‘The Frail Aged’

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The Concept of Frailty

• The terms ‘frailty’ - ‘frail elderly’ - ‘frail aged’ - are increasingly used in clinical practice and research studies with little agreement on their definition or clinical markers

• Yet frailty is something we all recognise. It predicts functional decline and it lies at the heart of geriatric medicine and aged care.
The Concept of Frailty

Medline

- 1989 “Frail elderly”: Greene and Monahan – ‘Gerontologist’
The Concept of Frailty
3000 ‘Medline’ references – since 1990

- 1968 to 1979 - 2 articles in total
- 1980 to 1989 - 4 articles per year
- 1990 to 1999 - 200 articles per year
- 2000 to 2003 - 300 articles per year
Markers of Frailty used in Studies

Age over 75 or 80 years is a good proxy for frailty

**Broad (crude) markers** *(Important but too late)*
- Disability
- Institutionalization
- Multiple pathology – cardiac/vascular/diabetes/dementia

**Clinical markers** *(Too ‘physical’?)*
- Muscle weakness/loss of muscle bulk/weight loss
- Exhaustion
- Inactivity & slowed gait *(getting closer)*

**Biological markers** *(Too narrow?)*
- Immune, inflammatory, endocrine & clotting systems
Deconditioning ➔ The Geriatric Syndromes

- Reduced mobility and social isolation
- Increased instability, falls, and fractures
- Increased confusion, delirium, and incontinence

Resulting in -
- Longer hospital stay – ‘reconditioning’
- Increased service use
- Earlier residential care
- Increased mortality
Mathematical Definitions of Frailty
A digression

• Vaupel (1998)
  – Mortality rate declines over 80 yrs

• Rockwood (2002)
  – Increased mortality is explained by having more accumulated ‘frailty’ measures
‘Survivor Effect’ - Declining death rate in the over 80s

Vaupel et al. Science 1998
### Canadian Study on Health and Ageing

**40 self-report variables used for a ‘Frailty Index’**

<table>
<thead>
<tr>
<th>Allergy/food</th>
<th>Asthma Arthritis</th>
<th>Alzheimer’s Other Dementia</th>
<th>Back pain Blood pressure</th>
<th>Bowel disorder Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergy/other</td>
<td>Cataracts Chronic bronchitis</td>
<td>Cognition impaired</td>
<td>Diabetes Dexterity problem</td>
<td>Emotional Problem Epilepsy</td>
</tr>
<tr>
<td>Help with meal</td>
<td>Housework Home care Heavy chores Heart disease</td>
<td>Migraine Mobility Movement Limited</td>
<td>Pain or discomfort limits activity</td>
<td>Severe pain Shopping Sinusitis</td>
</tr>
<tr>
<td>Speech Stroke</td>
<td>Thyroid condition</td>
<td>Ulcers (GIT)</td>
<td>Visual loss</td>
<td>Urinary incontinence</td>
</tr>
</tbody>
</table>
Accumulated Frailty reverses mortality decline in the old-old
Mathematical Model – The frailty index

• A good marker of biological ageing

• Which predicts mortality

• Doesn’t help us define Clinical Frailty
Frail Aged
Who are they?

• An identifiable group of impaired older people who are likely to have poorer health outcomes when stressed than their non-frail peers (the ‘healthy aged’)

• Frailty is best defined as a clinical syndrome - well recognized by the ancients

• An experienced clinical gerontologist can pick the frail aged - almost at a glance - in clinical settings, and also in shopping malls and on public transport, but only in off-peak hours - 10am to 4pm
Ancient Egypt
Hieroglyph for ‘old age’
Chinese & Japanese

The modern ideogram for ‘old’ is derived from an ancient ideogram showing a flexed old man, leaning on a stick.
The Israelites
Ecclesiastes Ch 12 Verses 3-5

• The keepers of the house shall tremble  Action Tremor
• The strong men shall bow themselves  Flexed posture
• Those that look out the window are dimmed  Loss of vision
• The daughters of music shall be brought low  Loss of Hearing
• They shall be afraid of that which is high  Gait instability
• The grass hopper drags itself along  Gait slowing
• And desire shall fail  Blessed relief
Frailty—Hypothesis

- Frailty is due to reduced brain reserve in multiple brain systems, leading to increased likelihood of functional decline under stress (notably delirium, loss of mobility, falls)

- The clinical markers of reduced brain reserve may best define - or alert us to - frailty in the old-old

- What are the best clinical markers?
**Frail Aged**
almost at a glance

**Gait slowing & Instability - Frontal &/or Extrapyramidal**
- Slowed gait  
  - Observe/Timed walk
- Flexed posture  
  - Observe
- Unsteady gait  
  - Heel-toe walk -care!

**Attention, memory, executive function - Frontal Systems**
- Inactivity/loss of interest  
  - History/Check GDS
- Slowed cognitive processing  
  - Observe/Simple test
- Mild cognitive impairment  
  - History/Simple tests
What is the evidence?
Sydney Older Persons Study: 1992 - 2002
(Random Sample of Community Dwellers Aged 75+)
Systemic disorders: Prevalence

(N=522. Age trends: * p < 0.05; ** p< 0.01)
Neurodegenerative disorders: Prevalence

(N=522. Age trends: * p < 0.05; ** p < 0.01)

The prevalence of depressive symptoms was 6% - without any age-related rise.
Frailty
Conclusions

• Clinical markers of reduced brain reserve may best define ‘frailty’ in the old-old, well before dementia, parkinsonism, delirium, immobility, or functional disability, is present

• Gait slowing and instability, and failing frontal executive & attentional systems, are likely to be the best markers of adverse outcomes

• Other frailty syndromes may also be important