Frailty Assessment 101

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Conflict of Interest Disclosures

- **Grants/research support**: Servier, Mespere Life Sciences, Heart and Stroke Foundation, CIHR, Alzheimer's Society
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- **Speaker fees**: Servier, Novartis, Pfizer, Home Care Assistance

- **Other**: Fellow: interRAI Canada

- I will not discuss off-label uses.

What is frailty?

Bergman et al. J Gerontol 2007;62A:7;731-7

- 2006: Second International Working Meeting on Frailty and Aging
- Vulnerability to stressors resulting from the age-related accumulation of impairments in multiple systems
- Stressor
  - illness
  - iatrogenic
  - environmental (e.g. roadside curb)

Frailty: Consequences

- Predisposes to
  - Functional impairment / disability
  - Caregiver burden and ill-health
  - Falls
  - Homecare utilization
  - Institutionalization
  - Hospitalization
  - Death

Poll: Please indicate ***any and all*** reasons why you measure frailty

1. Pass the time away
2. Refer to a chronic disease management program
3. Identify patients with HFrEF who I should NOT to treat with triple therapy
4. Refer for angiography
5. Refer for TAVR
6. Refer for palliative care
7. Refer to a specialized geriatric services

Why measure frailty?

Frailty is NOT a « cut-off » variable

- Assessing frailty can identify persons at lower risk despite their advanced age, and others at high risk despite their relative youth.
- Frail individuals may have far more to gain from the success of an intervention than non-frail individuals
- Similarly, they may also have far more to lose from adverse events
- For example, while a patient might benefit from a successful surgical procedure, the risk of an adverse event that could lead to permanent disability, for example a stroke, might inform their ultimate decision

The “Fundamental Equations” of geriatrics

Frailty = Vulnerability

Frailty x Stressor = Bad outcome

Modifying risk = intervening

- Intervening on the frail state itself, usually through multicomponent procedures such as the Comprehensive Geriatric Assessment

- Targeting components of the frail state through focused physical therapy or nutritional interventions.

Modifying risk = mitigating stressors

- Risk can also be modified by intervening on the stressor and mitigating, if not avoiding altogether, its impact on the frail person.
- Examples of such interventions include senior friendly hospital strategies (e.g. Hospitalized Elder Life Program), modified anaesthetic techniques, or minimally-invasive surgical techniques .
- TAVR vs. open AVR

Plotting a course

- The degree of frailty may be so great that any potential benefits of a proposed intervention are outweighed by the risks related to their severity as a stressor
- The cumulative burden of other accumulated deficits will remain the main driver of prognosis
- However, risk and frailty are never so great as to preclude sound palliative care.

How to measure frailty

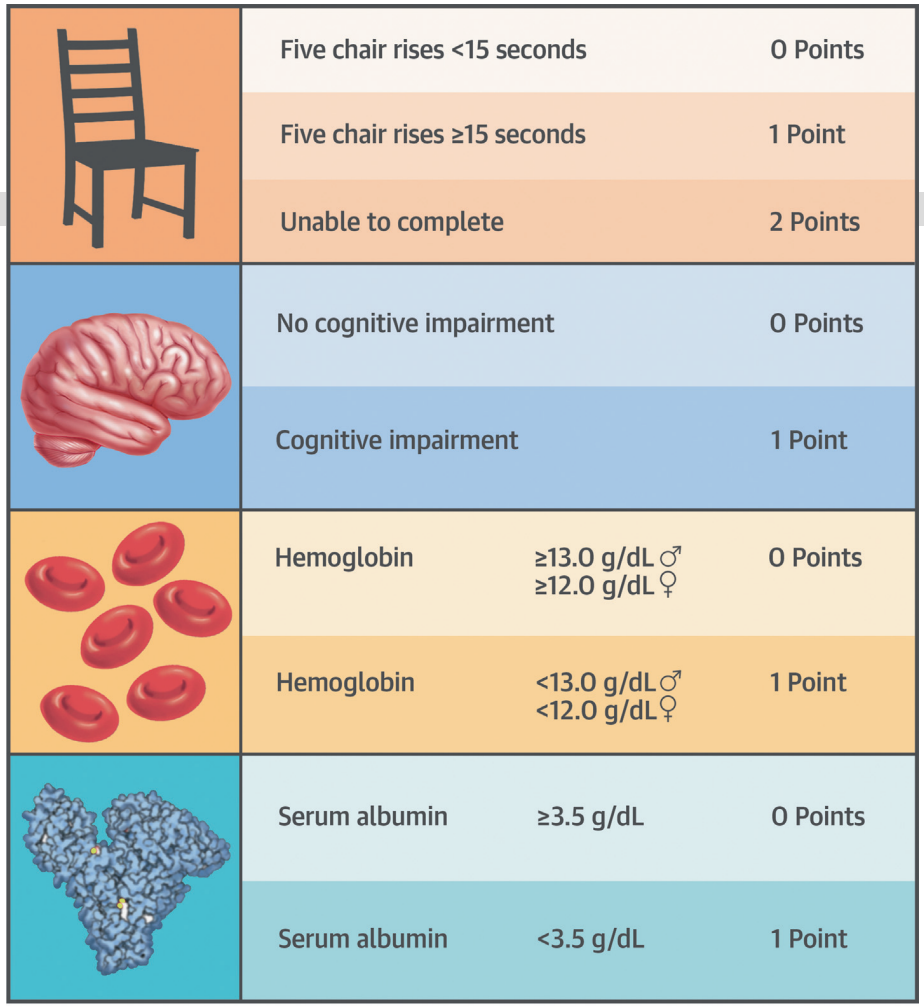
“Eyeball test”

- Can you tell frailty just by looking at it?
- Experts can … to a point
- Non-experts prone to bias
- Need something better…

My most recent eyeball experience

- Man, robust looking, with second failure of aortic valve replacement
- History of frontotemporal dementia
  - Mild to moderate
- Being considered for AVR
- Me: « He seems robust, but I'll use Afilalo's Essential Frailty Toolset »
- He could not complete the chair rise
- Score: 3/5

Afilalo et al JACC, 2017:70 (6)



	Five chair rises <15 seconds		0 Points
	Five chair rises ≥15 seconds		1 Point
	Unable to complete		2 Points
	No cognitive impairment		0 Points
	Cognitive impairment		1 Point
	Hemoglobin	≥13.0 g/dL ♂ ≥12.0 g/dL ♀	0 Points
	Hemoglobin	<13.0 g/dL ♂ <12.0 g/dL ♀	1 Point
	Serum albumin	≥3.5 g/dL	0 Points
	Serum albumin	<3.5 g/dL	1 Point

EFT Score	1-Year Mortality TAVR	SAVR
0-1	6%	3%
2	15%	7%
3	28%	16%
4	30%	38%
5	65%	50%

EFT Points: _____

The “Fried” Frailty Phenotype

Fried et al 2001

- What is a phenotype?
- Composite of observable traits
- More than just an “eyeball” test

5 criteria

1. Shrinking / unintentional weight loss
2. Weakness
3. Exhaustion / lack of endurance
4. Slowness
5. Low activity

What is missing from Fried?

- Shrinking… can one be overweight and frail?
- What about mood?
- What about cognition?
- Resist temptation to apply to persons with single organ failure: they will be “positive” for frailty but do they really have age-related deficit accumulation?

Frailty and deficit accumulation

Rockwood & Mitnitski J Gerontol Med Sci 2007; Mitnitski et al BMC Geriatrics 2002

- Concept: The more things wrong with you, the more frail you are
- Secondary analysis from Canadian Study on Health and Aging
  - Random sampling of 10267 persons 65 years+
  - 2914 underwent structured clinical assessment at baseline
  - 1338 survivors assessed 5 years later
  - 64% women, age 82.0 (SD 7.4)
- Developed Frailty Index of 70 deficits associated with cognitive and functional decline
- Rules to derive a FI from any data set

Data from the Canadian National Population Health Study

Song et al J Am Geriatr Soc 2010

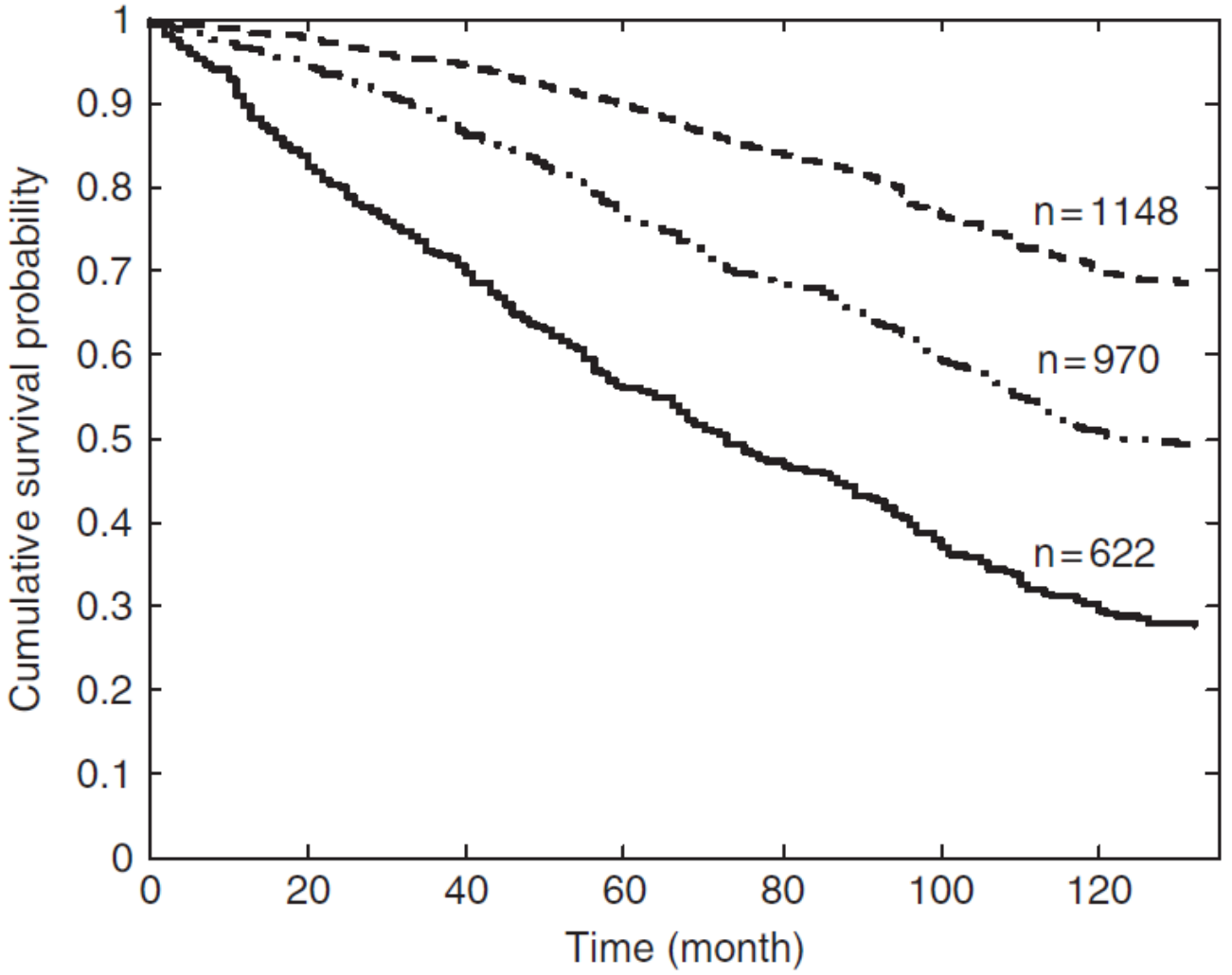


Figure 2. The Kaplan-Meier cumulative survival probability for people with three levels of the Frailty Index. The Frailty Index had been graded to be equivalent to the phenotypic definition: nonfrail (<0.08, dashed line), prefrail (0.08–0.24, dot-dashed line), and frail (≥ 0.25, solid line). A dose-response relationship was observed.

90-mortality from nursing homes by interRAI frailty algorithm: Different FIs = Different ability to predict

Courtesy: John Hirdes

Frailty Algorithm	Adjusted OR excl CHESS*	Model c statistic	Adjusted OR Controlling for CHESS*	Model c statistic
CHESS (base model)	1.69 (1.69-1.72)	0.778	--	--
FI (Hubbard)	1.44 (1.40-1.49)	0.754	1.20 (1.16-1.24)	0.780
FI (Martin)	1.08 (1.06-1.09)	0.748	0.94 (0.92-0.95)	0.778
FI (Armstrong)	1.75 (1.68-1.83)	0.756	1.48 (1.42-1.55)	0.782
FI (Campitelli)	1.07 (1.06-1.07)	0.760	1.04 (1.04-1.04)	0.782
FRAIL-NH	1.93 (1.75-2.12)	0.750	1.69 (1.54-1.87)	0.779

Controlling for:

- Age, Sex, Marital status, Day of stay at ax, Facility size, Province, ADL Hierarchy, Cognitive Performance, Physician visits, COPD, Pneumonia, Diabetes, Arthritis, Renal failure, Urinary tract infection, Alz & Related Dementia, Heart Failure, Cancer, Depression, admission source, Advanced directives DNR, Advanced directives DNH

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.

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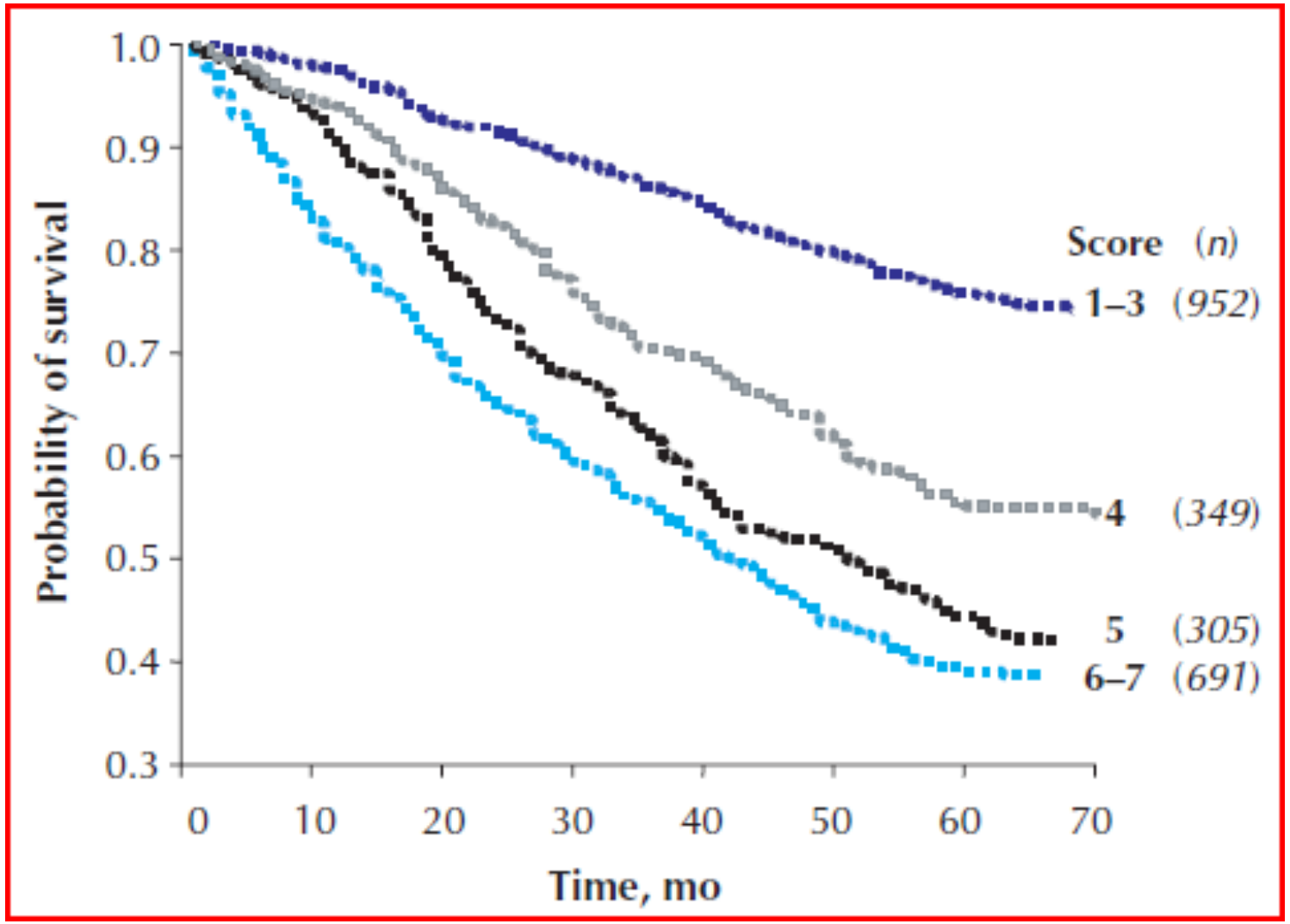
Survival



Rockwood et al CMAJ 2005

Home care and Long Term Care: interRAI CHESS Scale

- Changes in Health
- End-stage Disease
- Signs and Symptoms of Medical Problems

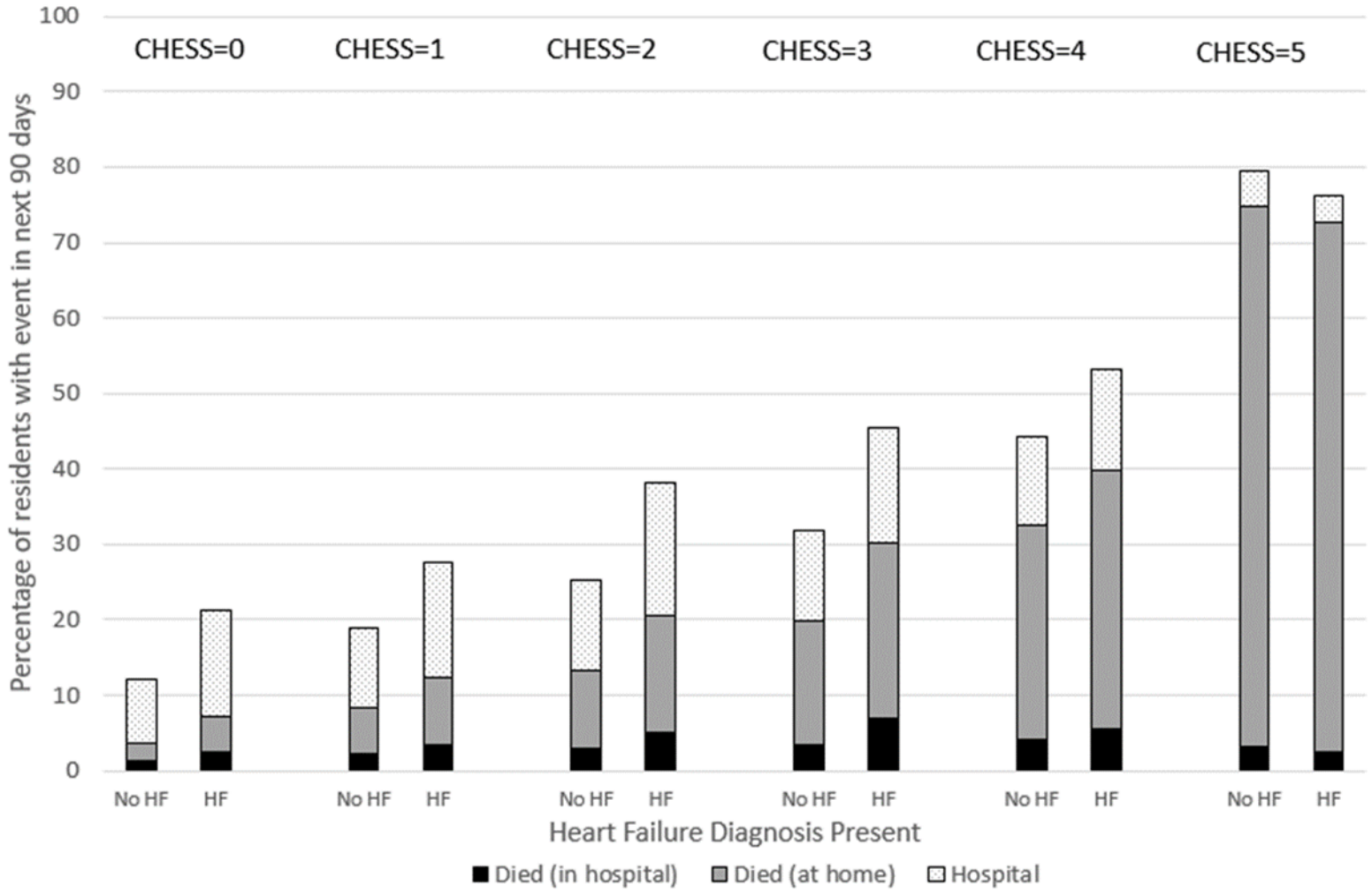
- Scores range from:
  - 0 → No instability in health
  - 5 → Highly unstable

- Predictive algorithm
  - 1 point each for declines in ADL and Cognition
  - 1 point for end-stage disease
  - Up to 2 points for count of signs and symptoms
    - Insufficient fluids, Edema, Shortness of breath, Vomiting, Weight loss, Decrease in food eaten

Courtesy Dr. John Hirdes

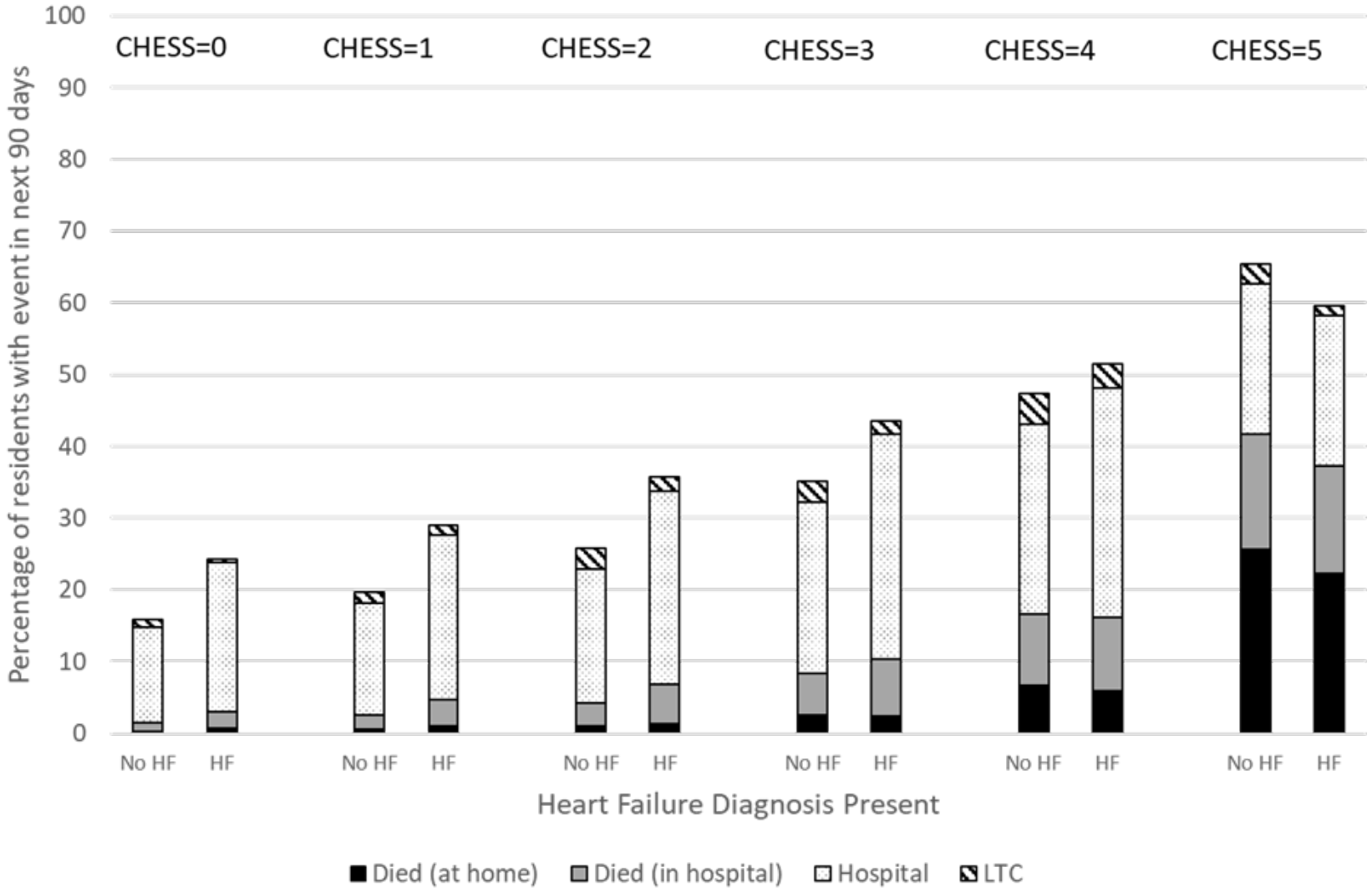
Outcomes of nursing home residents within 90 days of admission assessment, by CHESS score at admission, Ontario, Alberta and BC

Heckman et al JAMDA 2019



Percentage of home care clients institutionalized, died, or hospitalized within 180 days of intake assessment

Heckman et al, World InterRAI conference, 2020



Decisions! Decisions!

Frail HF patients need a HF clinic

Pulignano et al, 2010

RCT 173 pts randomized to HF management or usual care (primary plus specialist)

Table 2 Modified frailty score

1	Age over 80	(1)
2	Cognitive impairment[a]	(1)
3	Reduced mobility[b]	(1)
4	Urinary incontinence	(1)
5	Physical impairment[c]	(1)

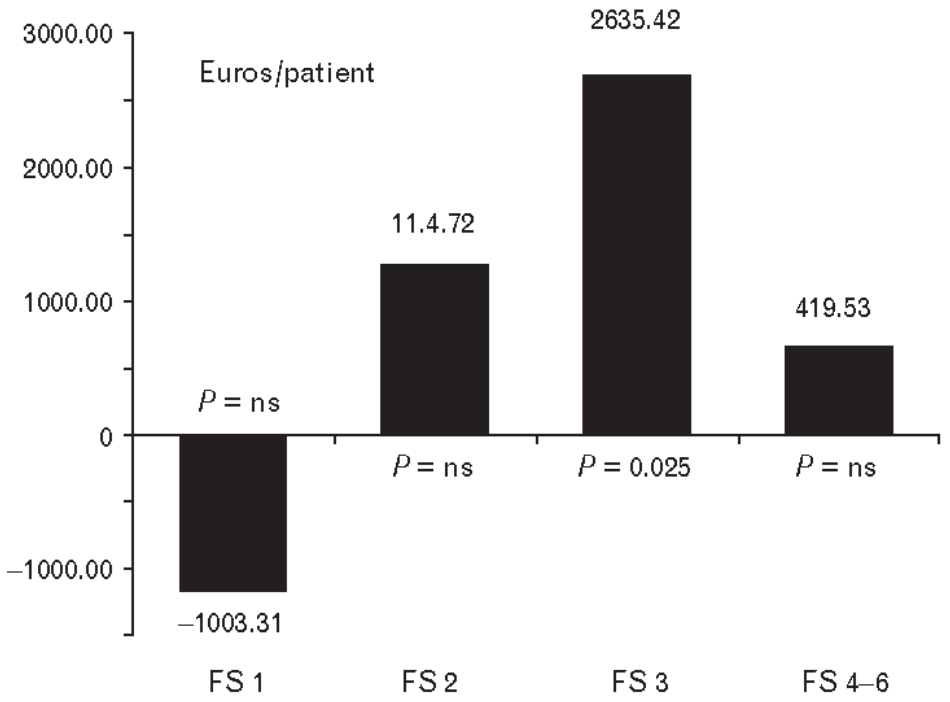
See text for details. [a]Defined as a MMSE score ≤24. [b]Defined as walk with assistance or unable to walk. [c]Defined as a NYHA functional class III–IV in stable conditions and optimized therapy.

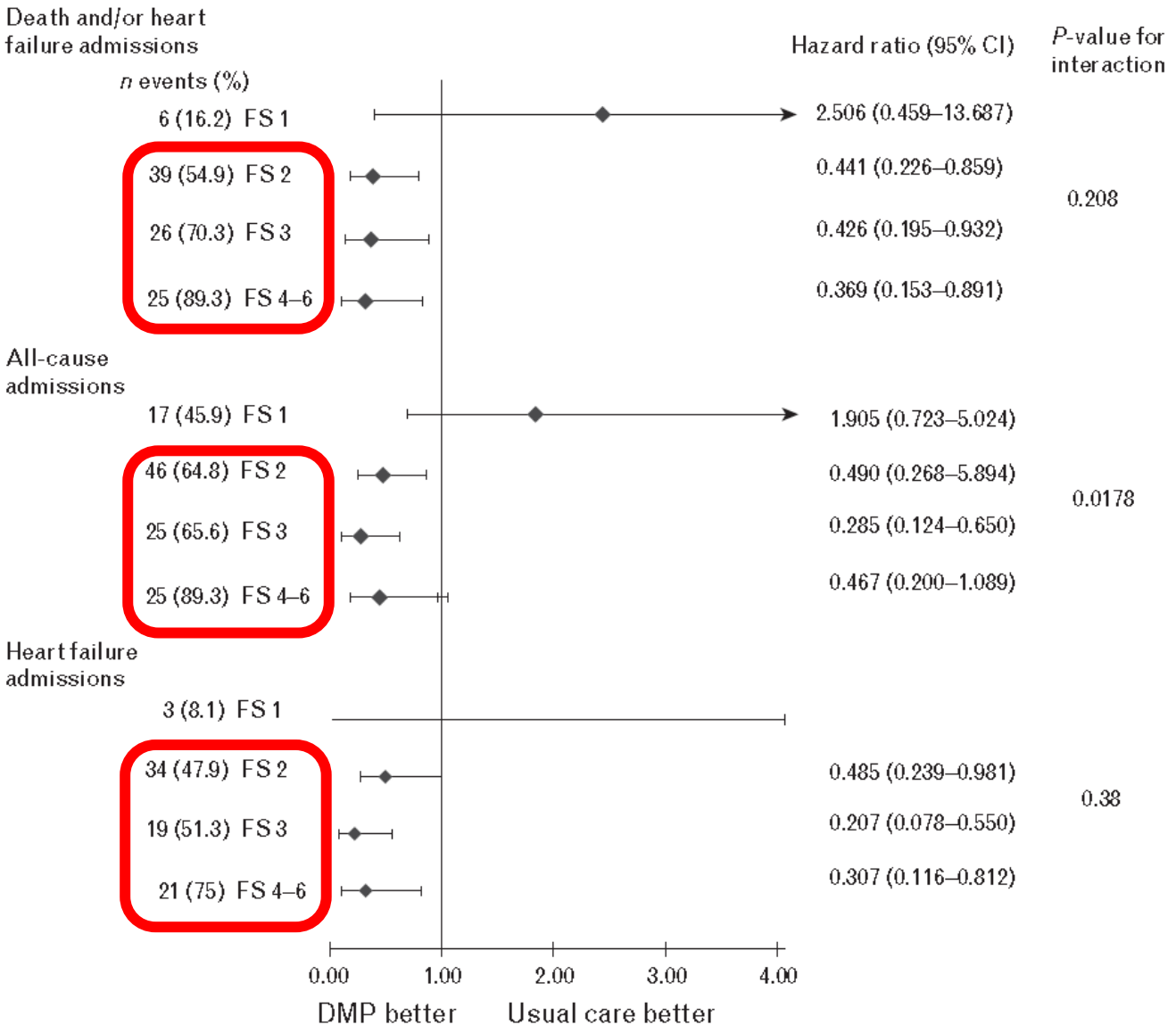
Table 3 Baseline demographic and multidimensional characteristics

Variable	DMP, $n=86$ (%)	Usual care, $n=87$ (%)	P
Age (years)	77.4 ± 5.9	77.5 ± 5.7	NS
Sex (% males)	44 (51.2)	46 (52.8)	NS
Education ≤5 years	45 (52.4)	47 (54)	NS
Single/widowed/divorced	43 (50)	44 (50.1)	NS
Living alone	18 (20.7)	20 (23)	NS
Low financial income[a]	11 (12.8)	13 (14.9)	NS
No social/family support	7 (8.1)	7 (8.0)	NS
≥2 IADL dependency[b]	48 (55.8)	49 (56.3)	NS
≥1 BADL dependency[b]	33 (38.3)	35 (40.2)	NS
MMSE ≤24	35 (40.6)	34 (39.1)	NS
Mean GDS 15 score	6.9 ± 3.1	6.6 ± 3.1	NS
Modified frailty score			
Frailty score 1	17 (19.8)	20 (23.0)	
Frailty score 2	33 (38.4)	38 (43.7)	
Frailty score 3	23 (26.7)	14 (16.1)	
Frailty score 4–6	13 (15.1)	15 (17.2)	NS
EuroQOL index	0.398 ± 0.35	0.381 ± 0,33	NS
Mean ESCBs score	29.3 ± 6.4	28.7 ± 5.9	NS

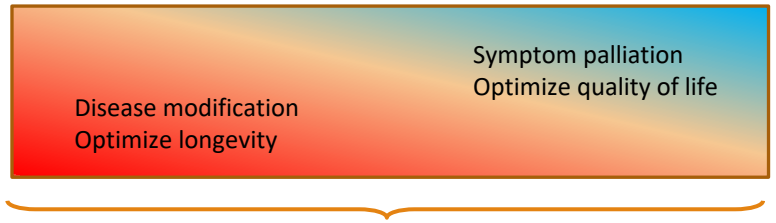
Frail HF patients benefit most from HF management programs

Fig. 4





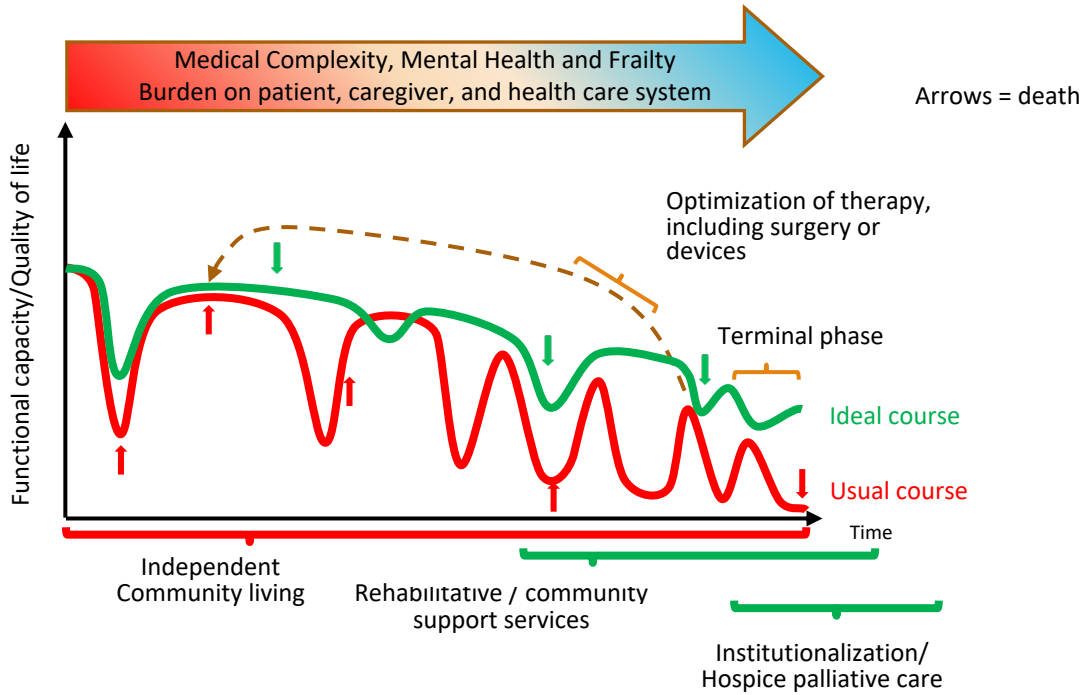
Managing Heart Failure through the course of the illness



Patient centered outcomes

1. Optimal HF therapies through to advanced stages

2. Engagement of patients and caregivers in self-care
   i. To monitor symptoms and weights for decompensation detection and timely intervention
   ii. Define care goals
   iii. Advance care planning



Final thoughts

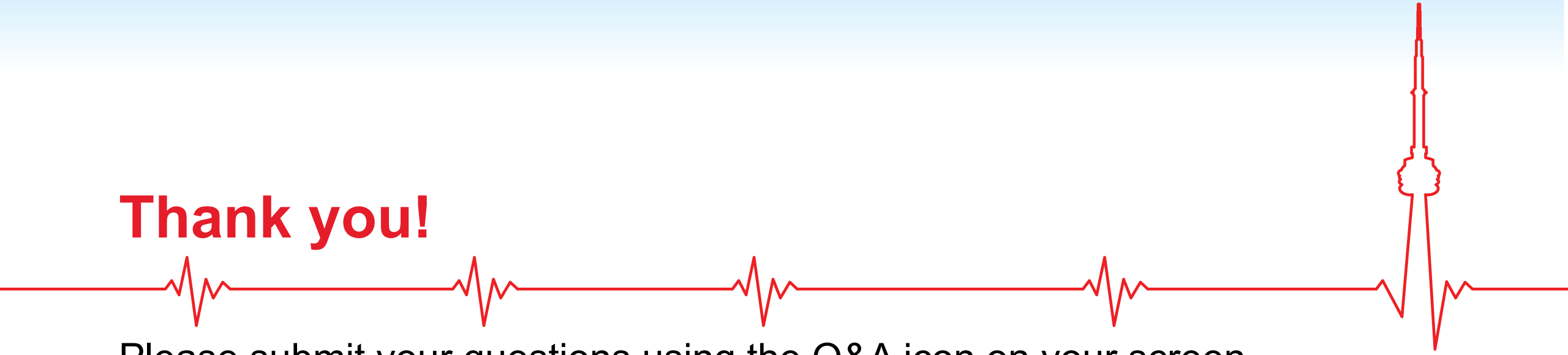
Different ways to measure frailty

- Avoid the Eyeball!
- Essential Frailty Toolkit: surgery (valve, CABG)
- Phenotype: different to operationalize
- Frailty index: Which one? Need an EMR and a dataset
- Clinical Frailty Scale: still need to do an assessment of symptoms, function
- Home care and Long Term Care: may use CHESS scale
- Others: gait velocity, grip strength: though challenge to operationalize

Frailty matters

- Measure it: choose an instrument well-validated for your sector or practice population
- Use it wisely: not as a « cut-off » but to choose treatment modalities more judiciously
- Engage with geriatricians
- We really need more research and we need to move towards standards

Thank you!



Please submit your questions using the Q&A icon on your screen