Social aspects of frailty: why do social circumstances matter?

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72 frail lives alone
isolated no family few friends no-one to help rarely gets out low mastery few resources
connected family many friends social supports engages in community volunteers high mastery many resources
How do we define frailty?

– Descriptive definitions e.g. Frailty Scale
– Rules-based definitions e.g. Frailty Phenotype
– Deficit accumulation: Frailty index
– The multidimensional view: “balance beam”
A multidimensional view of frailty: The Balance Principle (reserve!)

Sample list of deficits used in the frailty index.

Deficits

1. Eyesight
2. Hearing
3. Help to eat
4. Help to dress
5. Ability to take care of appearance
6. Help to walk
7. Help to get in and out of bed
8. Help to go to the bathroom
9. Help to take a bath or shower
10. Help to use the telephone
11. Help to travel beyond walking distance
12. Help with shopping
13. Help to prepare own meals
14. Help to do housework
15. Ability to take medications
16. Ability to handle own money
17. Self-rated health
18. Troubles prevent normal activities
19. Lives alone
20. Having a cough
21. Feeling tired
22. Nose stuffed up or sneezing
23. High blood pressure
24. Heart and circulation problems
25. Stroke or effects of stroke
26. Arthritis or rheumatism
27. Parkinson’s disease
28. Eye trouble
29. Ear trouble
30. Dental problems
31. Chest problems
32. Trouble with stomach
33. Kidney trouble
34. Losing control of bladder
35. Losing control of bowels
36. Diabetes
37. Trouble with feet or ankles
38. Skin problems
39. Fractures

Measuring frailty as an “index of deficits”

Frailty index distribution

- Range = 0 to 0.66, mean 0.16
Deficits accumulate, on average, at about 3% per year, regardless of the data source.
At any age, women accumulate more deficits than do men. For men & women, deficit accumulation is highly correlated (r>0.95) with mortality.

Mitnitski et al. JAGS 2005
A frailty index based on a Comprehensive Geriatric Assessment (FI-CGA) better stratifies 70-month survival than does age

Health

**Intrinsic** factors: frailty, comorbidity, genetics

**Extrinsic** factors: social and physical environment
Why are social circumstances important?

Risk factor

Management, Care planning, Discharge planning
Social factors and health

• Social factors individually associated with health
  – Socioeconomic status
  – Social inequalities
    • income, social status, control over life situation
  – Social support
  – Social networks
  – Social engagement
  – Social capital (individual vs. group)
  – Social cohesion

• Can these be conceptually unified?
There is a continuum of social factors that influence health, acting from individual to group level.

Social networks
Social capital
Social cohesion

Social support
Individual level characteristic

Individual
group

Collective level

Social factors and older adults’ health: the evidence

**Survival:** rich social networks, social supports, group engagement, occupational status (gradient), social capital, trust

**Cognitive decline and dementia:** social supports, social connectedness, loneliness, social engagement, social vulnerability, SES (individual and neighbourhood-level)

**Self-assessed health:** social capital, trust, social supports, volunteerism, group participation, SES (individual and neighbourhood)

**Mental health:** neighbourhood social capital, social ties, social networks, social supports, SES

**Mobility and falls:** SES, living alone, social engagement, neighbourhood deprivation/SES

**Functional decline/dependence:** low social engagement, social networks, social support, trust

**Institutionalization:** lack of social supports, social capital

**Frailty:** social vulnerability, isolation, lower SES, social position, community participation, social supports (including perceived social supports)

What is Social Vulnerability?

• **Social vulnerability** is the degree to which a person’s overall social situation leaves them susceptible to further insults (either health-related, or social).

• Consider the inverse: **social reserve**, the degree of resilience gained from a well-connected and supportive social situation.

• The more social problems one has, the more the vulnerability to adverse outcomes.
Social vulnerability index

Communication to engage in wider community
1. Read English or French
2. Write English or French

Living situation
3. Marital status
4. Lives alone

Social support
5. Someone to count on for help or support
6. Feel need more help or support
7. Someone to count on for transportation
8. Feel need more help with transportation
9. Someone to count on for help around the house
10. Feel need more help around the house
11. Someone to count on to listen
12. Feel need more people to talk with
13. Number of people spend time with regularly
14. Feel need to spend more time with friends/family
15. Someone to turn to for advice
16. Feel need more advice about important matters

Socially oriented Activities of Daily Living
17. Telephone use
18. Get to places out of walking distance

Leisure activities
19. How often visit friend or relatives
20. How often work in garden
21. How often golf or play other sports
22. How often go for a walk
23. How often go to clubs, church, community centre
24. How often play cards or other games

Ryff scales
25. Feel empowered, in control of life situation
26. Maintaining close relationships is difficult and frustrating
27. Experience of warm and trusting relationships
28. People would describe me as a giving person

How do you feel about your life in terms of ...
29. Family relationships
30. Friendships
31. Housing
32. Finances
33. Neighbourhood
34. Activities
35. Religion
36. Transportation
37. Life generally

Socio-economic status
38. Does income currently satisfy needs
39. Home ownership
40. Education

Similarities between frailty and social vulnerability?

Social vulnerability index

- Social vulnerability is correlated with the frailty index ($r=0.44$)
- This correlation differs for men and women (0.31 vs. 0.46)
## Associations of the social vulnerability dimensions with covariates

<table>
<thead>
<tr>
<th></th>
<th>Engagement</th>
<th>Contextual SES</th>
<th>Support</th>
<th>Living situation</th>
<th>Esteem</th>
<th>Mastery</th>
<th>Relations</th>
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</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td>Women more engaged p=0.03</td>
<td></td>
<td>Women more supported p=0.003</td>
<td>Women more alone p&lt;0.001</td>
<td>Women better mastery p=0.02</td>
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<tr>
<td><strong>Age</strong></td>
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<td></td>
<td></td>
<td>Older age, more alone p&lt;0.001</td>
<td>Older age, better mastery p&lt;0.001</td>
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<tr>
<td><strong>Frailty</strong></td>
<td>More frail, less engagement p&lt;0.001</td>
<td>More frail, lower SES p=0.07</td>
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<td>More frail, lower esteem p&lt;0.001</td>
<td>More frail, lower mastery p&lt;0.001</td>
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<td><strong>Education</strong></td>
<td>Lower educ, less engagement p&lt;0.001</td>
<td>Lower educ, lower SES p&lt;0.001</td>
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<td>Lower educ, lower esteem p=0.01</td>
<td>Lower educ, lower mastery p&lt;0.001</td>
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</tr>
</tbody>
</table>

Andrew and Keefe, BMC Geriatrics 2014
There is a meaningful survival gradient with increasing quartiles of social vulnerability.
Survival in “zero state” frailty stratifies by level of social vulnerability: the “zero state” of frailty as a candidate marker for the health of populations

<table>
<thead>
<tr>
<th></th>
<th>HR</th>
<th>95% CI</th>
<th>p value</th>
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<td>Low SV</td>
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<tr>
<td>Med SV</td>
<td>1.22</td>
<td>0.68-2.16</td>
<td>0.5</td>
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<tr>
<td>High SV</td>
<td>2.28</td>
<td>1.23-4.20</td>
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</table>

Cox regression model adjusted for age and sex

20% absolute increase in risk of mortality

<table>
<thead>
<tr>
<th></th>
<th>Survived</th>
<th>Died</th>
<th>Total</th>
<th>Absolute mortality</th>
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<tr>
<td>Low SV</td>
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<td>29</td>
<td>250</td>
<td>11.6%</td>
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<tr>
<td>Med SV</td>
<td>106</td>
<td>23</td>
<td>129</td>
<td>17.8%</td>
</tr>
<tr>
<td>High SV</td>
<td>39</td>
<td>18</td>
<td>57</td>
<td>31.6%</td>
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<tr>
<td>Total</td>
<td>365</td>
<td>70</td>
<td>436</td>
<td>20%</td>
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</tbody>
</table>

Andrew et al, Age and Ageing 2012
Social vulnerability varies by social welfare model: SHARE

Neighbourhoods matter…

Predicted frailty index by wealth and neighborhood deprivation, both split by quintiles, in fully adjusted models.

Lang et al. Socioeconomic status, neighborhood deprivation, and frailty in older adults. JAGS 2009
Frailty and National Income

Frailty decreases with Gross Domestic Product (GDP)
Social factors and older adults’ health: Mechanisms?

- **Biological & physiological:**
  - chronic stress
  - hormones
  - immune function

- **Psychological:**
  - self-efficacy
  - coping strategies
  - confidence

- **Behavioural:**
  - health behaviours - opportunities and norms

- **Material:**
  - access to goods & services
  - financial resources (what you have)
  - social status (who you are)
  - social contacts (who you know)

Acknowledgements

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• Olga Theou
• Lindsay Wallace
• Susan Kirkland
• John Fisk
• Ruth Hubbard
• Iain Lang
• Ingmar Skoog
Frail older adults have low reserve. They will be particularly vulnerable to problems in their environments and in our systems of care.

- Patient
- Provider
- Protocols & environment
- Systems and context

We have to think not only of plugging the holes smaller at each level, but also of making sure that they do not line up.
Desirability of scaling

cells

tissues

systems

societies
Vulnerability in each of the seven dimensions in relation to vulnerability in the others, adjusted for age, sex, frailty, and education.

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+ p<0.05, ++ p <0.01, +++ p<0.001

Andrew and Keefe, BMC Geriatrics 2014
Frailty: it comes down to Vulnerability Reserve
Frailty phenotype

- A phenotypic definition of frailty:
  Fried et al., 2001; 5 items
  weakness
  weight loss
  slowness
  inactivity
  exhaustion