The Community Assessment of Risk and Treatment Strategies (CARTS) Project

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A time of limited resources...

- Who gets them?
  
  Risk/benefit analysis is basis for distribution of scarce resources...

- Need to screen triage and prioritize those at greatest risk who will receive the greatest benefit...

- How do we screen and treat to prevent frailty..

- Where do we start?
The Challenge of Managing Frail Older Adults in the Community

Who is at risk?

It is possible to identify risk but how do we quantify it?

What is the greatest risk?

Should this person stay at home.....go to a nursing home?

What is the most appropriate response?
What is Risk?
Understanding Risk

• Risk is the chance an event will occur in the future
• It is the amount of potential harm that can be expected to occur at a set period of time, due to a specific
• Measurement is based upon individual risk factors
## Understanding Risk

### Risk Matrix

<table>
<thead>
<tr>
<th></th>
<th>Minimal</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certain</td>
<td>Green</td>
<td>Green</td>
<td>Yellow</td>
<td>Orange</td>
<td>Extreme Risk</td>
</tr>
<tr>
<td>Likely</td>
<td>Green</td>
<td>Green</td>
<td>Yellow</td>
<td>Orange</td>
<td>High Risk</td>
</tr>
<tr>
<td>Possible</td>
<td>Green</td>
<td>Green</td>
<td>Yellow</td>
<td>Orange</td>
<td>Medium Risk</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Green</td>
<td>Green</td>
<td>Yellow</td>
<td>Orange</td>
<td>Low Risk</td>
</tr>
<tr>
<td>Rare</td>
<td>Green</td>
<td>Green</td>
<td>Yellow</td>
<td>Orange</td>
<td>Minimal Risk</td>
</tr>
</tbody>
</table>
Understanding Frailty

• Difficult to define
• Multi-factorial definition
• Should correlate with
  • -disability
  • -co-morbidity
  • -self reported health
• About identifying a group with adverse outcomes.
Understanding Frailty

• “State of vulnerability defined by many factors” K Rockwood; Age & Ageing 2005.

• “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.

• Is frailty one condition?
Frailty

- Is a disorder of several inter-related physiological systems resulting in an accelerated decrease in physiological reserve & in the failure of homeostatic mechanisms
- Leading to a state of increased vulnerability after a stressor event
  - An apparently small insult leads to a disproportionate change in health status
- Which increases the risk of adverse outcomes, including
  - falls, delirium, disability & death

Frailty is expensive
Institutionalisation is expensive
What can be done?
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)
Risk Factors

Presence of risk factors + Reduced resilience = Frailty

Over 75 years
Diagnosed with COPD
Living alone
ADL dependency
The CARTS Project

**Aim:** To screen for frailty, triage those at medium-high risk of adverse healthcare outcomes and perform comprehensive assessments with person-centered treatment strategies.
CARTS as Risk Paradigm

• CARTS operationalizes “risk” as a surrogate marker for “frailty”

• Frailty is heightened vulnerability

• Instead of looking at frailty, the RISC uses risk of three adverse outcomes instead.

• Practical, approach taking caregiver network into consideration so it is more holistic than single patient parameters
CARTS PROGRAM (STAT)

- Screen
- Triage
- Assess: Diagnose/Identify issues
- Treat and Evaluate effect of interventions
- Follow over time to map risk
How CARTS Works

Public Health Nurses assess and score older adults in the community using the RISC tool

Those at medium-high risk are referred for further assessment using the CARI

Tailored treatment strategies prescribed and delivered by primary care team
How CARTS Works

RISC tool can be used in any setting e.g. community, family doctor or hospital

Single tool that communicates vital information about a patient quickly using a universal language-RISK

Integrates different parts of the system like community, family doctors and outpatients and inpatient services using this simple tool to designate risk level
Screening Tools

• Short screening and assessment tools:
  – Risk Instrument for Screening in the Community (RISC)
  – Community Assessment of Risk Instrument (CARI)

• These instruments assess a person’s physical, cognitive, and medical condition, and the ability of their caregiver network (i.e. family, friends, home help etc.) to manage any deficits in their care.
The RISC Tool

- Assesses risk of adverse outcomes within a defined time period (i.e. one year).
- Measures **care needs** (mental state, medical state and ADLs) & **care deficits** (ability of the caregiver network to manage any issues)
- Quick, objective and reproducible
- Predicts hospitalisation, institutionalisation and death
  - Triage those at higher risk to rapid assessment
- Enhances the integrated care agenda
  - A common language between primary and secondary care
### RISC Score Sheet

#### Demographics

<table>
<thead>
<tr>
<th>Personal Details</th>
<th>Name ________________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>______________________________________</td>
</tr>
</tbody>
</table>

**Living Arrangements:**
- [ ] Alone
- [ ] Spouse
- [ ] Child
- [ ] Other: ____________________________

**Gender:**
- [ ] Male
- [ ] Female
- [ ] DOB / / ID _______________________

#### Instructions

1. **Domain Concern**
   - If no concern for a Domain, move on to the next Domain. Complete all 4 domains.
2. **Step 1 Concern**
3. **Step 2 Concern**
4. **Step 3 Concern**

#### Caregiver Network

- [ ] Can manage
- [ ] Cannot manage
- [ ] Unable/Unlikely

#### Domain

<table>
<thead>
<tr>
<th>Domain</th>
<th>Concern</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mental State</td>
<td>N</td>
<td>Y</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 5</td>
</tr>
<tr>
<td>2. ADLs</td>
<td>N</td>
<td>Y</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 5</td>
</tr>
<tr>
<td>3. Medical/Physical State</td>
<td>N</td>
<td>Y</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 5</td>
</tr>
<tr>
<td>4. Other</td>
<td>N</td>
<td>Y</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>specify</td>
<td></td>
<td></td>
<td></td>
<td>4 5</td>
</tr>
</tbody>
</table>

#### Global Risk Score

- **A. Institutionalisation**
  - Overall risk of admission to long-term care (nursing home) in the next year.
  - [ ] Minimal / rare
  - [ ] Low / unlikely
  - [ ] Moderate / possible
  - [ ] High / likely
  - [ ] Extreme / certain

- **B. Hospitalisation**
  - Risk of hospitalisation during the next year.
  - [ ] Minimal / rare
  - [ ] Low / unlikely
  - [ ] Moderate / possible
  - [ ] High / likely
  - [ ] Extreme / certain

- **C. Death**
  - Risk of death in the next year.
  - [ ] Minimal / rare
  - [ ] Low / unlikely
  - [ ] Moderate / possible
  - [ ] High / likely
  - [ ] Extreme / certain

#### Global Risk Score Definitions

1. **Minimal:** Little or no serious consequence related to the risk / Rare: The event will almost never occur.
2. **Low:** Small impact from the risk, unlikely to cause serious harm / Unlikely: Low probability of the event occurring.
3. **Moderate:** Significant risk present / Possible: The event may occur but is infrequent or unlikely to occur soon.
4. **High:** Serious impact likely from the risk / Likely: High probability of the event occurring.
5. **Extreme:** Severe consequences likely / Certain: The event will almost certainly occur.
**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.

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DALHOUSIE UNIVERSITY
Department of Medicine
The CARI Tool

• More detailed risk assessment
• Collects demographic data and records the presence and magnitude (low, medium, high) of concern within and across three domains:
  – Mental state (7 items)
  – ADLs (15 items)
  – Medical state (9 items)
• 10 minutes to complete as part of a comprehensive geriatric assessment
# CARI Score Sheet

**Demographics:**
- Personal Details: Name__ Gender M/F: __ DOB: __/__/__
- Reason for referral: __
- Date of assessment: __

**Educational Level:**
- Primary __ Secondary __ 3rd level __ Other __

**Living Arrangements:**
- Alone: __ Living with: __

**Support:**
- Informal Yes: __ No: __ hrs/day days/week: __
- Family/Partner: __ Friend: __ Neighbour: __ Other: __

**Cancer Burden:**
- Primary: __
- Carer Burden Score: Mild (0-10) __ Moderate (11-20) __ Severe (21-30) __

**Medical History:**
- Primary diagnosis: __
- Other diagnoses: __

**Healthcare use:**
- No. A&E attendances (in the last year): __
- No. of admissions (in the last year): __ N/A __

**Medication:**
- Prescription meds: __ Over the counter meds: __

**Frailty:** (Your overall impression) Frail: __ Yes: __ Noc: __

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### Instructions

**Domain:** Concern

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mental State</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If there are concerns about issues in this domain (Circle Yes or No)</td>
<td>Circle the present severity of the concern</td>
<td>Can the caregiver network manage this concern for this domain?</td>
</tr>
<tr>
<td>N Y</td>
<td>1. Mild.</td>
<td>Can manage</td>
</tr>
<tr>
<td>2. Moderate.</td>
<td>2. Can manage</td>
<td></td>
</tr>
<tr>
<td>3. Severe.</td>
<td>3. Some help required</td>
<td></td>
</tr>
</tbody>
</table>

**A. Thinking & Reasoning**

| N Y | 1. Mild cognitive impairment (memory loss without functional loss (typically SMMSE of >24)). |
| N Y | 2. Established early dementia (typically SMMSE of >24-20). |
| N Y | 3. Moderate to severe dementia (Typically SMMSE of < 20). |

**B. Behaviours**

| N Y | 1. Agitation has occurred in the past but not recently. |
| N Y | 2. Agitation present but manageable / infrequent. |
| N Y | 3. Agitation present, wandering/restlessness, difficult to manage. |

**C. Psychiatric**

| N Y | 1. Past history of mood/anxiety or depression. |
| N Y | 2. Symptoms causing distress /social withdrawal. |

**D. Other**

<p>| N Y | Specify |
| N Y | 1. 2. 3. |</p>
<table>
<thead>
<tr>
<th>Domain 2.</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Issues</td>
<td>Concern</td>
<td>Status</td>
</tr>
<tr>
<td></td>
<td>ADLs</td>
<td>Activities of daily living</td>
<td>Circle the present level of function</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is there concern about issues in this domain? (Circle Yes or No)</td>
<td>1. Supervision or Set up. 2. Assist. 3. Dependent.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IF YES complete each section A, B below.</td>
<td></td>
</tr>
<tr>
<td>A. Basic ADLs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bladder</td>
<td>N O Y □</td>
<td>Occasional incontinence e.g. once per week /situational. 2. Frequently incontinent /wears pads. 3. Completely incontinent, needs physical help with pads or toilet.</td>
<td></td>
</tr>
<tr>
<td>Bowel</td>
<td>N O Y □</td>
<td>Occasional incontinence e.g. once per week /situational. 2. Frequently incontinent /wears pads. 3. Completely incontinent, needs physical help with pads or toilet.</td>
<td></td>
</tr>
<tr>
<td>Transfer</td>
<td>N O Y □</td>
<td>Minor help / standy assistance of one person / requires raised toilet seat or handrails. 2. Major help / assistance of one to two people. 3. Holist / bed bound.</td>
<td></td>
</tr>
<tr>
<td>Mobility</td>
<td>N O Y □</td>
<td>Uses aid (stick/frame) or standy assistance one person. 2. Major help / assistance of one to two people. 3. Immobile.</td>
<td></td>
</tr>
<tr>
<td>Dressing</td>
<td>N O Y □</td>
<td>Can dress with supervision set up /Rarely changes clothes. 2. Can dress upper half (but not lower half). 3. Full assistance (upper &amp; lower half) or resistive or refusing.</td>
<td></td>
</tr>
<tr>
<td>Bathing</td>
<td>N O Y □</td>
<td>Supervision in shower / bath but wash themselves / Not washing. 2. Needs assistance with set up. 3. Full assistance or unable as resistive or refusing.</td>
<td></td>
</tr>
<tr>
<td>Stairs/steps (No stairs not used)</td>
<td>N O Y □</td>
<td>Needs supervision on stairs but can use stairs / requires handrails. 2. Physical assistance of one to two people up &amp; down. 3. Unable / needs stair-lift / unwilling to move downstairs but unsafe.</td>
<td></td>
</tr>
<tr>
<td>Feeding</td>
<td>N O Y □</td>
<td>Supervision / encouragement / eating / set up. 2. Needs some assistance e.g. cutting up food but patient can feed themselves. 3. Hand fed / not eating or refusing food / peg feeding.</td>
<td></td>
</tr>
<tr>
<td>B. Instrumental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology use</td>
<td>N O Y □</td>
<td>Difficulty learning how or cannot use new appliances. 2. Can use with assistance/passive user (e.g. can answer phone but cannot initiate). 3. Unable / using inappropriately (calling at night).</td>
<td></td>
</tr>
<tr>
<td>Shopping</td>
<td>N O Y □</td>
<td>Needs someone to plan shopping with them / help with bags. 2. Needs someone to plan / physically assist them with shopping. 3. Unable to shop, would need shopping delivered.</td>
<td></td>
</tr>
<tr>
<td>Food preparation</td>
<td>N O Y □</td>
<td>Can only make simple meals (sandwiches / breakfast etc.). 2. Rotates meals prepared by carer / meals on wheels / makes tea. 3. Meals served to them / Unsafe (hazard) in kitchen.</td>
<td></td>
</tr>
<tr>
<td>Transportation (Not referring to driving ability)</td>
<td>N O Y □</td>
<td>Can arrange own transport out of house (call taxi, BRT). 2. Needs someone to accompany them outside the house. 3. Cannot travel outside house even with assistance/housebound.</td>
<td></td>
</tr>
<tr>
<td>Medications</td>
<td>N O Y □</td>
<td>Needs prompting to take medications / needs meds organised. 2. Needs to be given some (e.g. subcut insulin) / all medications. 3. Poor compliance / inappropriate administration / refusing.</td>
<td></td>
</tr>
<tr>
<td>Finances</td>
<td>N O Y □</td>
<td>Directs people but can't manage complex banking. 2. Needs assistance with bills, money, poor concept of value. 3. Taken care of by other / no concept of money / financial abuse.</td>
<td></td>
</tr>
<tr>
<td>C. Other</td>
<td>N O Y □</td>
<td>Specify</td>
<td>1 2 3</td>
</tr>
</tbody>
</table>
### Domain 3

#### Step 1

**Issues**

- Medical State
- A. Med Issues
- Chronic medical condition(s)
- Exclude mental state issues
- Symptoms/
  - Palliative care
  - Issues (e.g. pain)
- B. Physical
  - Hearing
  - Vision
  - Communication
  - Swallow
  - Nutrition
- Gait / Falls
- Environment/
  - Socioeconomics
- C. Other
- Specify

#### Step 2

**Care Network**

1. Can the caregiving network manage the concern for this domain?
   - 1. Can manage
   - 2. Can't manage
   - 3. Some gaps
   - 4. Cannot manage
   - 5. Absent/ability

**Global Risk Score**

<table>
<thead>
<tr>
<th>A. Institutionalization</th>
<th>1</th>
<th>Minimal</th>
<th>2</th>
<th>Low</th>
<th>3</th>
<th>Moderate</th>
<th>4</th>
<th>High</th>
<th>5</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall risk of admission to long-term care (nursing home) in the next year.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Hospitalization</th>
<th>1</th>
<th>Minimal</th>
<th>2</th>
<th>Low Unlikely</th>
<th>3</th>
<th>Moderate Possible</th>
<th>4</th>
<th>High Likely</th>
<th>5</th>
<th>Extreme Certain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of hospitalization including prolonged admission or readmission in the next year.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C. Death</th>
<th>1</th>
<th>Minimal</th>
<th>2</th>
<th>Low Unlikely</th>
<th>3</th>
<th>Moderate Possible</th>
<th>4</th>
<th>High Likely</th>
<th>5</th>
<th>Extreme Certain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of death in the next year.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comments:**

**Signed:**

**Role/position:**

**Years of experience:**

**Date:** / /
The CARTS instruments have been used with community-dwelling older adults in Portugal (n=5,500), Australia (n=500), Spain (n=350) and Ireland (n=800).

Results to date indicate that the RISC has good predictive validity (for hospitalisation, institutionalisation and death); high internal consistency and inter-rater reliability.

Unlike other risk/frailty instruments, the RISC takes into account the ability of the caregiver network to manage any concerns.
High Risk

The line graph shows a trend from Past to Future with High Risk decreasing over time.
Past Present Future

Moderate Risk

Decline

Improvement
Low Risk

Graph showing the trend of risk from past to present and future.
RISC Predictive Validity

• *Baseline*
  
  • Screened 803 March-August 2013

• *Follow up*
  
  • August 2013 to March 2014
Risk and Actual Rate (%) of Institutionalisation
Rate (%) of Institutionalisation based on Clinical Frailty Scores (Frail $\geq 5$ CFS) & Non-frail (< 5 CFS)
Risk of Hospitalisation and Actual No. of Hospital Days

**Total No. of Hospital Days**

- Low risk (n=687)
- Medium risk (n=63)
- High risk (n=33)

**Average No. of Hospital Days/patient**

- Low risk (n=687)
- Medium risk (n=63)
- High risk (n=33)
Hospitalisation (days) based on Clinical Frailty Scores (Frail ≥ 5 CFS) & Non-frail (< 5 CFS)

<table>
<thead>
<tr>
<th></th>
<th>Total Number of Hospital Days</th>
<th>Average Number of Hospital days/patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frail (n=419)</td>
<td>1800</td>
<td>4.5</td>
</tr>
<tr>
<td>Not Frail (n=357)</td>
<td>600</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Risk and Actual Rate (%) of Death
Rate (%) of Death based on Clinical Frailty Scores (Frail ≥ 5 CFS) & Non-frail (< 5 CFS)
### Natural History of Risk using the RISC

<table>
<thead>
<tr>
<th>Global Risk Score (Institutionalisation)</th>
<th>1-2 (Low)</th>
<th>3 (Moderate)</th>
<th>4-5 (High)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Patients at Baseline (T0)</td>
<td>687</td>
<td>63</td>
<td>33</td>
</tr>
<tr>
<td>Institutionalised by T6 months</td>
<td>10 (1%)</td>
<td>6 (11%)</td>
<td>3 (9%)</td>
</tr>
<tr>
<td>Institutionalised by T12 months</td>
<td>21 (3%)</td>
<td>9 (14%)</td>
<td>4 (12%)</td>
</tr>
<tr>
<td>Institutionalised by T21 months</td>
<td>57 (8%)</td>
<td>21 (33%)</td>
<td>10 (30%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Global Risk Score (Death)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Patients at Baseline (T0)</td>
<td>622</td>
<td>140</td>
<td>21</td>
</tr>
<tr>
<td>Deaths by T6 months</td>
<td>23 (4%)</td>
<td>15 (10%)</td>
<td>7 (30%)</td>
</tr>
<tr>
<td>Deaths by T12 months</td>
<td>41 (7%)</td>
<td>26 (19%)</td>
<td>12 (57%)</td>
</tr>
<tr>
<td>Deaths by T21 months</td>
<td>67 (11%)</td>
<td>38 (27%)</td>
<td>14 (67%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Global Risk Score (Hospitalisation)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Patients at Baseline (T0)</td>
<td>687</td>
<td>63</td>
<td>33</td>
</tr>
<tr>
<td>Total No. of Days in Hospital</td>
<td>1979</td>
<td>202</td>
<td>235</td>
</tr>
<tr>
<td>Average No. of Days in Hospital per patient</td>
<td>2.9</td>
<td>3.2</td>
<td>7.1</td>
</tr>
</tbody>
</table>

n= 783 of 803 patients with complete data
Outcomes of AO based on baseline clinical frailty scores

<table>
<thead>
<tr>
<th>Institutionalisation Rate</th>
<th>Frail (≥ 5 CFS) (n=421)</th>
<th>Not Frail (&lt;5 CFS) (n=357)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T6 months</td>
<td>14 (3%)</td>
<td>5 (1%)</td>
</tr>
<tr>
<td>T12 months</td>
<td>24 (6%)</td>
<td>11 (3%)</td>
</tr>
<tr>
<td>T21 months</td>
<td>61 (14.5%)</td>
<td>21 (6%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Death Rate</th>
<th>Frail (≥ 5 CFS) (n=421)</th>
<th>Not Frail (&lt;5 CFS) (n=357)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T6 months</td>
<td>37 (8.7%)</td>
<td>9 (2.5%)</td>
</tr>
<tr>
<td>T12 months</td>
<td>62 (14.7%)</td>
<td>18 (5%)</td>
</tr>
<tr>
<td>T21 months</td>
<td>89 (21%)</td>
<td>32 (9%)</td>
</tr>
</tbody>
</table>

n = 778 of 803 patients with valid Clinical Frailty Scores
Hospitalizations Based on baseline Clinical Frailty Scale scores

<table>
<thead>
<tr>
<th>Hospitalisation</th>
<th>Frail (≥ 5 CFS) (n=419)</th>
<th>Not Frail (&lt;5 CFS) (n=357)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total No. of Days in Hospital</td>
<td>1654</td>
<td>765</td>
</tr>
<tr>
<td>Average No. of Days in Hospital per patient</td>
<td>3.9</td>
<td>2.1</td>
</tr>
</tbody>
</table>
## Comparison of RISC data between Ireland and Portugal

<table>
<thead>
<tr>
<th></th>
<th>1-2 (Low)</th>
<th>3 (Moderate)</th>
<th>4-5 (High)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Global Risk Score (Institutionalisation)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk of Institutionalisation (Ireland)</td>
<td>687 (88%)</td>
<td>63 (8%)</td>
<td>33 (4%)</td>
</tr>
<tr>
<td>Risk of Institutionalisation (Portugal)</td>
<td>34 (33%)</td>
<td>15 (14%)</td>
<td>55 (53%)</td>
</tr>
<tr>
<td><strong>Global Risk Score (Hospitalisation)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk of Hospitalisation (Ireland)</td>
<td>525 (67%)</td>
<td>172 (22%)</td>
<td>86 (11%)</td>
</tr>
<tr>
<td>Risk of Hospitalisation (Portugal)</td>
<td>36 (35%)</td>
<td>26 (25%)</td>
<td>42 (40%)</td>
</tr>
<tr>
<td><strong>Global Risk Score (Death)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk of Death (Ireland)</td>
<td>622 (79%)</td>
<td>140 (18%)</td>
<td>21 (3%)</td>
</tr>
<tr>
<td>Risk of Death (Portugal)</td>
<td>40 (38%)</td>
<td>32 (31%)</td>
<td>32 (31%)</td>
</tr>
</tbody>
</table>

Ireland: n= 783, mean age 80 years, 36% male and 64% female  
Portugal n= 104, mean age 82 years, 35% male and 65% female
Table 1: Receiver operating characteristic (ROC) curve area under the curve scores and 95% confidence intervals (CI) for the global risk score and components of the Risk Instrument for Screening in the Community (RISC) scores including mental state, activities of daily living (ADL), and medical state domains, the primary caregiver, and primary cohabitant (who the patient is living with), for predicting one-year risk of institutionalization, hospitalisation, and death.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Institutionalization</th>
<th>Actual outcomes</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISC global risk score (CI)</td>
<td>0.70 (0.62–0.76)**</td>
<td>0.61 (0.55–0.66)**</td>
<td>0.70 (0.64–0.75)**</td>
</tr>
<tr>
<td>Mental state</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental state concern</td>
<td>0.62 (0.55–0.69)***</td>
<td>0.52 (0.47–0.58)</td>
<td>0.56 (0.50–0.61)*</td>
</tr>
<tr>
<td>Mental state severity of concern</td>
<td>0.64 (0.57–0.71)***</td>
<td>0.53 (0.47–0.58)</td>
<td>0.56 (0.51–0.62)*</td>
</tr>
<tr>
<td>Mental state caregiver network</td>
<td>0.64 (0.57–0.71)***</td>
<td>0.53 (0.47–0.58)</td>
<td>0.56 (0.50–0.61)</td>
</tr>
<tr>
<td>ADLs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADLs concern</td>
<td>0.60 (0.54–0.66)**</td>
<td>0.55 (0.50–0.60)</td>
<td>0.56 (0.50–0.61)*</td>
</tr>
<tr>
<td>ADLs severity of concern</td>
<td>0.66 (0.60–0.72)***</td>
<td>0.54 (0.49–0.59)*</td>
<td>0.63 (0.58–0.69)***</td>
</tr>
<tr>
<td>ADLs caregiver network</td>
<td>0.68 (0.62–0.74)***</td>
<td>0.57 (0.52–0.63)**</td>
<td>0.59 (0.53–0.65)**</td>
</tr>
<tr>
<td>Medical state</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical state concern</td>
<td>0.54 (0.48–0.61)</td>
<td>0.52 (0.47–0.58)</td>
<td>0.53 (0.48–0.59)</td>
</tr>
<tr>
<td>Medical state severity of concern</td>
<td>0.62 (0.55–0.69)***</td>
<td>0.57 (0.52–0.62)*</td>
<td>0.62 (0.56–0.67)***</td>
</tr>
<tr>
<td>Medical state caregiver network</td>
<td>0.63 (0.56–0.69)***</td>
<td>0.54 (0.49–0.59)</td>
<td>0.56 (0.50–0.61)*</td>
</tr>
</tbody>
</table>

*Statistically significant with P value <0.05.
**Statistically significant with P value <0.01.
***Statistically significant with P value <0.001.
Caregiver network

- The ability of the caregiver network to manage a person’s care is vital in risk of adverse healthcare outcomes such as hospitalisation, transfer to nursing home and death

- According to prior research:
  - The ability of the caregiver network to manage is a significant predictor of adverse healthcare outcomes
    
    \[O’Caoimh \textit{et al}, J Aging Research, 2015\]
  
    – Providing emotional and instrumental support to caregivers can reduce hospitalisation
    
    \[Longacre \textit{et al}, Research in Gerontological Nursing, 2014\]
Understanding Risk

Frailty + Caregiver Network = Adverse Outcomes
Funding

• **European H2020**
  – Applied for H2020 in 2014 – successful Stage 1, unsuccessful Stage 2
  – Resubmit for H2020 2016/2017 calls
  – The RISC tool is currently being integrated into 5 H2020 proposals (3 for PHC-21 and 2 for PHC-25)

• **Other National/International**
  – Health Research Board 2015 Definitive Intervention Call (submitted)
  – Funded in Spain, Portugal and Australia for their studies underway
  – Health Service Executive implementation across Cork and Kerry to screen 3000, triage and pilot interventions (€300,000 funding from 2015-2017).


- International Association of Gerontology and Geriatrics – European Region Congress (April 2015)
- National Homecare and Assisted Living Conference in Dun Laoghaire in May 2015 (invited speaker)
- ICT4Ageing Conference in Lisbon in May 2015 (Prof Molloy keynote speaker)
- GSA Conference in Orlando, USA in November 2015 (Symposium and abstracts submitted)
Screening for markers of frailty and perceived risk of adverse outcomes using the Risk Instrument for Screening in the Community (RISC)

Rónán O’Caoimh, Yang Gao, Anton Svendsrovska, Elizabeth Healy, Elizabeth O’Connell, Gabrielle O’Keeffe, Una Cronin, Eileen O’Herlihy, Nicola Cornally and William D Molloy

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 54% were female and 47%...
THE COMMUNITY ASSESSMENT OF RISK INSTRUMENT: INVESTIGATION OF INTER-RATER RELIABILITY OF AN INSTRUMENT MEASURING RISK OF ADVERSE OUTCOMES

R.M. CLARNETTE*, J.P. RYAN†, E. O'HERLIHY*, A. SVENROVSKI†, N. CORNALLY*, R. O'CAOIMH, P. LEAHY-WARREN*, C. PAUL†, D.W. MOLLOY*†

1. School of Medicine and Pharmacology, University of Western Australia, Crawley, Australia; 2. Department of Community and Geriatric Medicine, Fremantle Hospital and Health Service, Fremantle, Australia; 3. Centre for Gerontology and Rehabilitation, University College Cork, St Finbarrs Hospital, Cork City, Ireland; 4. UZIK Consulting Inc., Toronto, Canada; 5. School of Nursing and Midwifery, University College Cork, Ireland; 6. Institute of Biomedical Sciences Abel Salazar—University Of Porto, Porto, Portugal.

Corresponding author: Dr. Patricia Leahy-Warren, Email: patricia.leahy@ucc.ie, Telephone: +353214901461

Abstract: Background: Frailty is increasingly common in community-dwelling older adults and increases their risk of adverse outcomes. Risk assessment is implicit in the Aged Care Assessment Teams process, but few studies have considered the factors that influence the assessor's decision making or explored the factors that may contribute to their interpretation of risk. Objective: to examine the inter-rater reliability of the Community Assessment of Risk Instrument (CARI), which is a new risk assessment instrument. Design: A cohort study was used. Setting and participants: A sample of 50 community-dwelling older adults underwent comprehensive geriatric assessment by two raters: a geriatrician and a registered nurse. Procedure and measurements: Each participant was scored for risk by the two raters using the CARI. This instrument ranks risk of three adverse outcomes, namely i) institutionalisation, ii) hospitalisation and iii) death within the next year from a score of 1, which is minimal risk to 5, which is extreme risk. Inter-rater reliability was assessed with Gamma, Spearman correlation and Kappa statistics. Internal consistency was assessed with Cronbach’s alpha. Results: There were 30 female (mean age 82.25 years) and 20 male (mean age 81.75 years) participants. Items within domains showed good-excellent agreement. The gamma statistic was >0.77 on 6/7 Mental State items, 14/15 items in the Activities of Daily Living domain. In the Medical domain, 6/9 items had Gamma scores >0.80. The global domain scores correlated well, 0.88, 0.72 and 0.87. Caregiver network scores were 0.71, 0.73 and 0.51 for the three domains. Inter-rater reliability scores for global risk scales were 0.86 (institutionalisation) and 0.78 (death).
Which Part of a Short, Global Risk Assessment, the Risk Instrument for Screening in the Community, Predicts Adverse Healthcare Outcomes?

Rónán O’Caoimh,¹ Carol FitzGerald,¹ Una Cronin,¹ Anton Svendrovski,² Yang Gao,¹ Elizabeth Healy,³ Elizabeth O’Connell,⁴ Gabrielle O’Keeffe,⁵ Eileen O’Herlihy,¹ Elizabeth Weathers,¹,⁶ Nicola Cornally,¹,⁶ Patricia Leahy-Warren,⁶ Francesc Orfils,⁷ Constança Paúl,⁸ Roger Clarinette,⁹ and D. William Molloy¹

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⁴Centre for Public Health Nursing, Mahon and Ballintemple, Cork, Ireland
⁵Health Service Executive, Ireland
⁶School of Nursing & Midwifery, University College Cork, Ireland
⁷IDIAP Jordi Gol, Barcelona, Spain
⁸ICBAS, University of Porto, Portugal
⁹School of Medicine and Pharmacology, University of Western Australia, 35 Stirling Hwy, Crawley, WA 6009, Australia

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COMPONENTS OF THE RISK INSTRUMENT FOR SCREENING IN THE COMMUNITY (RISC) THAT CORRELATE WITH PUBLIC HEALTH NURSES’ PERCEPTION OF RISK

P. LEAHY-WARREN¹, R. O’CAOIMH², C. FITZGERALD², A. COCHRANE³, A. SVENDROVSKI¹, U. CRONIN⁴, E. O’HERLIHY⁵, N. CORNALLY¹, Y. GAO², E. HEALY², E. O’CONNELL⁶, G. O’KEEFFE⁷, S. COVENEY⁸, J. MCGLYNN⁹, C. FITZGERALD², R. CLARNETTE⁹, D. W. MOLLOY²

¹. School of Nursing & Midwifery, University College Cork, Ireland; ². Centre for Gerontology and Rehabilitation, University College Cork, St Finbarr’s Hospital, Cork City, Ireland; ³. Department of Psychology, Maynooth University, Maynooth, Co Kildare, Ireland; ⁴. UZIK Consulting Inc., Toronto, ON, Canada; ⁵. Centre for Public Health Nursing, Ballincollig and Bishopstown, Co Cork, Ireland; ⁶. Centre for Public Health Nursing, Mahon and Ballintemple, Cork City, Ireland; ⁷. Health Service Executive, Ireland; ⁸. School of Medicine and Pharmacology, University of Western Australia, Crawley, Australia.
Corresponding author: Dr Róisín O’Caoimh, Centre for Gerontology and Rehabilitation, University College Cork, St Finbarr’s Hospital, Douglas road, Cork City, Ireland, Email: roc Saoimh@hotmail.com, Phone: +3533214901461, Fax: +35334901635

Abstract: Background: Functional decline and frailty are common in community-dwelling older adults, leading to an increased risk of adverse outcomes. Objective: To examine the factors that public health nurses perceive to cause risk of three adverse outcomes: institutionalisation, hospitalisation, and death, in older adults, using the Risk Instrument for Screening in the Community (RISC). Design: A quantitative, correlational, descriptive design was used. Setting and Participants: A sample of 803 community-dwellers, aged over 65 years receiving regular follow-up by public health nurses. Procedure and Measurements: Public health nurses (n=15) scored the RISC and the Clinical Frailty Scale (CFS) on patients in their caseload. We examined and compared correlations between the severity of concern and ability of the caregiver network to manage these concerns with public health nurses’ perception of risk of the three defined adverse outcomes. Results: In total, 782 RISC scores were available. Concern was higher for the medical state domain (686/782,88%) compared with the mental state (306/782,39%) and activities of daily living (595/782,76%) domains. Concern was rated as severe for only a small percentage of patients. Perceived risk of institutionalisation had the strongest correlation with concern over patients mental state,(r=0.53), while risk of hospitalisation,(r=0.53) and death,(r=0.40) correlated most strongly
Review

Risk prediction in the community: A systematic review of case-finding instruments that predict adverse healthcare outcomes in community-dwelling older adults

Rónán O’Caoimh\textsuperscript{a,b,*}, Nicola Cornally\textsuperscript{a,c}, Elizabeth Weather\textsuperscript{a,c}, Ronan O’Sullivan\textsuperscript{a}, Carol Fitzgerald\textsuperscript{a}, Francesc Orfila\textsuperscript{d}, Roger Clarinette\textsuperscript{e}, Constança Paúl\textsuperscript{f}, D. William Molloy\textsuperscript{a,b}

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\textsuperscript{d} Institute for Research Primary Healthcare, Jordi Gol University, Barcelona, Spain
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ABSTRACT

Few case-finding instruments are available to community healthcare professionals. This review aims to identify short, valid instruments that detect older community-dwellers risk of four adverse outcomes:
Thank You

ANY QUESTIONS??