Multi-morbidity, Frailty and Polypharmacy

Prof Graham Ellis
National Clinical Advisor
Ageing and Health

Enabling health and social care improvement
Changes Associated with Ageing

• Respiratory – 30-40% loss of respiratory function with age
• Renal – 50% reduction in functioning nephrons
• Bone – 1% loss per year after 50
• Muscle – 25-50% loss by 80
• Vision 66% loss of light by age 60
• Brain – atrophies after 30!
Most over-65s have 2 or more conditions, and most 75+ have 3 or more conditions.
• Multiple and multiplying drugs

Guthrie et al 2015 BMC Medicine
Frailty

Multi-morbidity

Disability

The inability to withstand illness without loss of function

- Falls
- Functional Decline
- Immobility
- Delirium
- Cognitive decline
- Incontinence

Fried et al. 2001
Why focus on frailty?

Increasing numbers of people at risk of developing frailty leading to low resilience to crisis with gradual dependence on care.

- Not frail
- Mild frailty
- Moderate frailty
- Severe frailty

High resilience

Low resilience

Clegg et al. Lancet 2013

## Risk factors for Frailty

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Clegg A et al Lancet 2013;381(9868):752-762</td>
</tr>
<tr>
<td>Smoking</td>
<td>Kojima G et al BMC Geriatrics 2015;15(131)</td>
</tr>
<tr>
<td>Alcohol (&gt;15g/day)</td>
<td>Bioscience trends 2017;11(5):600-602</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>Shinghini S et al BMJ 2018;360:k1046</td>
</tr>
<tr>
<td>Obesity</td>
<td>Shinghini S et al BMJ 2018;360:k1046</td>
</tr>
<tr>
<td>Socioeconomic deprivation</td>
<td>Shinghini et al. BMJ 2018;360:1046</td>
</tr>
<tr>
<td>Depression</td>
<td>Soysal s. et al Ageing Research reviews 2017;36;(78-87)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Shinghini S et al BMJ 2018;360:k1046</td>
</tr>
</tbody>
</table>
Frailty Predicts... Everything!

<table>
<thead>
<tr>
<th>Primary care</th>
<th>Adjusted OR (95%CI)</th>
<th>Secondary Care</th>
<th>OUTCOME</th>
<th>Adjusted OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falls</td>
<td>1.23 (0.99-1.54)</td>
<td>Cardiology</td>
<td>30 day mortality post AS</td>
<td>2.22 (1.28 – 3.67)</td>
</tr>
<tr>
<td>Disability</td>
<td>1.79 (1.47-2.17)</td>
<td>Critical care</td>
<td>12m recovery after ICU</td>
<td>0.32 (0.19-0.56)</td>
</tr>
<tr>
<td>NH admission</td>
<td>2.60 (1.36-4.96)</td>
<td>General surgery</td>
<td>Post op morbidity</td>
<td>2.06 (1.18-3.60)</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>1.27 (1.11-1.46)</td>
<td></td>
<td>30 post op morbidity</td>
<td>4.00 (1.10-15.20)</td>
</tr>
<tr>
<td>Mortality</td>
<td>1.63 (1.27-2.00)</td>
<td>Gen medicine</td>
<td>Inpatient delirium</td>
<td>8.50 (4.80-14.80)</td>
</tr>
<tr>
<td>Dementia</td>
<td>1.33 (1.07-1.67)</td>
<td>Oncology</td>
<td>Chemo intolerance</td>
<td>4.86 (2.19-10.78)</td>
</tr>
<tr>
<td>QOL</td>
<td></td>
<td>Renal medicine</td>
<td>Mortality in ESRD on dialysis</td>
<td>2.24 (1.60-3.15)</td>
</tr>
<tr>
<td>Caregiver strain</td>
<td></td>
<td>Respiratory</td>
<td>90 readmission after COPD exacerbation</td>
<td>1.43 (1.13-1.80)</td>
</tr>
<tr>
<td>Depression</td>
<td>4.42 (2.66-7.35)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disability</td>
<td>2.05 (1.73-2.44)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Why does frailty matter?

<table>
<thead>
<tr>
<th>Frailty Level</th>
<th>Average Length of Stay per Unplanned Admission</th>
<th>Average Days Lost to Delayed Discharge per Admission</th>
<th>Average GP Appointments in a Year</th>
<th>Average Number of Individually Prescribed Items per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>45% not frail</td>
<td>13.5</td>
<td>1.2</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>35% mild frailty</td>
<td>23.4</td>
<td>3.3</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>15% moderate frailty</td>
<td>36.4</td>
<td>3.7</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>5% severe frailty</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Early identification and intervention

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Description</th>
<th>Impact</th>
<th>Evidence</th>
</tr>
</thead>
</table>
| **Geriatric Assessment in general elderly population** | Proactive approach  
Prevention focus  
Education element  
Nurse/GP/Social work/ health visitor/ Geriatrician (rarely)  
Follow up | ![NNT 263](image) | ![Meta analysis of RCTs](image) |
| **Geriatric Assessment in elderly population selected as frail** | Nurse/health visitor/social work/GP/geriatrician (<50%)  
Comprehensive review  
Prevention focus  
Follow up visits | ![downwards arrow](image) | ![Meta analysis of RCTs](image) |

Beswick AD et al Lancet 2008;371:725-735
Drivers for change

- Identify people before a crisis
- Multidisciplinary team working
- Access preventative support
- Plan for the future
Identifying people before a crisis

Planned Population (eFI)

Earlier reactive individual (Rockwood etc)

Individuals at the front door (Think FRAIL tool)

Community

SPARRA/HHG

Acute
# Electronic Frailty Index (EFI)

<table>
<thead>
<tr>
<th>Disease State</th>
<th>Symptoms / Signs</th>
<th>Disability</th>
<th>Lab Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthritis</td>
<td>Dizziness</td>
<td>Activity Limitation</td>
<td>Anaemia &amp; Haematinic Deficiency</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Polypharmacy</td>
<td>Requirement for Care</td>
<td></td>
</tr>
<tr>
<td>Heart Valve Disease</td>
<td>Sleep Disturbance</td>
<td>Housebound</td>
<td></td>
</tr>
<tr>
<td>Parkinson's Disease</td>
<td>Falls</td>
<td>Social Vulnerability</td>
<td></td>
</tr>
<tr>
<td>Skin Ulcer</td>
<td>Urinary Incontinence</td>
<td>Hearing Loss</td>
<td></td>
</tr>
<tr>
<td>Arthrit is</td>
<td>Urinary Problems - Blindness</td>
<td>Vision Problems</td>
<td></td>
</tr>
<tr>
<td>Atrial Fibrillation</td>
<td>Dizziness</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Foot Problems</td>
<td>Dyspnoea</td>
<td>Housebound</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>Sleep Disturbance</td>
<td>Social Vulnerability</td>
<td></td>
</tr>
<tr>
<td>Peptic Ulcer</td>
<td>Falls</td>
<td>Hearing Loss</td>
<td></td>
</tr>
<tr>
<td>Stroke and TIA</td>
<td>Urinary Incontinence</td>
<td>Vision Problems</td>
<td></td>
</tr>
<tr>
<td>Chronic Kidney Disease</td>
<td>Hypotension</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Fragility Fracture</td>
<td>Hypotension</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Hypotension /Syncope</td>
<td>Peri pheral Vascular Disease</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Peripheral Vascular Disease</td>
<td>Thyroid Disorders</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Thyroid Disorders</td>
<td>Falls</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Coronary Heart Disease</td>
<td>Dizziness</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Heart Failure</td>
<td>Hypertension</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>Peri pheral Vascular Disease</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Respiratory Disease</td>
<td>Thyroid Disorders</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Urinary System Disease</td>
<td>Urinary Incontinence</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Memory and Cognitive Problems</td>
<td>Falls</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Weight Loss and Anorexia</td>
<td>Urinary Incontinence</td>
<td>Activity Limitation</td>
<td></td>
</tr>
<tr>
<td>Mobility and Transfer problems</td>
<td>Activity Limitation</td>
<td>Activity Limitation</td>
<td></td>
</tr>
</tbody>
</table>
Electronic Frailty Index (EFI)

- 35% Mild Frailty
- 15% Moderate Frailty
- 5% Severe Frailty

Risk of hospitalisation:
- 20%
- 40%
- 70%

People registered with test GP practices aged 65 and over
The electronic frailty index (eFI) is a severity grading of frailty of older patients based on patterns of frailty coded in your clinical system. This report provides an overview of the patients in each eFI category in your practice, and highlights those whose eFI has increased over the past six months.

A full list of older (65+) patients and their eFI can be accessed [here](#).

**eFrailty Index Grouping**

<table>
<thead>
<tr>
<th>Severe</th>
<th>Moderate</th>
<th>Mild</th>
<th>Not frail</th>
</tr>
</thead>
<tbody>
<tr>
<td>97</td>
<td>203</td>
<td>490</td>
<td>368</td>
</tr>
</tbody>
</table>

% of patients over 65

**High Priority Patients**

- Increasing severe: 3
- Escalation to severe: 8
- Moderate but increasing: 2
- Escalation to moderate: 22
Identifying people before a crisis

**Midlock medical centre** in Glasgow:

- MDT started to discuss high risk patients
- 50% of people who were ‘severely frail’ were not known to them
- Nearly 50% were dead six months later
- Use the eFI to generate a list to discuss at monthly MDT meetings for joint decision making around how these people can be supported

- Video available: [https://youtu.be/Ynwv9UvCwa4](https://youtu.be/Ynwv9UvCwa4)
Access preventative support

• **Lorn Medical Centre in Oban** –
  • Identify people with frailty
  • Comprehensive assessment
  • MDT discussion
  • Direct towards appropriate support – re-ablement delivered by third sector.

• **Path Medical Practice in Kirkcaldy** –
  • Pharmacists using EFI to identify patients
  • GP input to agree frailty levels
  • Target frailty and multiple medicines for polypharmacy reviews.

• **Dr. Iain Morrison, Cluster Quality Lead, Midlothian** – Hypoglycaemia cluster initiative – review of frail type 2 diabetics – Rx pulled back as appropriate
Planning for the future

- **Dollar health centre** in Forth Valley use the eFI
- Identify people with moderate/severe frailty
- Discuss at monthly MDT palliative care meetings.
- Increased number of ACP conversations
- Patients and families feeling more in control and aware of help available in crisis.
- Increased community referral (e.g. ACP community team, dementia outreach)

Frailty Recognition: What should you be thinking about?

- A background understanding of the Frailty Models may help:

**Phenotype**
- Involuntary weight loss?
- Exhaustion?
- Slow gait speed?
- Poor hand grip strength?
- Sedentary behaviour?

**Cumulative Deficits**
- Low mood
- Loss of hearing
- Loss of vision
- Increasing polypharmacy
- Increased dependency/loss of independent function
- Worsening memory and thinking
- Loss of social connections

**Frailty syndromes**
- Falls
- Immobility
- Delirium
- Incontinence
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**Frailty syndromes**
- Falls
- Immobility
- Delirium
- Incontinence
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.

Frailty and polypharmacy: why does it matter?

- Frail people with excessive polypharmacy are **6 times more likely to die** than their non-frail counterparts.
  
  Polypharmacy and frailty: prevalence, relationship and impact on mortality in a French Sample of 2350 old people. https://doi.org/10.1002/pds.3772

- **Frailty is a stronger predictor** of Medication Related Harm (MRH) than age
  


- ‘Appropriate’ treatment targets for fit patients may be at best inappropriate, at worst harmful in frail patients
Overly tight BP targets in frail patients have:

No evidence of benefit

- **No mortality difference** for frail older people if BP <140/90
  
  *Age and Ageing, Volume 48, Issue 5, September 2019, Pages 627–635, [https://doi.org/10.1093/ageing/afz072](https://doi.org/10.1093/ageing/afz072)*

- **No relationship between SBP and mortality** observed among slower walkers.
  

Emerging evidence of harm

- **Increased mortality in frail, care home patients** if SBP<130 on ≥2 antihypertensive Rx (NNH = 10 over 2 years)
  

- **Lower SBP correlated to higher mortality** in pts aged ≥75 years **with impaired MMSE or ADL.**
  

- **BP negatively associated with the risk of death** in patients unable to complete the walk test.
  
Frailty guidelines are emerging & thankfully becoming more specific

**NHS Fife Hypertension (before)**

| Aim for: BP ≤ 140/90 mmHg (≤150/90 if > 80 years of age). If h/o CVD, diabetes, CKD, aim for < 130/80. In frail/elderly patients the above targets may be difficult to achieve and individual targets should be set based on appropriateness and tolerability. |

**NHS Fife Hypertension (now)**

- **Fit/Mildly frail patients** - treat as per usual guidelines unless postural drop.
- **Moderate frailty** – aim for 140-160. < 140 – pull back. In the presence of postural drop/symptoms affecting QOL a SBP of 160 -190 mmHg may be reasonable.
- **Severely frail / assisted standing patients/patients unable to attempt timed walking test/short life expectancy** - stop all anti-hypertensives/stop measuring BP.
Prescribing Guidance for Moderate to Severely Frail Patients

**DIABETES:** in mild frailty aim for: HbA1c 54–59; BP 145/85

<table>
<thead>
<tr>
<th>Rockwood</th>
<th>Therapeutic Target</th>
<th>Suggested Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 6: Modest Frailty</td>
<td>Control of symptoms</td>
<td>HbA1c 60–85, BP 160/90 and no postural drop</td>
</tr>
<tr>
<td>7 to 9: Severe Frailty</td>
<td>Symptom control</td>
<td>Avoid hypoglycaemia; HbA1C only to identify risk of hypoglycaemia (aim &gt;65); Usually no BP Rx</td>
</tr>
</tbody>
</table>

**OSTEOPOROSIS:**

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<th>Suggested Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 6: Modest Frailty</td>
<td>Risedronate 5 mg ol daily</td>
<td>Ensure compliance with inhaler therapy; Consider stopping theophylline; Anticipatory Care Plan</td>
</tr>
<tr>
<td>7 to 9: Severe Frailty</td>
<td>Nabumetone for 4 yrs if patient or care plan agree</td>
<td>Usual Rx but may be unable to use inhalers; Avoid theophyllines; Avoid oral tuberculosis</td>
</tr>
</tbody>
</table>

**ANALGESIA:** Usually not to exceed: Morphine 60 mg bid, Fentanyl 25 μg patch

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</tr>
</thead>
<tbody>
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<td>5 to 6: Modest Frailty</td>
<td>Non-steroidal anti-inflammatory drugs (NSAIDs) only if eGFR ≥30, and then only short term</td>
<td>Periodic review of NSAIDs in patients with chronic kidney disease</td>
</tr>
</tbody>
</table>

Published by NHS Gloucestershire Clinical Commissioning Group June 2017.
Anticholinergic Cognitive Burden (ACB)

Score 1
- Atenolol
- Captopril
- Ranitidine
- Codeine
- Prednisone
- Digoxin
- Furosemide

Score 2
- Carbamazepine
- Pethidine
- Amantadine

Score 3
- Amitriptyline
- Atropine
- Chlorpheniramine
- Clozapine
- Olanzapine
- Oxybutynin
- Paroxetine

A positive ACB score was associated with falls OR 1.8
Falls through gait and balance impairment - not muscular weakness

Total Anticholinergic Burden Score

Hospitalisation with falls over 10 yrs in the EPIC-Norfolk
Is this patient frail?

- 82 years old.
- She is having elective pelvic floor surgery due to urinary incontinence
- Noticed herself "slowing down" over the last 6 months and has not had the energy to travel
- She is feeling more fatigued throughout the day and not as active as she once was.
- Not limited her ability to look after her home or herself
- Finding herself less likely to join her husband on their daily nature walks. Instead, she finds herself in the garden because it doesn't come with the same level of physical exertion that walking does.
- She is beginning to wonder if she should further investigate her fatigue
Is this patient frail?

- Female Age 65
- Lives at home with her husband
- Rises from her chair slowly in the waiting room and walks with a stick for balance (2 falls in last year). Feels dizzy on rising.
- Wears glasses
- Struggles with pain
- History of TIA
- On 10 regular Rxs – struggled to manage.
- Worries about her memory
- Not very active. Looks after her grandchildren after school but feels ‘tired all the time’
Why does it matter for this patient?

- On 3 BP Rxs.
- Systolic in 150s on sitting, 130 on standing
- (postural drop, but sitting systolic on high side in patient with a h/o TIA and also falls)
- NHS Fife guideline— Fit/mildly frail – treat as normal unless postural drop
Is this patient frail?

- Female, Age 84
- Lives at home with her daughter (meals and cleaning)
- Struggling with ADL – needing prompting for washing and dressing for 3+ weeks now
- Daughter doing cooking and cleaning
- Presents with:
  - Fall
  - Increasing confusion over 3 week period
Is medication ‘appropriate’ to her level of frailty?

- Adcal-D3
- Paracetamol
- Cetirizine
- Folic Acid
- Apixaban
- Lercanidipine
- Losartan
- Bisoprolol
- Digoxin
- Zopiclone
- Lorazepam
- MST Continus (20mg/15mg)
- Co-codamol (8/500)
- Lactulose
- Voltarol gel

**Background:**
- Vascular dementia
- CKD
- AF
- Psoriatic Arthropathy
- Osteoporosis
- Hypertension

**Value**
- BP = 117/56, Hb = 12.6, eGFR = 54
Is this patient frail?

- Female, age 86
- Lives in a care home (not nursing home)
- Wears glasses
- Wears pads for urinary incontinence (and occasional faecal incontinence)
- Dementia
- Mood good – can chat away, very smiley
- Assisted standing
- Needs help with dressing, washing. Independent with feeding/drinking.
- On 8 regular medicines
Is her medication ‘appropriate’ to her level of frailty?

If not, what would you change & why?

- Atenolol 50mg od
- Bendroflumethiazide 2.5mg od
- Metformin 1G BD
- Gliclazide 40mg OD
- Donepezil 5mg OD
- Solifenacin 5mg OD
- Alendronic acid 70mg weekly
- Adcal D3 caplets 2 BD

PMH
- Hypertension
- NIDDM
- Dementia
- Osteoporosis
- Urinary incontinence

Value
- BP = 112/67
- Hba1c = 52
- eGFR = 54
If you would like more information

Clinical Frailty Scale (CFS) Training Module
https://rise.articulate.com/share/deb4rT02lvONbq4AfcMNRUudcd6QMts3#

Multi-morbidity: clinical assessment and management NICE guideline [NG56]
https://www.nice.org.uk/guidance/ng56

Living and Dying Well with Frailty Collaborative

Electronic Frailty Index

People Living with Frailty
https://ihub.scot/improvement-programmes/living-well-in-communities/people-with-frailty/
Thank you and thoughts