Fall Prevention: Screening Older Adults from the Bedside to the Community
Jacqueline Osborne PT, DPT, GCS, CEEAA
September 14, 2014

Session Objectives

1. Recognize the content of evidence-based falls screening tools for older adults in different settings:
   a) Community
   b) Home Health Care
   c) Skilled Nursing Facility
   d) Sub-acute/Inpatient Rehabilitation
   e) Acute Care

2. Recognize the steps necessary to implement a falls screen event for community dwelling older adults.

3. Identify how to use the information collected at a falls screening event for community dwelling older adults.
Many falls are preventable through risk identification and targeted intervention!

Beattie 2014

Fall Prevention Starts with a Screen
**Risk Stratification**

- **High risk = Further assessment**
  - Reports frequent falls in the last year
  - Reports 1 fall with high-risk circumstances
  - Presents for medical attention due to a fall
  - Reports difficulties with walking or balance

- **Moderate Risk = Referral to community-based programs or to a health care provider**
  - Reports only a single fall
  - Reports or demonstrates no difficulty with walking or balance

- **Low Risk = Referral to community-based programs**
  - No reported falls
  - No demonstrate gait and balance difficulties
Community Dwelling Older Adults

- Private Residences
- Assisted Living Facilities
- Senior Center Members
- Outpatients

Evidence-Based Screening Tools

- American Geriatric Society/British Geriatric Society Clinical Practice Guidelines for Fall Prevention
- Performance-Based Measures
- STEADI Toolkit
- Risk Stratification Tool

“All older people should be given a short screen for fall risk and, if at risk referred on to further detailed assessment and intervention.”

(AGS, BGS, AAOS 2001;2010)
Screen vs Assessment

**Screen**
- Require little time
- Require minimal to no specialized training
- Inexpensive
- Valid in general older adult populations

**Assessment**
- Increased time commitment
- Requires specialized training to administer and interpret
- May be costly to obtain and use
- Non-generalizable to all older adult populations

**Sidebar: Screening for Falls**
1. Two or more falls in prior 12 months?
2. Presents with acute fall?
3. Difficulty with walking or balance?

**AGS/BGS Clinical Practice Guidelines for Fall Prevention**

1. Physical Therapy
2. Physician

Refer to provider to obtain a multifactorial assessment.
Standardized tests:
1. TUG
2. BBS
3. POMA

The Berg Balance Test

- Berg Balance Scale (Neuls 2011; Muir & Berg 2008; Daubney 1999)
  - Predictive of falls ONLY in frail older adult populations
  - Has a ceiling effect in more active community dwelling older adults
  - Recommended that the BBS be used as a balance test in older adults in conjunction with other tests not as a fall risk tool
  - 58% is related to ankle DF and subtalar evertor strength

Performance-Based Tests

- Can be used as screens for falls:
  - Timed Up & Go
  - One Legged Stand
  - 10 Meter Walk Test

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**Timed Up & Go (TUG)**

- Stand from sitting in a chair 46 cm in height w/o armrests, walk at usual walking pace 3 m, turn around and sit back down in the chair.

- **Score:**
  - >14 sec = high risk for falls; **community dwelling older adult**
  - SN = 87%; SP = 87% (Shumway-Cook 2000)
  - <12 sec = normal mobility; **community dwelling older adult**
  - SN & SP not reported (Bischoff 2003)

  3 meters
  Remember to consider chair height

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**TUG (seconds) – Normative data in community dwelling older adults**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-69</td>
<td>7.30</td>
<td>8.10</td>
</tr>
<tr>
<td>71-75</td>
<td>8.60</td>
<td>10.70</td>
</tr>
<tr>
<td>76-80</td>
<td>9.42</td>
<td>10.71</td>
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<tr>
<td>81-85</td>
<td>10.34</td>
<td>12.36</td>
</tr>
<tr>
<td>86-99</td>
<td>11.13</td>
<td>13.15</td>
</tr>
</tbody>
</table>

(Lusardi 2003a; Pondal & del Ser 2008b)

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**One Legged Stand (OLS)**

- Stand on preferred leg w/ EO arms across chest, barefoot for 30 s

- Assistance to assume the starting position or to maintain the position for 30 sec = impairment

- Statistically significant ↑ in fall risk in **community dwelling older adults** who are unable to hold OLS for at least 10 seconds (Muir 2010)

- Consider taking an average of 3 trials
OLS (Franchignoni 1998)

- Can predict fall risk
  - Sn = 0.95; Sp = 0.58 (cutoff time of 30 sec)
  - +LR = 20; -LR = -0.08

<table>
<thead>
<tr>
<th>Age</th>
<th>Seconds (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-59</td>
<td>29.4 - 30.0 (Bohannon 1984)</td>
</tr>
<tr>
<td>60-69</td>
<td>27.0</td>
</tr>
<tr>
<td>70-79</td>
<td>17.2</td>
</tr>
<tr>
<td>80-99</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Gait Speed: 10MWT

Gait speed = meters x seconds

Gait Speed: The 6th Vital Sign
(Fritz & Sowers 2009)
Gait Speed (m/s)
Normative data
(Oh-Park 2010)

<table>
<thead>
<tr>
<th>Age</th>
<th>Males (n = 116)</th>
<th>Females (n = 188)</th>
</tr>
</thead>
<tbody>
<tr>
<td>70-74</td>
<td>1.12</td>
<td>1.10</td>
</tr>
<tr>
<td>75-79</td>
<td>1.12</td>
<td>1.02</td>
</tr>
<tr>
<td>80-84</td>
<td>1.08</td>
<td>1.00</td>
</tr>
<tr>
<td>&gt; 85</td>
<td>1.02</td>
<td>1.01</td>
</tr>
</tbody>
</table>

Calculated via GAITRite mat = 21 feet (15 feet measured)

Gait Speed m/s
Normative data
(Chui 2010)

<table>
<thead>
<tr>
<th>Age</th>
<th>Males</th>
<th>n</th>
<th>Females</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>70-79</td>
<td>1.55</td>
<td>4</td>
<td>1.34</td>
<td>15</td>
</tr>
<tr>
<td>80-89</td>
<td>1.30</td>
<td>26</td>
<td>1.05</td>
<td>51</td>
</tr>
<tr>
<td>90-99</td>
<td>1.09</td>
<td>5</td>
<td>0.78</td>
<td>17</td>
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</tbody>
</table>

Gait Speed m/s
Normative data
(Lusardi 2003)

<table>
<thead>
<tr>
<th>Age</th>
<th>Group</th>
<th>N</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comfortable</td>
<td>60-69</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Fast</td>
<td>60-69</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70-79</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70-79</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No Device</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Device</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90-101</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No Device</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Device</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All</td>
<td>17</td>
</tr>
</tbody>
</table>

Calculated via GAITRite mat = 12 ft
AGS/BGS Clinical Practice Guidelines for Fall Prevention

- Evidence-Based Screening Tools
  - American Geriatric Society/British Geriatric Society Clinical Practice Guidelines for Fall Prevention
  - Performance-Based Measures
  - STEADI Toolkit
  - Risk Stratification Tool

- Developed by the CDC to assist primary care providers to incorporate fall risk assessment and individualized interventions into their clinical practice
- Launched in 2011 to pilot in 3 states over 5 years (Oregon, New York and Colorado)
- Based on the Clinical Practice Guidelines for Fall Prevention developed by the AGS and the BGS

http://www.cdc.gov/homeandrecreationalsafety/Falls/steadi/index.html
• Algorithm for Fall Risk Assessment & Interventions
  – Stay Independent Brochure

  — Score ≥ 4 points = may be at risk for falling
  — Fell in the past year
  — Feels unsteady when standing or walking
  — Worries about falling

Check Your Risk for Falling

<table>
<thead>
<tr>
<th>Score</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have you fallen in the past year?</td>
<td>People who have fallen once are likely to fall again.</td>
<td>People who have never fallen are likely to remain stable.</td>
</tr>
<tr>
<td>2. Have you had a change in your body or balance?</td>
<td>People who have been advised to use a cane or walker may need to use these in the future.</td>
<td>People who have never had a change in their balance are likely to remain stable.</td>
</tr>
<tr>
<td>3. Do you feel unsteady when you stand or walk?</td>
<td>Unsteadiness or falling is a sign of balance issues.</td>
<td>People who do not feel unsteady are likely to remain stable.</td>
</tr>
<tr>
<td>4. Do you worry about falling?</td>
<td>People who worry about falling are likely to fall.</td>
<td>People who do not worry about falling are likely to remain stable.</td>
</tr>
</tbody>
</table>

Total:

- Add up the number of points for each "yes" answer. If you scored ≥ 4 points or more, you may be at risk for falling. Discuss these findings with your doctor.
Performance-based gait strength and balance assessment:
- Timed Up & Go
- 30 Second Chair Stand Test
- 4-Stage Balance Test

Test of LE functional strength
- Select a standard height chair (45-46cm; 17-18in height) place against a wall
- Arms across chest; sit in middle of chair
- Stand fully then return to sit
- Repeat as many times as possible in 30s
### 30s Chair Stand
**Below Average Scores**

<table>
<thead>
<tr>
<th>Age</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-64</td>
<td>&lt; 14</td>
<td>&lt; 12</td>
</tr>
<tr>
<td>65-69</td>
<td>&lt; 12</td>
<td>&lt; 11</td>
</tr>
<tr>
<td>70-74</td>
<td>&lt; 12</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>75-79</td>
<td>&lt; 11</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>80-84</td>
<td>&lt; 10</td>
<td>&lt; 9</td>
</tr>
<tr>
<td>85-89</td>
<td>&lt; 8</td>
<td>&lt; 8</td>
</tr>
<tr>
<td>90-94</td>
<td>&lt; 7</td>
<td>&lt; 4</td>
</tr>
</tbody>
</table>


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**4-Stage Balance Test**

- **Test of Static Balance**
  - **EO**
  - **No AD**
  - **4 positions**
    - Feet side-by-side
    - Semi-tandem
    - Tandem
    - One leg stand

If individual can hold a position for 10 sec w/o moving feet or needing support, go on to next position. If not, stop the test.

The 10 s cutoff may not be sensitive enough to capture higher functioning older adults with a balance impairment (Hile 2012)

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### Algorithm for Fall Risk Assessment & Interventions
• 4 determinants for recurrent falls:
  – History of falls -- 8
  – Living alone -- 3
  – Taking ≥ 4 medications/day -- 3
  – Being female -- 2

Low risk = 0-4; moderate risk = 5-10; high risk = 11-16

• Perform an in-depth multifactorial assessment for those in high risk category and moderate risk who fail the FTSS (>15 sec)

Fall Risk Stratification Tool
(Buatois 2010)

• Multifactorial tool developed:
  – For community dwelling older adults ≥ 65
  – To be administered by minimally trained staff with a follow up interpretation by a trained primary care provider

Contains previously validated measures
• TUG
• Modified Falls Efficacy Scale
• Home Safety Checklist
• Mood Scale (GDS – short)
  – Score : ≥ 5/30 = PCP review

Fall Risk Assessment and Screening Tool: FRAST
(Renfro 2011)

FRAST
FRAST

Modified Falls Efficacy Scale

Geriatric Depression Scale -- Short
Home Health Care

- Community dwelling older adults
- Non-institutionalized
- Home-bound

Missouri Alliance for Home Care Fall Risk Assessment Tool (MAHC-10)

- 10 core elements
- ≥ 4 = at risk for falls; < 4 = not at risk for falls
- Cutoff score of 4: Sn = 96.9%; Sp = 13.3%
- Cutoff score of 6: Sn = 68.7%; Sp = 46.9%

Calys 2012
**TUG**

- 15 sec = cut-point that discriminates those @ low risk & high risk for falls; frail older adults in LTC facilities; Sn = 81%, Sp = 39% (J Whitney 2005)
- > 35 sec = rule-in high fall risk; but < 35 sec did not rule it out; frail older adults in LTC facilities; Sn = 36%, Sp = 86% (Nordin 2008)
- Value of TUG lies in ability or inability to complete the test rather than time to complete the test; older adult in acute settings; Sn and Sp not reported (Large 2006)

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**TUG Take Home Message**

- TUG may be more appropriate for screening or assessing fall risk in frail community dwelling older adults or those using an AD (Lin 2004) rather than in healthy community dwelling older adults even if they have a fall history
- Consider chair height

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**Skilled Nursing or Sub-acute Setting**

- Institutionalized
- Lower functioning than those living in ALF or private home
- May be similar in function to an older adult who is home bound
St. Thomas Risk Assessment Tool in Falling Elderly Patients (STRATIFY)

Oliver 1997

STRATIFY: Setting Matters

- Oliver 1997: risk score ≥ 2
  - Local: Sn = 93%, Sp = 88%; +LR = 7.75, -LR = 0.08
  - Remote: Sn = 92%, Sp = 68%; +LR = 2.87, -LR = 0.12
- Coker 2003: Predictive value for fall risk in older adults not as applicable in a GRU in Ontario, Canada:
  - Sn = 66%; Sp = 47%; +LR = 1.24, -LR = 0.72
- Wijnia 2006: STRATIFY was disappointing when used in a nursing home in the Netherlands:
  - Sn = 50%, Sp = 76%; +LR = 2.10, -LR = 0.66

STRATIFY: Population Matters

- STRATIFY ≥ 2 was a poor predictor of falls post-stroke in 3 rehab facilities in North England: (Smith 2006)
  - After first 28 days of admission:
    - Sn = 11.3%; Sp = 89.5%; +LR = 1.07, -LR = 0.99
  - At discharge:
    - Sn = 16.3%; Sp = 86.4%; +LR = 1.20, -LR = 0.97
- What is the take home message? –
  - It is doubtful that this tool can accurately identify potential fallers for preventative interventions when used in isolation.
4-item Peninsula Health Fall Risk Assessment Tool (PH-FRAT) (Stapleton 2009)

- Administered by nurses
- Based on PMH, medication list, patient/caregiver consultation, observation
- \( n = 291 \)
- Cutoff @ 14: \( Sn = 68.8\%; \) \( Sp = 70.2\% \)

FRAT (Stapleton 2009)

- Number readmitted to acute care after SNF D/C
  - 22.1\%: within 30 days
  - 12\%: within 10 days
- 10.3\% ER visit w/o hospitalization
  - 5,800 people
- 14.7\% ED visit w/ hospitalization
  - 8,300 additional people

Acute Care Use After SNF D/C (Toles 2014)
Acute Care Setting

- Easily identifiable high risk population of older adults (Close 2012)
- Demographics & medical history

Hendrich II Fall Risk Model (HIIFRM) (Hendrich 1995)

Available at
www.hartfordign.org
and/or
www.ConsultGeriRN.org

E-mail notification of usage to:
hartford.ign@nyu.edu

Cutoff = 5
Sn = 74.9%
Sp = 73.9%

Morse Falls Scale (MFS) (Morse 1989)

No risk = 0-24
Low Risk = 25 - 50
High Risk = ≥ 51

Cutoff = 25
Sn = 88%
Sp = 48.3% Kim 2007
Acute Care Setting

- Variables associated with falls were interventions (Titler 2011)
  - Medical and nursing treatments
- Iatrogenic factors (Mentisoudis 2014)
- Patient's perspectives (Carroll 2010)
  - Need to toilet
  - Unexpected weakness and imbalance

Falls Risk Screen

- If the purpose of the screen is to determine fall risk, the literature does not recommend that screens include measures of:
  - Orthostatic Hypotension
  - Visual Impairment
  - Medication Review
  - ADLs
  - Cognitive Impairment
  - Tandem Stand
  - Observational Gait Analysis

Screen Event Details

- Audience
- Venue
- Timing
- Incentives
- Marketing
- Data Collection
- Staffing and Logistics
- Consent
- Outcomes
Audience

- Gather information
  - Current activity levels
  - Recent need for physical therapy services
  - Fall history

Venue

- Ample space
- Low noise
- Provide a snack

Timing

- Consider time of day
- Avoid holding event at the same time as competing programming
### Incentives

- Consider giveaways
  - T-shirts
  - Water bottles
  - Night lights
  - Educational Materials (handouts; CDC, APTA)

### Marketing

- Avoid advertising a “fall” screening event
- Consider alternative wording:
  - Wellness Screen
  - Health Check
  - Activity Screen

### Data Collection

- Can start with questions (history & demographics)
  - Have you fallen at least 1 time in the last year?
  - Do you perceive that you have any problems with your balance or walking?
  - Do you take more than 4 medications?
Data Collection

• Should have a performance-based section:
  – 30 second chair stand
  – 4-stage balance test
    • Feet side-by-side
    • Semi-tandem
    • Tandem
    • One leg stand
  – Timed Up & Go
  – 10 Meter Walk Test

Data Collection

• Provide synopsis of findings in a written, brief easy to understand format

• Provide comparisons

• Develop a plan for recommendations that an individual can take to a physician

• Provide your contact information

Screening Form Example

<table>
<thead>
<tr>
<th>YOUR RESULTS</th>
<th>DEFINITION/INTERPRETATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Pressure</td>
<td>Normal: &lt;120/80</td>
</tr>
<tr>
<td></td>
<td>Pre-High Blood Pressure: 160-190/100-130</td>
</tr>
<tr>
<td></td>
<td>High Blood Pressure: &gt;140/90</td>
</tr>
<tr>
<td>Time to Stand</td>
<td>Cut off = 15.5 seconds</td>
</tr>
<tr>
<td>Time to Stand</td>
<td>Cut off = 20 seconds</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk Factor Score</th>
<th>Risk Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0 - 4</td>
</tr>
<tr>
<td>Moderate</td>
<td>5 - 10</td>
</tr>
<tr>
<td>High</td>
<td>11 - 16</td>
</tr>
</tbody>
</table>

DOES ___ / ___ / ___

Have you fallen in the last year? Y or N (x)  
Do you live alone? Y or N (x)  
Do you take > 4 medications? Y or N (x)  
Are you female? Y or N (x)
• Determine the flow of the event

• Set up stations with necessary equipment

• Ensure adequate seating for participant and guest

Logistics

Staffing

• Staff the screening event with volunteer health care providers, students

• Consider training your staff

Property of Jacqueline Osborne PT, DPT, GCS, CEEAA; Please request permission prior to use
Consent in Participate in Screening Program
Brooks Rehabilitation

Consent

Survey staff/volunteers

- Were there any issues/problems during the event?
- Is there anything you would change should a similar event be offered in the future?
- Did you find this event beneficial?

Survey senior center members

- Did anyone seek services from a physical therapist or physician?
  - If not, what were the barriers?
  - If so, what was the recommendation?
- Would you attend a future similar event?
  - Why or why not?
- Are there any aspects of the event you would change, omit, or add?
Thank You!

References

References


References


References