Geriatric frailty

Assessment tools and
importance of frailty for clinical practice

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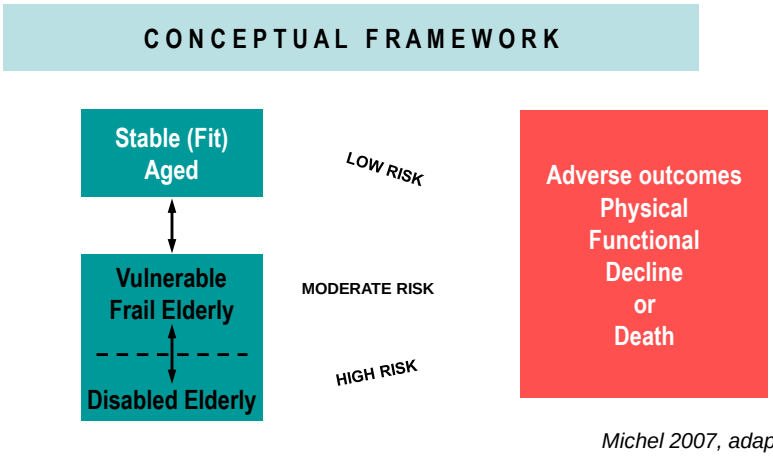
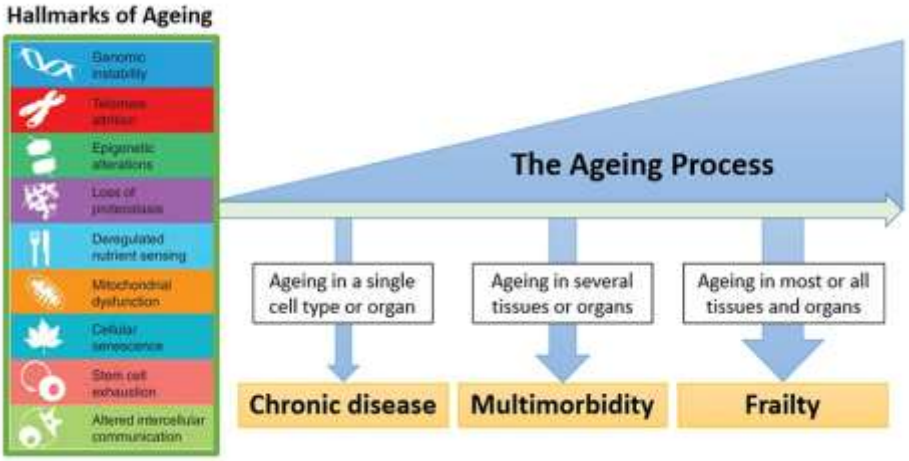
Heterogeneity of older population



Michel 2007, adapted

Aging, multimorbidity and frailty

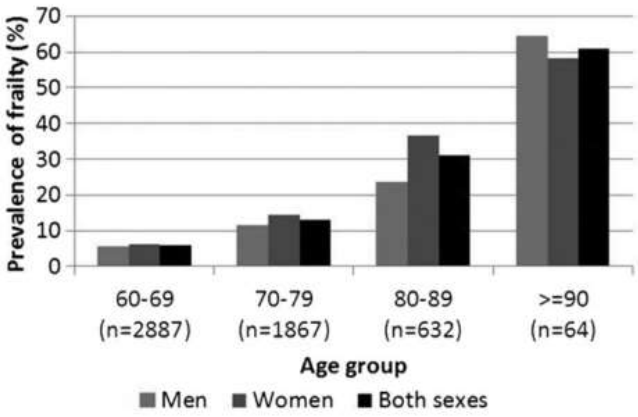


Thillainadesan J et al Frailty, a multisystem ageing syndrome, *Age Ageing*, 2020;49 (5):758–763

Prevalence of frailty
English Longitudinal Study of Ageing (ELSA)

Gale C.R. *Age and Ageing*. 2015

Weighted prevalence of frailty in 2008-2009 according to age and sex



Frailty

Definition and clinical correlates

Defining frailty

Age-related alteration in physiology and pathology that leads to vulnerability with loss of organ system reserve, limited capacity to respond to internal and environmental stresses, unstable homeostasis and **poor medical and functional outcomes.**

Studenski JAGS 2004;62:1560-66,Ferrucci J Endocrinol Invest. 2002;25:10-5

A biologic syndrome of decreased reserve and resistance to stressors, resulting from cumulative declines across multiple physiologic systems and causing vulnerability to adverse outcomes.

Fried LP et al. J Gerontol A Biol Sci Med Sci 2001

What does it mean clinically to be frail?

- **aged** over 75 years with **co-morbidities** that may include dementia, reduced renal function
- **reduced resilience** to external stressors (may take longer to recover from illnesses such as urinary tract infections or from incidents such as falls)
- an apparently **minor event can trigger a major change**
- episodes of **acute illness** during which their **health deteriorates** before improving, but they **do not recover** to the same level of functional ability that they had before the event.

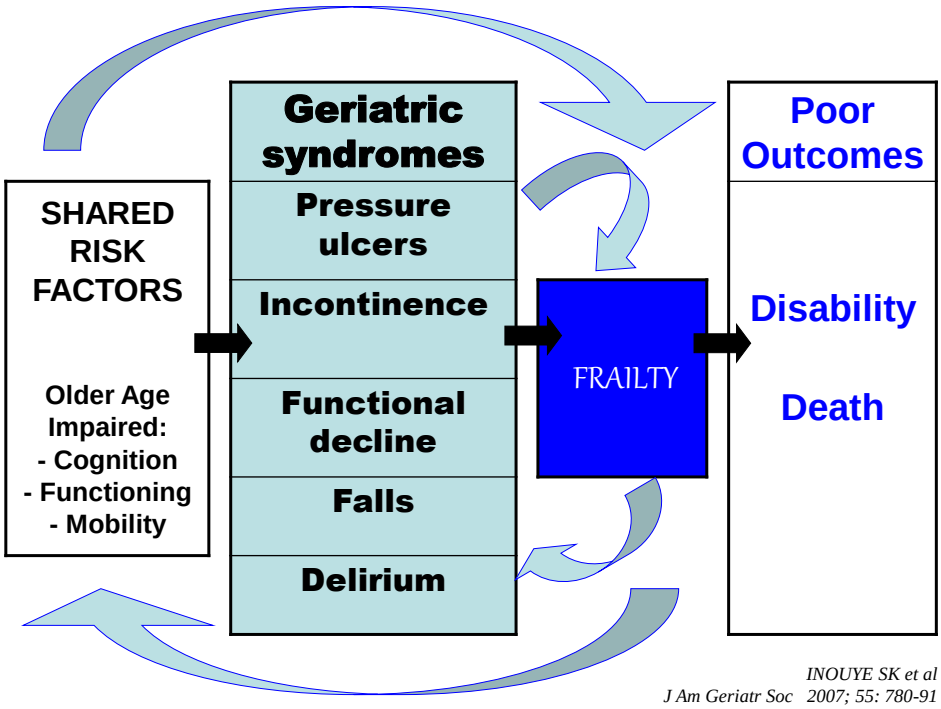
Frailty is associated with an array of adverse health outcomes

- Decreased quality of life
- Loss of fitness, loss of autonomy, disability, depencency
- Multimorbidity
- Polypharmacy (drug-drug, drug-disease interaction, inappropriate prescribing, adverse drug events)
- Falls, depression, delirium
- Mortality

+ health Services use (physician´s visits, emergency, (re)hospitalization, community Services, longterm care

Components of frailty

- Physical frailty (and sarcopenia)
- Cognitive frailty
- Social frailty
- Pharmacologic frailty?



INOUYE SK et al
J Am Geriatr Soc 2007; 55: 780-91

The need of screening for frailty (distinguish between these „old cars“)

Geriatric patient
(or subject at risk)

versus

Older patient
(chronologically old)

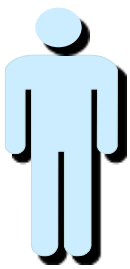
Frailty phenotype

the Journals of gerontology
BIOLOGICAL SCIENCES AND MEDICAL SCIENCES

56:M146-M157 (2001)

SYMPTOMS= Frailty criteria

Weight loss (unintentional)
Weakness (grip strength)
Fatigue
Low physical activity
Slow walking speed



SIGNS

Sarcopenia
Osteopenia
Balance and gait abnormalities, falls
Deconditioning
Undernutrition

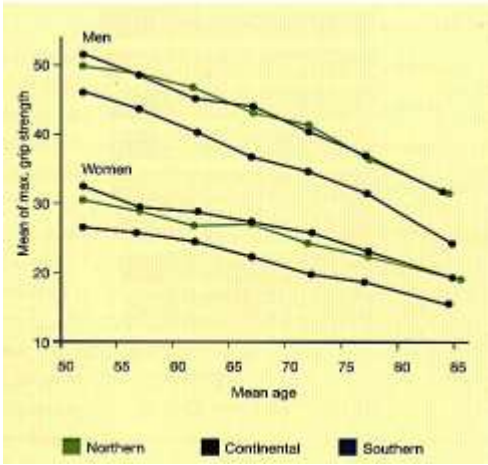
Fried L., 2001

Criteria of frailty and their measurements

Table 1. Frailty Defining Criteria: Women's Health and Aging Studies (WHAS) and Cardiovascular Health Study (CHS)

Characteristic	WHAS	CHS
Weight loss	BMI < 18.5 or Weight at age 60 minus weight at exam ≥10% of weight at age 60	Lost >10 pounds unintentionally in last year
Exhaustion	Any of: Low usual energy level (≤3) Felt unusually tired in last month Felt unusually weak in last month	Either of: Felt that everything I did was an effort in last week Could not get going in last week
Slowness	Walking 4 m (speed) in: ≤0.65 m/s for height ≤159 cm ≤0.76 m/s for height >159 cm	Walking 15 feet (time) in: ≤7 seconds for height ≤159 cm ≤6 seconds for height >159 cm
Low activity level	<90 kcal of physical expenditure on activity scale (6 items*)	<270 kcal of physical expenditure on activity scale (18 items†)
Weakness	Grip strength of the dominant hand: ≤17 kg for BMI ≤23 ≤17.3 kg for 23< BMI 26 ≤18 kg for 26< BMI 29 ≤21 kg for BMI >29	Grip strength of the dominant hand: ≤17 kg for BMI ≤23 ≤17.3 kg for 23< BMI ≤26 ≤18 kg for 26< BMI ≤29 ≤21 kg for BMI >29

Maximal grip strenght by age in Europe (SHARE Study)



Fried frailty phenotype assessment tool

Fried criteria are the most commonly used frailty instrument in research

However, their use in clinical practice may be limited:

Fried criteria require more time, equipment and expertise it has been developed in a USA community-dwelling sample excluding older subjects with cognitive impairment, stroke and depression.

Fried criteria may be difficult to easily apply to clinical trial populations as well, particularly with regard to the assessment of habitual physical activity and in those having the highest degree of health and functional impairment (e.g. hospitalized subjects, nursing home and assisted living residents).

EMA Reflection paper on frailty: instruments for baseline characterisation of clinical trial older populations EMA/CHMP/778709/2015 2018

Deficit accumulation and Frailty Index (FI)

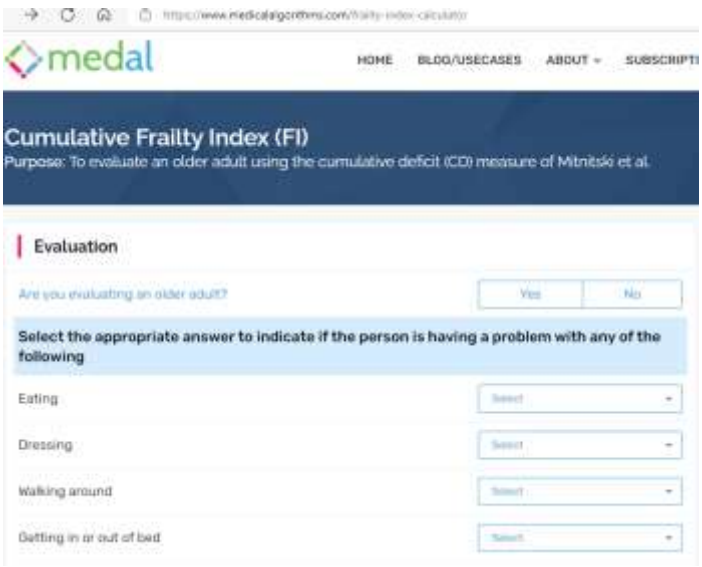
- Frailty = multidimensional risk state
- Measured by quantity rather than by the nature of health problems.
- Various disorders are accumulated during life.
- The more deficits are accumulated, the more likely that person is to be frail. Deficits can be symptoms, signs, diseases, disabilities, abnormal laboratory measurements
  - Accumulate with age
  - Associated with adverse outcome

Mitnitski et al. 2001; Rockwood and Mitnitski 2007,Searle et al., 2008

Frailty Index based on comprehensive assessment Canadian Study on Health and Aging, 2004

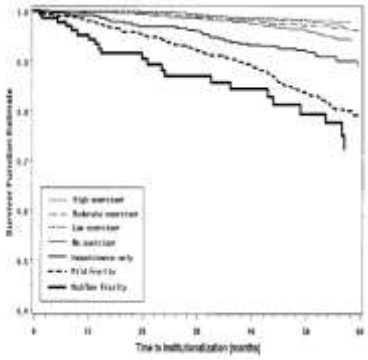
Appendix 1: List of variables used by the Canadian Study of Health and Aging to construct the 70-item CSHA Frailty Index

- 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

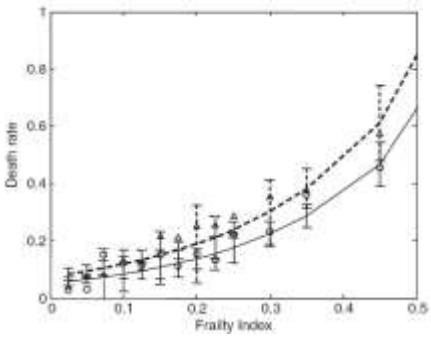


Prevalence, Attributes, and Outcomes of Fitness and Frailty in Community-Dwelling Older Adults: Report From the Canadian Study of Health and Aging

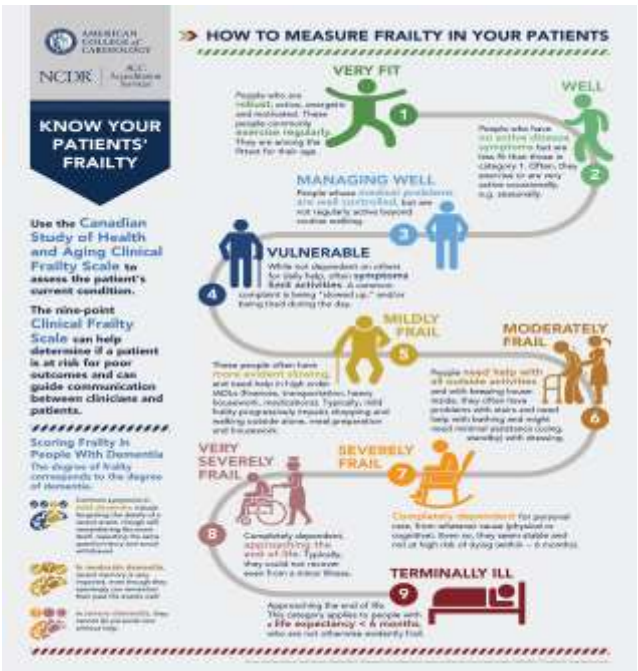
Journal of Gerontology: MEDICAL SCIENCES
2004, Vol. 59A, No. 12, 1310–1317



Institutionalization



Mortality



Clinical Frailty Scale (CFS)

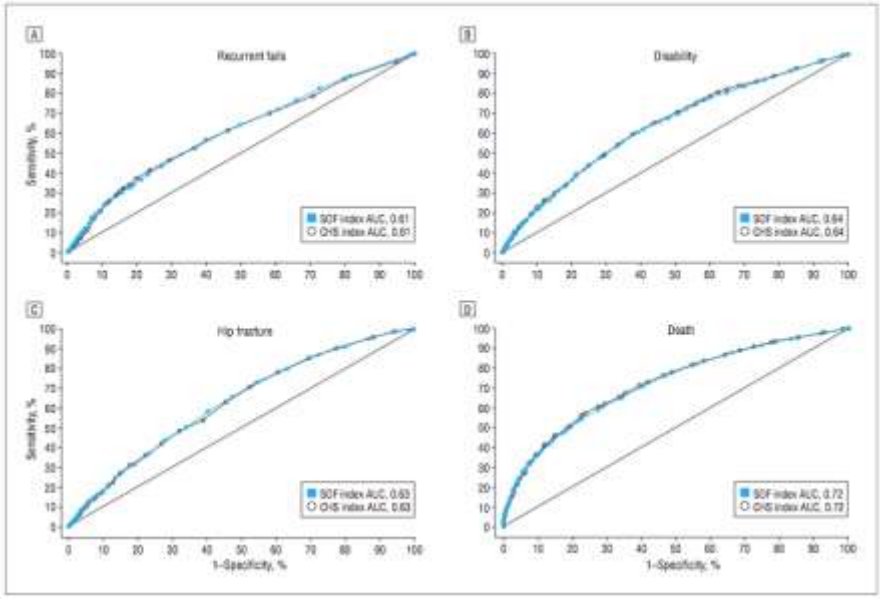
Based on
Frailty index
or
Comprehensive clinical assessment

Rockwood et al., CMAJ 173(5) 2005

Short instrument for identifying frail patients in clinical practice

Study of Osteoporotic Fracture (SOF) Criteria for Frailty		
Frailty Criteria	**Data Collection**	**Score**
Weight loss ≥ 5% over 3 yrs	Weight 3 years ago Weight today Change in weight/ Weight 3 years ago= % loss	Score=1 if weight loss ≥ 5% Otherwise, Score=0
Inability to do 5 chair stands	Sit in chair, do not use arms, rise 5 times	Score=1, if unable Otherwise, Score=0
"Do you feel full of energy?"	Ask the question, must answer yes or no	Score=1, if no Otherwise, Score=0
		Sum above scores
If summed score is 2 or 3, patient is frail; If score is 1 patient is prefrail; If score=0 the patient is robust		

Reference: Ensrud KE, Ewing SK, Taylor BC, et al. Comparison of 2 frailty indexes for prediction of falls, disability, fractures, and death in older women. Arch Intern Med. 2008 Feb 25;168 (4):382-9



1. Weight loss
2. Inability to rise from a chair
3. Reduced energy level

Ensrud K et al. *Arch Intern Med* 2008;168:382-9

9 January 2018
EMA/CHMP/778709/2015
Committee for Medicinal Products for Human Use (CHMP)

Reflection paper on physical frailty: instruments for baseline characterisation of older populations in clinical trials

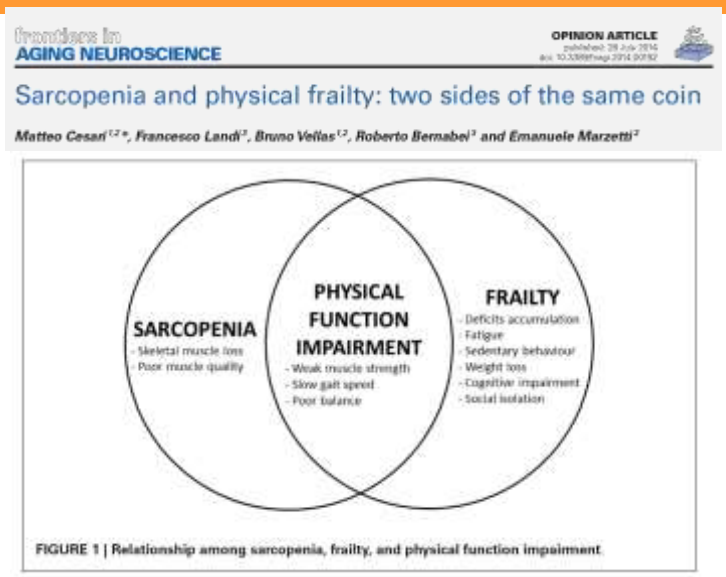
„…ensuring that population included in the clinical development program is representative of the target patient population' and states that 'vulnerable geriatric patients at high risk of adverse outcomes (so-called "frail" geriatric patients)' are considered 'particularly important to address in the planning of the clinical development program'"

Keywords ***Frailty, older people, ICH E7, geriatrics, elderly, baseline characterisation, ageing***

Table of contents

This document recommends two measures to describe functional status/ physical performance of vulnerabe elderly patients enrolled into clinical drug trials: SPPB and gait speed

Identifying an at-risk older population



27

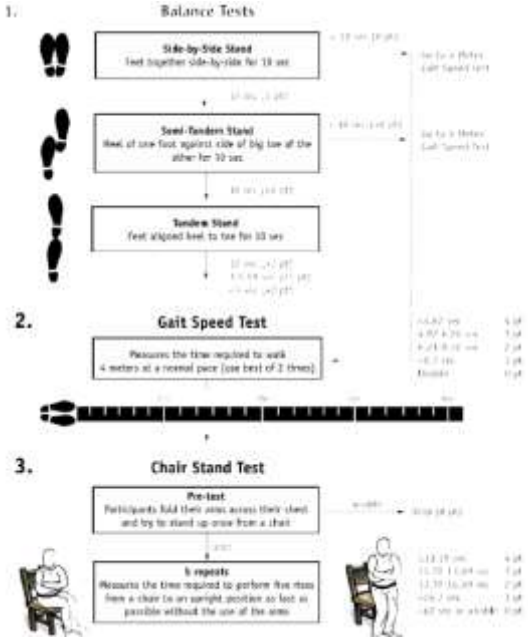
Physical performace tests as markers of frailty

Short Physical Performance Battery (SPPB)

- Walking speed
- Chair stand
- Balance test

Guralnik JM, Ferruci L et al, NEJM 1995;332:556-561

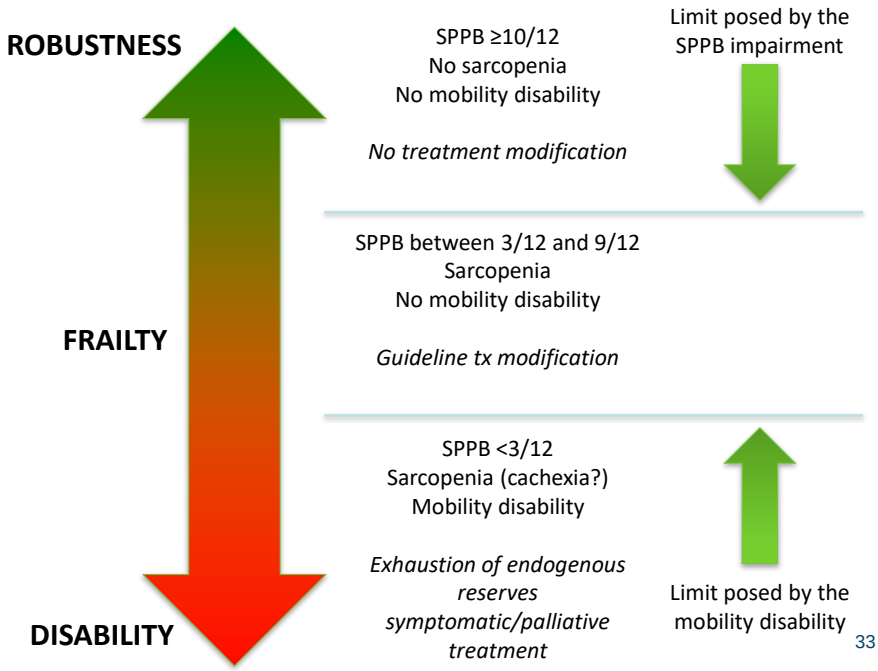
Short Physical Performance Battery



SSPPB evaluation

Total score

Appropriate physical performance	**10-12 points**
Pre-frailty	**7-9 points**
Frailty	**6 and less**



33

structured medication review serving quick identification and management of potentially problematic medications

- medications with increased anticholinergic burden
- benzodiazepines and z-drugs
- medications that cause an increased risk of falls in the older person
- use of inappropriate antipsychotics in patients with dementia
- management of constipation and glycaemic control
- chronic pain management.


Guidelines in practice

Frailty and polypharmacy: the role of the practice pharmacist

Pharmacist competencies: frailty

- Understand how to screen for and interpret frailty instruments scores
- Understand the aging physiology and pharmacology in older people and the impact on drug handling
- Understand how to tackle polypharmacy and co-morbidity safely
- Understand how to deprescribe medications safely and appropriately
- Understand how to put together/contribute to care plans for older people
- Understand how to showcase and evaluate your interventions and outcomes.

Polypharmacy and frailty: prevalence, relationship, and impact on mortality in a French sample of 2350 old people.

polypharmacy and excessive polypharmacy were associated with frailty with OR 1.77 [1.20-2.61] and 4.47 [2.37-8.42], resp Frailty (hazard ratio [HR] 2.56 [1.63-4.04]) and excessive polypharmacy (HR 1.83 [1.28-2.62]) were independent predictors of mortality.

Frail people with excessive polypharmacy were six times more likely to die during the follow-up period (HR 6.30 [3.09-12.84]).

Herr M et al Pharmacoepidemiol Drug Saf. 2015 (6):637-46.


BJCP British Journal of Clinical Pharmacology

SYSTEMATIC REVIEW AND META-ANALYSIS | Free Access

The relationship between frailty and polypharmacy in older people: A systematic review

M. Gutiérrez-Valencia, M. Izquierdo, M. Cesari, Á. Casas-Herrero, M. Inzitari, N. Martínez-Velilla

First published: 25 March 2018 | https://doi.org/10.1111/bcp.13590 | Citations: 152

Springer Link

Review Article | Open Access | Published: 22 May 2022

Scoping Review of Studies Evaluating Frailty and Its Association with Medication Harm

Jonathan Yong Jie Lam, Michael Barras, Ian A. Scott, Duncan Long, Leila Shafiee Hanjani & Nazanin Falconer

Drugs & Aging 39, 333–353 (2022) | Cite this article

Results:

Overall, frail individuals were at risk of medication harm with rates ranging between 18.7 and 77% across the nine studies. However, whether frailty is an independent predictor of medication harm remains uncertain, as this was only evaluated in one study. The risk of bias assessment identified limitations in methods and reporting with all nine studies.

Multi-morbidity, frailty and self-care: important considerations in treatment with anticoagulation drugs. Outcomes of the AFASTER study.

patients who were assessed as frail or having greater comorbidity were less likely to receive anticoagulant drugs at discharge.

CONCLUSION:

This study highlights multi-morbidity, frailty and self-care to be important considerations in thromboprophylaxis. Shared decision-making with patients and caregivers offers the potential to improve treatment knowledge, adherence and outcomes in this group of patients with complex care needs.

Cardiology and internal medicine

Ferguson C et al *Eur J Cardiovasc Nurs. 2016 Apr 1. pii: 1474515116642604*

Frailty assessment in the cardiovascular care of older adults.

Epidemiological studies have consistently demonstrated that frailty carries a relative risk of >2 for mortality and morbidity across a spectrum of stable CVD, acute coronary syndromes, heart failure, and surgical and transcatheter interventions.

Frailty contributes valuable prognostic insights incremental to existing risk models and assists clinicians in defining optimal care pathways for their patients.

Interventions designed to improve outcomes in frail elders with CVD such as multidisciplinary cardiac rehabilitation are being actively tested.

Cardiology and internal medicine

Afilalo J et **al** J Am Coll Cardiol. 2014 Mar 4;63(8):747-62

Prevalence and impact of fall-risk-increasing drugs (FRIDs), polypharmacy, and drug-drug interactions in robust versus frail hospitalised falls patients: a prospective cohort study

Patient hospitalised after fall (N=204)

Frail fallers had significantly higher number of fall-risk-increasing drugs (frail 3.4 ± 2.2 vs. robust 1.6 ± 1.5, P < 0.0001), total number of drugs and DDIs.

While on FRIDs recurrent falls were most likely to occur with 1.5 FRIDs in the frail and 2.5 FRIDs in the robust.

Frailty makes a difference in drug-related adverse events

Bennett A et al Drugs Aging. 2014 Mar;31(3):225-32

Sedative load and frailty among community-dwelling population aged ≥65 years

CONCLUSION

Higher sedative load was positively associated with phenotype frailty and the FI. This suggests that careful consideration must be given when prescribing sedatives to frail older adults, who are most vulnerable to adverse drug reactions and adverse health outcomes.

The Irish Longitudinal Study on Ageing (TILDA)

Careful drug use in pre-frail/frail seniors

Peklar J et al J Am Med Dir Assoc. 2015 Apr;16(4):282-9

The Importance of Evaluating Frailty and Social-behavioral Factors for Managing Drugs and Dialysis Prescription in Elderly Patients.

propose that 3 variables:
frailty phenotype,
senile GFR, and
detrimental social-behavioral factors,
should be considered at time of prescribing drugs or medical procedures in the elderly. Additionally, they should also be considered when prescribing therapies in elderly patients suffering from chronic diseases (diabetes mellitus, chronic kidney disease, etc.), or on organ replacement treatments (dialysis and transplantation).

Nephrology

Musso CG et al Drug Res (Stuttg). 2016 Apr;66(4):223-4.

Conclusions I

- Pharmacists more frequently provide consultations to elderly patients
- It is important to distinuish between robust, pre-frail and frail elderly persons to suggest individualized pharmacological treatment
- Frailty is a strong predictor of adverse health outcomes including those related to drug use (polypharmacy, inappropriate drugs, interactions, ADE)
- Pharmacists can use short valid frailty screening tools (e.g. SOF criteria, CFS) and/or know how to interpret frailty scores to identify vulnerable patients

Conclusions II

- Assessing frailty as part of the individualized comprehensive assessment of senior enable to estimate patient´s ability to withstand and profit from either standard medical management, modified medical approach or symptomatic (conservative/palliative) treatment.
- Vulnerability should be evaluated also in currently independent patients. Performance tests are recommended (grip strength, gait speed, SPPB)
- In high risk patients (age over 85 yrs, 4+ commorbidities, ADL disability, with geriatric syndromes (dementia, delirium, depression, incontinence, immobility, instability) appropriateness of intervention should be considered.
- For clinical trials EMA recommends proportional participation of older and vulnerable subjects. Baseline status/performance should be assessed using SPPB or gait speed

After this lecture

I hope …..

you all are