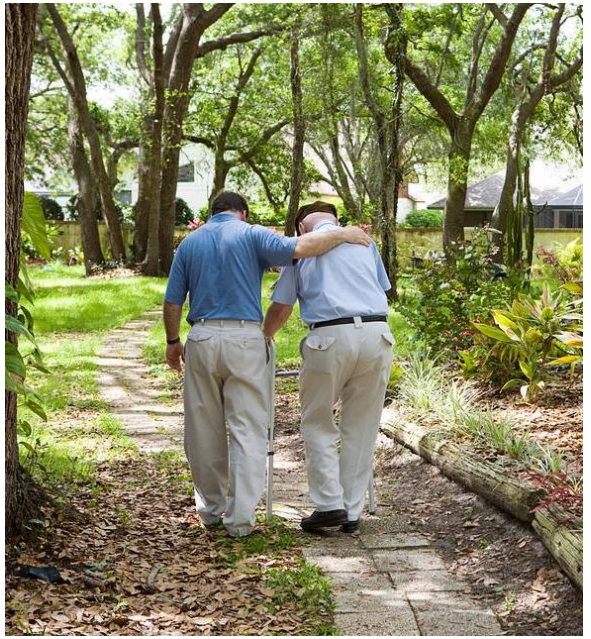
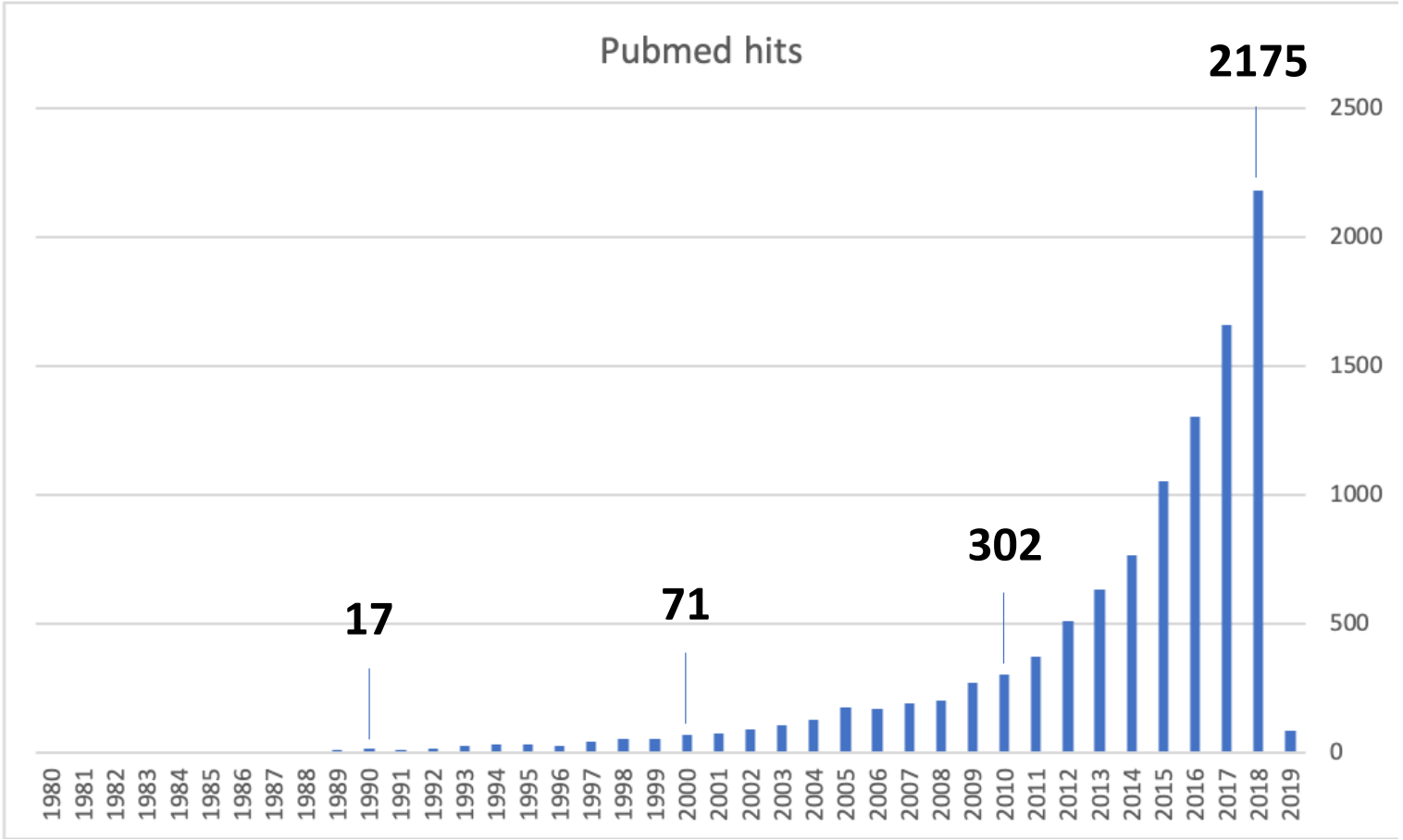
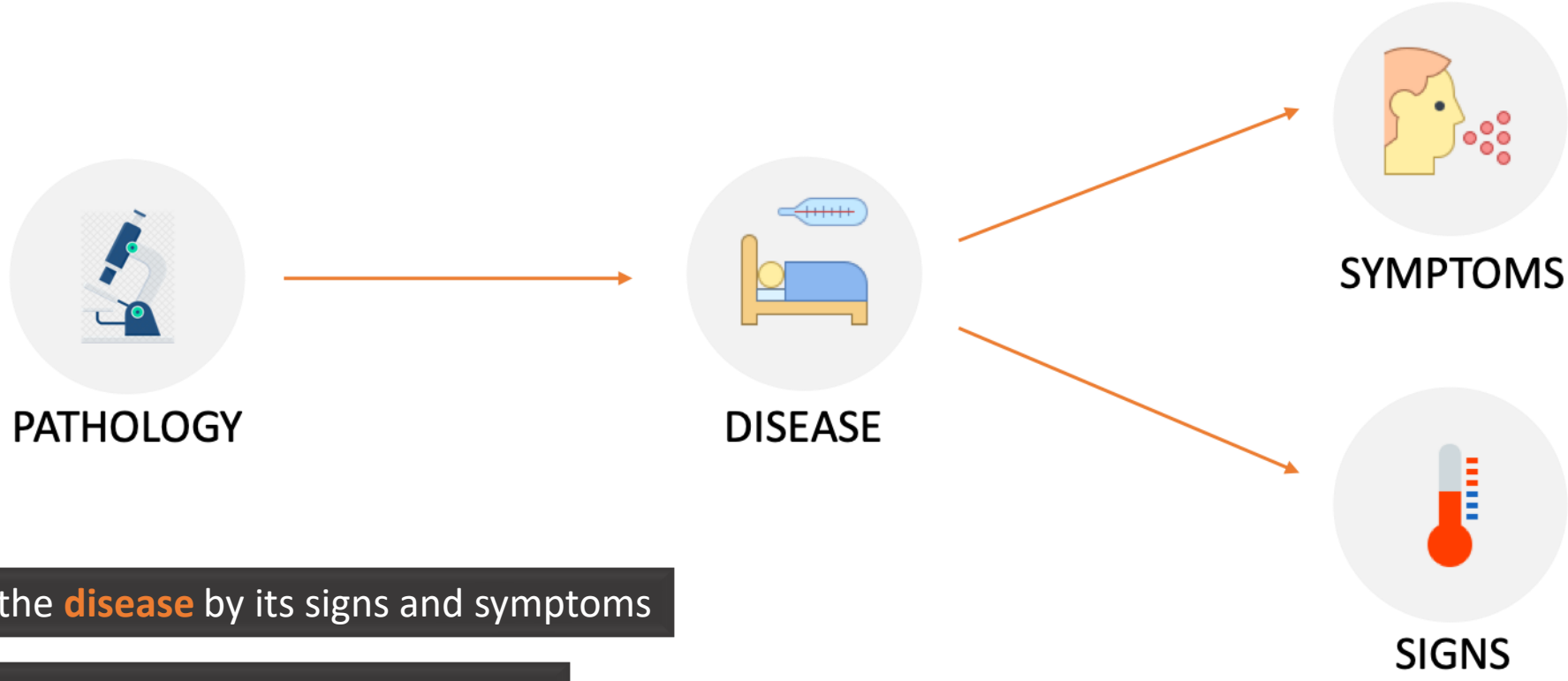


Frailty

Frailty papers (per pubmed)



The unique features of the old person

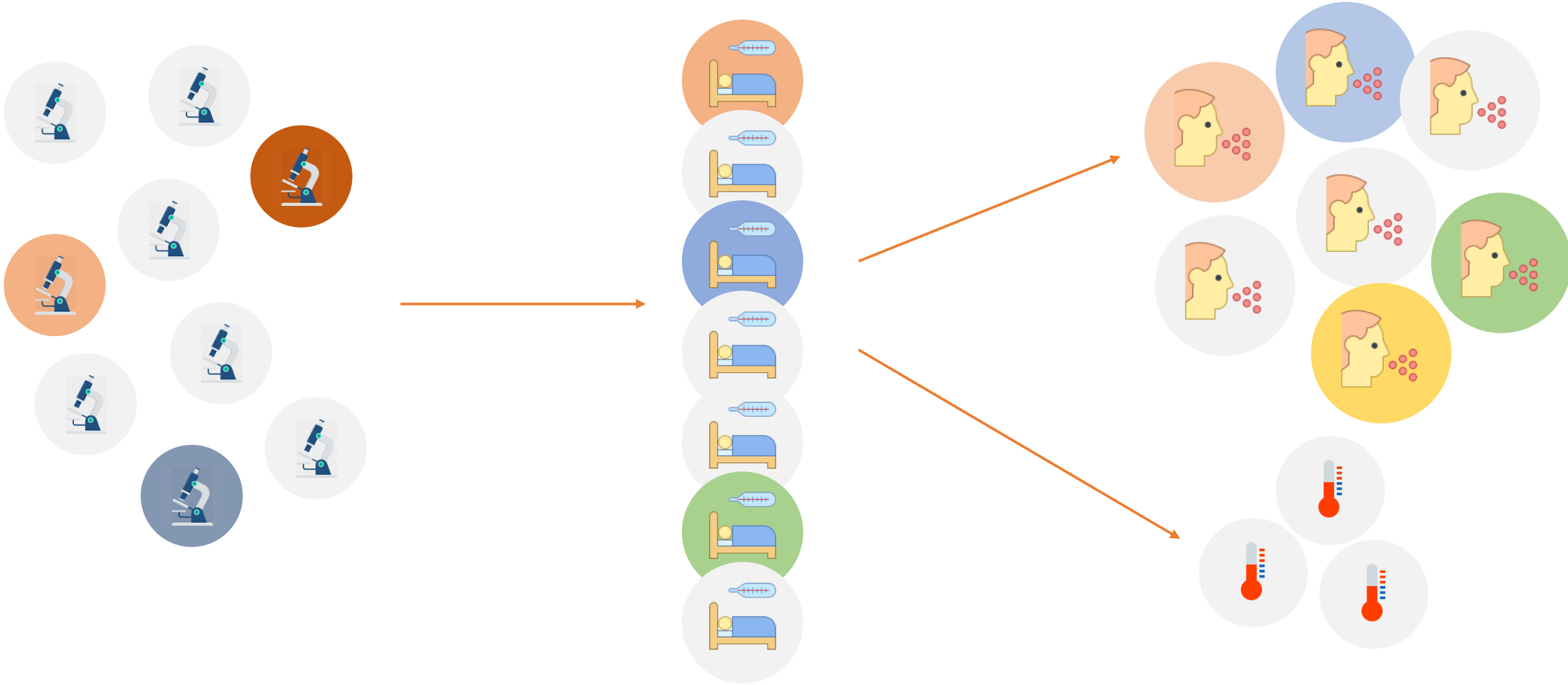


Identify the **disease** by its signs and symptoms

Treat (based on **pathogenesis** if possible)

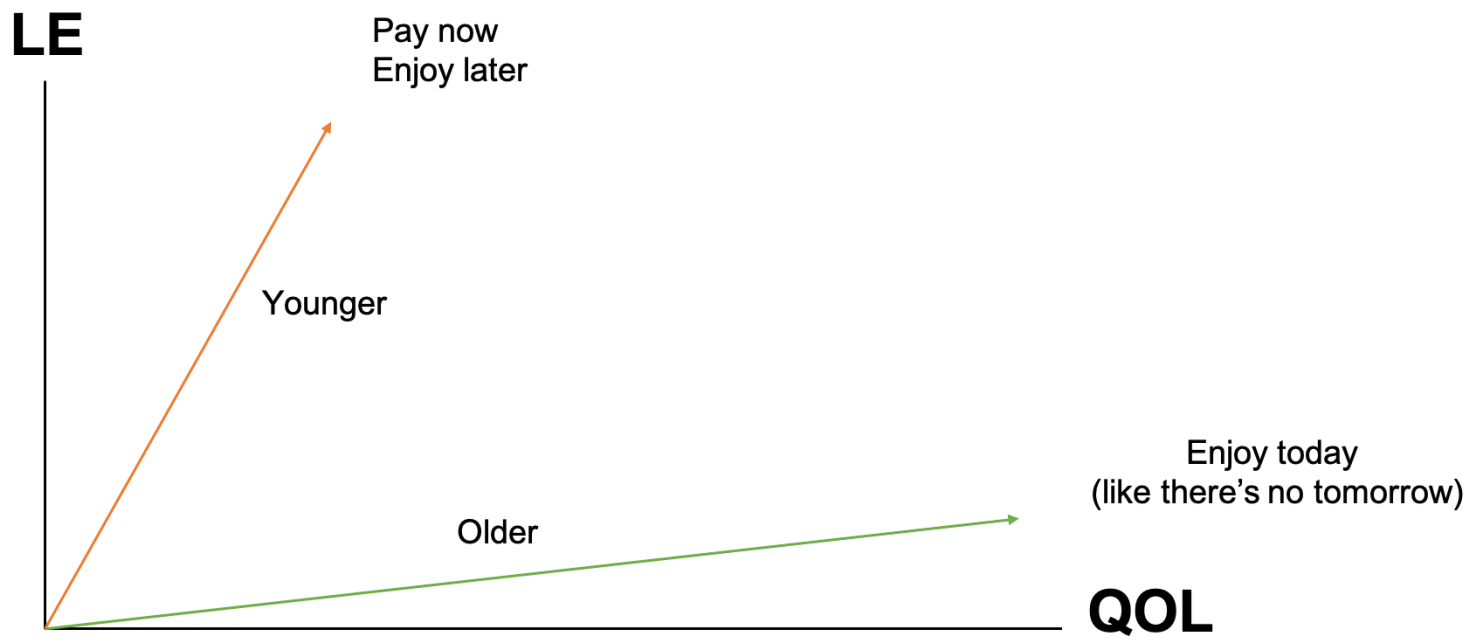
Treat **symptoms** as well

Disease based care dogma

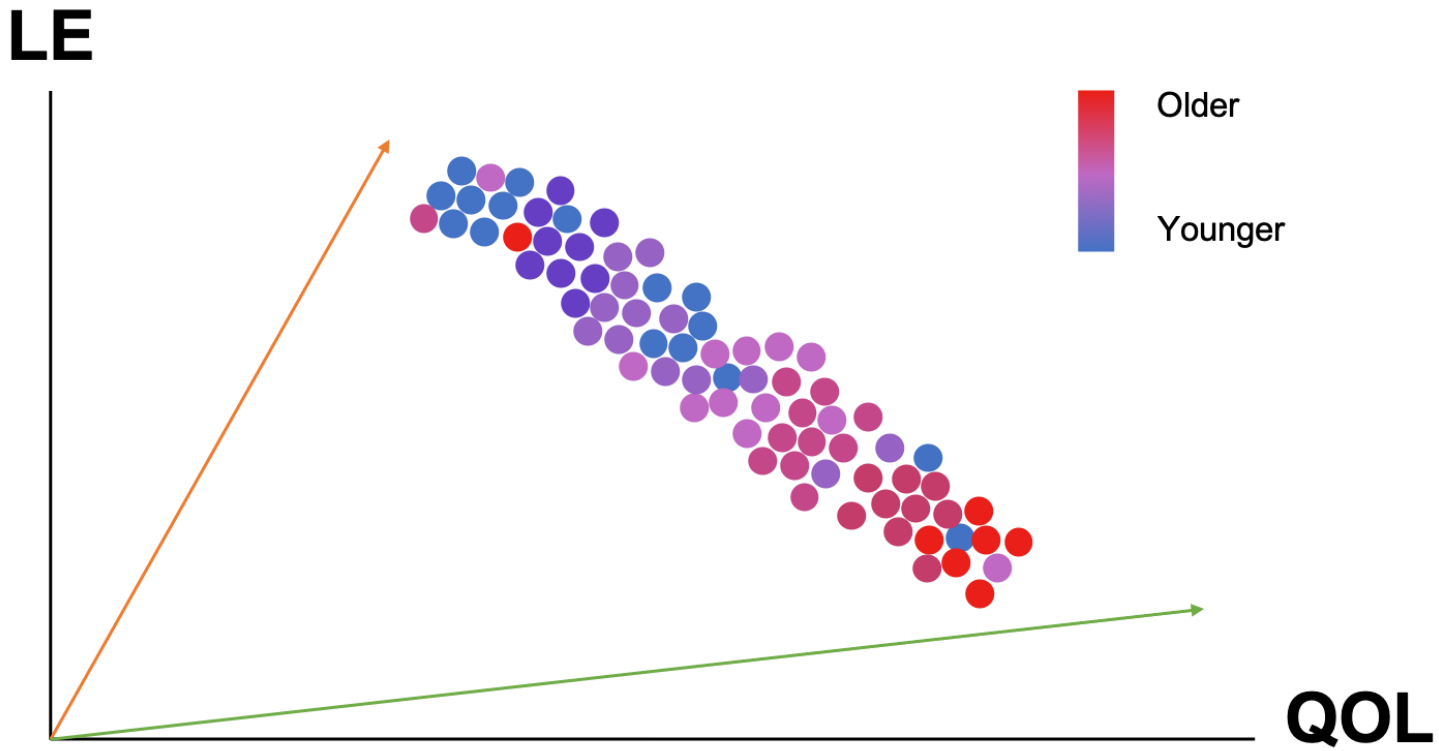


Disease based care (in the older patient)

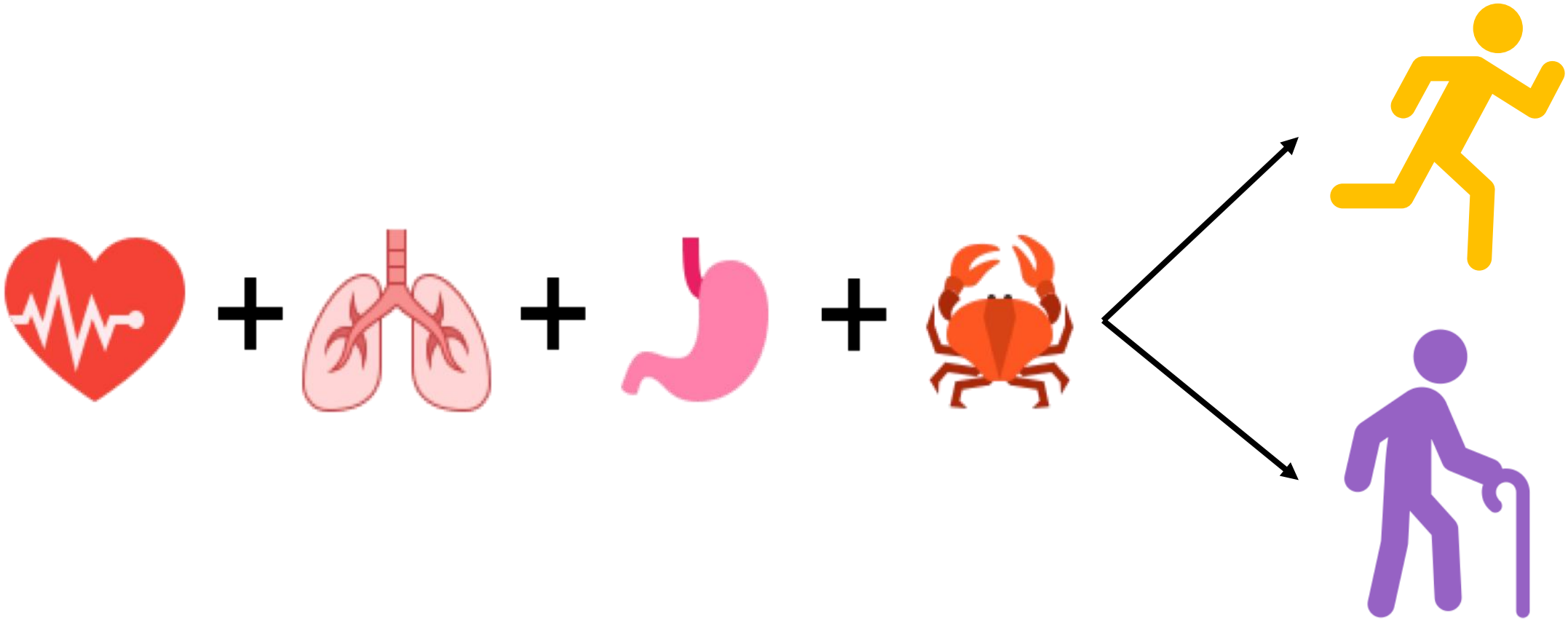
Life extension vs. Quality of life



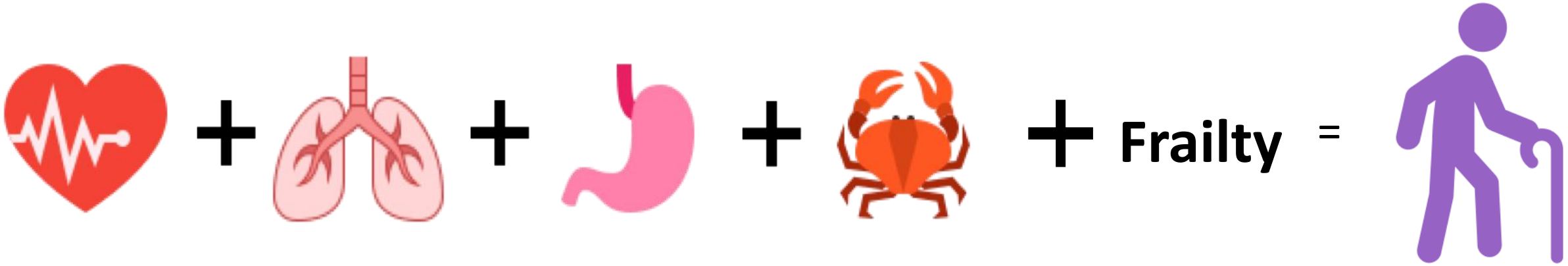
Life extension vs. Quality of life



The sum is greater than its parts



The sum is greater than its parts



Frailty definition

"Medical syndrome with multiple causes and contributors, characterized by diminished strength, endurance, and reduced physiologic function that increases an individual's vulnerability for developing increased dependency and/or death"

Morley JE, Vellas B, van Kan GA, et al. **Frailty consensus: a call to action**.
J Am Med Dir Assoc. 2013;14(6):392–397.

Comprehensive frailty model

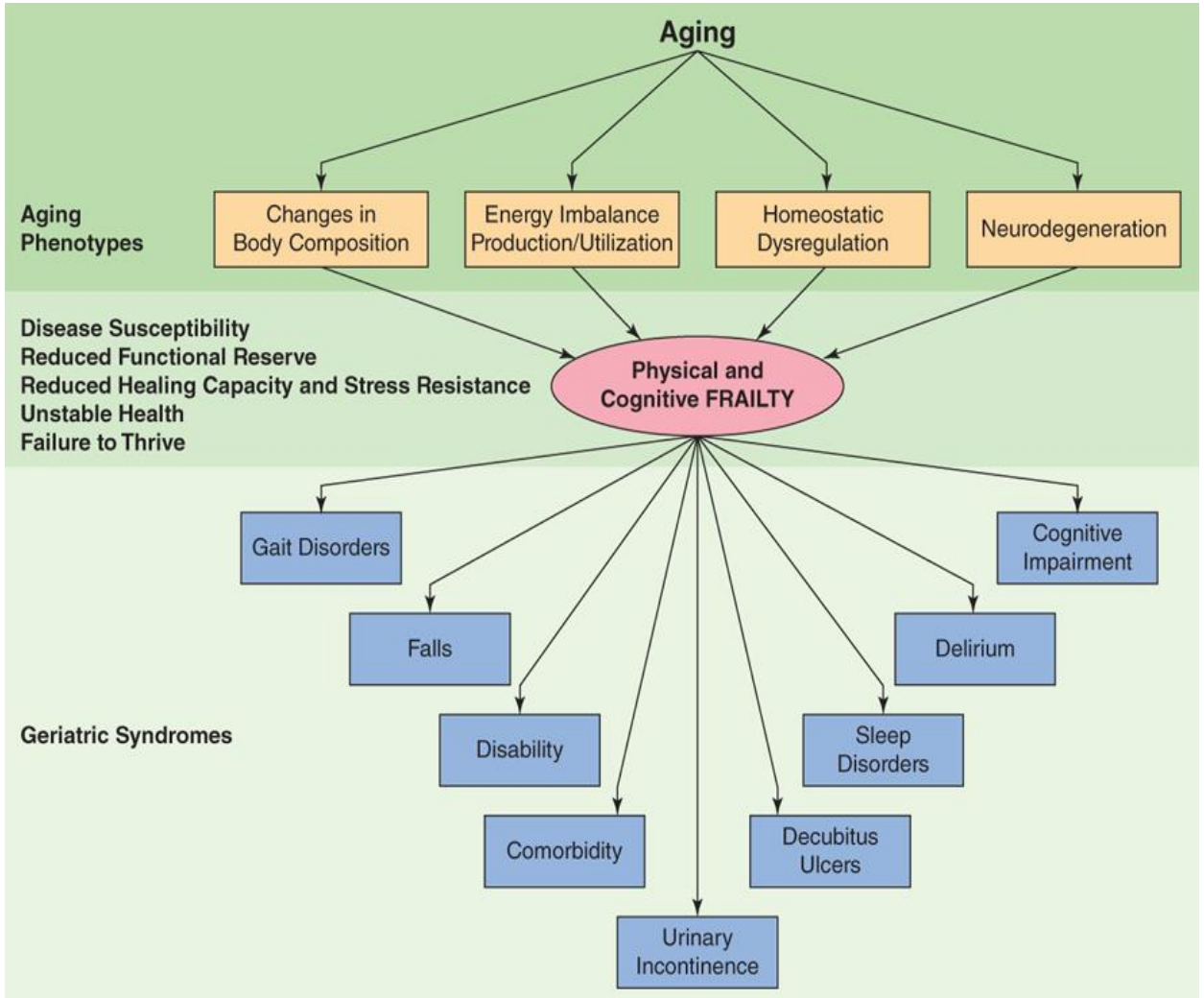
Ferrucci L, Studenski S. Clinical problems of aging. In: Longo DL, Fauci AS, Kasper DL, et al. *Harrison's Principles of Internal Medicine*. 18th ed. New York, NY: McGraw Hill; 2012.

Frailty as accelerated aging

Changes in physiologic dimensions that change with aging in all humans

Disease states cannot define frailty (do not affect all humans)

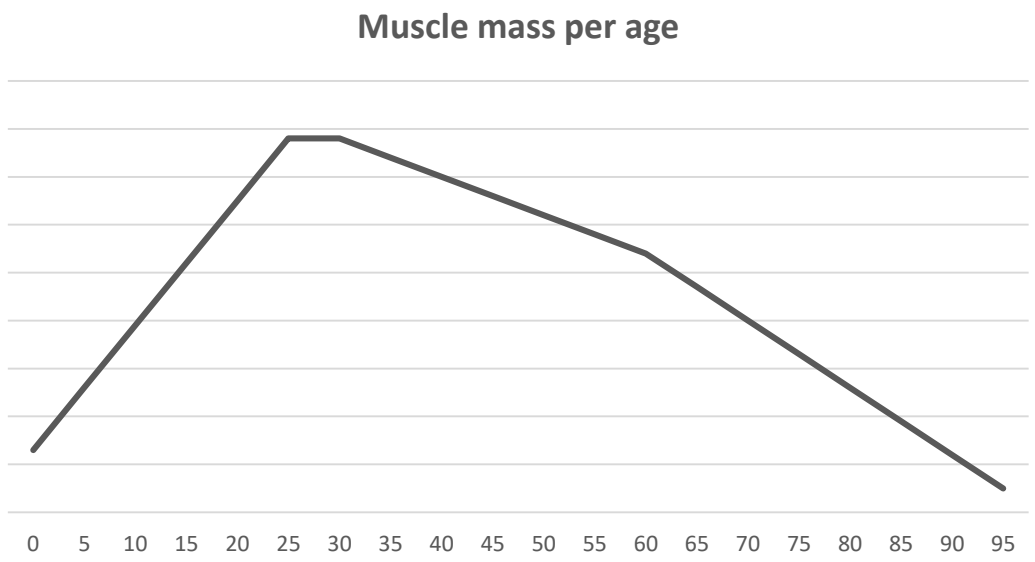
Accelerated aging



Ferrucci L, Studenski S. Clinical problems of aging. In: Longo DL, Fauci AS, Kasper DL, et al. *Harrison's Principles of Internal Medicine*. 18th ed. New York, NY: McGraw Hill; 2012.

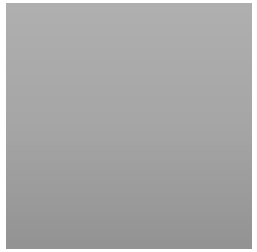
Body Composition

- Muscle
  - Mass
  - Composition
  - Fat infiltration
  - NMJ dysfunction
  - Impaired repair mechanisms
- Bone
  - Demineralization -> Osteoporosis



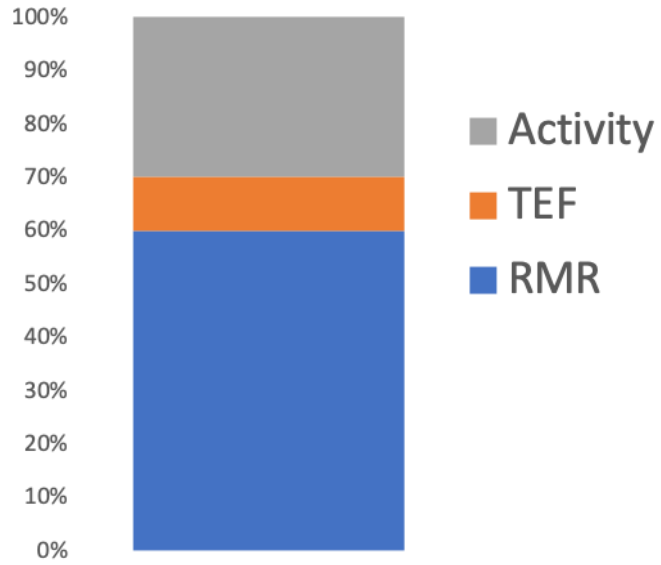
Impaired energy balance in frailty

VO2 max ≅ energy availabilityTotal energy expenditure (TEE) ≅ Energy consumption



VO↓2

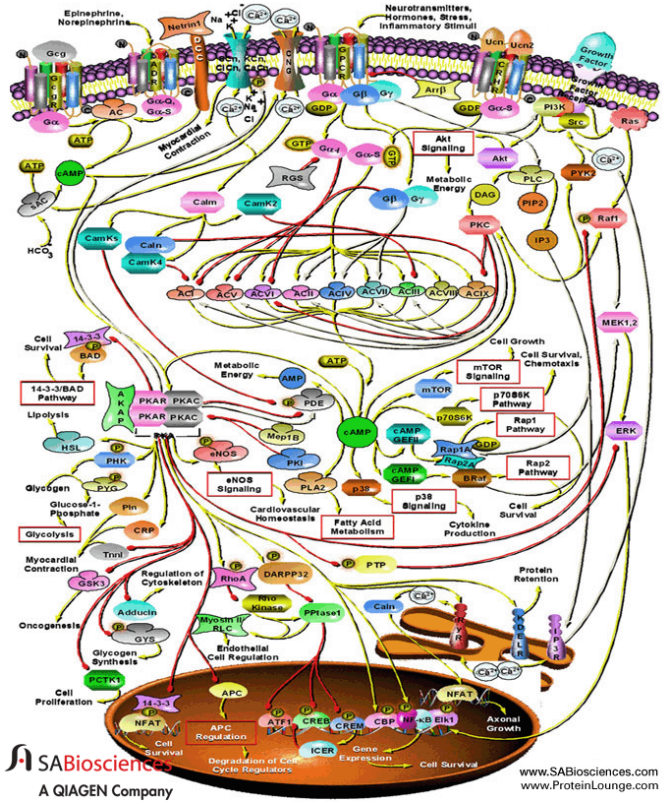
RMR ↑



Homeostatic dysregulation

Inflammaging

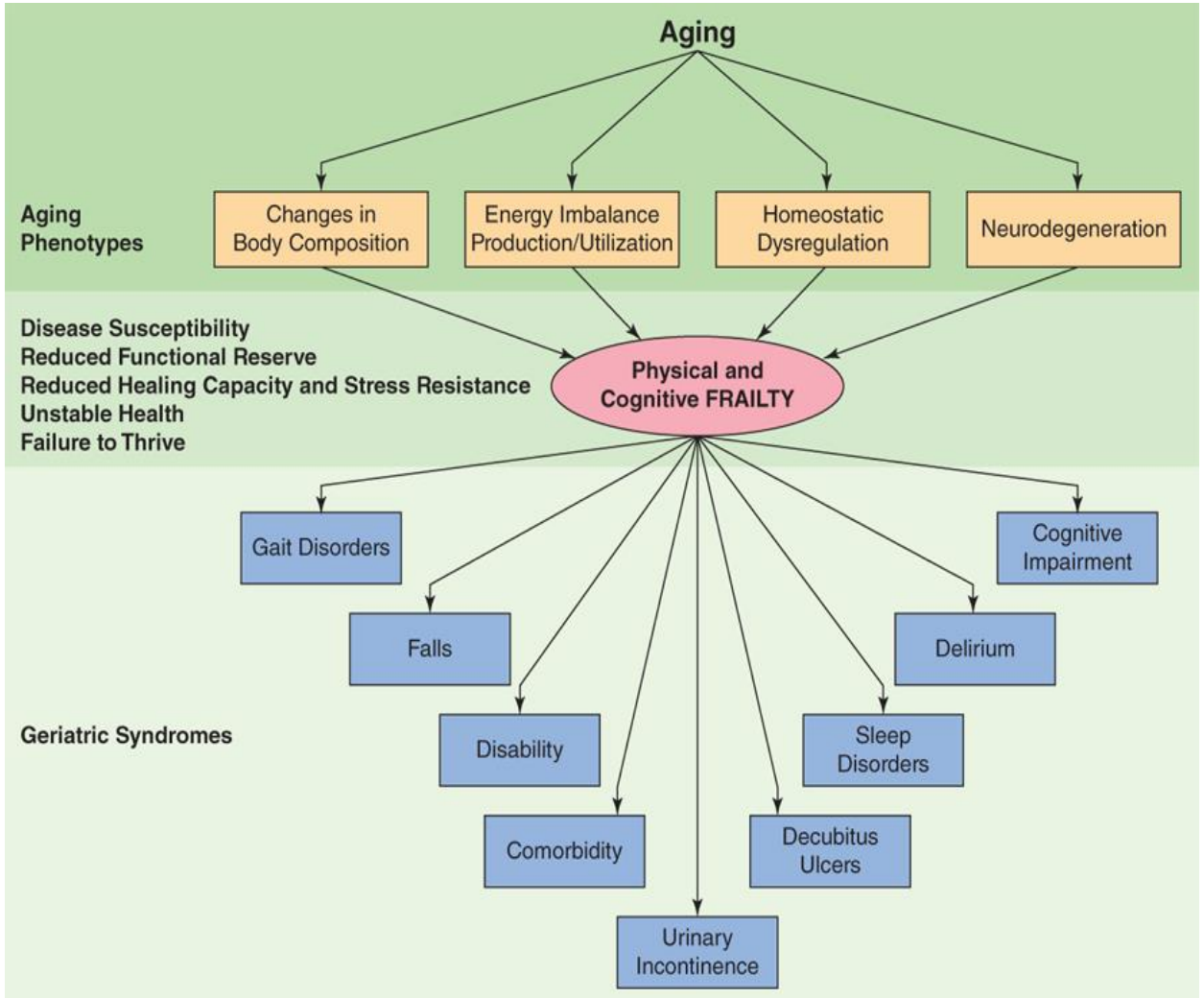
Hormonal dysregulation



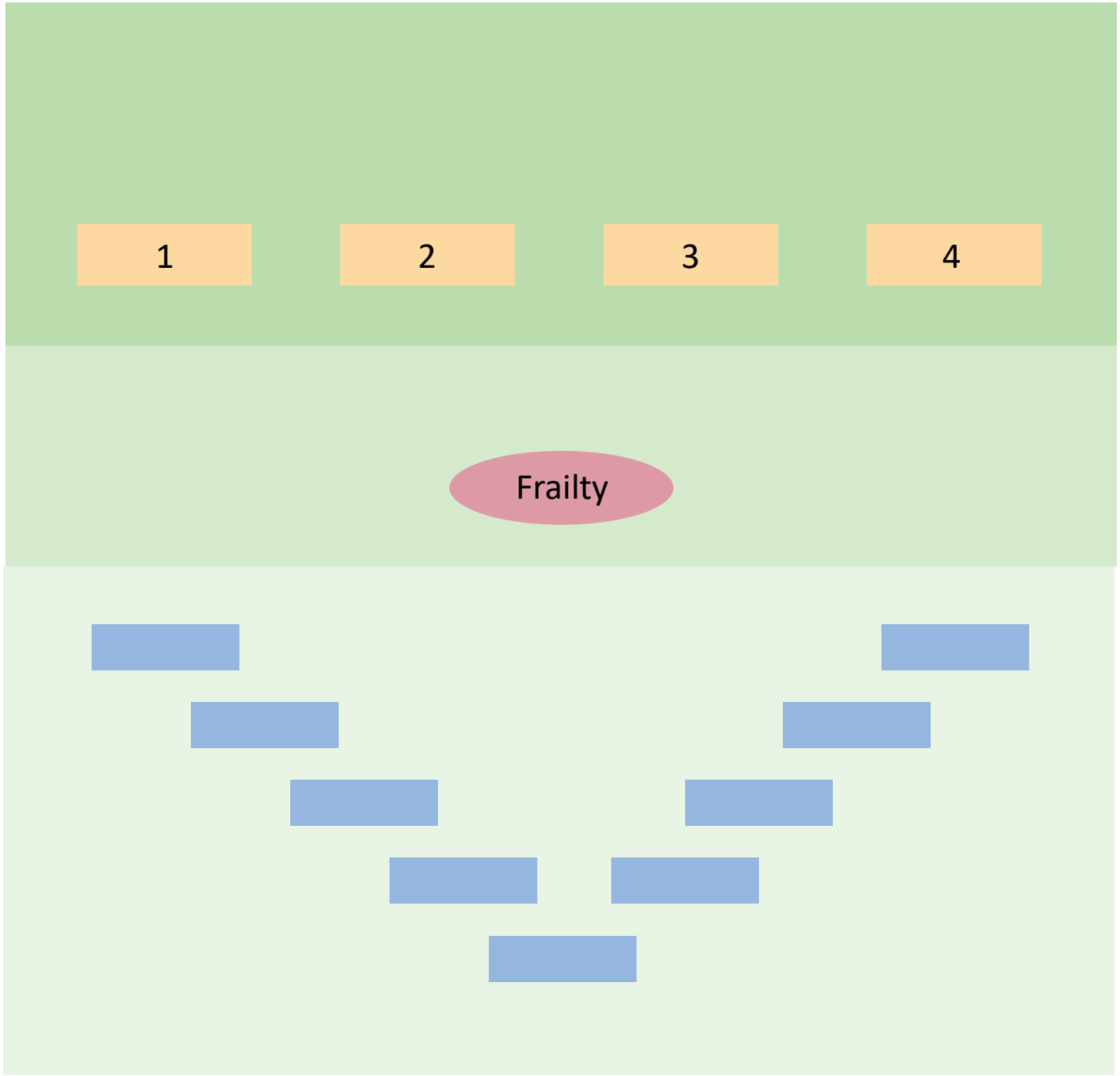
Neurodegeneration

- CNS
  - Memory
  - Processing speed
  - Multitasking
- PNS
  - Motor neuron number⇩
  - Motor unit number ⇩
  - Motor unit size⇧
  - Fine motor control ⇩
  - Increased demyelination

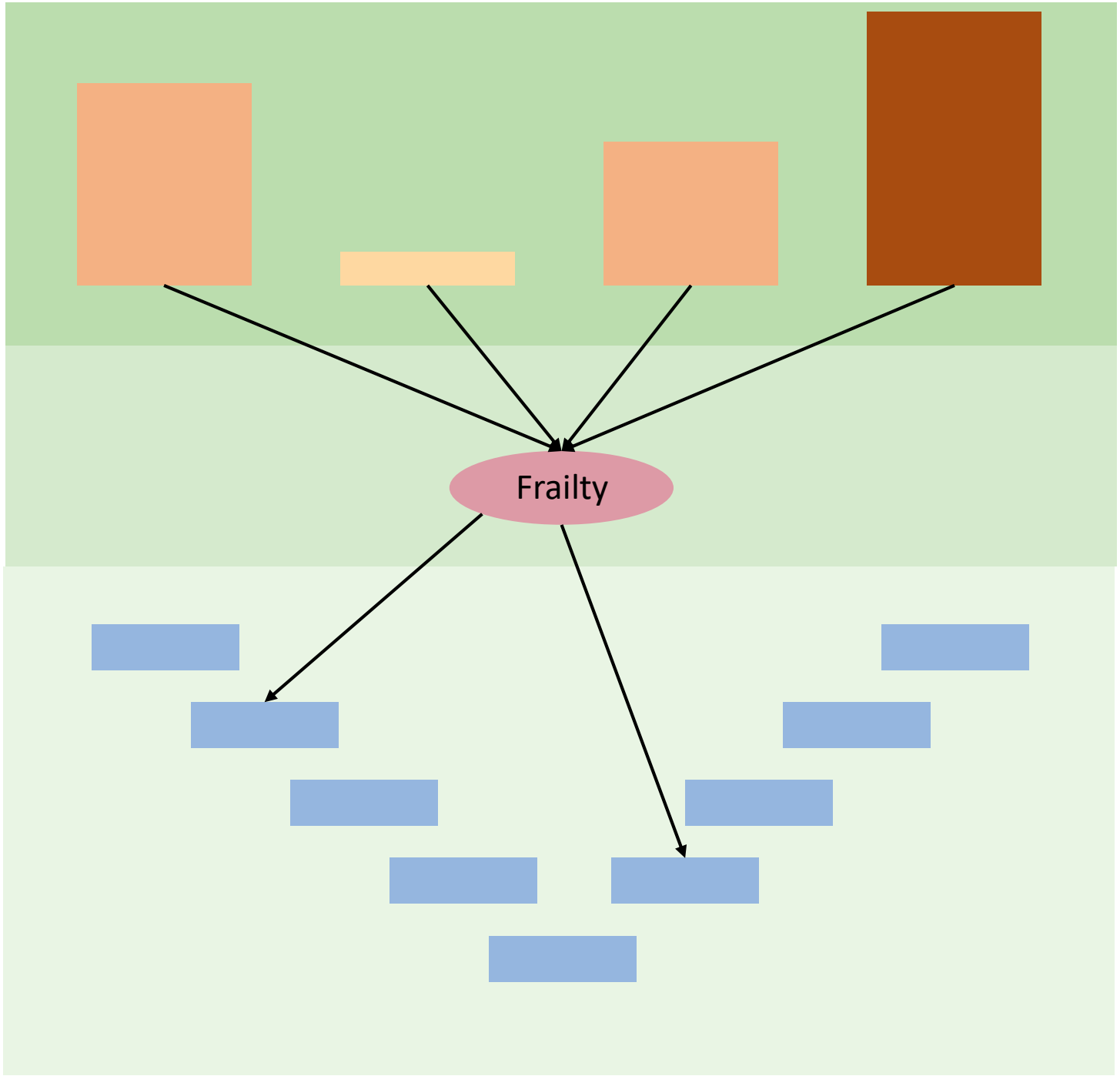
Accelerated aging



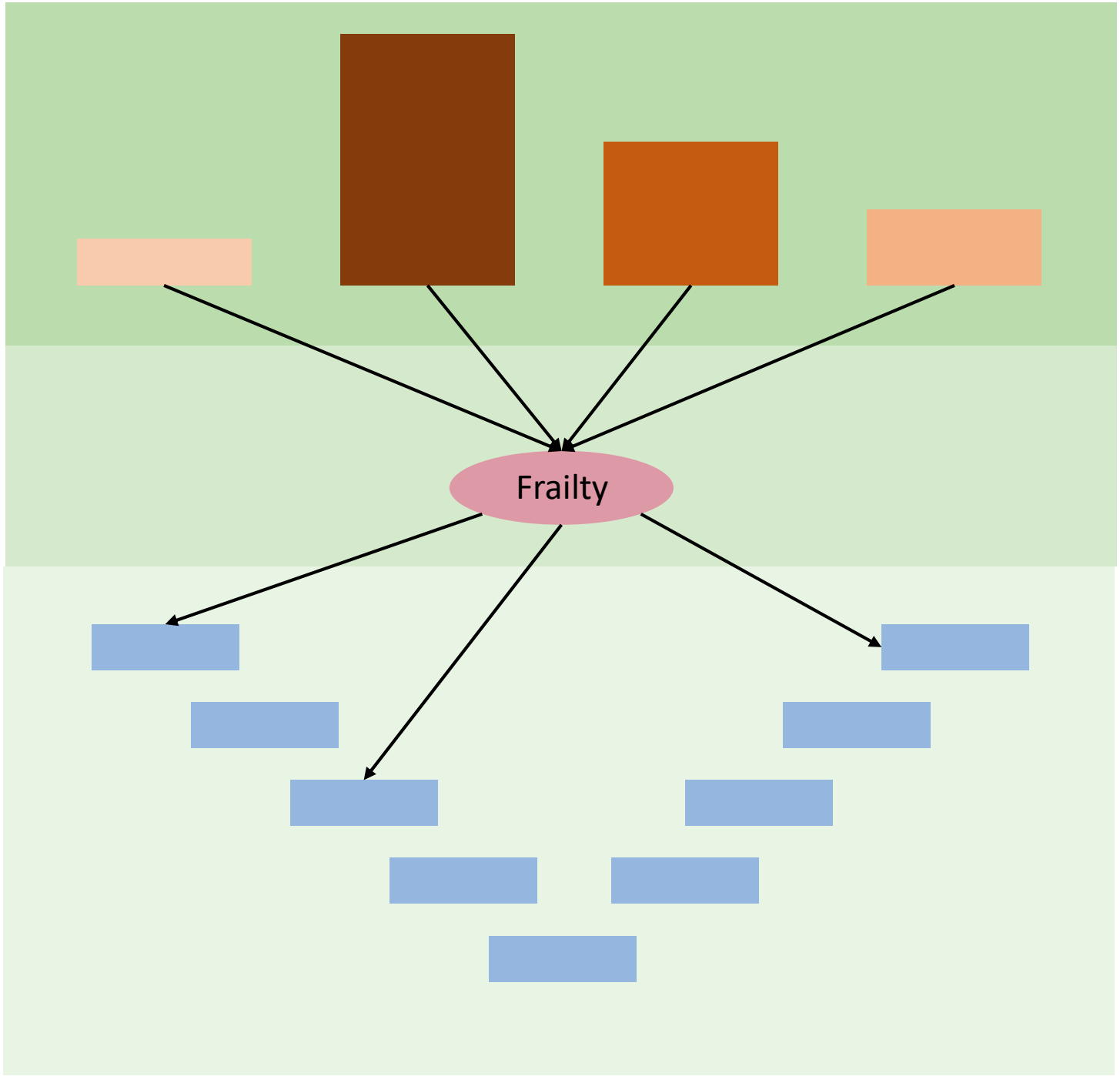
Accelerated aging



Accelerated aging



Accelerated aging

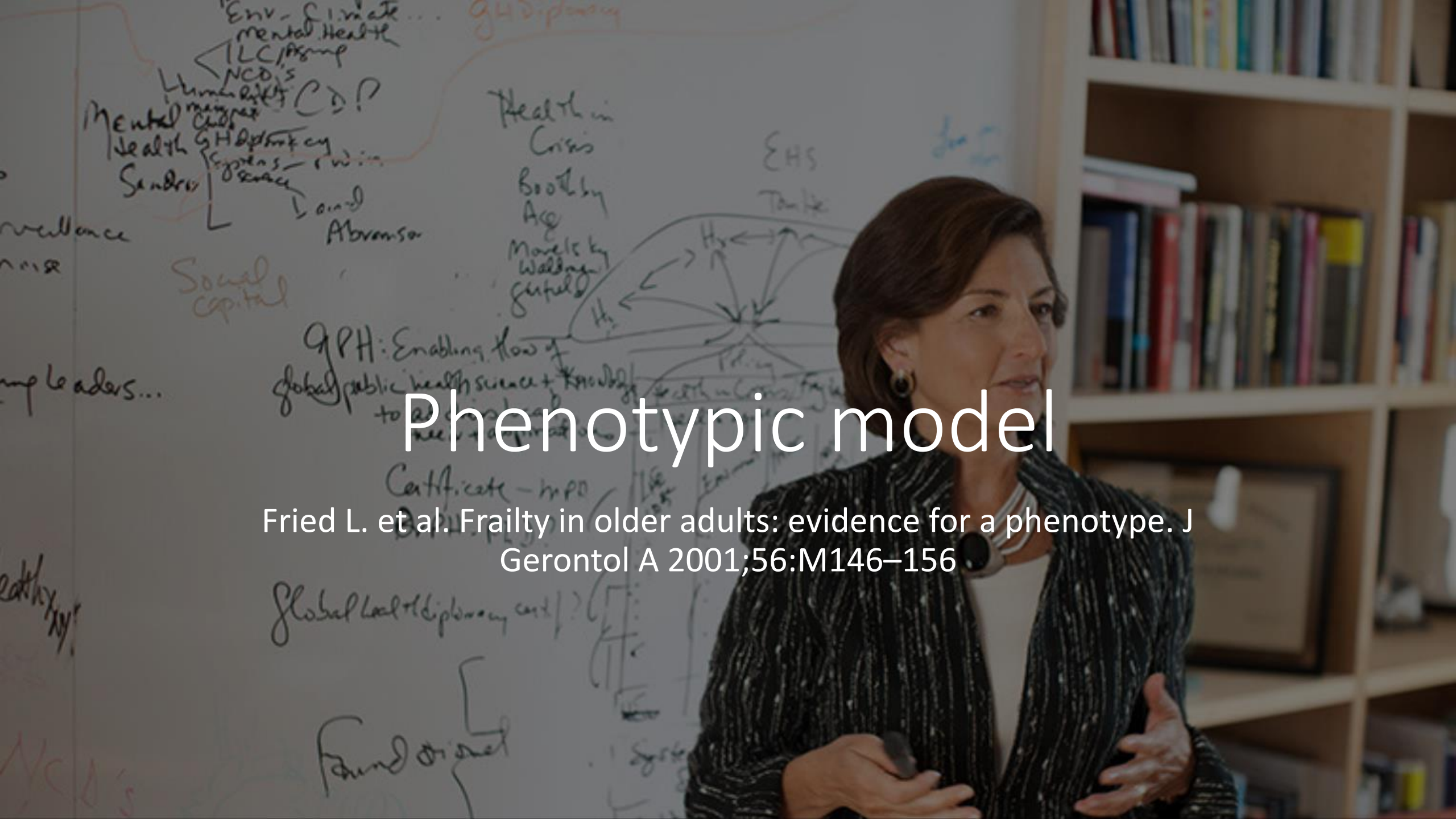


Frailty screening tools

Phenotype model

Cumulative deficit model (FI)

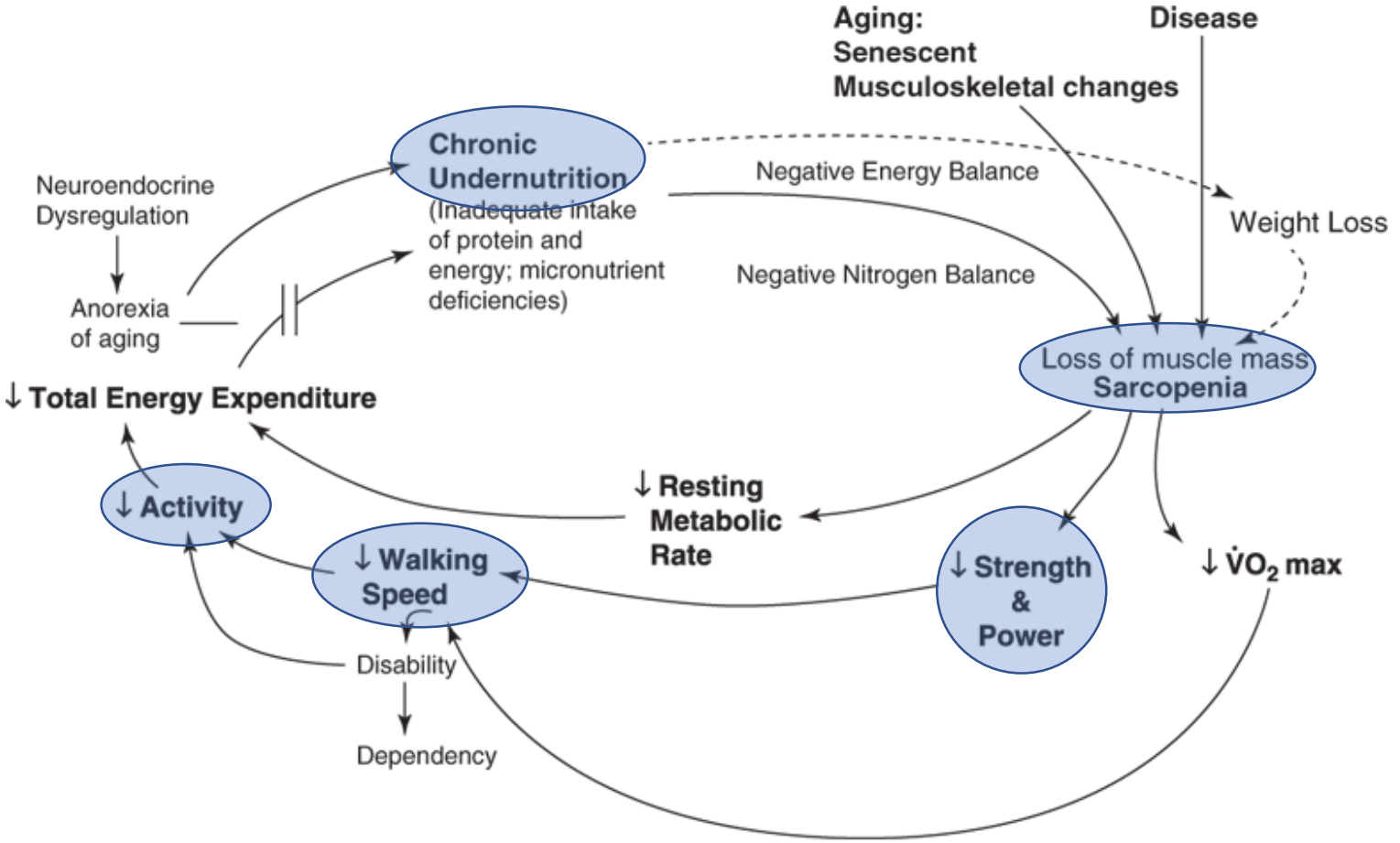
Frailty scale



Phenotypic model

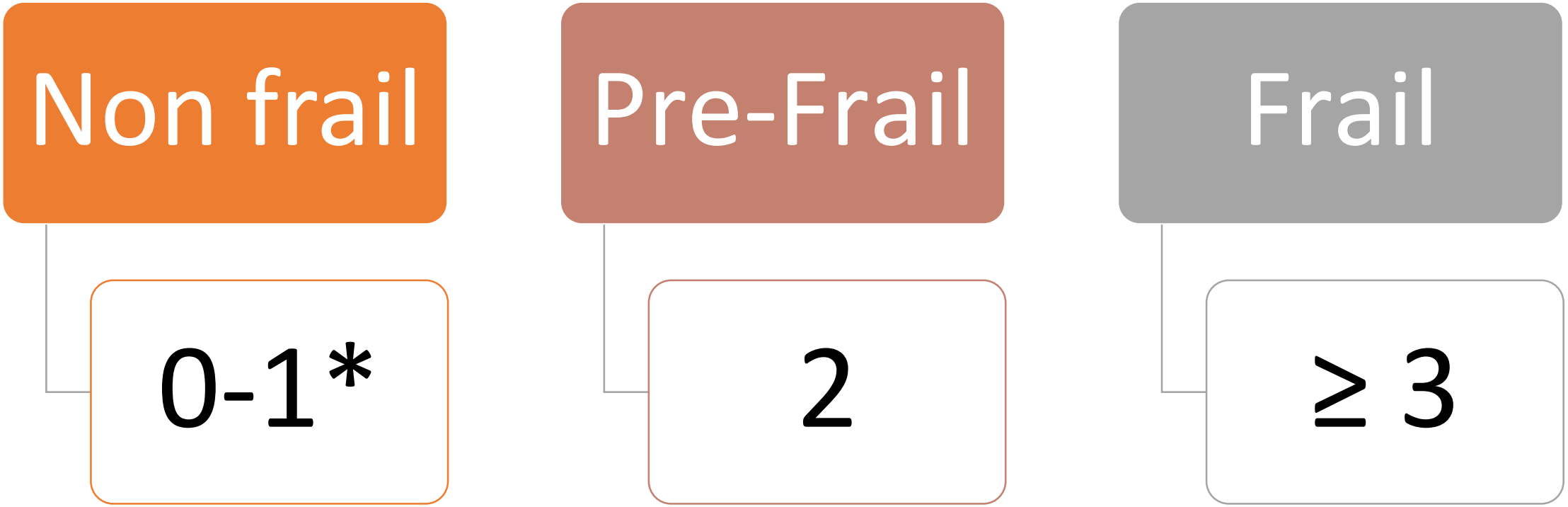
Fried L. et al. Frailty in older adults: evidence for a phenotype. J Gerontol A 2001;56:M146–156

Phenotypic model



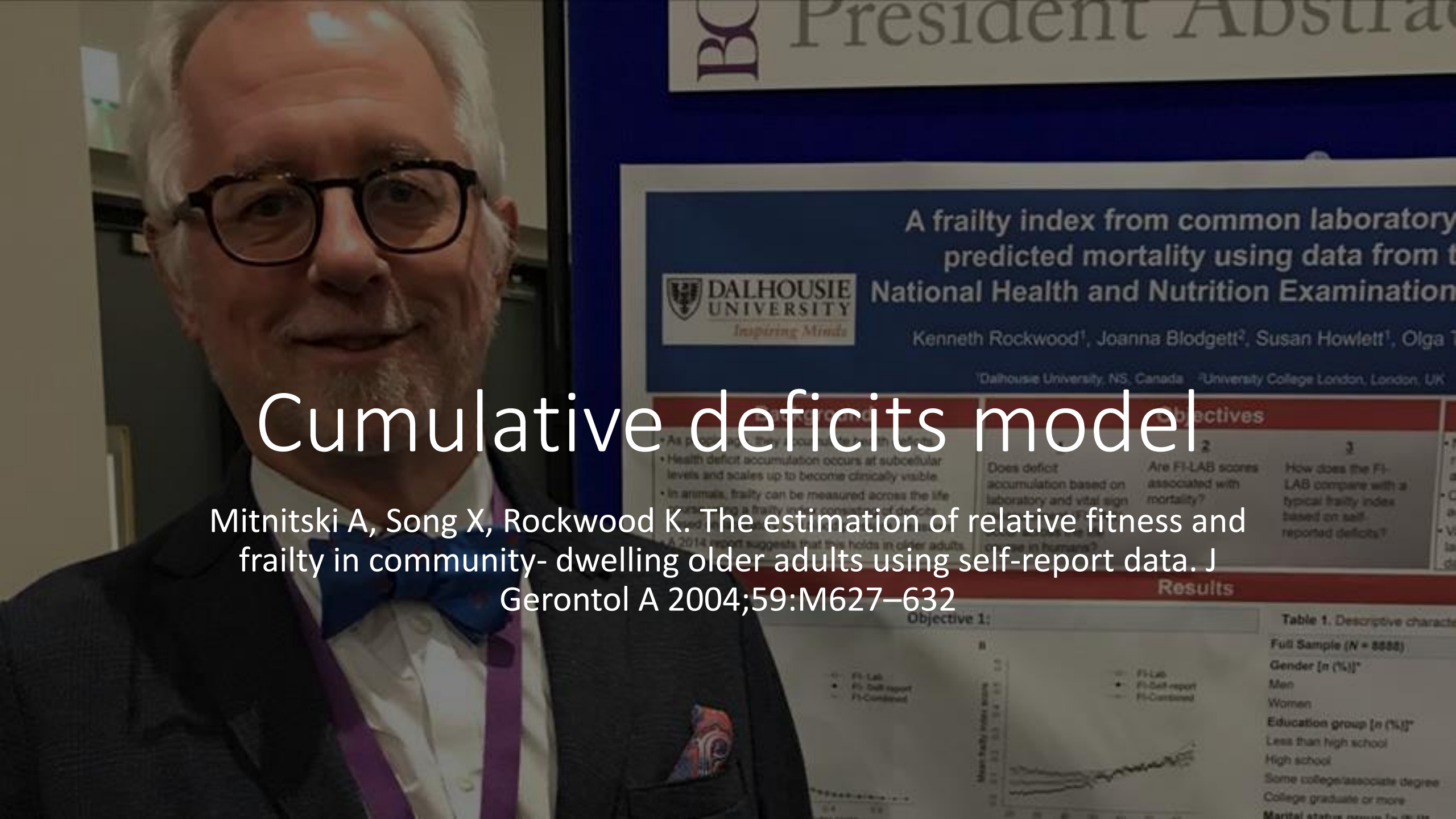
CHARACTERISTICS OF FRAILTY	CARDIOVASCULAR HEALTH STUDY MEASURE
Weight loss (unintentional)/sarcopenia (loss of muscle mass)	> 10 lb (4.5Kg) lost unintentionally in prior year
Weakness	Grip strength: lowest 20% (by gender, body mass index)
Exhaustion/poor endurance	Exhaustion” (self-report)
Slowness	Walking time/15 ft: slowest 20% (by gender, height)
Low activity	kcal/wk: lowest 20% males: <383 kcal/wk; females: <270 kcal/wk

Fried’s Frailty criteria



*** higher risk, 1 defined pre-frail earlier**

Phenotypic model scoring system



Cumulative deficits model

Mitnitski A, Song X, Rockwood K. The estimation of relative fitness and frailty in community- dwelling older adults using self-report data. J Gerontol A 2004;59:M627–632

Frailty Index

- Data driven quantitative measurement
  - Clinical
  - Functional
  - Cognitive

$$\frac{\text{Positive variables}}{\text{Total variables}} = 0....1$$

Mitnitski A, Song X, Rockwood K. The estimation of relative fitness and frailty in community-dwelling older adults using self-report data. J Gerontol A Biol Sci Med Sci 2004;59:M627–632

Frailty index - cutoffs

Non frail FI ≤ 0.08

Pre frail 0.08 < FI < 0.25

Frail FI ≥ 0.25

Frailty index items

Function (10)

MS and neuro (17)

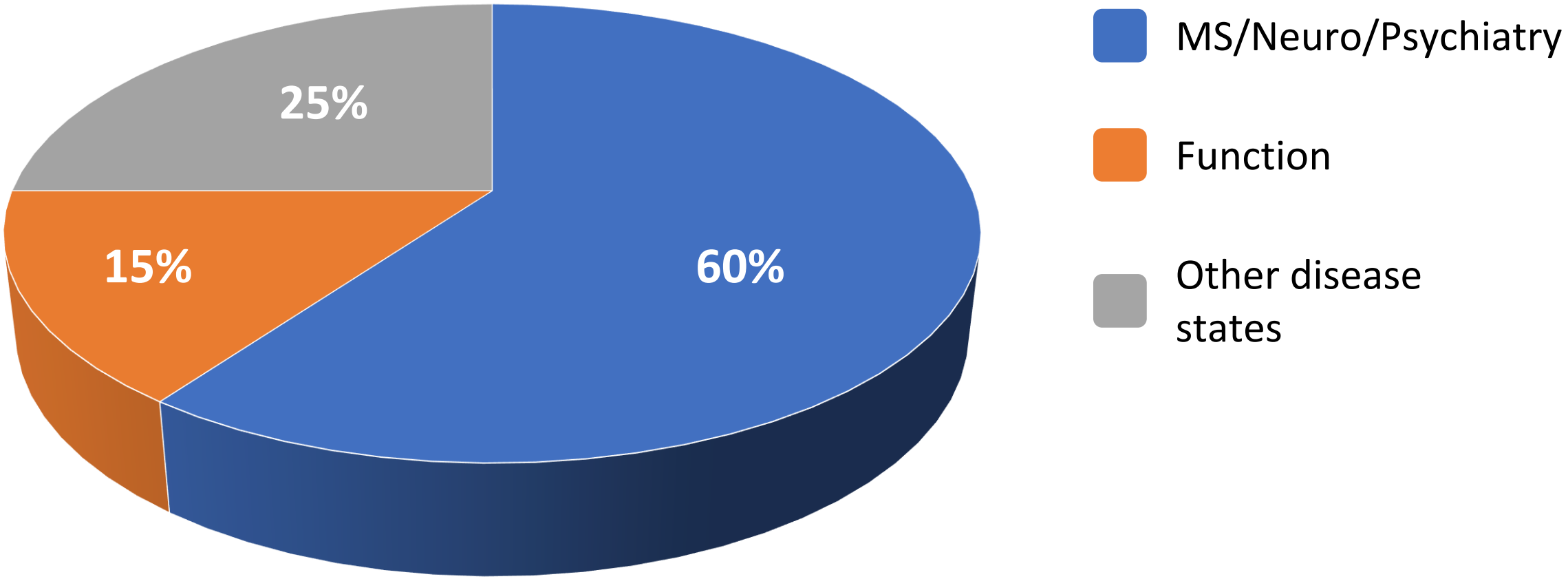
Mood and cognition (13)

Disease states (30)

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

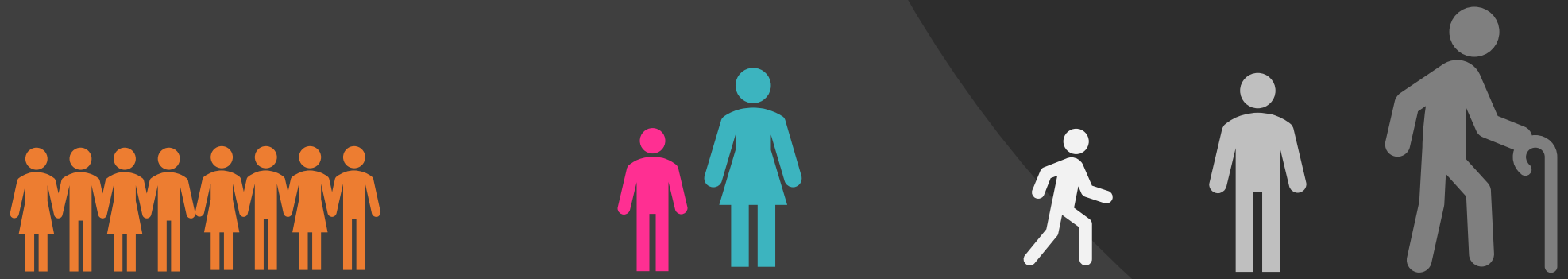
Frailty index variables distribution



Epidemiology of frailty

Epidemiology of frailty

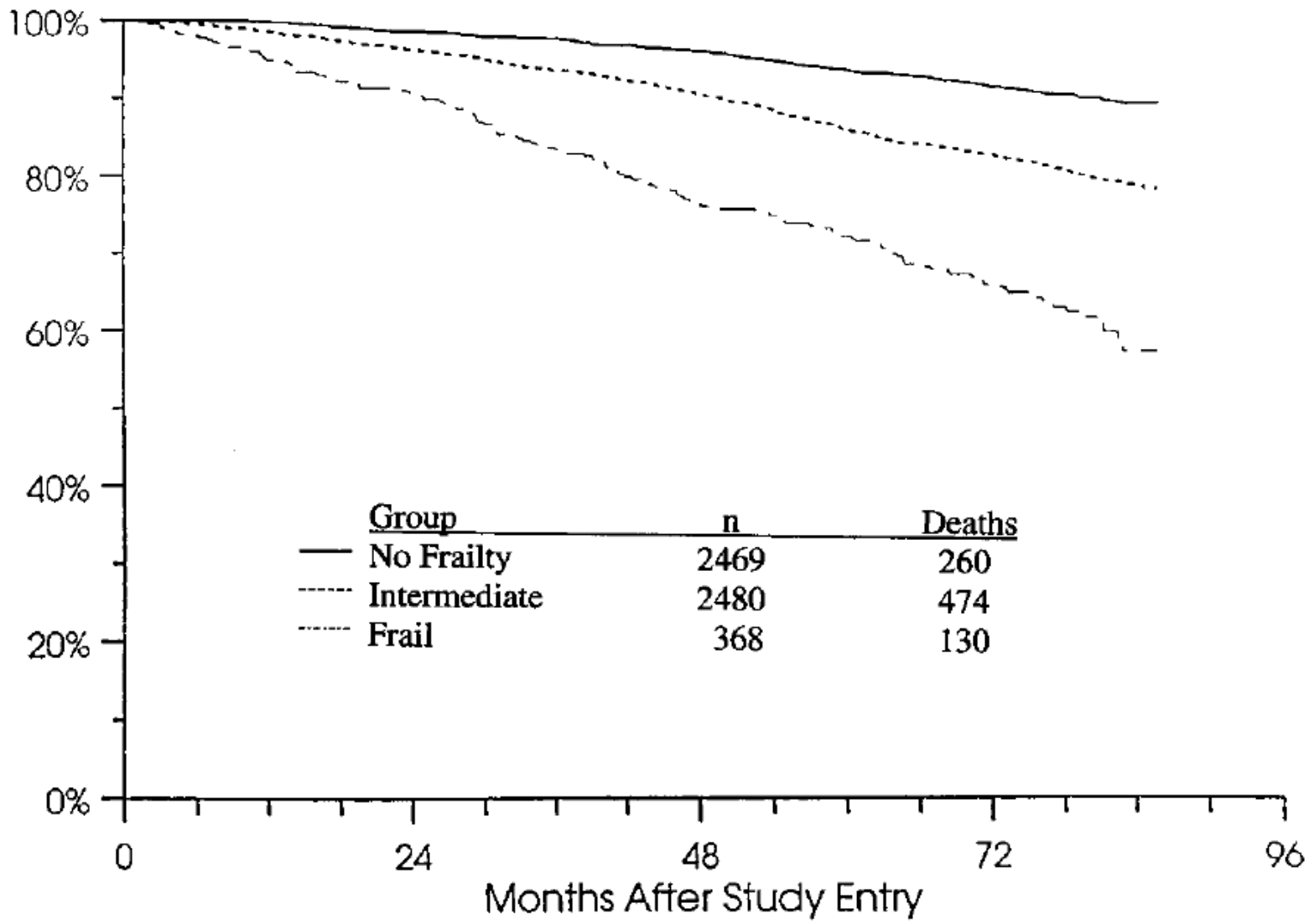
- The main challenge - Definition

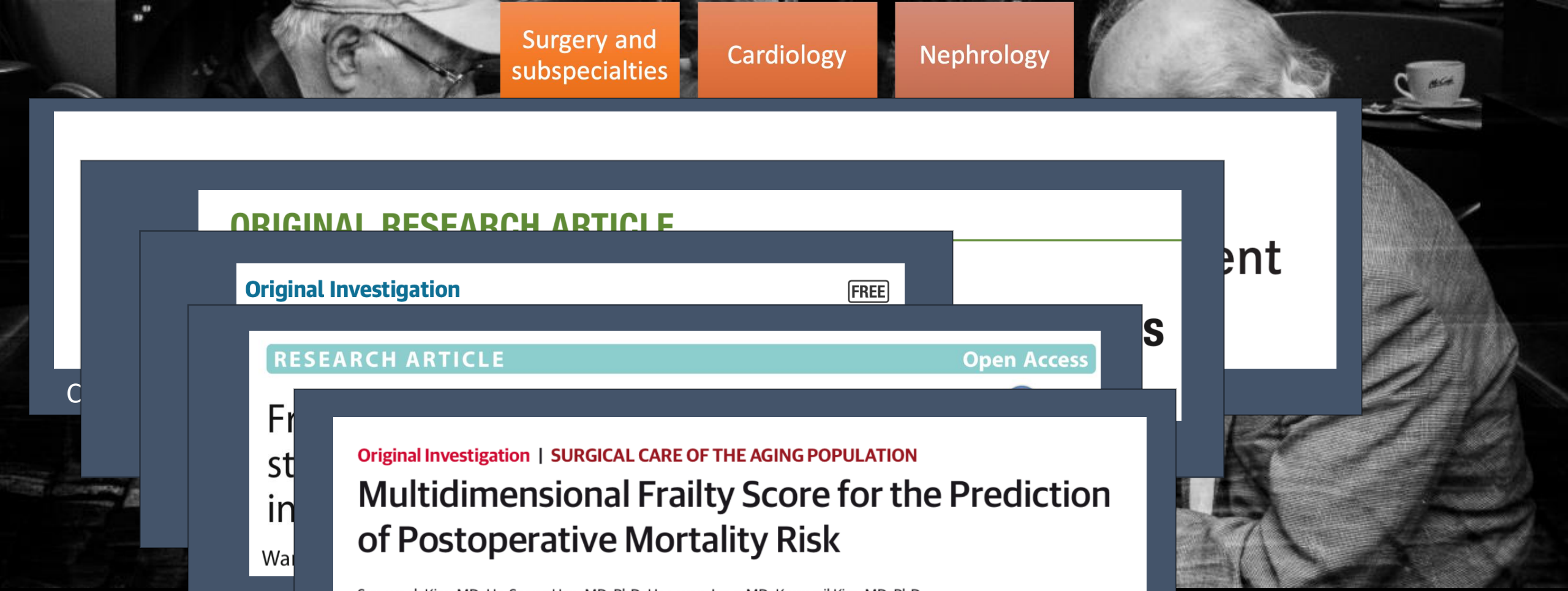


10-12%

…25%

Survival curves (Phenotypic model)





Frailty in the context of specific medical conditions

Implementation of **Frailty** for non-geriatricians

Screening tools

No standard tools available

Usage

* Inpatient – improved geriatric care
* Prognostication
* Patient selection for intervention
* Referral for CGA

The first senior moment.