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# **Biomedical versus BioPsychosocial Model of Frailty**

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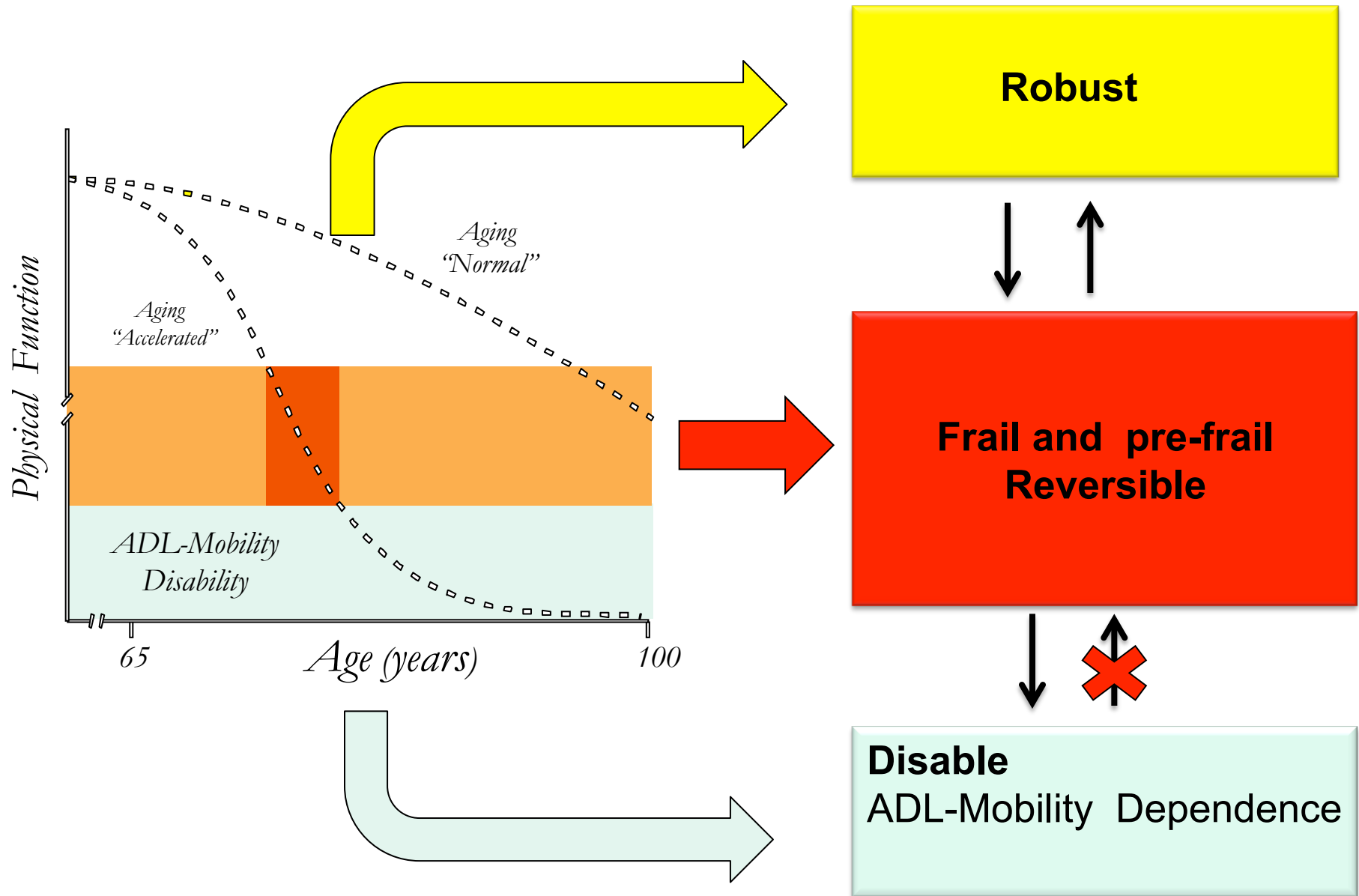
## **Outline**

**The evolution of the biological/physical model of frailty and its pitfalls.**

**The additional value of biopsychosocial model in the detection of frailty.**

**From bench to bedside: 1 clinical case showing the multidomain components of frailty.**

# Trajectories of physical function in older subjects



# From Certification of Disability to Assessment of Frailty

Very expensive with poor quality of life

**DISABILITY**



**ADL  
IADL  
Barthel  
Braden**

**Caregivers**

**Social-Health Services**

**FRAILTY**



**Measures ?**

**Subjects ?**

**Models ?**



# Current Approach of Social-Health System

Expensive with poor quality  
of life for subjects and  
caregiver

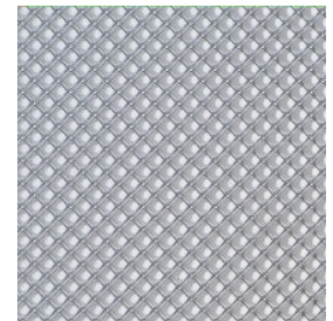
***DISABILITY'***

***HOSPITALIZATION***

**wide mesh fishnet**

***FRAILTY***

**Narrow mesh fishnet**



# Evolution of the Concept of Frailty

“A dramatic condition of a group of older subjects characterized by physical disability, affective disorders, in structurally and socially unfavourable environment” (Tavani C., 1978).

**SOCIO-ANTROPOLOGICAL CONDITION**

**GERIATRIC SYNDROME**

**Phenotypic and Clinical Physical Model**

diminished resistance to stressor  
with specific signs and symptoms

(Fried et al, 2004)

(Rockwood 2010)

**BIO PSYCHO SOCIAL**

**Multidomain vulnerability**

Dynamic status that affects an individual who experienced loss in one or more functional domains: physical, psychological, social.

(Gobbens et al, 2010)

**Vulnerability**

# The progress of Biomedical Model of frailty

**Subjective  
Assessment**



**Questionnaire  
Self-Reported**

**Objective  
assessment**

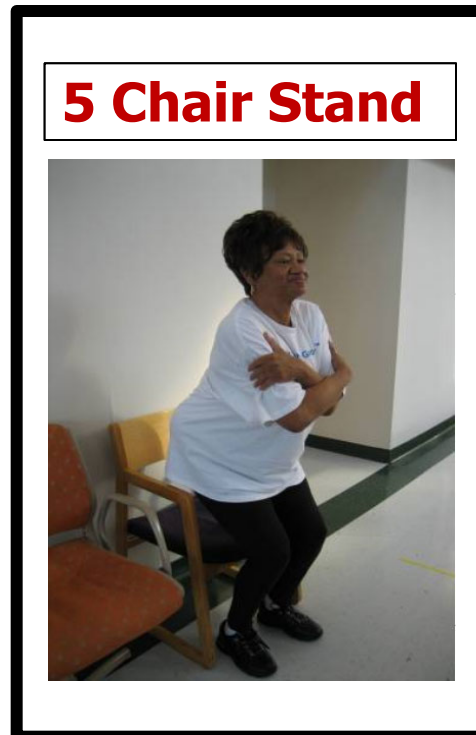
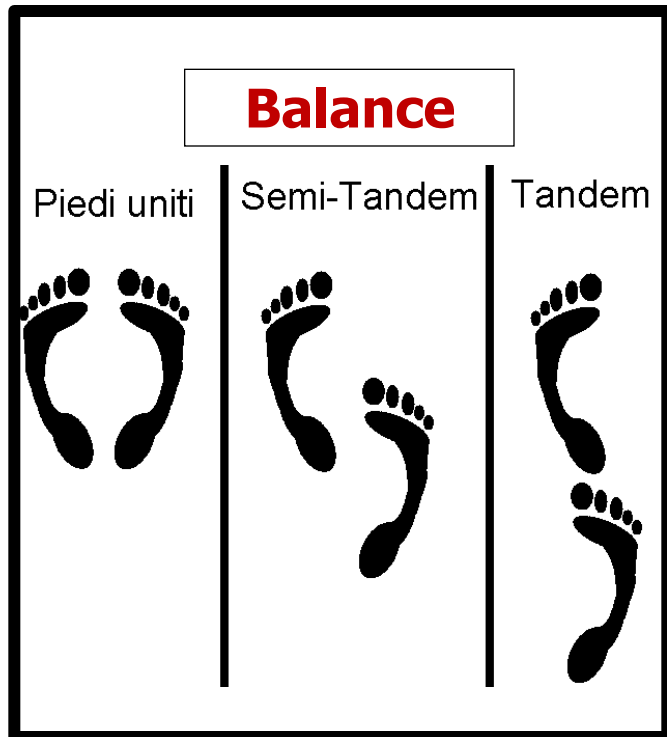


**Gait Speed  
SPPB  
Hand grip  
strength**

# SPPB and diagnosis of physical frailty

Short Physical Performance Battery can be used to detect physical frailty (cut off=9)  
(Da Câmara 2013)

It is composed by three tests



Each test has a score: from 0 to 4 points  
Maximum Score= **12 points** (subject fully performant)



## Frailty as altered response to stressors and resiliency

### HYPOTHALAMIC-PITUITARY-ADRENAL (HPA) RESILIENCY

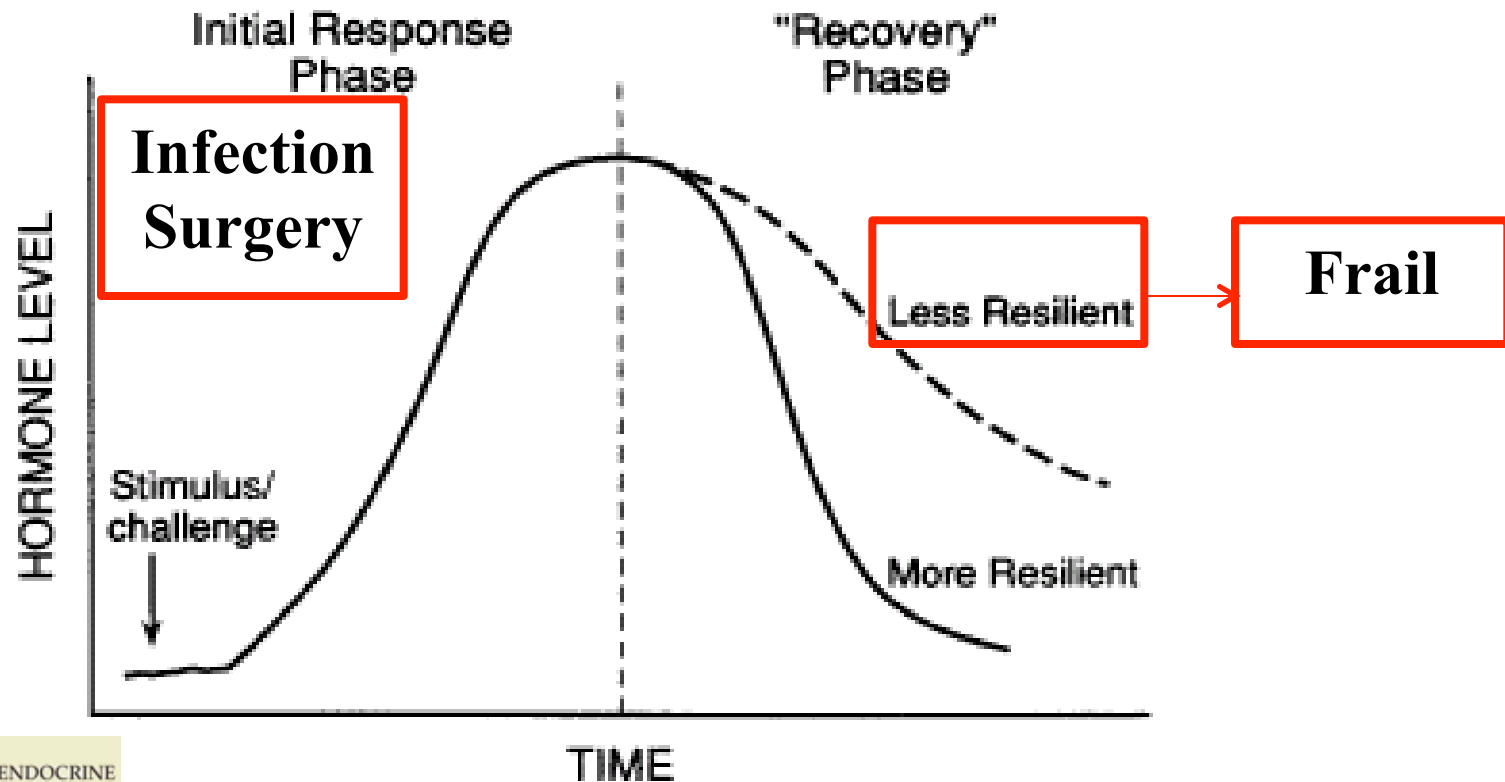
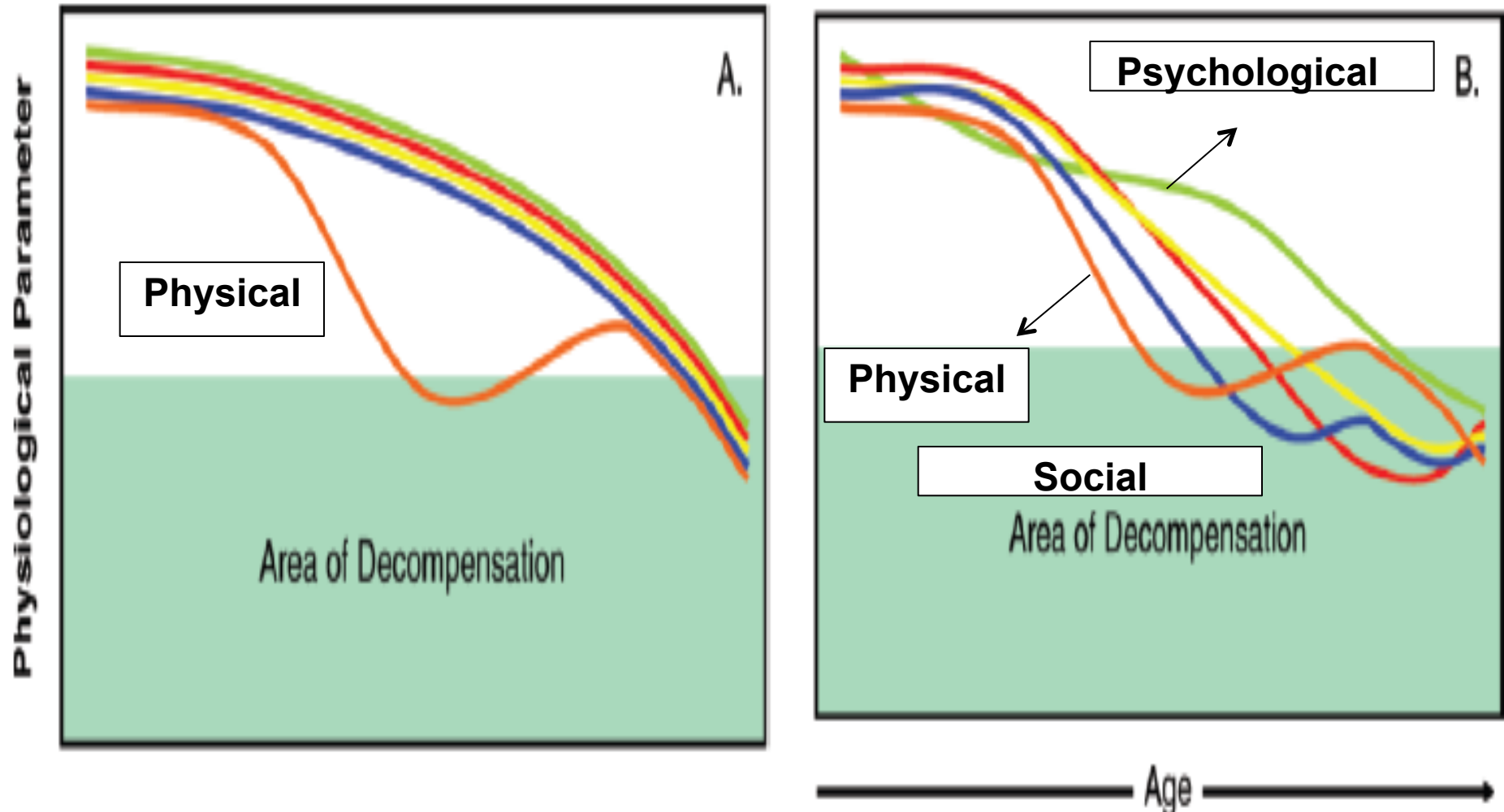


FIG. 1. HPA axis resiliency in response to challenge.

# The Multidomain Model of frailty



# EDMONTON FRAIL SCALE

Domain	Item	0 points	1 point	2 points
Cognition	Please imagine that this pre-drawn circle is a clock. I would like you to place the numbers in the correct positions then place the hands to indicate a time of 'ten past eleven'	No errors	Minor spacing errors	Other errors
General health status	In the past year how many times have you been admitted to hospital?	0	1–2	≥2
	In general, how would you describe your health?	Excellent, very good, good	Fair	Poor
Functional independence	With how many of the following activities do you require help: meal preparation, shopping, transportation, telephone, housekeeping, laundry, managing money, taking medications?	0–1	2–4	5–8
Social support	When you need help, can you count on someone who is willing and able to meet your needs?	Always	Sometimes	Never
Medication use	Do you use five or more prescription medications on a regular basis?	No	Yes	
	At times do you forget to take your prescription medications?	No	Yes	
Nutrition	Have you recently lost weight so that your clothing has become looser?	No	Yes	
Mood	Do you often feel sad or depressed?	No	Yes	
Continence	Do you have a problem with losing control of urine when you don't want to?	No	Yes	
Functional performance	I would like you to sit in this chair with your back and arms resting. When I say 'go,' please stand up and walk to the mark on the floor (approximately 3 metres away), turn round return to the chair and sit down	0–10 seconds	11–20 seconds	>20 seconds, patient unwilling or requires assistance
Total	Final score is the sum of column totals			/17

Scoring: not frail 0–5; apparently vulnerable 6–7; mild frailty 8–9; moderate frailty 10–11; severe frailty 12–17.

# **The Story based on physical frailty**

**Subject 94 years old living alone in an apartment located at 3° floor without elevator appointed in February 2016 for a visit at Frailty Lab of the University-Hospital of Parma**

**Symptom**

**Referred Inhability to complete 400 meter walking distance between his house and newsstand without stopping three times (fatigue) since 10 days**

**SPPB=9**

**Heart Failure and moderate aortic stenosis**

**Is it all physical/biological Frailty matter?**

# The Complete Story

**Subject 94 years old living alone in an apartment located at 3° floor without elevator appointed in February 2016 for a visit at Frailty Lab of the University-Hospital of Parma**

**Symptom**

**Inability to complete 400 meter walking distance between his house and newsstand without stopping three times (fatigue)**

**Deterioration of symptoms concomitant to son departure for few months**

**micronutrients deficiencies including iron, potassium and magnesium**

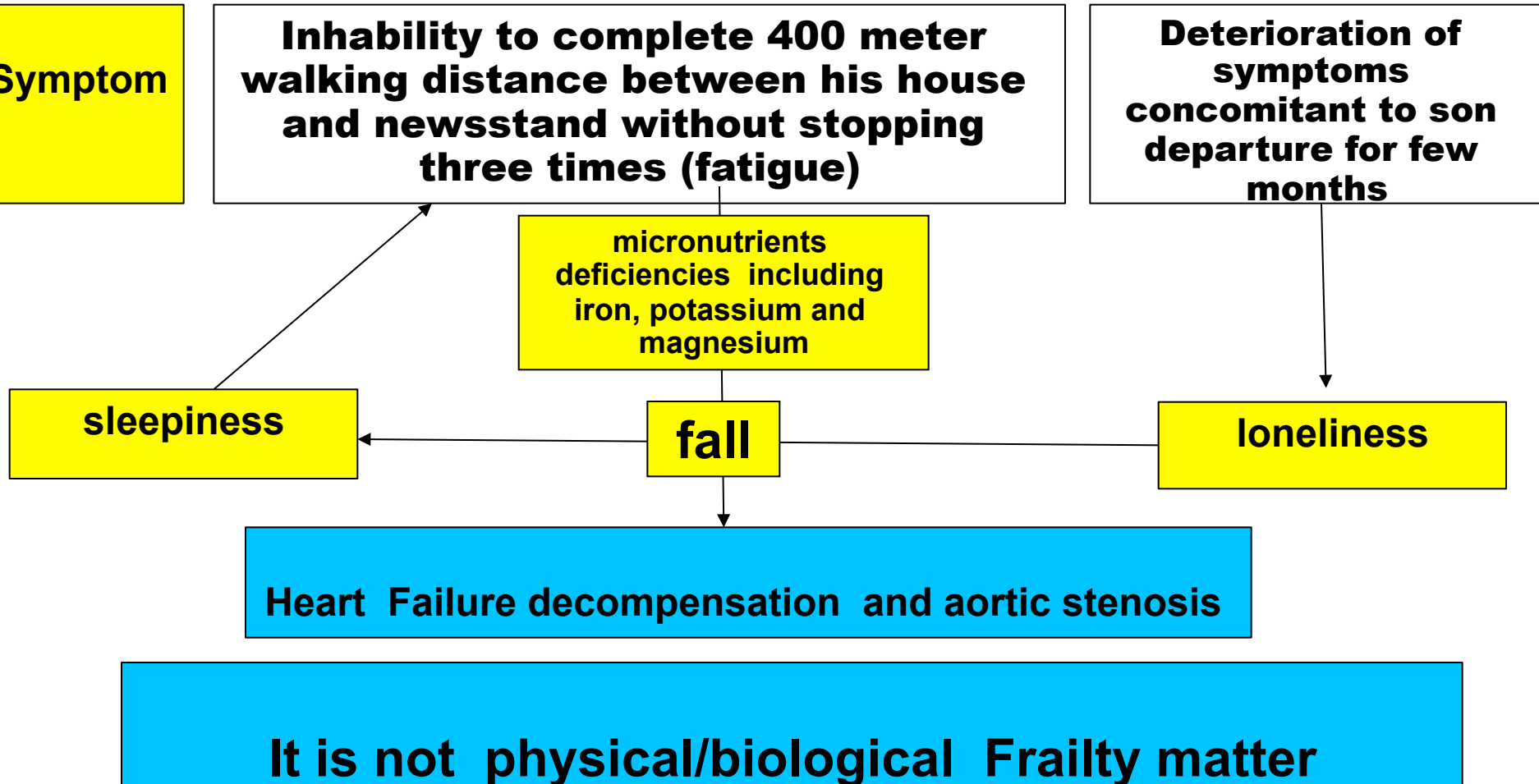
**sleepiness**

**fall**

**loneliness**

**Heart Failure decompensation and aortic stenosis**

**It is not physical/biological Frailty matter**



# Frailty as altered response to stressors and resiliency

## HYPOTHALAMIC-PITUITARY-ADRENAL (HPA) RESILIENCY

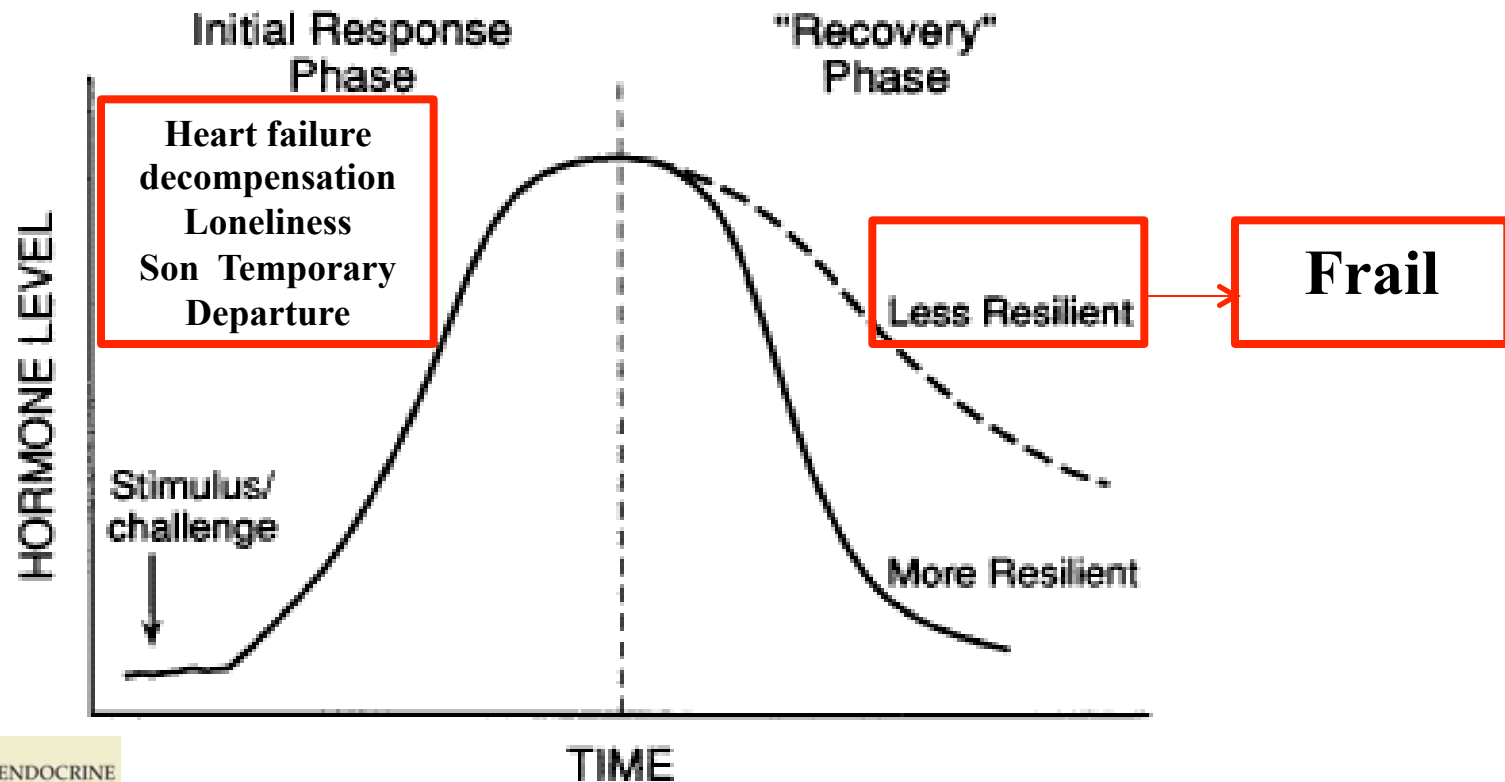
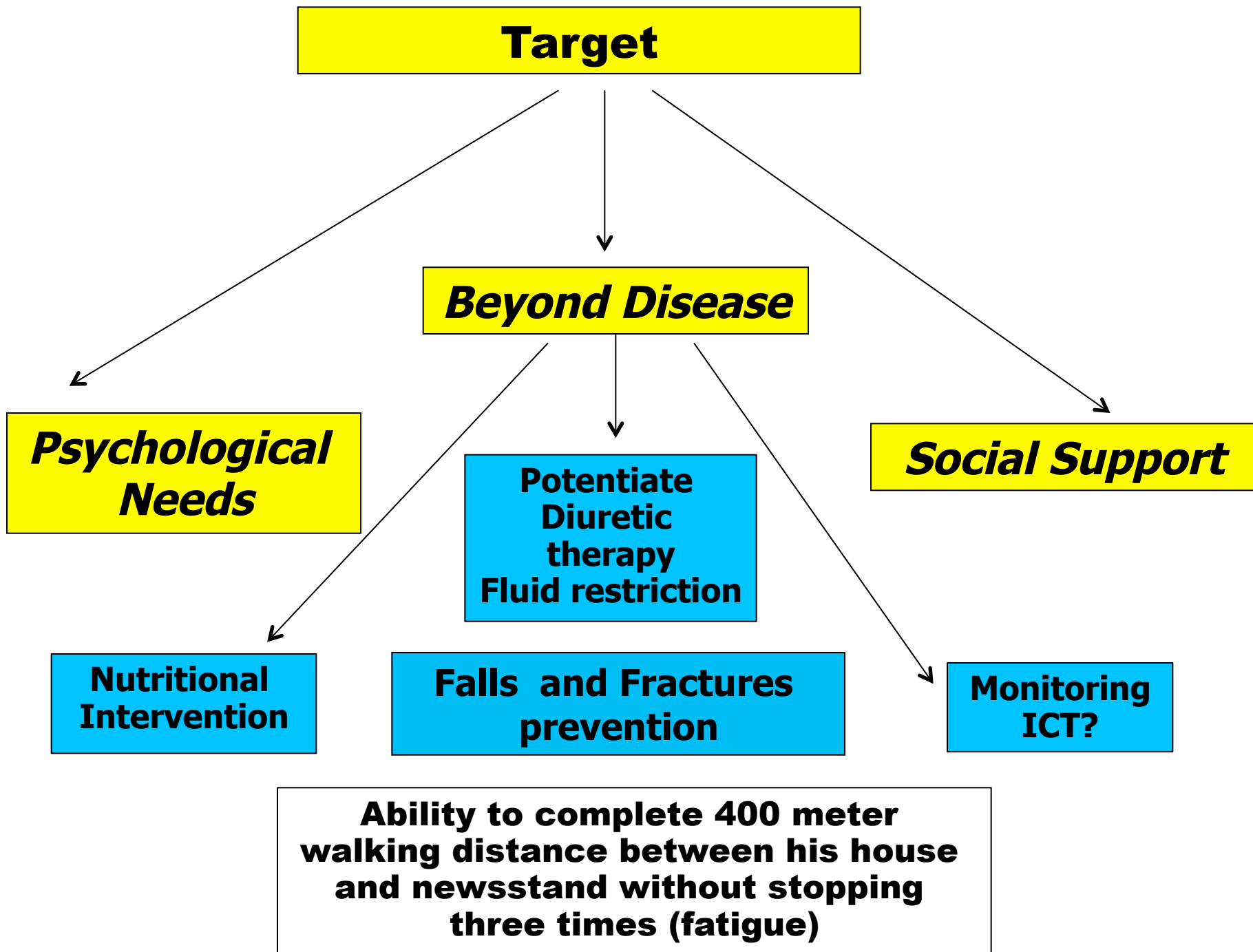


FIG. 1. HPA axis resiliency in response to challenge.



# Avoid the Involution of the Concept of Frailty

“ A dramatic condition of a group of older subjects characterized by physical disability, affective disorders, in structurally and socially unfavourable environment”

( Tavani C., 1978)

## SOCIO-ANTROPOLOGICAL CONDITION

### GERIATRIC SYNDROME

#### Phenotypic and Clinical Physical Model

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## **Take Home Messages**

**The biological/physical model of frailty made significant progress during the last decades making possible the elevation from socio-anthropological condition to a geriatric syndrome.**

**The “vulnerability” is not completely captured by the biological perspective and the biopsychosocial model adds important value in both assessment and target of intervention during frailty.**

**The operationalization of biopsychosocial model is required in order to avoid the involution of concept of frailty.**

	TEST		SCORE		INTERPRETATION
INDEPENDENCE PROFILE					
AUTONOMY	BADL	95/100			Auto-sufficient
	IADL	7/8			Auto-sufficient (score adjusted for sex)
PHYSICAL AND OSTEO-MUSCLE FUNCTION					
PHYSICAL PERFORMANCE	SPPB		9/12		Frail individual
Gait speed	4 mt		0.90 m/sec		
RISK OF FRACTURE	DEFRA + US calcaneal		15% rischio di fratture maggiori a 10 anni		
Muscle strength	Hand grip DX: 20.4 Kg		Hand grip SX: 26 Kg		Mild sarcopenia
Physical and Mental Fatigue	Pittsburgh Fatigability scale		PHYSICAL	MENTAL	Moderate physical fatigueNo Mental fatigue
			19/35	0/50	
NUTRITIONAL STATE	BODY WEIGH T		67 Kg		
	BMI		23		Normal
	MNA-SF		8/14		Risk of Malnutrition
NEUROPSYCHOLOGICAL					
Cognitive Function	MMSE		30/30,		Normal
	Clock Drawing Test (CDT)		3/3		
Mood	GDS 15		8/15		Mild-moderate depressive symptoms
SONNO/SLEEPINESS	Epworth Sleepiness Scale (ESS)		7		None
CLINICAL COMPLEXITY AND POLIPHARMACOTHERAPY					
MULTIMORBIDITY	Diseases		6		Multimorbidity
HEALTH STATUS	EQ - 5D ver. 3L		21222 – Score 0,701		Non optimal health status
Medications	Number		8		Polipharmacotherapy