FRAILTY

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MEDICLINIC

South African Geriatrics Society

FRAILTY

- Definition
- Epidemiology
- Pathophysiology
- Identification
- Differential diagnosis
- Outcomes
- Management/Prevention

DEFINITION

- CLINICAL DEFINITION: "a state of increased vulnerability to stressors due to age-related declines in physiologic reserve across neuromuscular, metabolic and immune systems" (Walston, Hadley et al. 2006)
- CELLULAR DEFINITION: Homeostenosis – decreased physiologic reserves to meet the challenges to homeostasis.(Resnick and Marcantonio 1997)

- Thus: excess demand on a reduced capacity (Ahmed, Mandel et al. 2007)

DISABILITY VS FRAILTY

- Disability – inability to perform ADL's
- Disability does not affect body across multiple organ systems
- Frailty can lead to disability and vice versa, but they are distinct entities.

(Ahmed, Mandel et al. 2007)

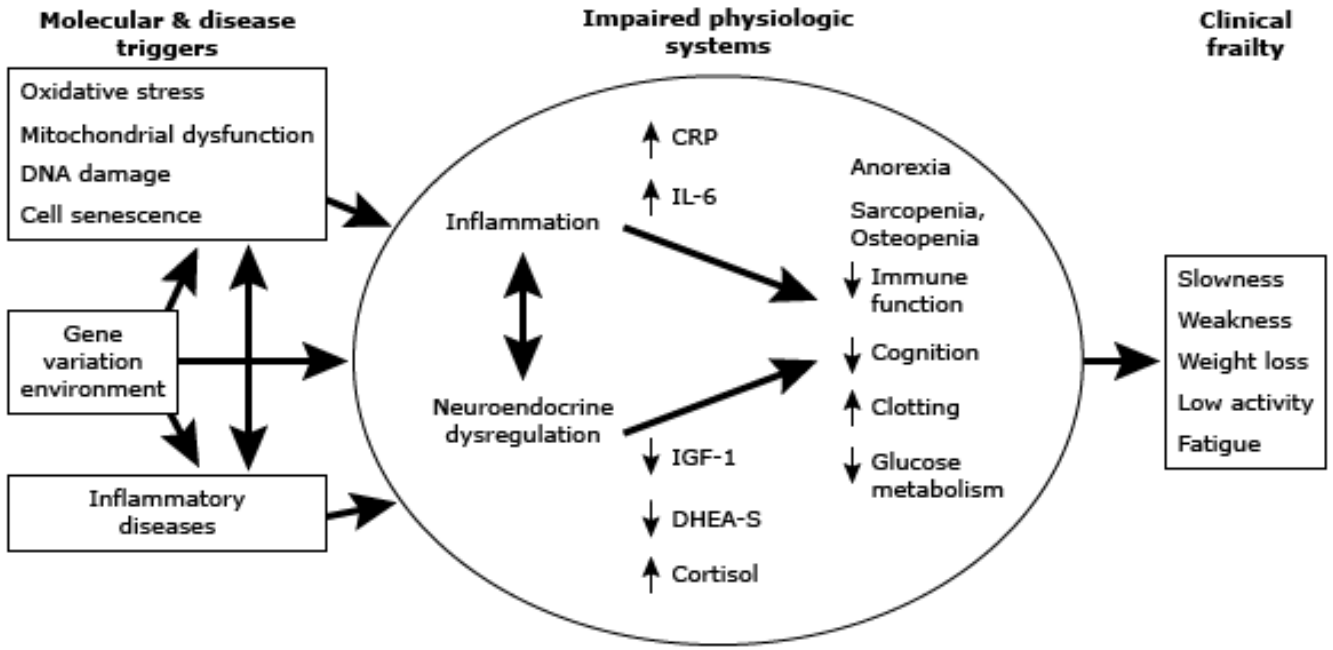
- Age, chronic conditions and disability do not establish the diagnosis (Walston 2017)
- It's a spectrum biological disorder
  - Robust – pre-frail – frail –failure to thrive (advanced/end-stage)-death (Ahmed, Mandel et al. 2007)

PREVALENCE

- Difficult to determine due to different definitions used in studies.
  - Physical frailty definitions – 9.9% for frailty and 44.2% for pre-frailty (Collard, Boter et al. 2012)
  - Cardiovascular health study – 6.9%
  - Broad phenotype definitions – 13.6%
- Women more than men (9.2% vs 5.2%)
- SA rural population - 7%
- Tanzania (community dwelling) – 19.1%

PATHOPHYSIOLOGY

Hypothesized model of frailty and adverse health outcomes



CRP: C-reactive protein; IL: interleukin; IGF: insulin-like growth factor; DHEA-S: dehydroepiandrosterone sulfate.

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RISK FACTORS

- Older age
- Current smoker
- Lower education level
- Current use of HRT (Fugate Woods, LaCroix et al. 2005)
- Depression or use of anti-depressants (Lakey, LaCroix et al. 2012)
- Intellectual disability
- Not married
- Poor nutritional status and decreased protein intake (Beasley et al 2010; Bollwein et al 2013)
- Alzheimer's disease pathology

TOOLS TO IDENTIFY FRAILTY:

1.

Clinical Frailty Scale*

1 **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2 **Well** – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.

3 **Managing Well** – People whose **medical problems are well controlled,** but are **not regularly active** beyond routine walking.

4 **Vulnerable** – While **not dependent** on others for daily help, often **symptoms limit activities.** A common complaint is being "slowed up", and/or being tired during the day.

5 **Mildly Frail** – These people often have **more evident slowing,** and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6 **Moderately Frail** – People need help with **all outside activities** and with **keeping house.** Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.

7 **Severely Frail** – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8 **Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. **Terminally Ill** - Approaching the end of life. This category applies to people with **a life expectancy <6 months**, who are **not otherwise evidently frail.**

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging Revised 2008.
2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

DALHOUSIE UNIVERSITY

TOOLS TO IDENTIFY FRAILTY:

2. Comprehensive Frailty Assessment Instrument – CFAI

- Self-reporting
- Domains – physical, psychological, social and environmental, (cognitive)
- Helps towards a more holistic approach to frailty and appropriate interventions

TOOLS TO IDENTIFY FRAILTY:

3. Linda Fried – cardiovascular health study – Fried Frailty Index (FFI)

- Weight loss (>5% of body weight in the last year)
- Exhaustion (positive response to the question regarding effort required for activity)
- Weakness (decreased grip strength)
- Slow walking speed (>6-7 seconds to walk 15feet (3m))
- Decreased physical activity (kcals spent per week – males <383 kcals; females <270kcal)

TOOLS TO IDENTIFY FRAILTY:

4. Study for osteoporotic fractures frailty tool

- Weight loss of >5% in last year
- Inability to rise from chair five times without use of arms
- "No" response to "do you feel full of energy"

5. Rockwood/CSHA study

- Cumulative deficit
  - 92 problems – the more you have, the higher risk for frailty

TOOLS TO IDENTIFY FRAILTY:

5. FRAIL scale

- F – Are you fatigued?
- R – Resistance (can you climb a flight of stairs?)
- A – Activity (can you walk around the block?)
- I – Number of Illnesses (≥5)
- L – Loss of weight (>5% in 6 months)

DIFFERENTIAL DIAGNOSIS
(WEIGHT LOSS, WEAK AND IMPAIRED FUNCTIONAL ABILITIES)

- Depression
- Malignancy
- Rheumatologic disease (PMR, vasculitis)
- Endocrine disease (DM, thyroid)
- Cardiovascular disease
- Renal disease
- Hematologic disease
- Nutritional deficits
- Neurologic disease

LABORATORY TESTS

- FBC
- Urea/creat and electrolytes
- Calcium and albumin
- Basic liver enzymes
- Vit B12
- Vit D
- TSH

WHY IS IT IMPORTANT?

- In community:
  - Hospitalization
  - Institutionalisation
  - Death
  - Depression
  - Impaired cognition
  - Falls risk (and increased risk of hip fractures)

- In hospital:
  - Predicts surgical outcome
    - 20x less likely to go home
    - 2.5x more complications
  - Increased risk of developing disabilities (7x)
  - Early re-admission
  - Impaired mobility

OTHER USEFUL TOOLS

RANKIN scores

1 - - no significant disability

2 - - slight disability, but able to look after own affairs without help

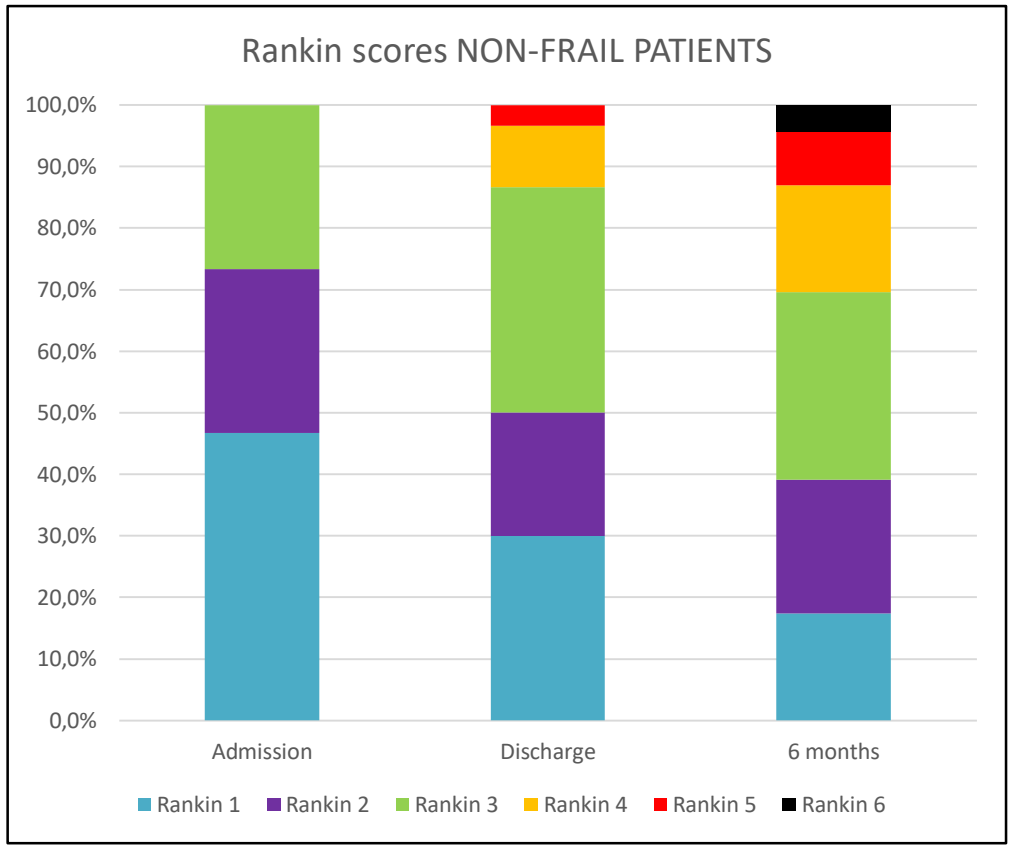
3 - - moderate disability, but can walk without help

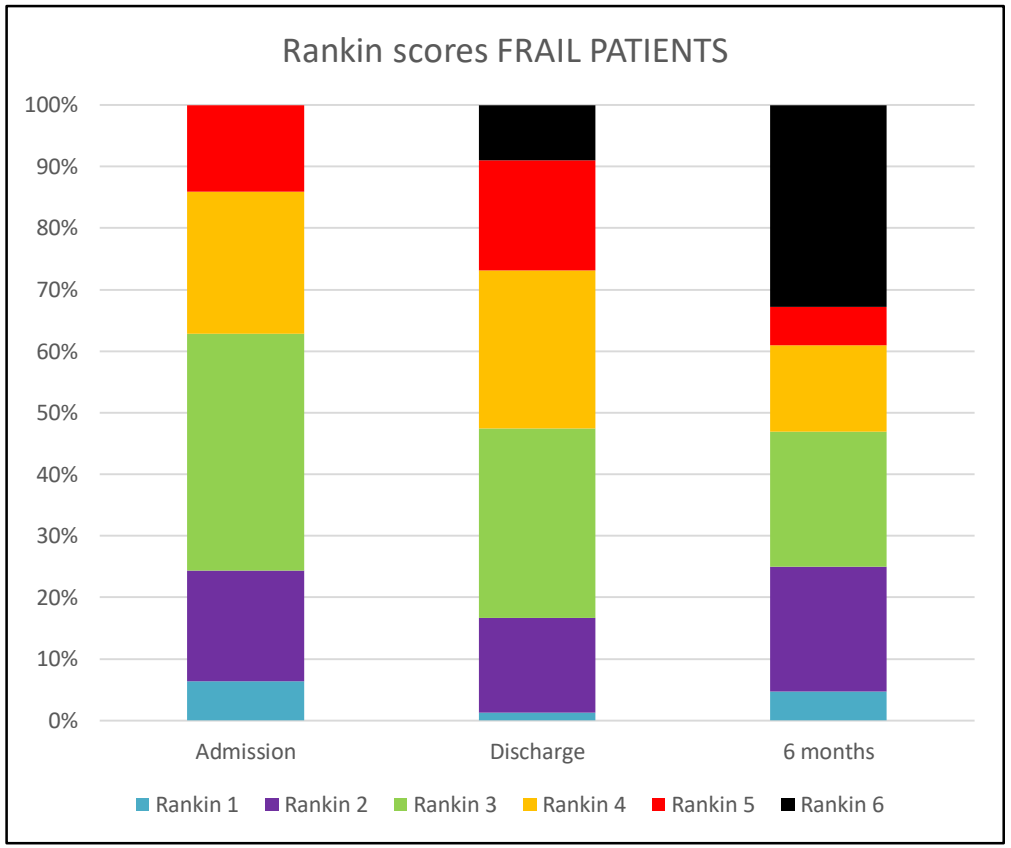
4 - - unable to attend to own bodily needs without help

5 - - bedridden, requiring constant nursing care

6 - - death

IN URBAN SA – HOSPITALISED PATIENTS





	Year	Country	Participants (n)	Length of follow-up (years)	Falls (HR*/OR† [95% CI])		Worsening disability (HR*/OR† [95% CI])		Hospitalisation (HR*/OR† [95% CI])		Care home admission (HR*/OR† [95% CI])		Mortality (HR*/OR† [95% CI])	
					Inter-mediate frailty	Severe frailty	Inter-mediate frailty	Severe frailty	Inter-mediate frailty	Severe frailty	Inter-mediate frailty	Severe frailty	Inter-mediate frailty	Severe frailty
Cardiovascular Health Study (CHS)[3]	2001	USA	5317	7	1·12* (1·00–1·26)	1·23* (0·99–1·54)	1·55* (1·38–1·75)	1·79* (1·47–2·17)	1·11* (1·03–1·19)	1·27*, (1·11–1·46)	NA	NA	1·32* (1·13–1·55)	1·63* (1·27–2·08)
Canadian Study of Health and Aging (CSHA)[92]	2004	Canada	9008	5	NA	NA	NA	NA	NA	NA	2·54 † (1·67–3·86)	2·60† (1·36–4·96)	2·54† (1·92–3·37)	3·69† (2·26–6·02)
Women's Health and Aging Study (WHAS)[93]	2006	USA	1438	3	0·92* (0·63–1·64)	1·18* (0·63–2·19)	NA	NA	0·99* (0·67–1·47)	0·67* (0·33–1·35)	5·16* (0·81–32·79)	23·98* (4·45–129·2)	3·50* (1·91–6·39)	6·03* (3·00–12·08)
Study of Osteoporotic Fractures (SOF)[94]	2008	USA	6701	4·5	1·23† (1·02–1·48)	2·44† (1·95–3·04)	1·89†, (1·66–2·14)	2·79† (2·31–3·37)	NA	NA	NA	NA	1·54† (1·40–1·69)	2·75* (2·46–3·07)

HR=hazard ratio. NA=not available. OR=odds ratio. *Hazard ratio. †Odds ratio. The comparator for hazard ratios and odds ratios is people who are not frail.

Table: **Covariate-adjusted associations between frailty and adverse outcomes (falls, disability, hospitalisation, care home admission, and mortality) from four large prospective cohort studies**

Clegg, A., et al., Frailty in elderly people. The Lancet, 2013. 381(9868): p. 752-762.

	Year	Country	Participants (n)	Length of follow-up (years)	Falls (HR*/OR† [95% CI])		Worsening disability (HR*/OR† [95% CI])		Hospitalisation (HR*/OR† [95% CI])		Care home admission (HR*/OR† [95% CI])		Mortality (HR*/OR† [95% CI])	
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Women's Health And Aging Study (WHAS)

5.16 (0.81-32.79)

23.98 (4.45-129.2)

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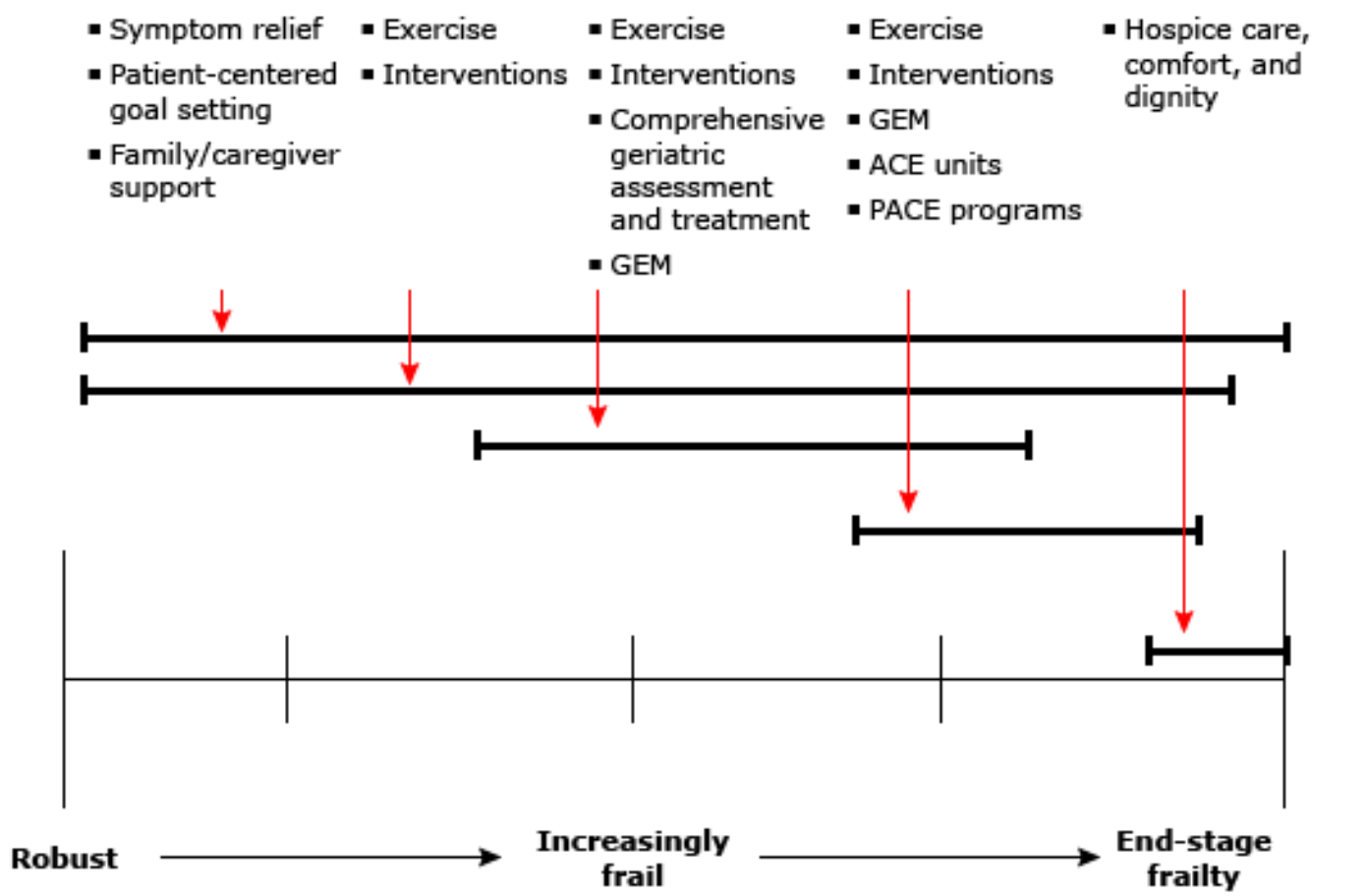
WHY IS IT IMPORTANT?

- In specific illnesses/conditions:
  - Coronary artery disease – increased mortality
  - Worse clinical outcomes with chemotherapy
  - HIV accelerated immune-function deterioration

Potential interventions along the spectrum of frailty in older adults



ACE unit: Acute Care for Elders unit; GEM: Geriatric Evaluation and Management; PACE: Program for All-Inclusive Care of the Elderly.

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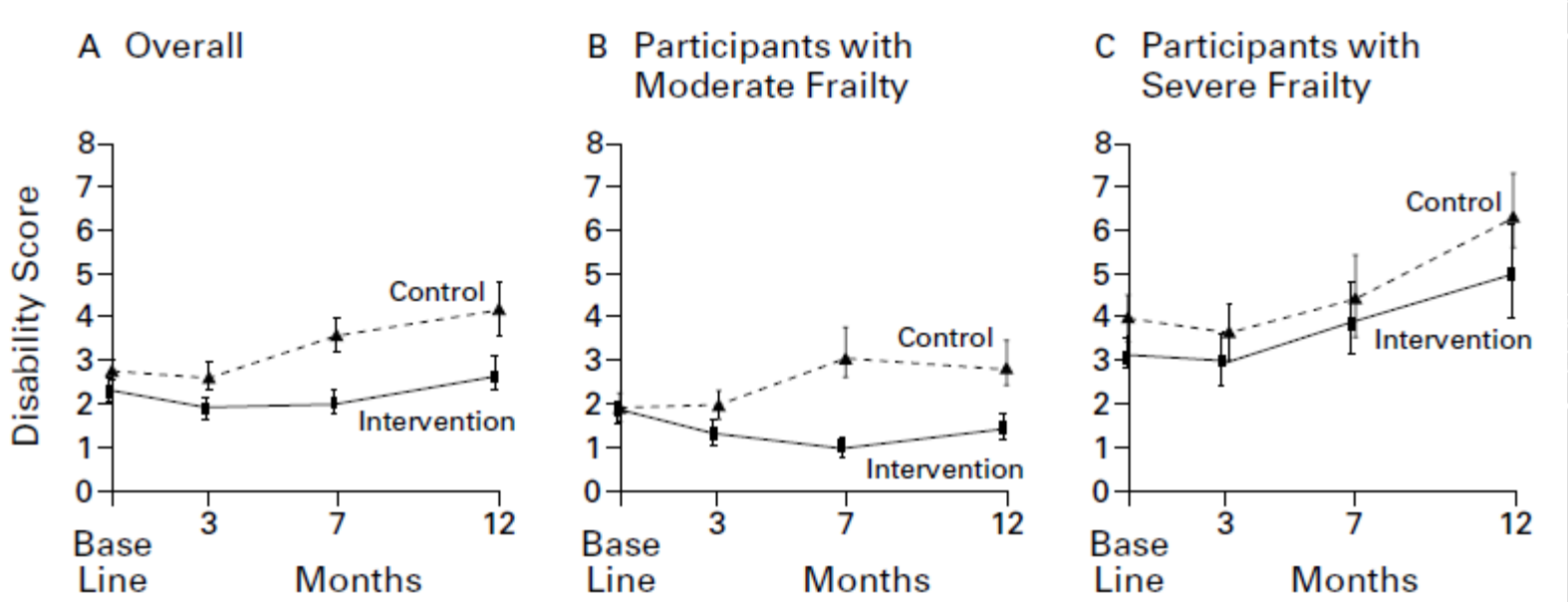
INTERVENTIONS

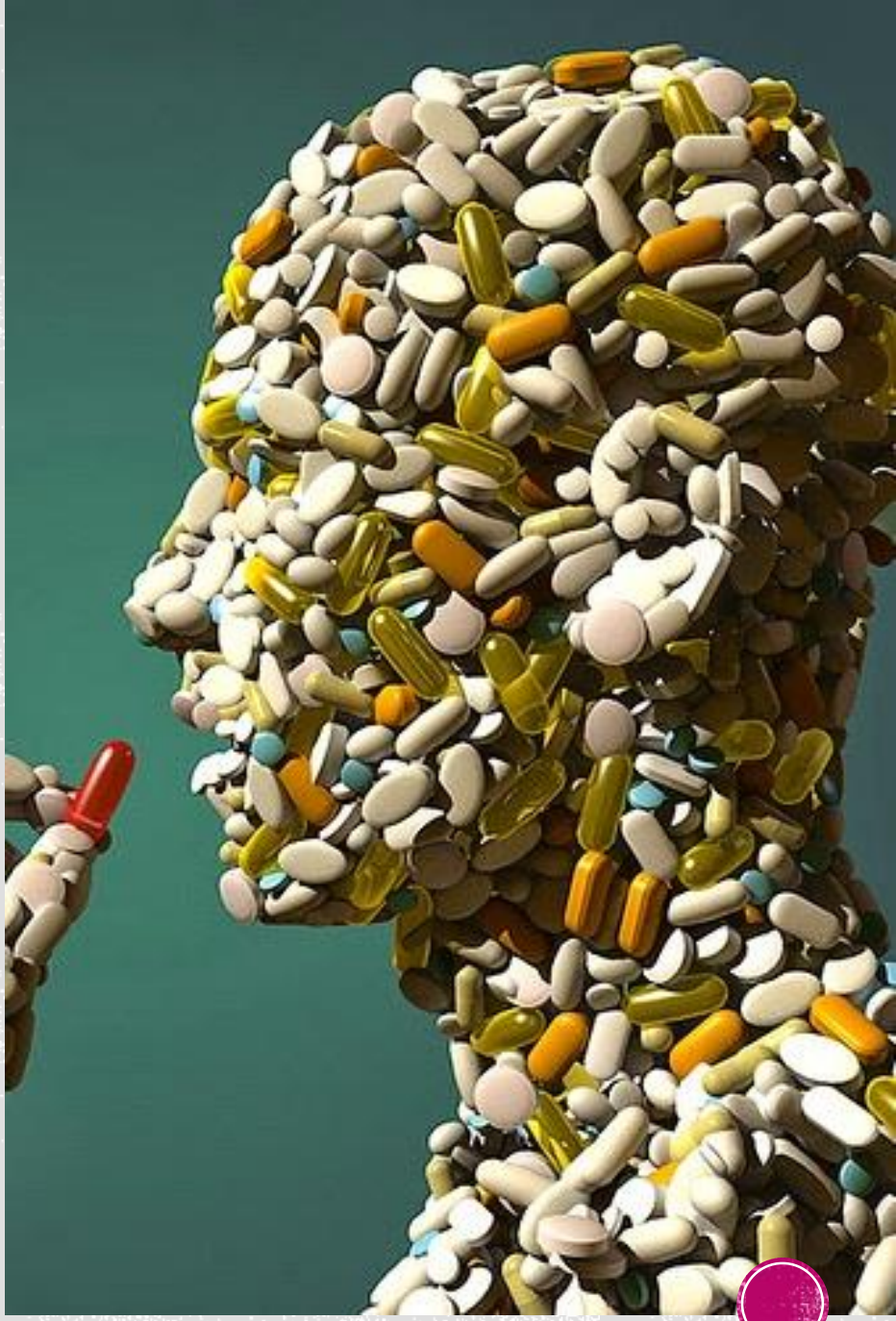
Identify the goal of care

WHAT DOESN'T WORK...

- Routine testosterone replacement
- Growth hormone/GHRF supplementation
- DHEA-S



N Engl J Med 2002;347:1068-74



WHAT DOES WORK…

- Comprehensive Geriatric Assessment
- Exercise – especially resistance training (Chan et al 2012)
- Nutritional supplementation
  - vit D 800-1000 IU daily in deficient patients
  - Avoid weight loss – caloric and protein supplementation
  - Mediterranean diet (Talegawkar SA et al 2012)
- Medication review
  - Stop unnecessary drugs
  - Consider side-effects as a potential cause for a new symptom
  - Consider non-pharmacologic approaches
  - Substitute with safer alternatives
  - Reduce the dose
  - Use beneficial therapies when indicated
- Palliative care

CONCLUSION

- Frailty = a biological syndrome with low reserve and therefore low resistance to stressors
- It is due to cumulative decline across multiple physiological systems
- It leads to increased vulnerability to adverse outcomes …disability, poor quality of life and death
- It is important to identify it before it is too late

Clegg, A., et al., *Frailty in elderly people.* The Lancet, 2013. **381**(9868): p. 752-762.