Frailty as an emerging public health crisis!

Understanding frailty at population level!

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08/03/2017
A brief history of frailty.....

Figure 1. PubMed search for frailty and randomised controlled trials (RCT) including community based studies.
A brief history of frailty.....

Special Article

Frailty: An Emerging Public Health Priority

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A brief history of frailty.....
Understanding Frailty at Population level: Then and......
Understanding Frailty at Population level: ......soon to be

Populations are getting older

Percentage aged 60 years or older:
- 30% or more
- 10 to <30%
- <10%

2025

World Health Organization
FACING THE FACTS: THE FUTURE OF IRELAND

128,000
number of 80-year-olds in 2011

484,000
number of 80-year-olds in 2046

1.4m
number of over 65-year-olds by 2046

6.7m
projected population by 2046

57.4 years
male life expectancy in 1926

85.1 years
male life expectancy in 2046

57.9 years
female life expectancy in 1926

88.5 years
female life expectancy in 2046

100,300
increase in the number of children at primary school age by 2021

300,000
increase in labour force by 2046

860,700
number of over 65-year-olds by 2026

Source: CSO population and labour force projections, 2016-2046
Understanding Frailty at Population level: ......soon to be

The U.S. Population Ages 100 and Older Is Projected to Reach 600,000 by 2060.

U.S. Centenarians in Thousands

**Frailty: Definition**

Difficult to define, no one accepted definition:

- “Frailty is a distinctive health state related to the ageing process in which multiple body systems gradually lose their in-built reserves”
  
  British Geriatrics Society (Clegg et al., Lancet 2013)

- “Physiological syndrome characterised by decreased reserve and diminished resistance to stressors resulting from a cumulative decline across multiple physiological systems, and causing vulnerability to adverse outcomes”
  
  American Geriatric Society

- “State of vulnerability defined by many factors”
  
  Rockwood K., Age & Ageing 2005
Frailty: Definition

- No definition is perfect!
- Difficult to define.
- Multi-factorial definition
- Should correlate with
  - disability
  - co-morbidity
  - self reported health
- About identifying a group with adverse outcomes.
- Comparisons between studies are difficult as different definitions/measures of frailty are used.
Frailty: Risk Factors

* Age (>75 years)
* No formal education
* Living alone
* Chronic condition (CHF, Asthma, COPD, Stroke)
* Depression
* Cognitive impairment
* Sensory impairment (visual or hearing)
* Poor nutrition
* Poor mobility and ADL dependence

Ballard et al. (2013), Castell et al. (2013), Ng et al. (2014)
Figure 1. Frail older people display low resilience to minor stressors (e.g. urinary tract infection). This figure adapted from Clegg A, Young J, Illiffe S, et al. Frailty in elderly people. Lancet 2013;381:753(Figure 1) with permission from Elsevier.

Note: *Two or more out of the following nine diseases: myocardial infarction, angina, congestive heart failure, claudication, arthritis, cancer, diabetes, hypertension, COPD.
## Models of Frailty

<table>
<thead>
<tr>
<th>Models of frailty</th>
<th>Frailty Phenotype</th>
<th>Frailty Index</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Described first by Fried et al 2001. Focus on frailty as a physical syndrome.</td>
<td>Described by Rockwood as the proportion of the number of deficits to the total number of deficits possible.</td>
</tr>
</tbody>
</table>
| **Characteristics** | 1. Weight loss (>5% in last year)  
2. Exhaustion;  
3. Weakness (decreased grip strength);  
4. Slow walking speed (>6 to 7 seconds for 15 feet);  
5. Decreased physical activity. | Counts the number of possible deficits and disabilities from a set list. Frailty reported as a decimal. |
| **Score** | 0 = Non-Frail  
<3 = Pre-frail  
≥3 = Frail | Cut-off of 0.25 = frail  
Correlates well with the Clinical Frailty Scale |

Cesari M et al, Age Ageing 2014;43(1)10-12.
## Comparison of different Frailty screens

<table>
<thead>
<tr>
<th>Frailty Screen</th>
<th>Type of screen</th>
<th>No of items</th>
<th>No of frailty domains</th>
<th>Cognition assessed</th>
<th>Physical frailty assessed</th>
<th>Nutrition assessed</th>
<th>Validated in community sample</th>
<th>Cut-off scores available</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFI</td>
<td>Self rated Questionnaire</td>
<td>15</td>
<td>7</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>≥4 Mod-severe frail</td>
<td>71% (Develop disability)</td>
<td>63%</td>
</tr>
<tr>
<td>TFI</td>
<td>Self rated Questionnaire</td>
<td>15</td>
<td>6</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>≥5 Frail</td>
<td>62% (Develop disability)</td>
<td>71%</td>
</tr>
<tr>
<td>SPQ</td>
<td>Self rated Questionnaire</td>
<td>6</td>
<td>4</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>&gt;1 Frail</td>
<td>75% (Functional decline)</td>
<td>52%</td>
</tr>
<tr>
<td>EARLI</td>
<td>Self rated Questionnaire</td>
<td>6</td>
<td>4</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>≥6 (GP in UK)</td>
<td>64%</td>
<td>64%</td>
</tr>
<tr>
<td>SHARE-FI</td>
<td>Observer rated &amp; clinical:software</td>
<td>6</td>
<td>2</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>(11+ EU countries)</td>
<td>Non-frail Pre-frail Frail</td>
<td>-</td>
</tr>
<tr>
<td>FI</td>
<td>Observer rated:software</td>
<td>70</td>
<td>36</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Canada</td>
<td>Non-frail Pre-frail Frail</td>
<td>-</td>
</tr>
<tr>
<td>CFS</td>
<td>Observer rated:clinical</td>
<td>9</td>
<td>Overall clinical phenotype</td>
<td>(indirect)</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>&lt;3 Non-Frail 4 Pre-frail 5 Frail</td>
<td>0.70-0.75 accuracy for mortality</td>
<td>-</td>
</tr>
<tr>
<td>CHS</td>
<td>Observer rated:Questionnaire &amp; clinical</td>
<td>2</td>
<td>5</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0 Non-frail 1 Pre-frail 3 Frail</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
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.

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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.

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Understanding Frailty

* Frailty is:
  * Either social, physical or psychological or a combination of these components.
  * A dynamic condition that can improve or worsen over time.
  * Related to disability and multi-morbidity but NOT synonymous with it.

* Early intervention with frail persons is assumed to:
  * Improve quality of life.
  * Reduce costs of care, use of community resources, admissions to hospital and long-term care institutions.

* May be reversible?
  * Part reversible, particularly when it is independent of disease and disability.
  * Approximately 10% of people transition from pre-frail to non-frail (robust) states per 18 months of follow-up.

Rodríguez-Mañas et al., J Ger A Bio Sci Med Sci 2013
Gill et al., Arch Intern Med 2006
The Identification of Frailty: A Systematic Literature Review

Shelley A. Sternberg, MD, MSCE, Andrea Wershof Schwartz, MD, MPH, Sathy Karunananthan, MSc, Howard Bergman, MD, and A. Mark Clarfield, MD

An operational definition of frailty is important for clinical care, research, and policy planning. The literature on the clinical definitions, screening tools, and severity measures of frailty were systematically reviewed as part of the Canadian Initiative on Frailty and Aging. Searches of MEDLINE from 1997 to 2009 were conducted, and reference lists of retrieved articles were pearled, to identify articles published in English and French on the identification of frailty in community-dwelling people aged 65 and older. Two independent reviewers extracted descriptive information on study populations, frailty criteria, and outcomes from the selected papers, and quality rankings were assigned. Of 4,334 articles retrieved from the searches and 70 articles retrieved from the pearling, 22 met study inclusion criteria. In the 22 articles, physical function, gait speed, and cognition were the most commonly used identifying components of frailty, and death, disability, and institutionalization were common outcomes. The prevalence of frailty ranged from 5% to 58%. Despite significant work over the past decade, a clear consensus definition of frailty does not emerge from the literature. The definition and outcomes that best suit the unique needs of the researchers, clinicians, or policy-makers conducting the screening determine the choice of a screening tool for frailty. Important areas for further research include whether disability should be considered a component or an outcome of frailty. In addition, the role of cognitive and mood elements in the frailty construct requires further clarification. J Am Geriatr Soc 59:2129-2138, 2011.

Key words: frailty; systematic review; clinical tool; operational definition

When asked to define frailty, the image of a thin, stooped, slow octogenarian quickly comes to mind. Despite an intuitive understanding by clinicians, consensus on a definition of frailty has been much slower and more difficult to reach. Frailty has variously been defined as physical disability, impairment in basic or instrumental activities of daily living, or simply an increased vulnerability to adverse outcomes. The definition that Fried et al. proposed describes a wasting syndrome, with weight loss and negative energy balance as important elements. Other criteria have emphasized a life course approach, taking into account mid- and early-life influences on late-life frailty. Cognitive and social factors are a more-recent research focus.

An operational definition of frailty is important for clinical care, research, and policy planning. Fried’s definition based on data from the Cardiovascular Health Study includes three or more of weight loss, weakness, exhaustion, low activity level, and slow gait speed. This syndrome of frailty, with its own underlying pathophysiology, is held to be a construct distinct from disability or comorbidity. This definition has been widely used for research purposes but has so far proven impractical in the clinical setting. An “accumulation of deficits” model of frailty, which posits that, simply put, the more things go awry, the more likely frailty is to develop, has been described. This mathematical model counts disabilities and comorbidities. Although well validated and investigated, this tool is more useful for policy planners than for clinicians. A clinically usable definition of frailty would help physicians screen their patients for frailty and allow for stratification according to risk level before cancer treatment, coronary angiography, or surgery. Just as clinicians need a uniform definition of frailty to screen and treat their patients appropriately, so too do researchers and policy-makers. Whether exploring the etiologies and predictors of frailty, or interventions to prevent and treat frailty, researchers need a clear definition to define their study populations and measure their results. Similarly, policy decisions regarding the distribution of scarce resources to help frail older adults and planning for future needs of an aging society are also
Most-common identifying factors for frailty were: physical function, gait speed, and cognition.

Outcomes most commonly examined were death, disability, and institutionalization.

Trend towards including disability/functional decline as an outcome rather than a component of frailty.

No consensus!
* Overall weighted prevalence is 10.7% in community dwellers.
* Much variation between studies.
* Review of 21 studies and more than 61,500 community-dwelling older persons – range from 4 to 59.1% !!!!
* In the SHARE study prevalence rates between EU MS’s varied between 5.8% and 27.3%.
* Women (9.6%) twice as likely as men (5.2%) to be frail.
* Prevalence markedly increased in persons > 80 years of age.
* Prevalence of pre-frailty (those at risk of becoming frail) is up to 60% in >65 year olds in the EU.

Santos-Eggimann et al., J of Ger 2009, 64, 675-681.
Frailty in EU (SHARE)

Frailty in EU (SHARE)

The frailty index = the proportion of the number of deficits to the total number of deficits possible.
Frailty in Ireland: North V South

Figure 2: frailty by age group

(Scarlett et al., 2014)

Frailty is more prevalent among women than men in ROI: 7% compared with 6%. Both sexes have higher rates in NI where 22% of women and 19% of men are frail.

http://www.cardi.ie/sites/default/files/FrailtybriefFINAL-lowres.pdf
Frailty in the hospital setting
Prevalence of Frailty in the Emergency Department

* Older patients presenting to ED have more comorbidities and are present less well than younger patients (Peters et al., 2010)
* Although only one fifth of those attending ED are aged >65 years, half of all those admitted are Frail. (Latham et al., 2014)
* Approx. 80% of those aged >85 years require admission.
* In UK EDs 62% of all those aged > 85 years are admitted i.e. “ED conversion rate” compared with 21% of all ages.
* In Ireland, est. prevalence of frailty in older adults (>70) attending ED is high (60%) of non-consecutive older attendees in Ireland. (Small., 2016)
Prevalence of Frailty in the Emergency Department

- 307 patients
- 280 included:
  - Median age 78
  - 53.6% female

FRAIL scale
- Fatigue
- Resistance (ability to climb one flight of stairs)
- Ambulation (ability to walk one block)
- Illnesses (Greater than 5)
- Loss of Weight (>5%)  
  
 0 = robust/ 1-2 = pre-frail /≥3 = frail

- Point prevalence frailty: 58%
- FRAIL scale only: Point prevalence frailty: 29%
- FRAIL scale only: Point prevalence pre-frailty: 41%
Prevalence of Frailty in the Emergency Department

* ED Conversion Rate was 60% (169/280)
* 68.4% frail patients admitted V 50.8% of non-frail patients (p=0.003)
* 20% of ≥70’s readmitted ≤30-days after discharge
* 24% of frail patients readmitted ≤30-days V 15% of non-frail patients
* **Median LOS** for patients ≥70 was 7 (+/-10) days
* Frail patients had statistically significantly **longer LOS** 9 (+/-12) versus 5 (+/-8) for non-frail patients, z=-3.3, p=0.001
All inpatients ≥18 screened and assessed for frailty over 24hrs June 2016.

N=380.

Overall point prevalence of established frailty (excluding pre-frailty) = 33%.

Median Baseline (pre-admission) Clinical Frailty Scale score = 3; IQR +/- 3.

“Shifts” in frailty status in setting of acute illness are common and should be interpreted with care!
Point Prevalence of Frailty in a Irish University Hospital

* Baseline (pre-admission)

Distribution of Clinical Frailty Scale (CFS) scores
Point Prevalence of Frailty in a Irish University Hospital

* Current (on review)

Distribution of Clinical Frailty Scale (CFS) scores
Point Prevalence of Frailty in a Irish University Hospital

* Prevalence of frailty by ward

N=380*

*Overall point prevalence of frailty = 33%
Frailty in the community setting
Frailty in the Community

TILDA participants aged 65 years and older (n=3,422) categorised as:
- Robust (0-3 health problems),
- Pre-frail (4-7 health problems),
- Frail (8 or more health problems).

Roe et al., TILDA 2016
Figure 2. Weighted estimate of frailty among PHN users aged 65 years and older (TILDA, wave 1).
Frailty in the Community

O’Caoimh et al. BMC Geriatrics 2014, 14:104
http://www.biomedcentral.com/1471-2318/14/104

RESEARCH ARTICLE

Open Access

Screening for markers of frailty and perceived risk of adverse outcomes using the Risk Instrument for Screening in the Community (RISC)

Rónán O’Caoimh1,2*, Yang Gao1, Anton Svendrovski2, Elizabeth Healy3, Elizabeth O’Connell4, Gabrielle O’Keefe5, Una Cronin1, Eileen O’Herlihy1, Nicola Cornally1,6 and William D Molloy1,7

Abstract

Background: Functional decline and frailty are common in community dwelling older adults, increasing the risk of adverse outcomes. Given this, we investigated the prevalence of frailty-associated risk factors and their distribution according to the severity of perceived risk in a cohort of community dwelling older adults, using the Risk Instrument for Screening in the Community (RISC).

Methods: A cohort of 803 community dwelling older adults were scored for frailty by their public health nurse (PHN) using the Clinical Frailty Scale (CFS) and for risk of three adverse outcomes: i) institutionalisation, ii) hospitalisation and iii) death, within the next year, from one (lowest) to five (highest) using the RISC. Prior to scoring, PHNs stated whether they regarded patients as frail.

Results: The median age of patients was 80 years (interquartile range 10), of whom 64% were female and 47.4%
Figure 2 Distribution of clinical frailty scale scores in the study population (n = 784).
Consensus?

Frailty Consensus: A Call to Action

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ADVANTAGE Joint Action (JA) officially started on 1st January 2017 and celebrated its Kick-off meeting during 19th-20th January in Madrid.

A total of 64 participants representing the 21/28 EU Member States & Norway and several organizations that form the Consortium attended, as well as a number of invitees from several EU funded projects and representatives from the European Commission (DG SANTE and CHAFEA).
Joint Action on Frailty Prevention

Goals and progressing according to the Grant Agreement

**General objective**
- to build a common understanding on frailty to be used in the Member States by policy makers and other stakeholders.

**Specific objectives**
- To agree a common understanding of an integrated frailty prevention approach for health and social care system across Europe
- To prepare a common European framework, including roadmap on screening, early diagnosis, assessment and management of frailty
- To develop a strategy promoting the implementation of the “frailty prevention approach”

**Deliverables**
- 16 Public report

**Milestones**
- 33 milestones

**Project indicators/output/outcomes/impact**
- Set of documents, collection of information, reports, meeting, forum, tools for assessment and guidelines

**Project effectiveness**
- Assessment of communication within the project, administration, involvement of external stakeholders and management of the eight work packages

Co-funded by the Health Programme of the European Union
As frailty is age associated, it is not a surprise it’s prevalence is increasing.

While highly prevalent the “true” prevalence of frailty is unclear.

Little is known about incidence, pre-frailty states, trajectories and the benefits/risks associated with screening, surveillance & monitoring for frailty.

Definitions, definitions and settings (context) – consensus on a definition or a common approach is needed.

Targeted screening (case-finding) in different healthcare settings is important to intervene and plan service delivery.