



# Elephants and Blind Men

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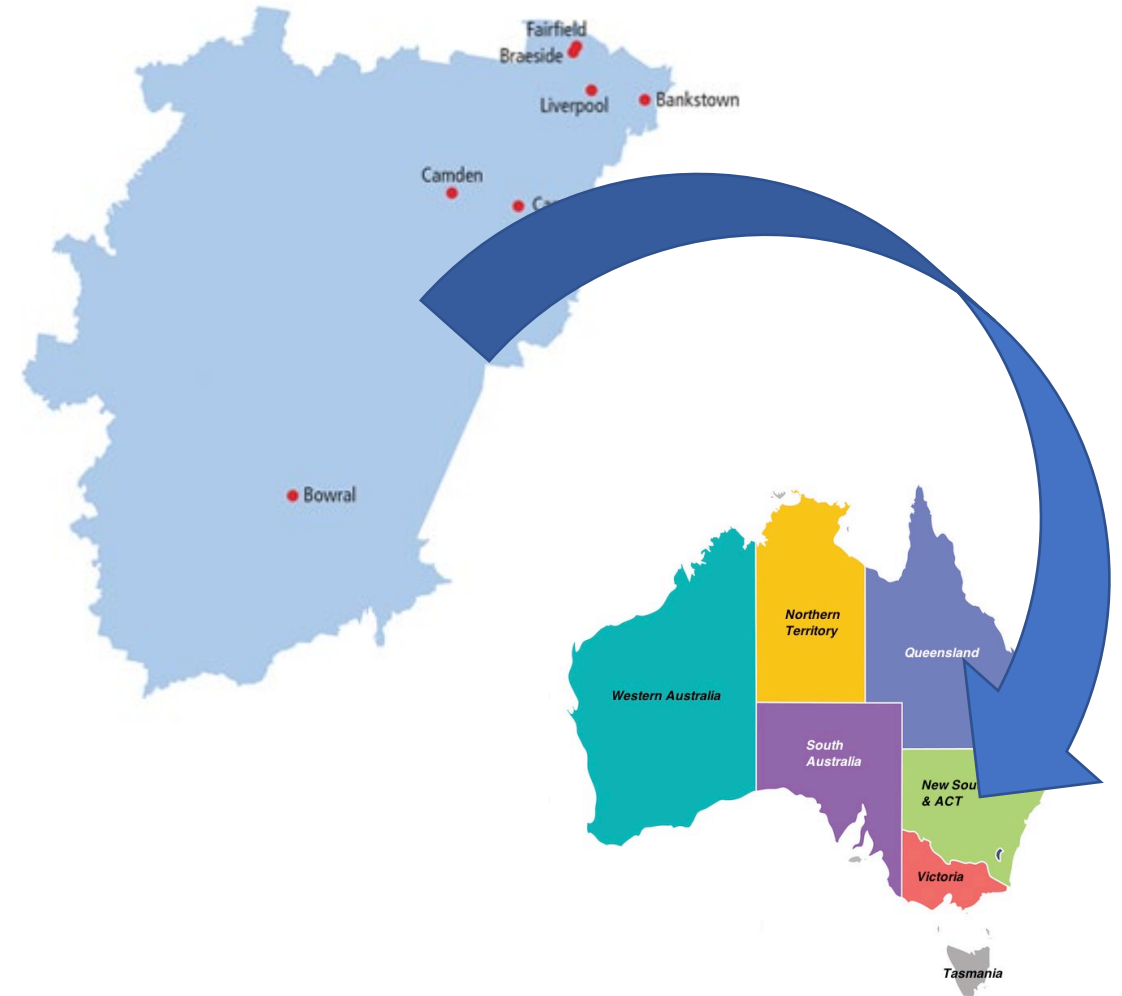
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# Conflicts of interest

- No conflicts

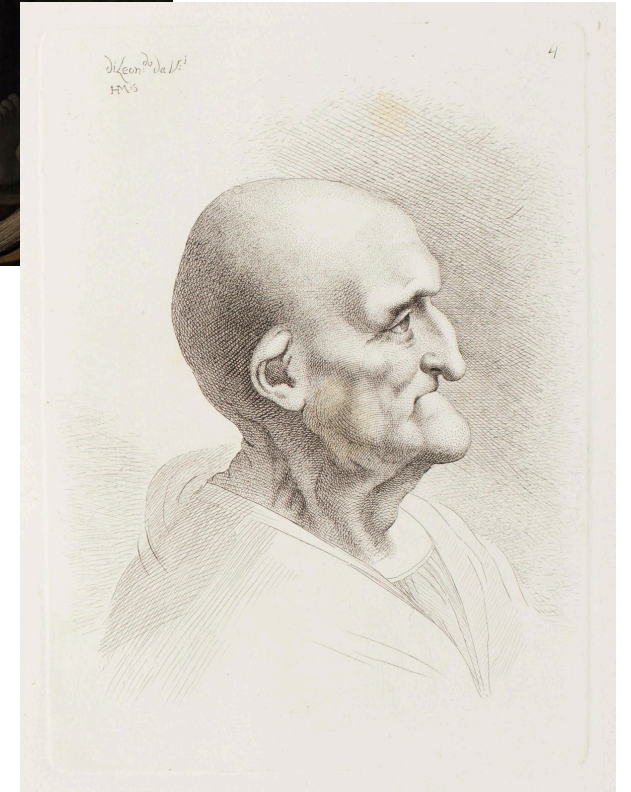
# Brief explainer

- Geriatrician from southwest Sydney
- SW Sydney is a migrant/refugee hub
  - Waves of successive migration since 1950s
- Socioeconomically significantly poorer than other regions
- High levels of CALD patients (culturally and linguistically diverse)
  - Half of elderly patients have no conversational English



# Brief explainer (2)

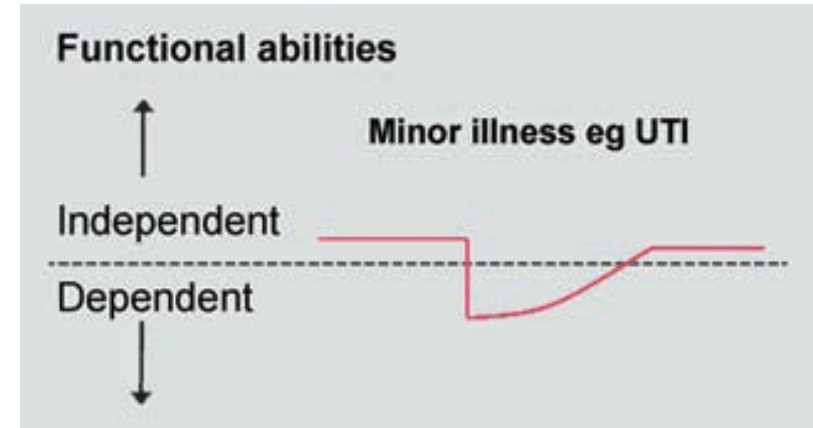
- First brush with frailty
  - Surgical consult services
  - Referral generally for
    - Please fix – medically stuffed
    - Please get out of hospital (don't really know how)
  - Some multimorbid patients
  - Mostly frail patients – but they couldn't articulate/describe frail patients
  - 'Eyeballing' the kind of patient that probably needs a geriatrician



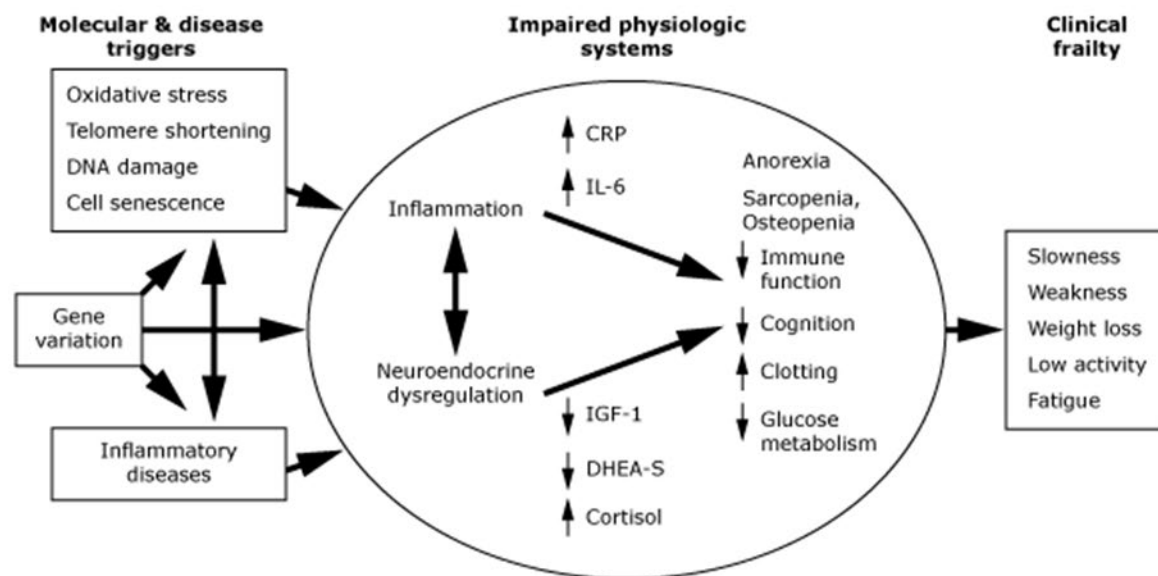


# Frailty

- Latin 'fragilita' (brittleness)
- An important concept but still completely not understood
- No internationally agreed definition
  - State in late life due to multifactorial pathology that results in vulnerability to sudden health state changes from relatively minor stressors
  - Delirium, falls and acute functional impairment: the geriatric syndromes
  - 'Frailty phenotype'



## Hypothesized modal pathway between molecular and disease related etiologies, pathophysiology, and ultimately frailty and adverse health outcomes



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# The Fried frailty phenotype (2001)

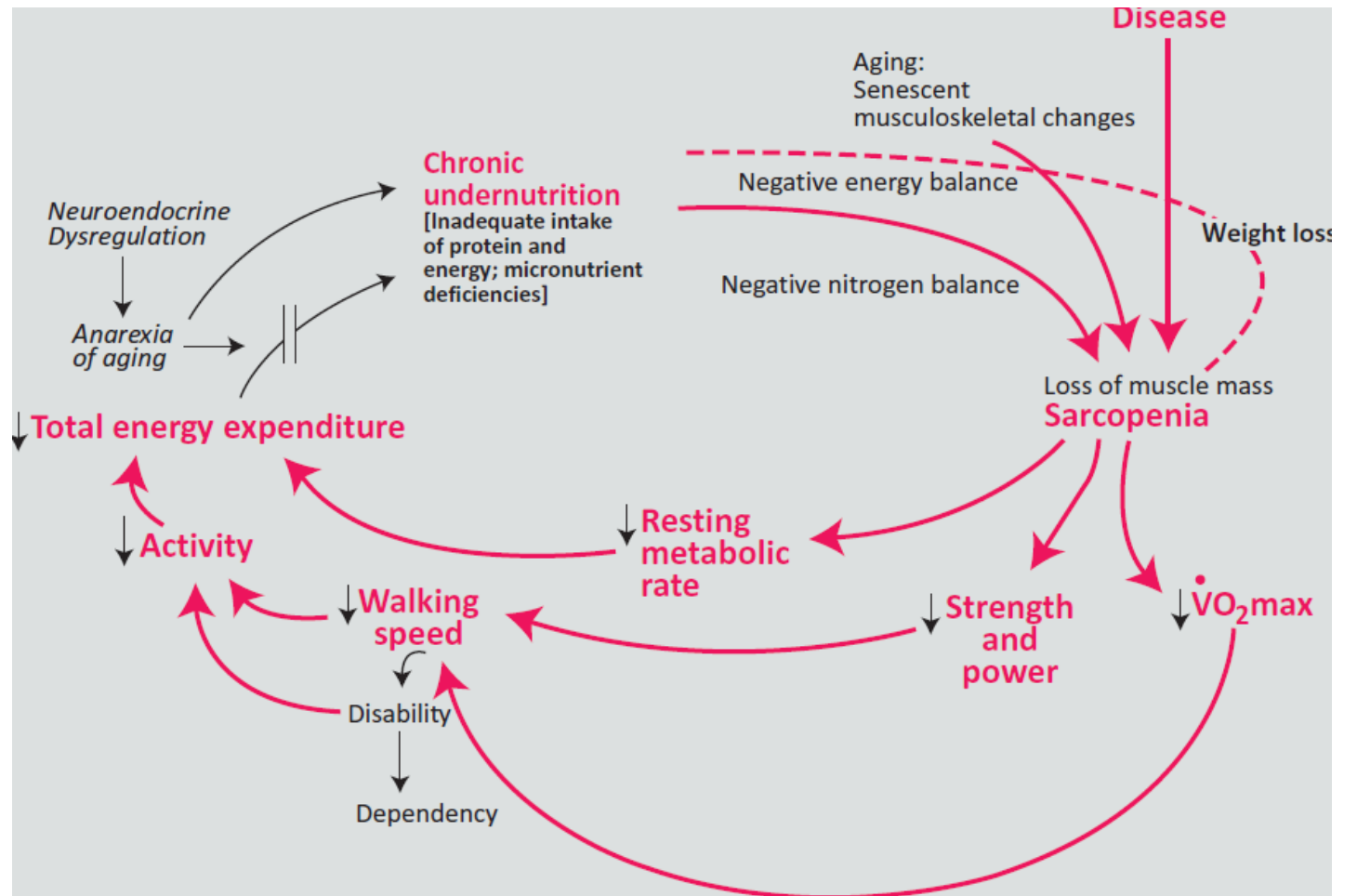
**Table 1. The five Fried model indicators of frailty and their associated measures.**

| Frailty indicator      | Measure   |
|------------------------|---|
| Weight loss            | Self-reported weight loss >4.5 kg or recorded weight loss $\geq$ 5% per annum   |
| Exhaustion             | Self-reported exhaustion on CES-D scale (3-4 days per week or most of the time) |
| Low energy expenditure | Energy expenditure <383 Kcal/week (males) or <270 Kcal/week (females)           |
| Slowness               | Standardised cut-off times to walk 15 feet, stratified for sex and height       |
| Weakness               | Grip strength, stratified by sex and BMI  |

BMI = body mass index; CES-D = Center for Epidemiological Studies Depression.

- No indicators – not frail
- 1-2 indicators – ‘intermediate’/pre-frail
- 3-5 indicators – frail
- Initial models of the frailty phenotype excluded patients with MMSE<18, so relationship with cognitive impairment unclear

# The cycle of frailty





# Frailty: the scope of the problem

- Ofori-Asenso *et al* (2019)
  - Systematic review/meta-analysis (mostly developed world)
  - 46 observational studies; 120,815 robust/prefrail participants
  - Mean follow-up – 3 years
  - Those who survived – 13.6% (13,768 out of 100,313) became frail; pooled incidence rate was 43.4 (150.6 new cases) per 1000 person-years
- O’Caoimh *et al* (2020)
  - Systematic review/meta-analysis (also mostly developed world)
  - Prevalence estimates – individuals >50 years, identified using frailty measures/scales
  - Pooled global prevalence: 12% (physical measures alone) up to 24% using FI in studies used

# Why is identification important?

**Table 2. Three-year covariate adjusted outcome data for older people, categorised on the basis of five operationalised criteria.<sup>8</sup>**

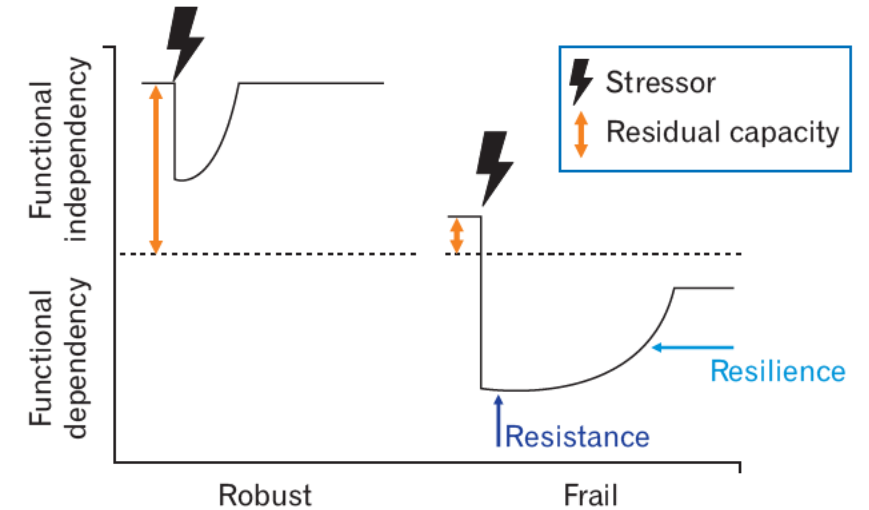
| Outcome                  | Covariate adjusted three-year hazard ratios<br>(95% confidence interval) |                      |               |
|--------------------------|--|----------------------|---------------|
|                          | No frailty   | Intermediate frailty | Frail         |
| Worsening ADL/disability | 1.0  | 1.7 (1.4–2.0)        | 1.9 (1.5–2.6) |
| Hospitalisation          | 1.0  | 1.1 (1.0–1.3)        | 1.3 (1.1–1.5) |
| Death                    | 1.0  | 1.5 (1.1–2.0)        | 2.2 (1.5–3.3) |

No frailty: none of the five operationalised Fried criteria for frailty (unintentional weight loss, exhaustion, low energy expenditure, slowness, weakness).

Intermediate: one or two criteria.

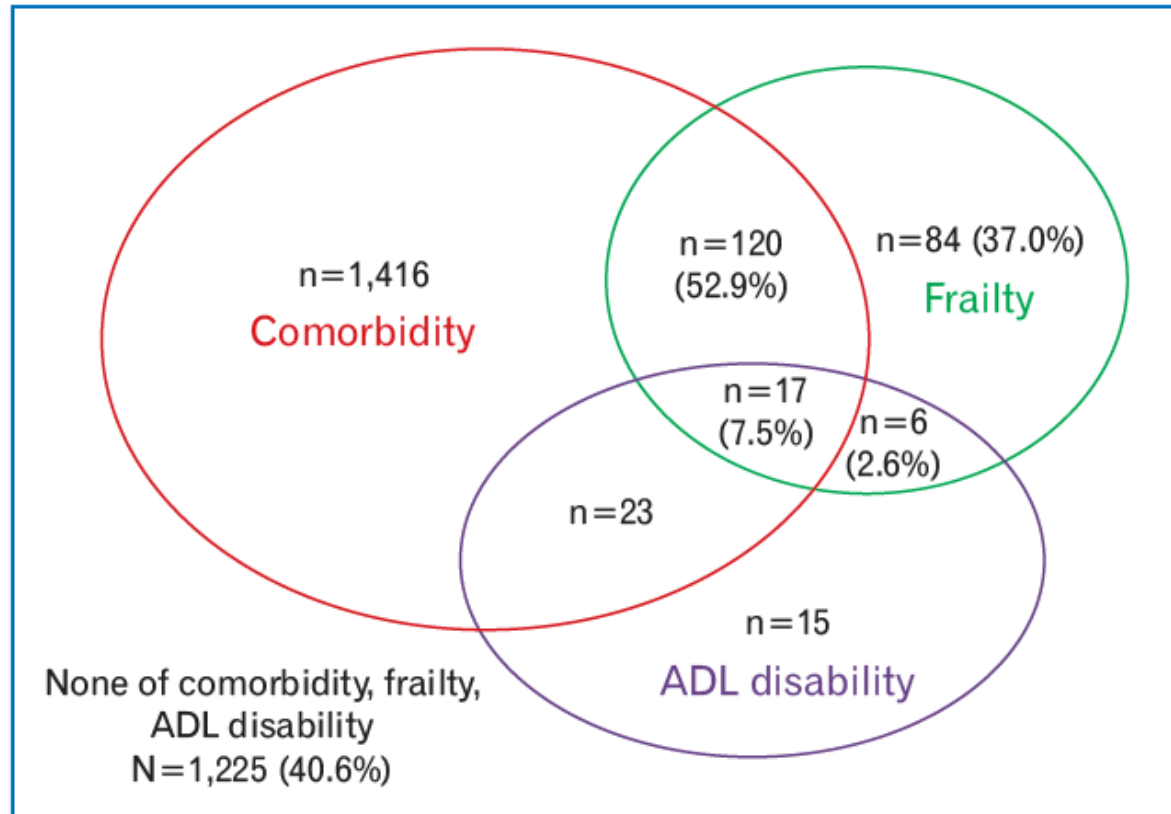
Frail: three or more criteria.

ADL = activities of daily living.



- Disability in the frail may present progressively or catastrophically
  - Ferruci et al (1996): cohort of 6,640 older adults – half will present catastrophically
- The social costs of frailty are enormous
  - UK: £5.9 B (2006), projected to be £ 13.4 B (2026)

# Why is identification important? (2)



# Frailty Indices

- Growing number of instruments to measure/quantify frailty
- Roughly divisible into two kinds of scales
  - Phenotypic – scales that measure physical manifestations of frailty
    - Rockwood/CFS; SOF index
  - Multidimensional – instruments that measure both physical and psychosocial aspects of frailty
    - CGA, FRAIL, FI-CD, Edmonton
- Can range from simple scales to complex research instruments
- Varied uses – some from screening tools to prognostic tools

# Phenotypic scales: the Clinical Frailty Scale (CFS)

- Also known as the Rockwood scale or the Canadian Study of Health and Ageing Scale (CHSA)
- 7-point scale based primarily on mobility, global function and dependence
- Pros: Easy to use, good correlation with prognosis; correlates well with a CGA
- Cons: Correlation with CGA drops with dementia; suggest using more discriminatory tools at scores 6 and 7



## UNDERSTANDING FRAILTY:

# HOW TO MEASURE FRAILTY IN YOUR PATIENTS USING THE CLINICAL FRAILTY SCALE



# Multidimensional: the Edmonton Frail Scale (CFS)

- 17-point scale with multiple domains
  - Cognition, general health status, function, social support, medications, nutrition, mood, continence
- Pros: Easy to use (relatively) – doesn't require geriatrics-specific training
  - Used in a variety of settings to detect frailty (diabetic foot patients, colorectal surgery patients)
- Cons: Significantly more involved than phenotypic scales – physiotherapy input recommended because of TUG

**Table 1.** The Edmonton Frail Scale

| The Edmonton Frail Scale: |  |                                     |                      | Score: ___/17   |
|---------------------------|--|-------------------------------------|----------------------|---|
| Frailty domain            | Item   | 0 point                             | 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 after eleven'   | No errors                           | Minor spacing errors | Other errors  |
| General health status     | In the past year, how many times have you been admitted to a hospital?   | 0                                   | 1–2                  | ≥2  |
|                           | In general, how would you describe your health?  | 'Excellent',<br>'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 different 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 such 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. Then, when I say 'GO', please stand up and walk at a safe and comfortable pace to the mark on the floor (approximately 3 m away), return to the chair and sit down' | 0–10 s                              | 11–20 s              | One of >20 s<br>patient unwilling,<br>or requires<br>assistance |
| Totals                    | Final score is the sum of column totals  |                                     |                      |   |

# Frailty Indices: Problem One

- Where to start and which to use?
  - Faller et al (2019) – systematic review of scales
  - They reviewed 51 scales, from the very simple, to the very complex to detect and quantify frailty
- ‘There is a large number of instruments for measuring the same construct... which makes it difficult for clinicians to choose the most appropriate...’

Table 2. Description of the instruments identified in the review and their characteristics: Number of items, domains, application scenario, language, study site, type of measurement scale, pre-frailty verification and mortality prediction.

| Instrument  | Authors, Year                                    | No. items | Domains       | Settings                               | Language | Country           | Scale type*  | Pre-frailty | Mortality         |
|---|--|-----------|---------------|--|----------|-------------------|--|-------------|-------------------|
| 11-point FI   | Velanovich et al., 2013                          | 11        | Ph            | Hospital                               | English  | USA               | Dichotomous scale (frail—not frail)<br>Range 0–11  | –           | Yes               |
| 5-item mFI  | Chimukangara et al., 2017                        | 5         | Ph            | Hospital                               | English  | USA               | Dichotomous scale (frail—not frail)<br>Range 0–5   | –           | Yes               |
| 68-item FI  | Ma et al., 2016                                  | 68        | Ph, Ps, S     | Community                              | English  | China             | Continuous Scale: 0–1. Combination of tests. $\geq 0.25$ frail   | –           | Yes               |
| Brief Frailty Index   | Freiheit et al., 2010                            | 5         | Ph, Ps, S     | Hospital                               | English  | Canada            | Dichotomous scale Frail—Not Frail $\geq 3$ frail   | –           | Yes               |
| British frailty index   | Kamaruzzaman et al., 2010                        | 35        | Ph, Ps, S     | Community                              | English  | UK                | Dichotomous scale (frail—not frail)  | –           | Yes               |
| Comprehensive Frailty Assessment Instrument-CFAI  | De Witte et al., 2013; De Witte et al., 2013     | 23        | Ph, Ps, S, En | Community                              | English  | Belgium, China    | Dichotomous scale (frail—not frail)<br>Range 19–97. Does not have a cutoff point   | –           | No                |
| Instrument  | Authors, Year                                    | No. items | Domains       | Settings                               | Language | Location of study | Scale type*  | Pre-frailty | Outcome mortality |
| Clinical Global Impression of Change in Physical Frailty CGIC-PF                                | Studenski et al., 2004                           | 38        | Ph, Ps, S     | Community                              | English  | USA               | Dichotomous scale (frail—not frail)  | –           | No                |
| Continuous Frailty Scale-CFS  | Wu et al., 2018                                  | 5         | Ph            | Community                              | English  | USA               | Ordinal Scale: 3 levels. Range: 0–5, 0 Robust, 1–2 pre-frail, $\geq 3$ frail   | Yes         | Yes               |
| CP-FI-CGA-Care Partners Frailty Index Comprehensive Geriatric Assessment                        | Goldstein et al., 2013; Goldstein et al., 2015   | 62        | Ph, Ps, S     | Community, Emergency, Geriatric clinic | English  | Canada            | Dichotomous scale (frail—not frail)  | –           | Yes               |
| Clinical Frailty Scale-CSHA   | Rockwood et al., 2005; Gregorevic et al., 2016   | 70        | Ph, Ps        | Community/Hospital                     | English  | Canada, Australia | Ordinal Scale: 1–7 7 levels (from robust to complete dependence)   | Yes         | Yes               |
| CSHA CFS TV—Chinese Canadian Study of Health and Aging Clinical Frailty Scale Telephone Version | Chan et al., 2010                                | 17        | Ph, Ps        | Community                              | English  | Taiwan            | Ordinal Scale: 1–7 7 levels (from robust to complete dependence). Phone version of the CSHA Clinical Frailty Scale.                        | Yes         | Yes               |
| Instrument  | Authors, Year                                    | No. items | Domains       | Settings                               | Language | Location of study | Scale type*  | Pre-frailty | Outcome mortality |
| EASY-Care Two-step Older persons Screening—Easycare TOS   | Van Kempen et al., 2013; Van Kempen et al., 2014 | 38        | Ph, Ps, S     | Community                              | English  | Netherlands       | Dichotomous scale (frail—not frail). Two-phase evaluation. 1 <sup>st</sup> phase—clinical reasoning, 2 <sup>nd</sup> phase—home evaluation | –           | No                |

(Continued)

# Frailty Indices: Problem One

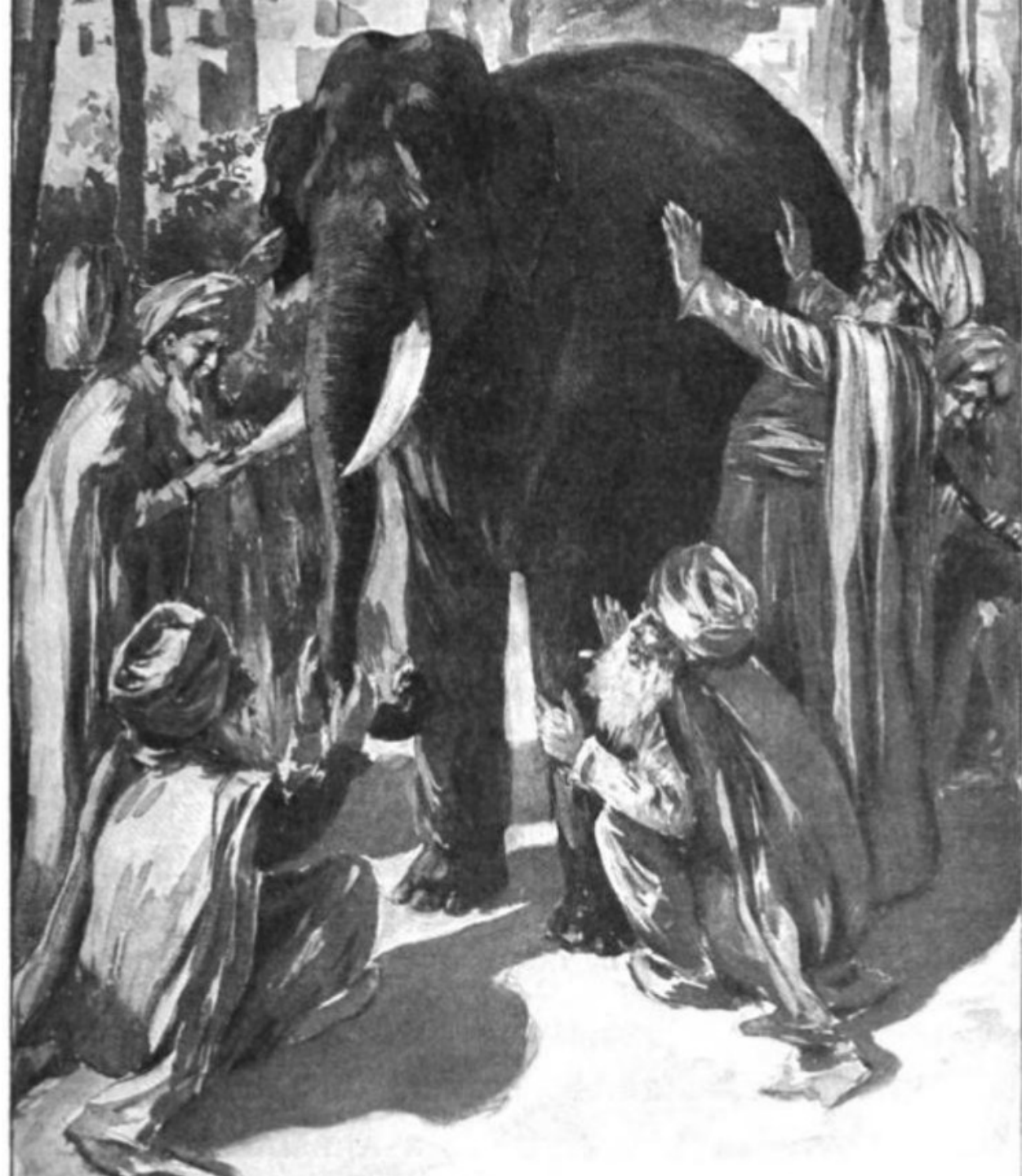
Table 2. Results of binary logistic regression analyses indicating the contribution of frailty instruments to study outcomes<sup>a</sup>, controlling for age and gender ( $n = 172^b$ )

| Index      | Frailty prevalence, $n$ (%) | Poor discharge outcome<br>( $n = 35$ ) |            |                  | Poor 6-month outcome<br>( $n = 98$ ) |           |                  |
|------------|-----------------------------|--|------------|------------------|--------------------------------------|-----------|------------------|
|            |                             | OR                                     | 95% CI     | P-value          | OR                                   | 95% CI    | P-value          |
| Grip       | 128 (75)                    | 6.47                                   | 1.46–28.60 | <b>0.014</b>     | 2.65                                 | 1.23–5.69 | <b>0.013</b>     |
| Katz       | 129 (75)                    | 5.55                                   | 1.56–11.73 | <b>0.008</b>     | 3.17                                 | 1.45–6.91 | <b>0.004</b>     |
| FI-CD      | 65 (38)                     | 5.09                                   | 2.23–11.62 | <b>&lt;0.001</b> | 4.25                                 | 2.18–8.31 | <b>&lt;0.001</b> |
| SOF        | 120 (70)                    | 3.44                                   | 1.21–9.78  | <b>0.020</b>     | 3.26                                 | 1.55–6.87 | <b>0.002</b>     |
| Lawton     | 98 (57)                     | 3.06                                   | 1.28–7.29  | <b>0.012</b>     | 2.21                                 | 1.18–4.16 | <b>0.014</b>     |
| CHS        | 96 (56)                     | 2.98                                   | 1.28–6.97  | <b>0.012</b>     | 2.17                                 | 1.15–4.09 | <b>0.017</b>     |
| SHERPA     | 87 (51)                     | 2.54                                   | 1.06–6.07  | <b>0.037</b>     | 2.54                                 | 1.06–6.07 | <b>0.037</b>     |
| Gait speed | 46 (27)                     | 2.18                                   | 0.94–5.06  | 0.068            | 2.06                                 | 1.01–4.20 | <b>0.046</b>     |
| HARP       | 43 (25)                     | 2.04                                   | 0.89–4.68  | 0.091            | 1.91                                 | 0.93–3.92 | 0.079            |
| FRAIL      | 107 (62)                    | 1.81                                   | 0.78–4.19  | 0.166            | 1.68                                 | 0.87–3.22 | 0.120            |
| CCI        | 38 (28)                     | 1.10                                   | 0.44–2.73  | 0.847            | 1.48                                 | 0.71–3.10 | 0.295            |
| FI-CGA-10  | 45 (26)                     | 1.01                                   | 0.42–2.43  | 0.976            | 1.59                                 | 0.79–3.19 | 0.195            |
| MPI        | 42 (24)                     | 0.94                                   | 0.38–2.33  | 0.901            | 1.68                                 | 0.83–3.42 | 0.152            |



# The Elephant and Blind Men problem

- Hindu/Buddhist parable about the limitations of empirical observation
- A group of blind men who have never seen an elephant before try to imagine an elephant by touching it
- The particular viewpoint is influenced by which part you are trying to measure
- Because frailty is multidimensional, the scales can produce wildly different results



# The Elephant and Blind Men problem (2)

- Both studies conclude that clinical judgment is still the best tool to evaluate the needs of individual patients
- Multidimensional indices are probably better
- ‘The process of identifying frailty should be based on a single test requiring few resources, which can be interpreted by non-specialists’



# Frailty Indices: Problem Two

- Multidimensional scales are generally reliable, but their utility is limited by the conclusions clinicians attach to them, or the actions generated by said conclusions
- The Criteria for Screening and Triaging to Appropriate Alternate Care (CRiSTAL) scale
- Joint Australian-Danish study
- Multidimensional frailty scale for prognosticating 3-month mortality in ED patients >65

Predictive validity of the CriSTAL tool for short-term mortality in older people presenting at Emergency Departments: a prospective study

# Frailty Indices: Problem Two

- CRiSTAL correlated well with Fried frailty phenotypes and other frailty scales (CFS)
- Logistic regression: correlated highly with death at 3 months
- Patients identified by CRiSTAL were interviewed by ED Clinical Nurse Specialists and the prognostic implications were discussed
- This didn't work – uptake was low
- This part of the study was later abandoned





*La sala del hospital en la visita del médico en jefe (1889); Luis Jimenez Aranda (1845-1928)*



# Mrs L.F.

- Referral from LVH Aortic Valve team for frailty assessment
- 93/F living at home alone, supportive son
- Multiple falls (daily to twice a day) – severe aortic stenosis
- Geriatrician review from 2019 – MCI, but lost to follow-up
- Anticoagulated for AF (warfarin)



Drawing, Study of Hands for Elderly Woman in "Communion of the Sick"; Daniel Huntington (1816–1906)

# Liverpool Hospital Aortic Valve Team

- Planning started in 2019
- Operational disagreements (between ICU, anaesthetics and cardiology) delayed implementation until 2021
- Multidisciplinary team evaluation of patients with severe aortic stenosis
  - Cardiologist
  - Nurse coordinator
  - Physiotherapist
  - Cardiothoracic surgeon
  - Geriatrician

# Liverpool Hospital Aortic Valve Team (2)

- No referrals refused (referrals through individual cardiologists rather than primary care)
- Each clinician does own separate parallel assessments of patient
- Team meeting weekly to decide to recommend an outcome
  - Medical/palliative management
  - Schedule for TAVI
  - Schedule for SAVR
- Also ironing out appropriateness for recovery procedures (resuscitation, bail-out, ICU, need for ECMO, etc)

# Mrs L.F.

- English somewhat limited, born in Calabria and emigrated in mid-70s to Liverpool area
- Independent of self-care, needed assistance with shopping, showering; able to meal-prepare
- Hard of hearing +++
- RUDAS 22/30
- Not sarcopenic – physically quite robust
- No history of fragility fractures
- Edmonton Frailty Scale – 10/17 (moderate frailty)
- Discussion with son and patient
  - Both would like to remain at home for as long as possible and would like to consider any intervention to help preserve independence



*Old Woman Leaning on a Stick* (1860), Ludwig Knaus (1829–1910)

# TAVI team meeting

- Somewhat spirited discussion but eventually managed to convince team to pursue TAVI
- Spent roughly 6 days in hospital
  - Post-procedure delirium, likely precipitated by subsequent pneumonia
  - Resolved by D2, most of time spent trying to raise INR again
- Doing well at 1 week follow-up and at 3 months post-procedure
- No further falls



# Frailty Indices: Problem Three

- Frailty indices do not make distinctions between reversibility as they are snapshots in time
- Breaking the cycle of frailty by intervening is tricky when the potential for harm is present
- It's a given that geriatricians advocate for their patients
- The challenge for geriatricians is creating and driving models that allow them to actively participate in managing the very frail -- collaboratively

# Multidisciplinary models for frailty care

- Surgical/perioperative geriatrics
  - Prince of Wales Hospital, NSW: active collaboration between colorectal surgery and geriatricians (patient selection, prehab, post-operative care)
- Orthogeriatrics
- Multidisciplinary PEG team (UK)
  - Collaboration between gastroenterologists and geriatricians to decide appropriateness of gastrostomy tube insertions
- Oncology-geriatrics – appropriateness for chemotherapy
- Haematology-geriatrics – appropriateness for transplant
- Emergency room physicians and geriatrics – case-finding models in which appropriate patients are moved to low-stimulus environments

# Conclusions

- Frailty is important to spot but be aware of the limitations of the tools you are using
  - Different scales measure different aspects
  - They are snapshots in time and do not account for reversibility
  - There are times to use your clinical judgment despite what the 'objective' data is telling you
- Collaboration with other specialties about the optimal care of the frail patient remains a challenge



Perhaps if we each had a  
candle and went in, the  
differences would  
disappear.

- Rumi (1207-73)





# Questions?

