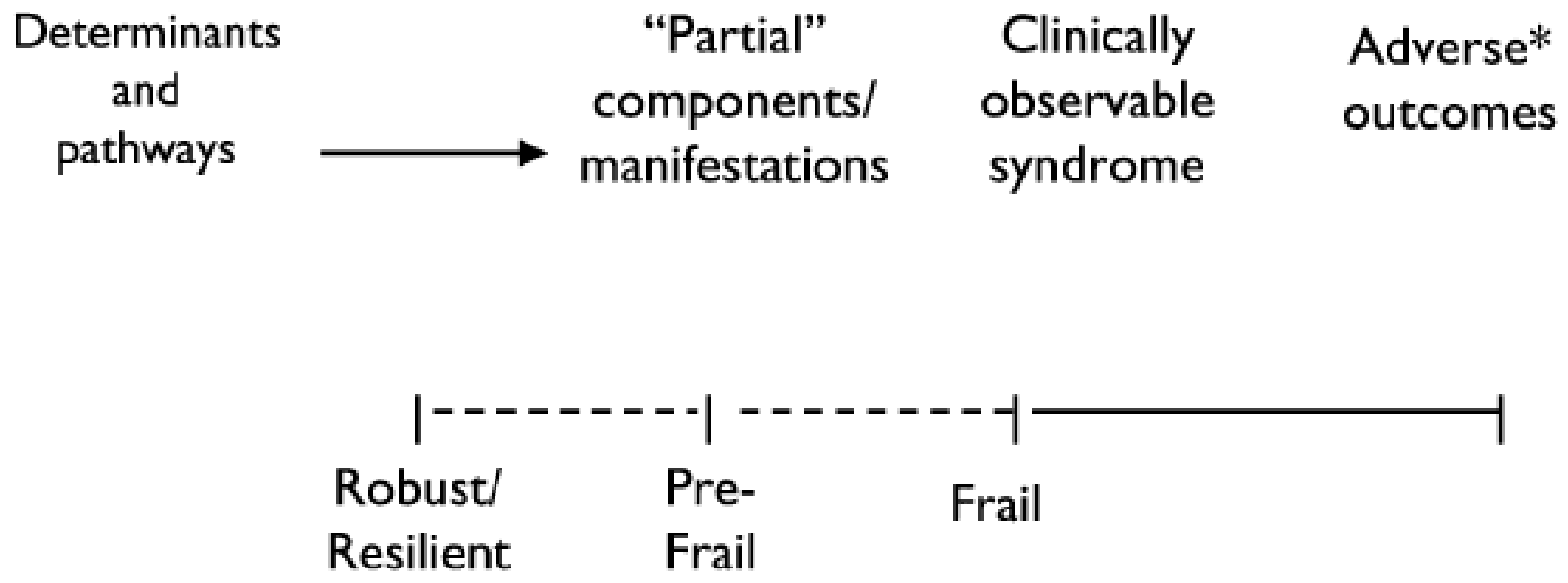


Figure 1. Hypothesized pathway to frailty.

Sternberg, 2011

The identification of frailty

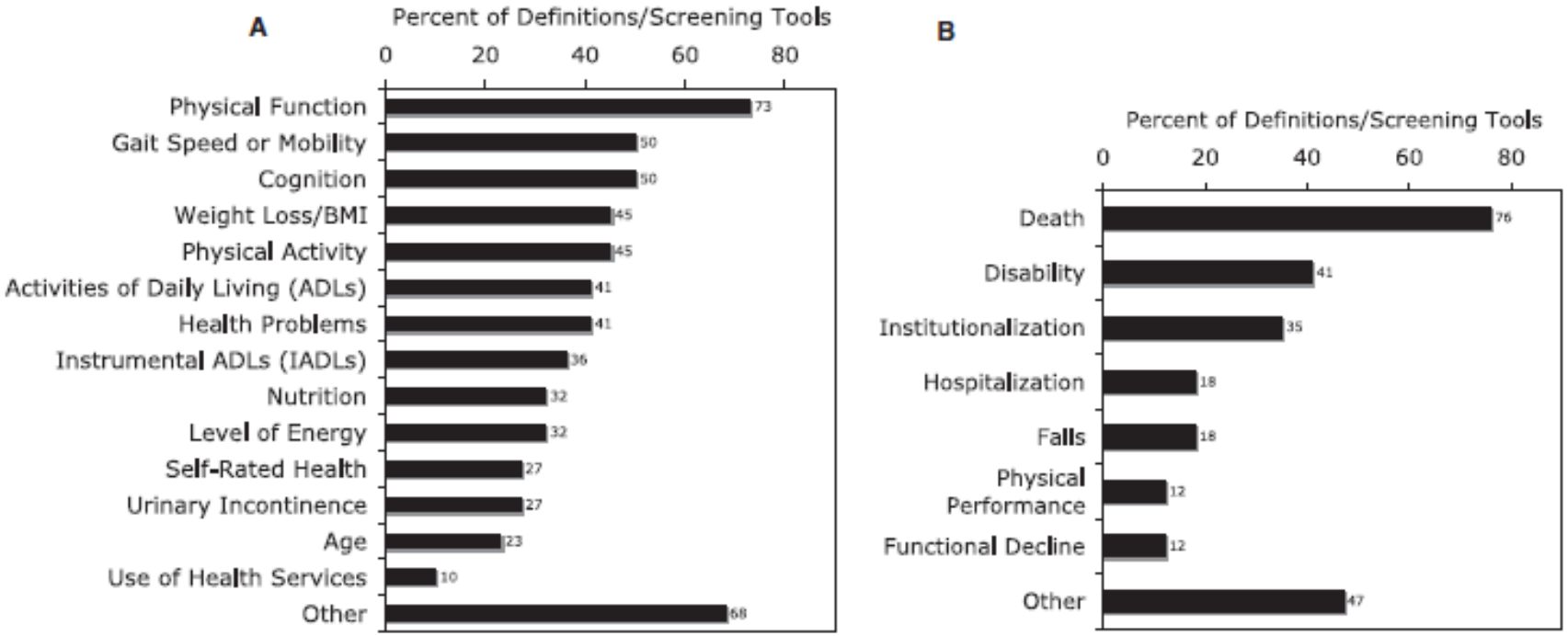
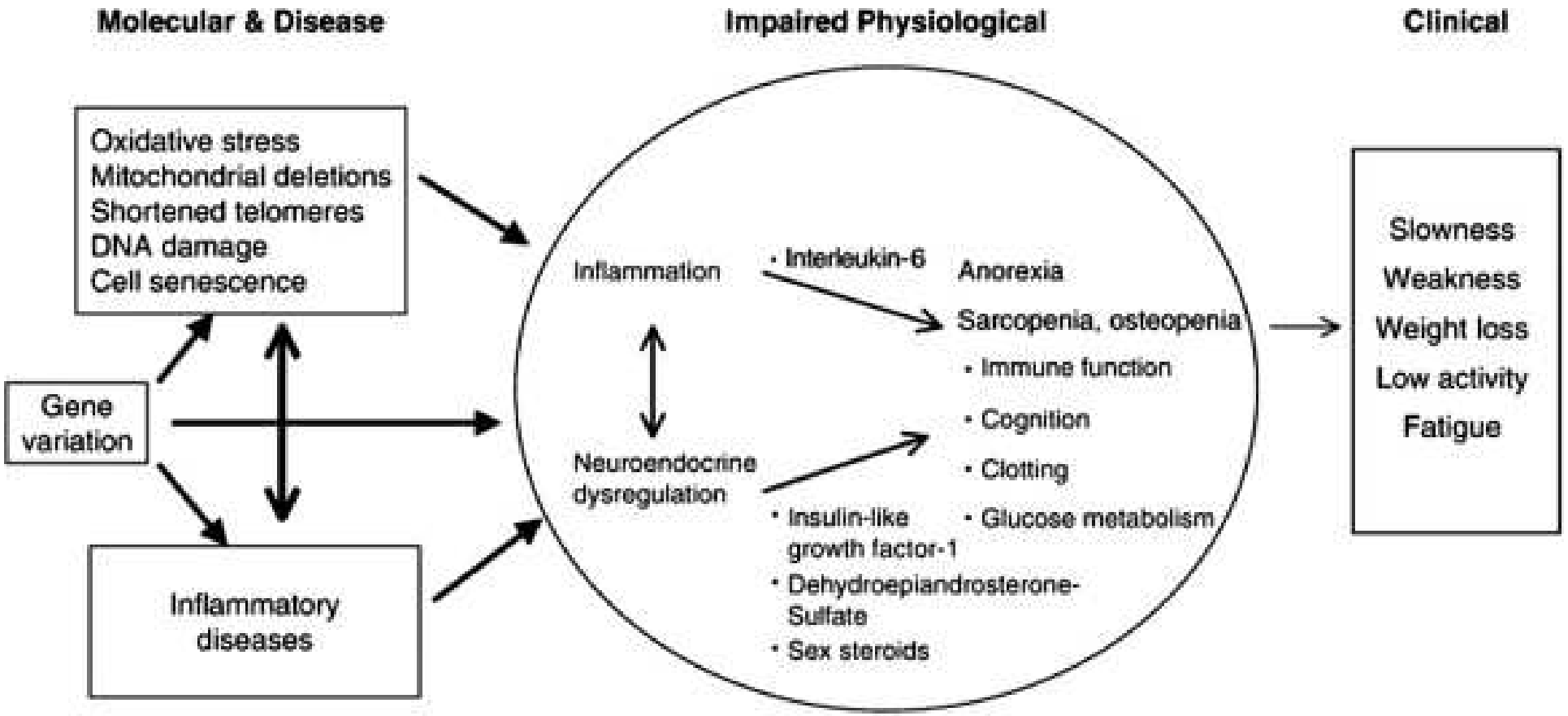


Figure 3. A. Prevalence of identifying factors for frailty in definitions and screening tools. B. Prevalence of outcomes of frailty predicted by definitions and screening tools. BMI = body mass index.

Sternberg, JAGS 2011

Frailty as a Single Syndrome

Walston, 2006



Hypothesized relationship between molecular, physiological, and clinical variables

Frailty

Loss of resilience

Frailty is a term to denote:

- a multidimentional loss of resources (energy, physical ability, cognition)
- a disregulation of interactions (feed-back) within and between multiple physiological functions

Leading to:

a) Compromised ability to regulate **homeostasis**
b) Loss of **resilience** in the face of stressors

That is **vulnerability**

Rockwood, 2005

Frailty

Loss of resilience

Syndrome of **decreased resilience** and physiologic reserves, in which a mutually exacerbating cycle of declines across multiple sistems results in negative energy balance, sarcopenia, and diminished strenght and tolerance for exertion, neuroendocrine disregulation, and immune impairment.

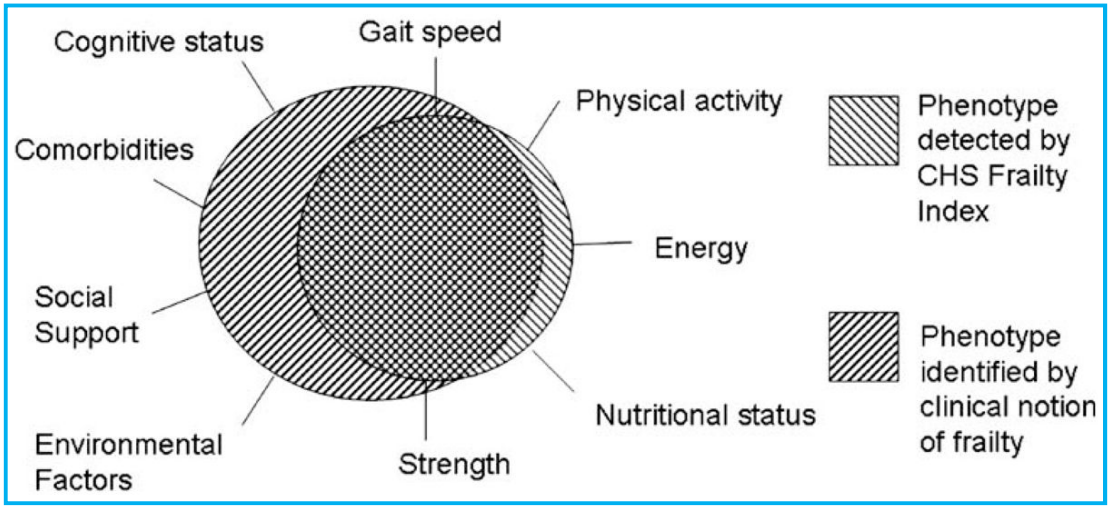
Abellan van Kan, 2010

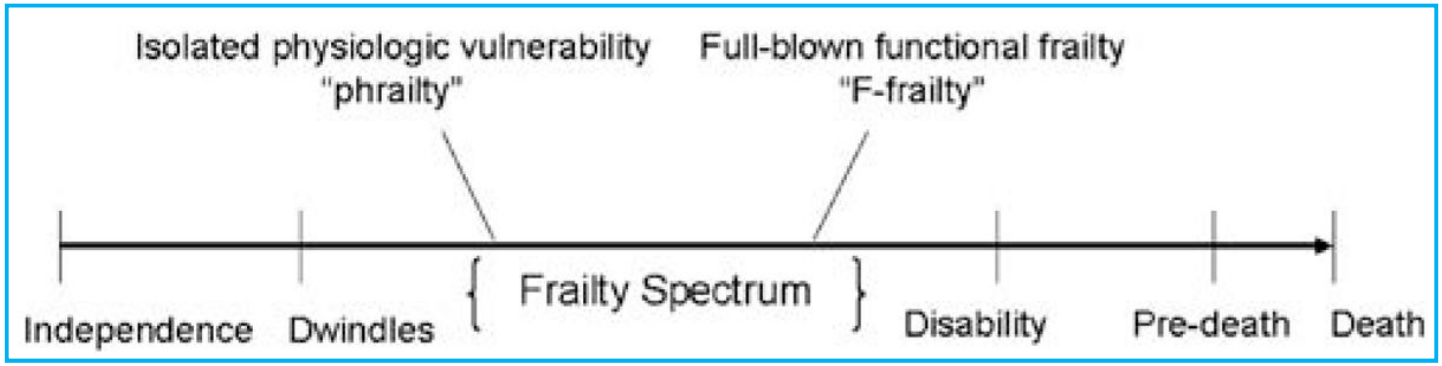
J Gerontol A Biol Sci Med Sci, 2007

Frailty Thy Name Is … Phrailty?

Heather E. Whitson, Jama L. Purser, and Harvey J. Cohen

Center for the Study of Aging and Human Development, Duke University Medical Center, Durham, North Carolina.





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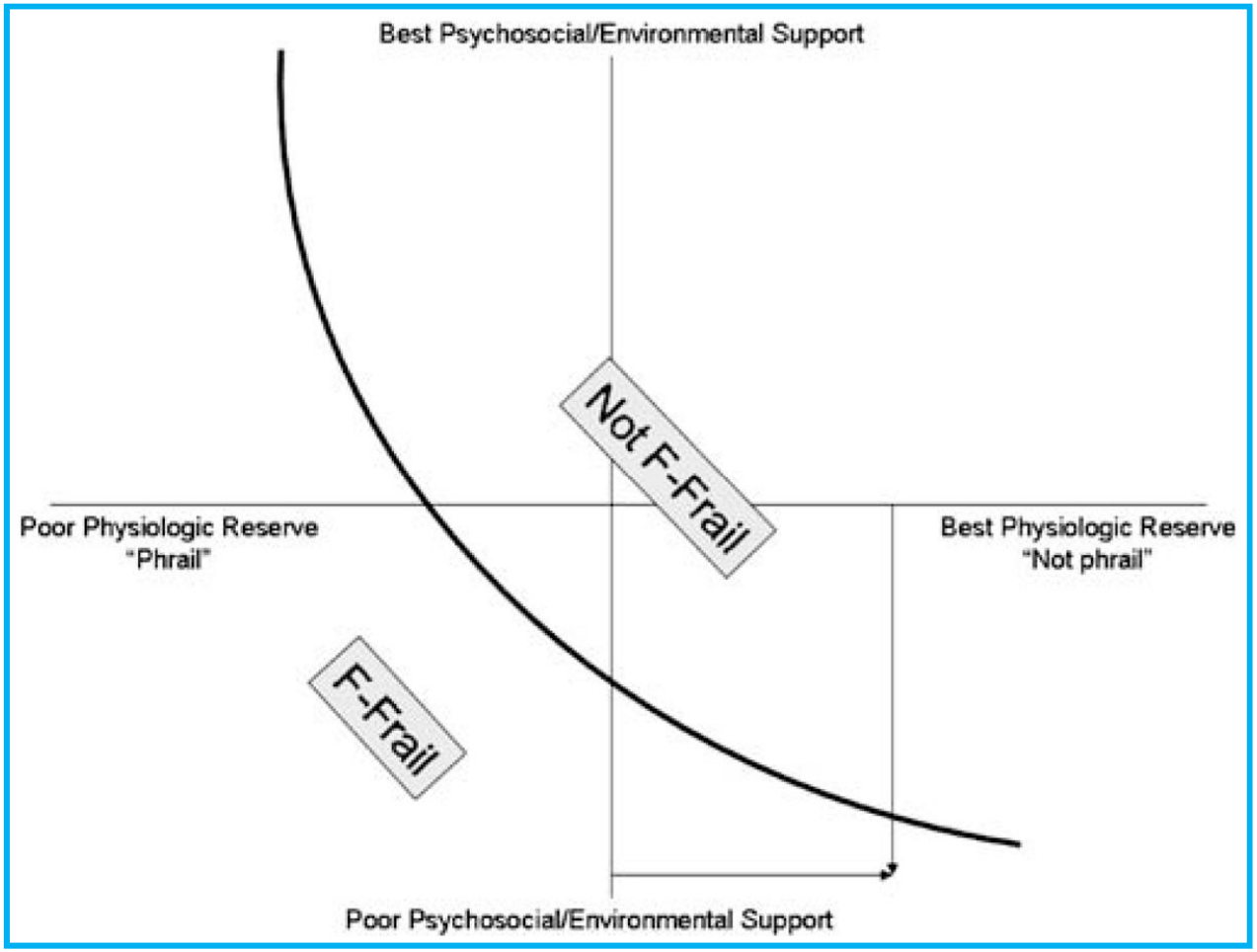
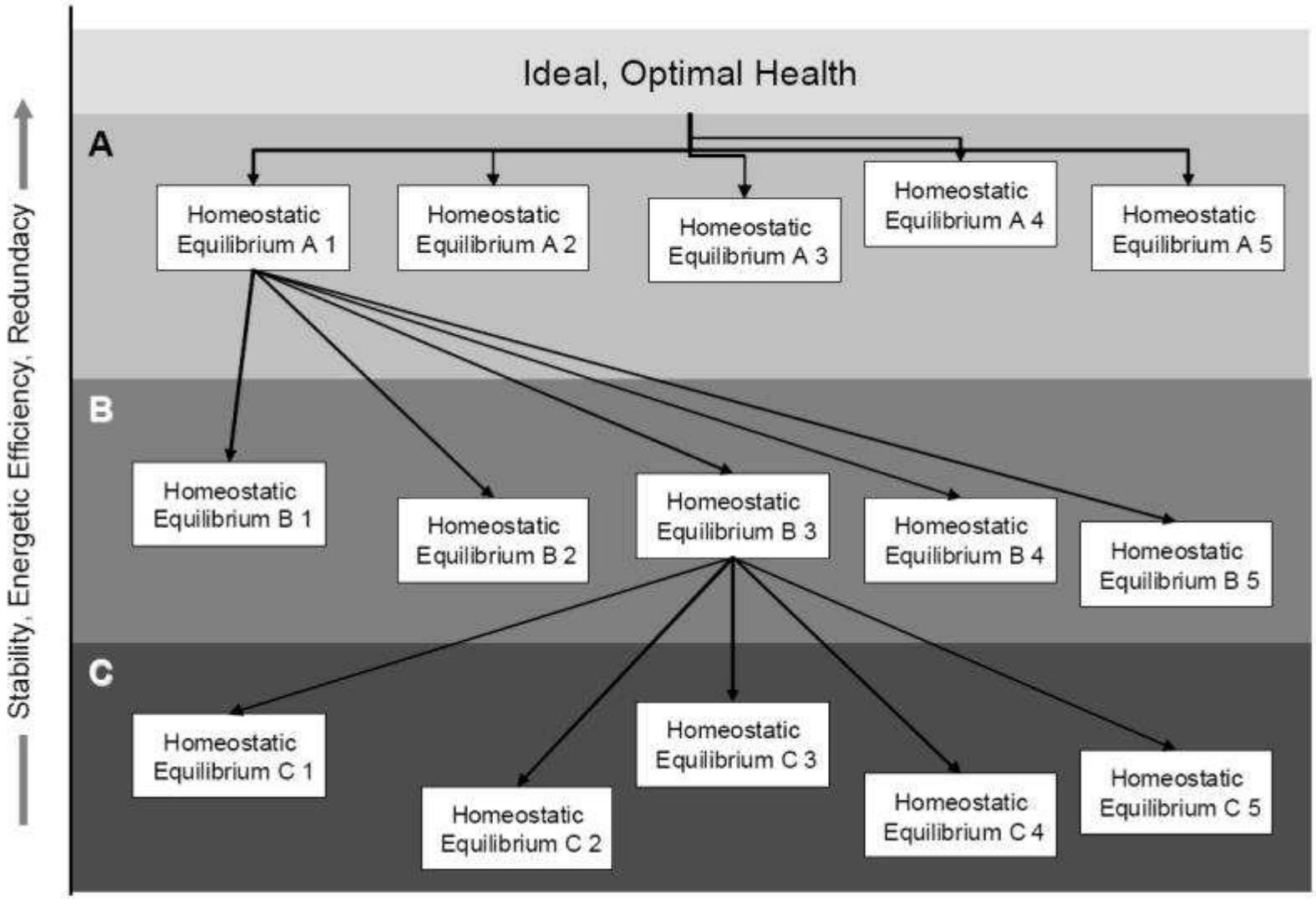




The ideal, optimal health is characterized by robust homeostasis, energetic efficiency and redundancy. Challenge above the threshold of compensation cause a transition to one of possible alternative homeostatic states that are less stable, less energetically **...**

Ferrucci L, 2008

Frailty as a Nexus Between the Biology of Aging

Ferrucci L et al, *Public Health Reviews. 2010*

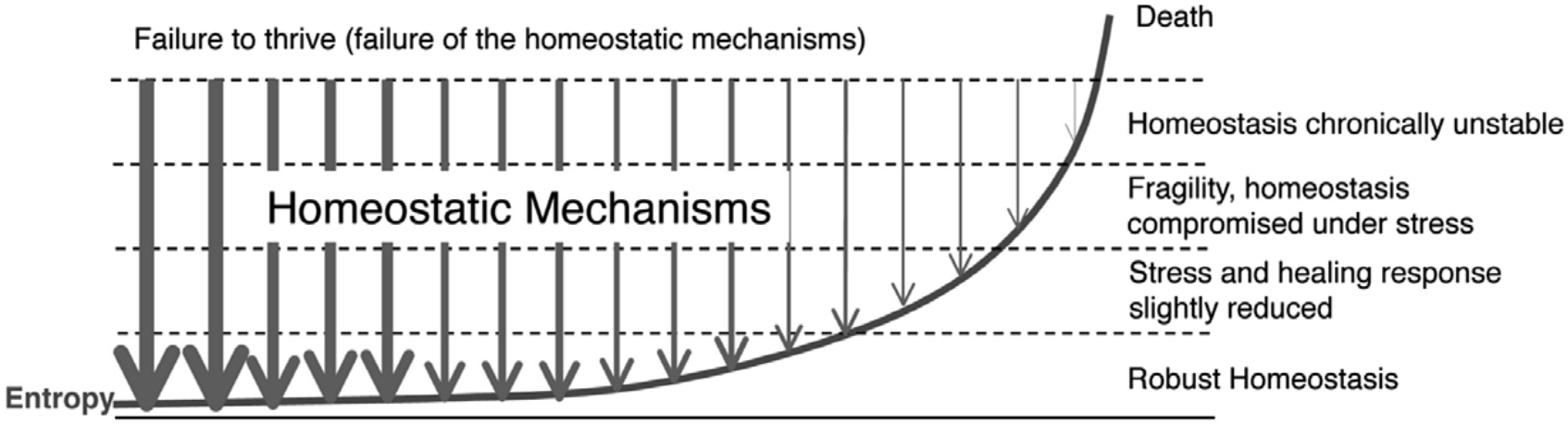
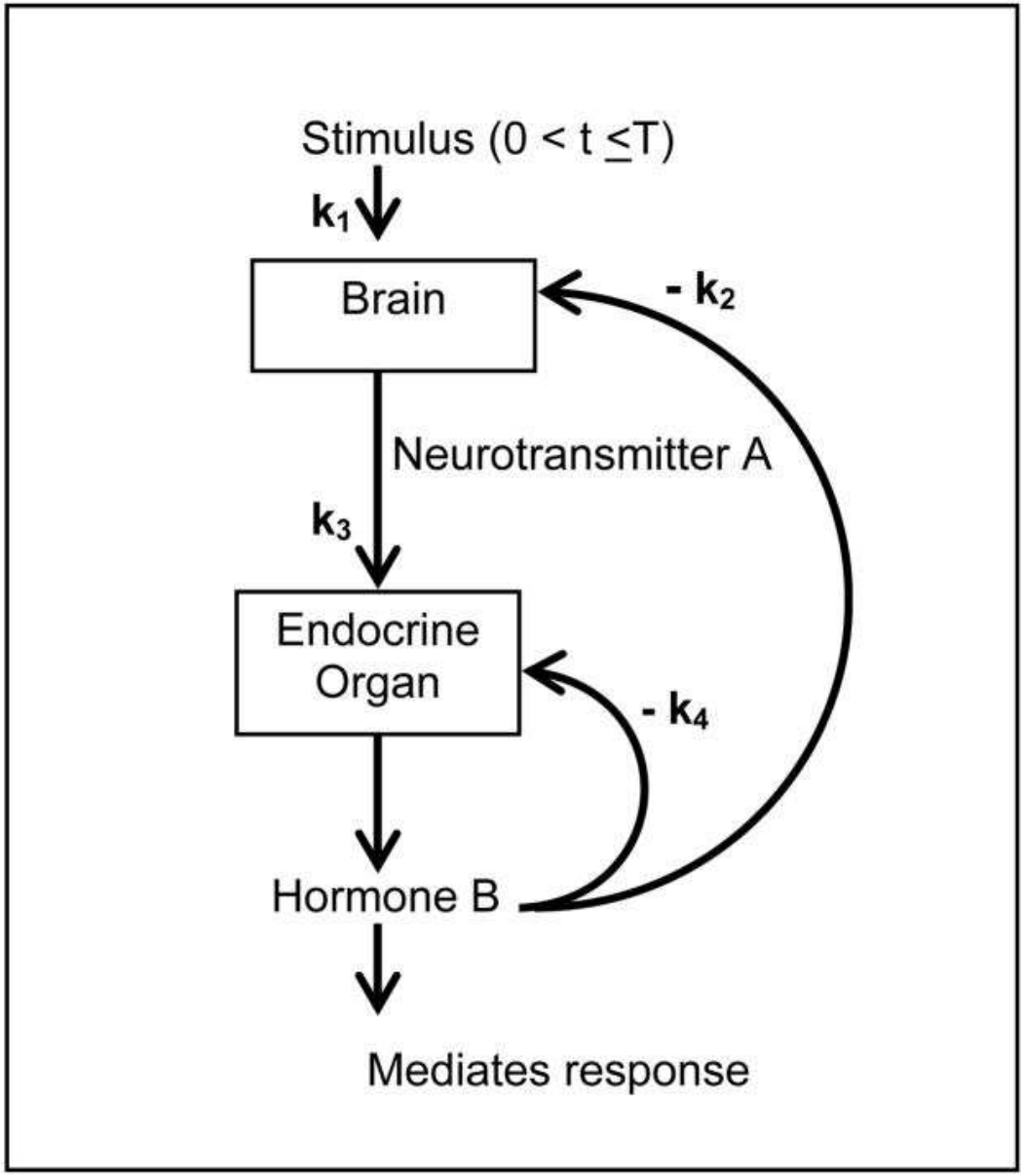


Fig. Aging may be conceptualized as a process of progressively increased entropy coupled with reduction and subsequently failure of the homeostatic mechanisms.

Stimulus-response paradigm for characterizing the loss of resilience in homeostatic regulation associated with frailty

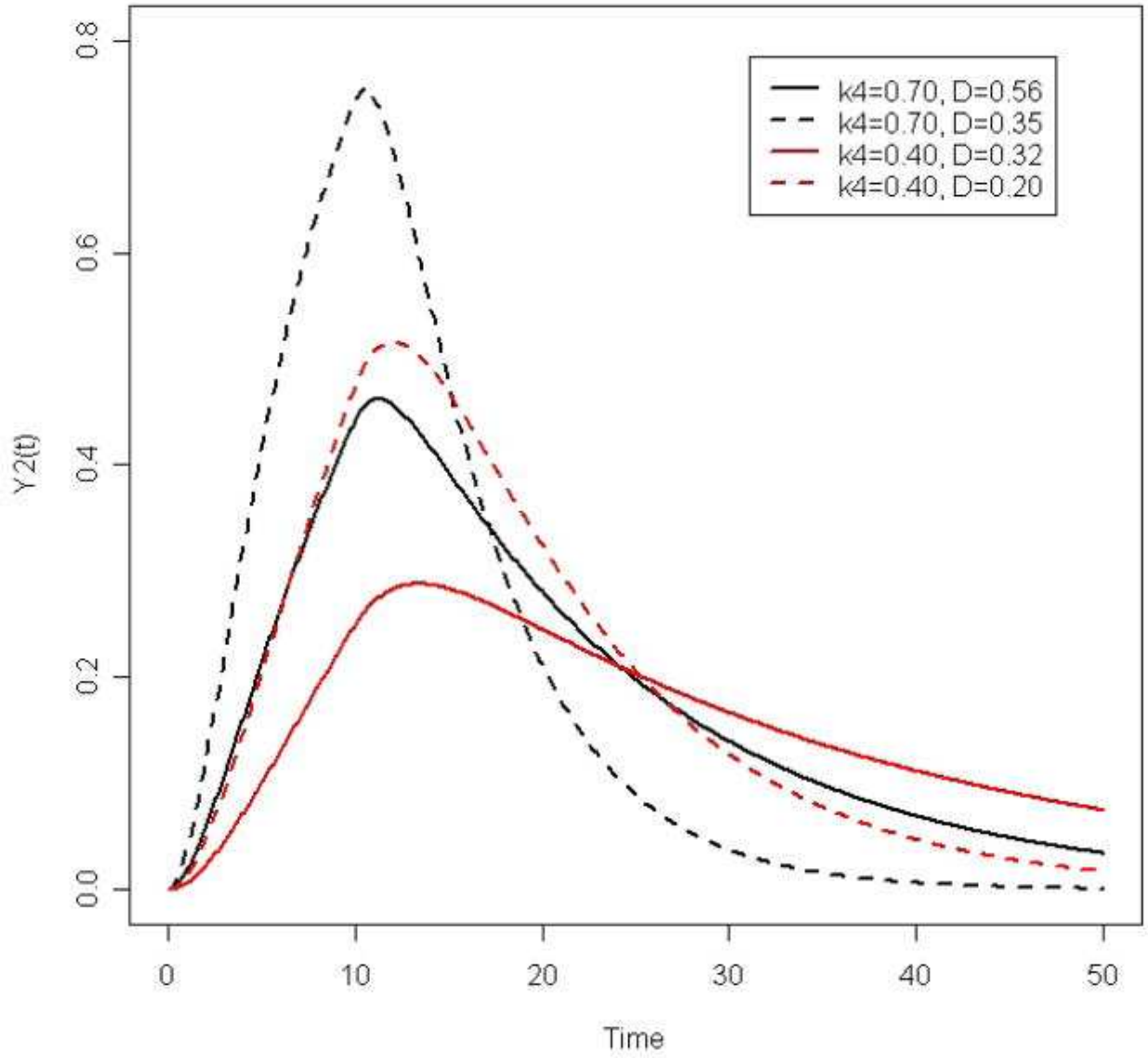


Varadhan et al, 2008

A schematic showing the components and parameters of a hypothetical dynamical system

Stimulus-response paradigm for characterizing the loss of resilience in homeostatic regulation associated with frailty

Varadhan et al, 2008



Dynamic response curves of the concentration of hormone B for different values of system parameters.

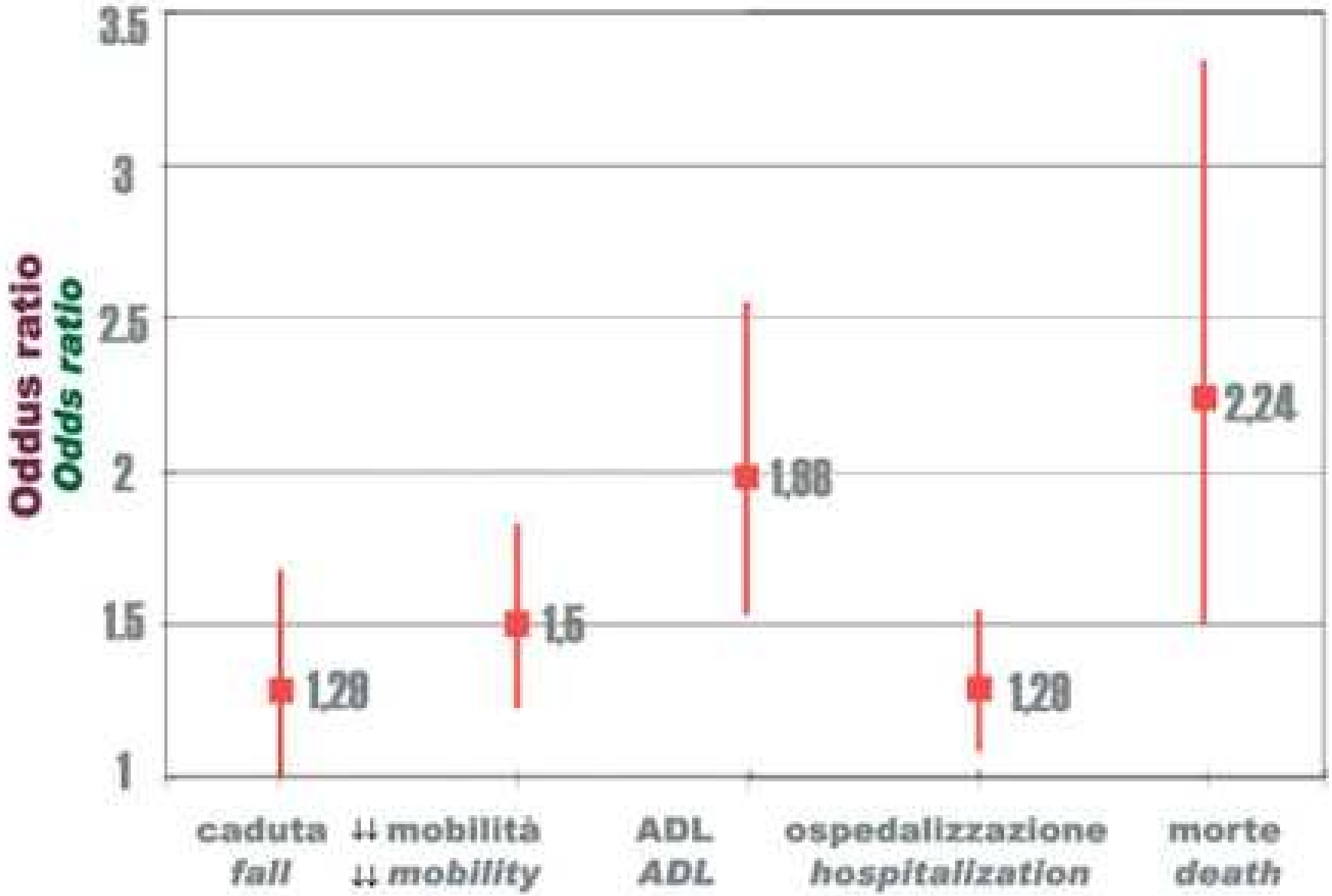


Fig. Rischio di eventi avversi nell'anziano fragile rispetto al non fragile al termine di 3 anni di osservazione longitudinale (Fried LP. 2001).

I markers biologici della fragilità: l'ipoalbuminemia

- L'albumina serica è un fattore di rischio indipendente di mortalità in soggetti anziani
- L'albumina serica rappresenta un predittore di mortalità a lungo termine tra soggetti non-istituzionalizzati e di mortalità a breve termine in quelli istituzionalizzati

Sahyoun et al, J Clin Epidemiol 1996

I markers biologici della fragilità: l'ipocolesterolemia

- Bassi livelli di colesterolo sierico possono essere considerati un marker ematologico indipendente di fragilità nel paziente anziano ospedalizzato
- Rappresenta un predittore di mortalità in RSA, Ospedale e in comunità
- Bassi livelli di colesterolo sono associati a compromissione delle funzioni cognitive, all'età, alla disabilità, all'alta comorbilità, alla politerapia ed alla malnutrizione

Ranieri P, Exp Aging Res. 1998

REVIEW

Nutrition in care homes and home care: How to implement adequate strategies (report of the Brussels Forum (22e23 November 2007))

M. Arvanitakis, A. Beck, P. Coppens, F. De Man, M. Elia, X. Hebuterne.
Clinical Nutrition 2008

Background & aims

Undernutrition in home care and care home settings is an unrecognized problem with significant consequences. The present work was edited after a forum concerning nutrition in these settings was held in Brussels in order to tackle the problem.

Conclusions

Undernutrition in home care and care home settings is a considerable problem and measures should be taken to prevent and treat it.

Relationship between nutrition status and dental occlusion in community-dwelling frail elderly people

Kikutani T et al, *Geriatr Gerontol Int, 2012*

Conclusion: This large-scale cross-sectional survey showed that loss of natural teeth occlusion was a risk factor for malnutrition among community-dwelling frail elderly.

Apoptosis in skeletal myocytes: a potential target for interventions against sarcopenia and physical frailty – a mini-review.

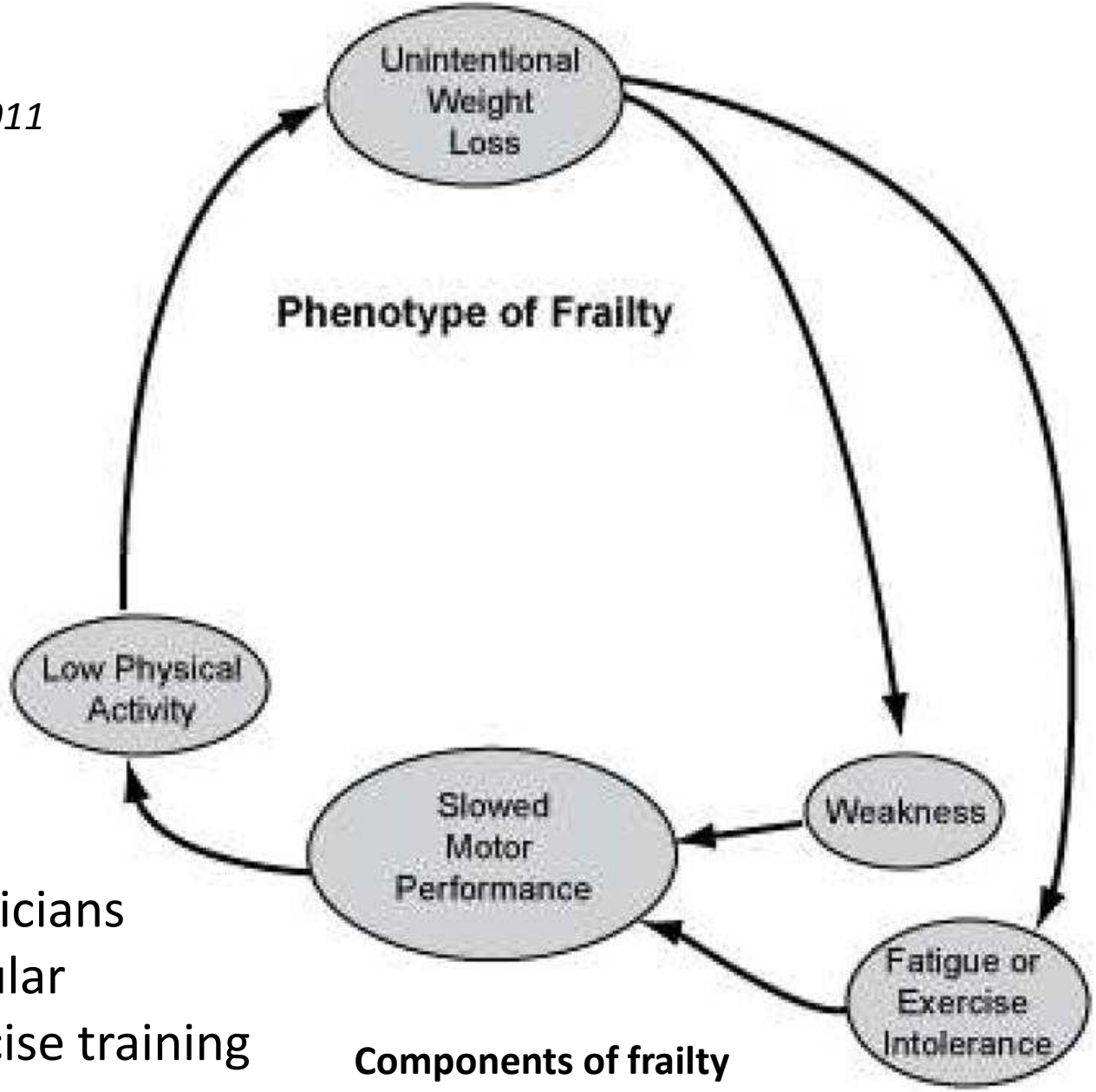
Marzetti et al, Gerontology 2012

BACKGROUND: Growing experimental evidence indicates that progressive myonuclear elimination over the course of aging via an apoptosis-like process may represent a mechanism through which muscle atrophy and loss of physical function develop. Notably, the proapoptotic environment taking place in aged muscle appears amenable to interventions.

CONCLUSIONS: Available evidence suggests that targeting myonuclear apoptosis might provide novel and effective therapeutic tools to combat sarcopenia.

Exercise as an Intervention for Frailty

Liu CK, *Clin Geriat Med, 2011*



Components of frailty

Conclusions

Studies suggest that clinicians should recommend regular physical activity or exercise training to frail older adults.

Genes, physical fitness and ageing

Garatachea, *Ageing Res Rev, 2012*

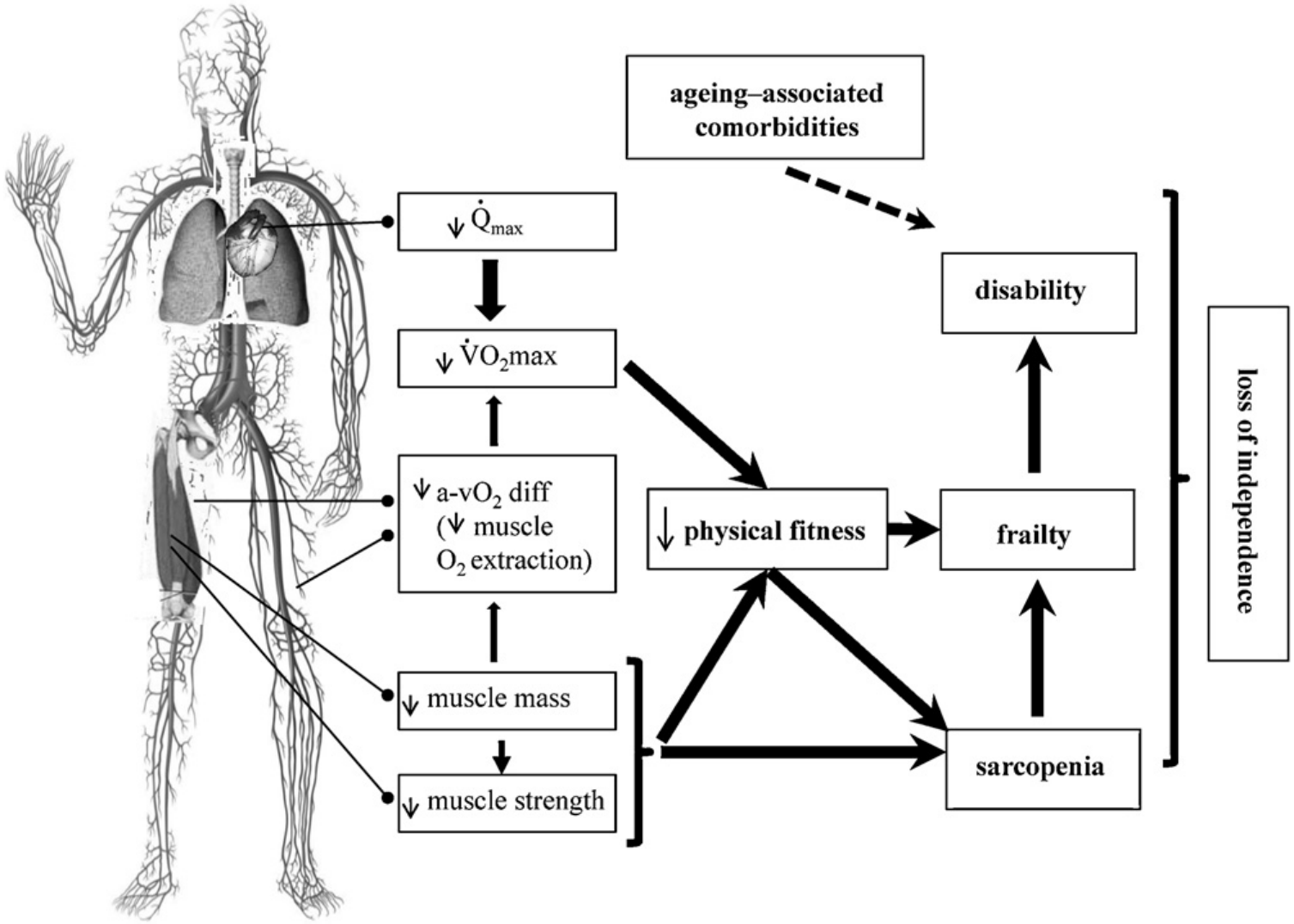
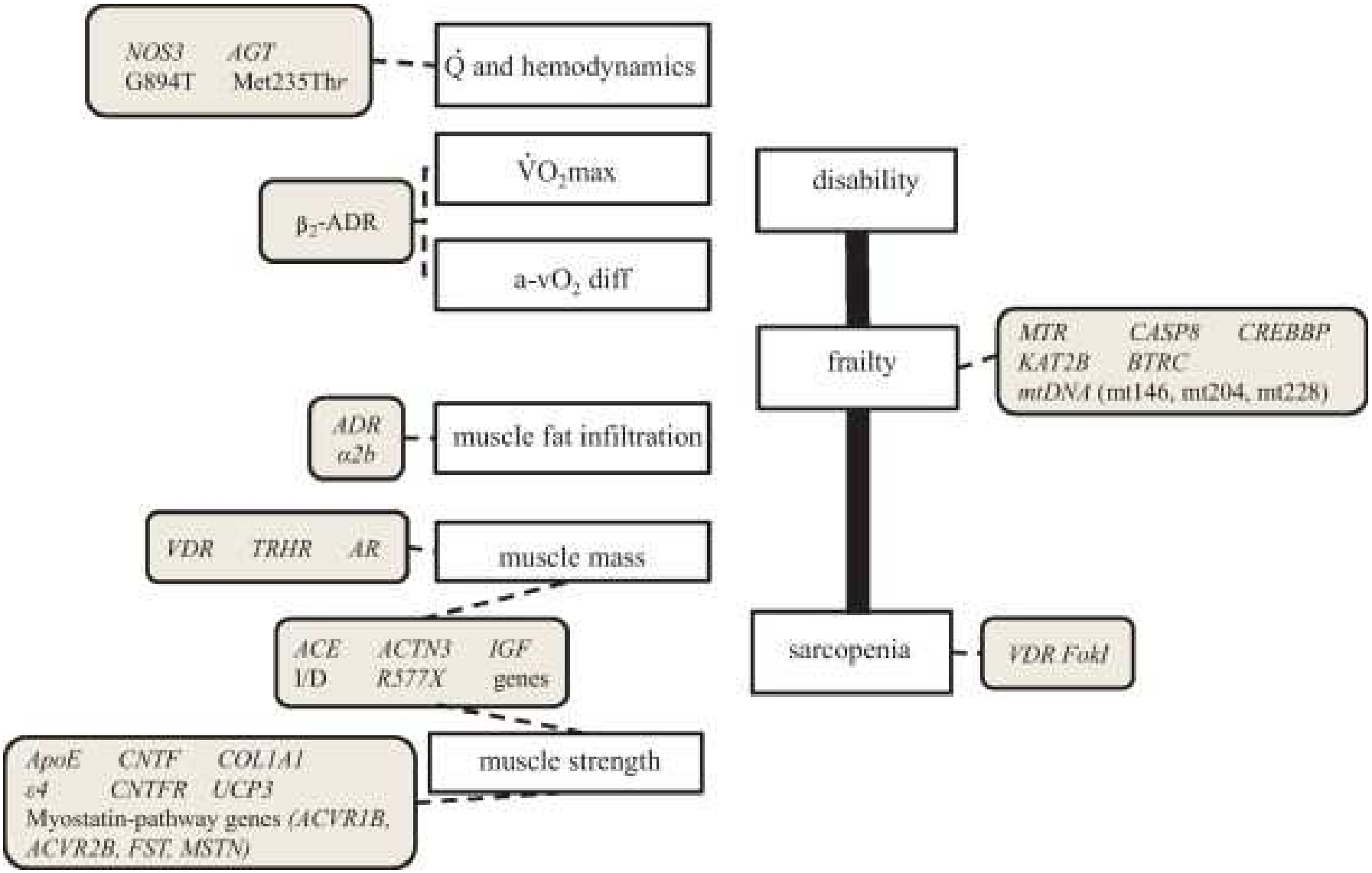


Fig. 1. Summary of the main factors that contribute to age-related declines in physical fitness and physical fitness related phenotypes, resulting in loss of independence. Abbreviations: a-vO2 diff, arteriovenous oxygen difference; Q, cardiac output; ˙VO2 max, maximal oxygen uptake (or maximal aerobic capacity).

Genes, physical fitness and ageing Garatachea, *Ageing Res Rev, 2012*



Summary of the main possible functions (still remaining confirmation and thus marked with dash lines) of candidate genes.

VIII Rapporto Sanità
CEIS Università di Roma Tor Vergata
"Opzioni di Welfare e integrazione delle politiche"

Nota per la stampa

Sintesi del Rapporto

Roma, 13 giugno 2012

- Spesa sanitaria italiana in calo progressivo: nel 2011, – 26% rispetto a Francia e Germania
- Con i nuovi ticket 42.000 famiglie italiane si impoveriranno per pagare le spese mediche
- Non autosufficienza: i soldi ci sarebbero, ma si perdono in mille rivoli e gli anziani non sono assistiti
- Spending review: la sanità ha già dato, altri tagli non sarebbero sostenibili