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Falling For You:

A Fall Reduction Tool Kit

Tools & Samples

1. Performance Improvement Project (PIP) for Fall Reduction
2. Fall Reduction Protocol/Policy
3. Leadership Fall Reduction Protocol Checklist
4. Designated Leader Checklist
5. Fall Huddle
6. Caregiver Investigative Checklist – QAPI
7. Fishbone Diagram and Instructions
8. 5-Whys Tool
9. Proof of Investigation
10. Sample Injury Reduction Interventions
11. Sample fall care plans
12. Frailty and Sarcopenia Articles
13. Family Falls Flier
14. Assessment Tools
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Performance Improvement Project (PIP) for Fall Reduction

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Change (Action to be Taken): Refinement or Alteration:	By Whom?	Completion Date & Goal	Resources Needed?
YOUR FACILITY flags in the **X** percentile for falls with major injury and the **X** percentile for falls. The center identifies _____ contributing to falls with injury and overall increased falls. This center provides services to two (2) high risk fall groups – short-term rehabilitation and cognitively impaired residents. The center would like to reduce risk factors for falls and falls with injury below the 75th percentile within the next 90 days. **(This is provided as a sample – individualize as needed.)** The center is fulfilling the standards of practice through real time care plan updates to reduce recurrence, assessments to determine baseline changes, evaluation of intrinsic and extrinsic factors and therapy services. There is a process for follow up when a head injury occurs or is suspected. Falls are reviewed in real time and the DON, or nurse manager, is contacted during off hours for care plan feedback; at the end of the week falls are reviewed for intervention efficacy and the care plan is updated. This reduces likelihood of recurrence during the weekend. The center has individualized QI processes in for contributive factors (root cause analysis) and will improve use of aggregate (group) data (see #7 below). 1. Introduce and implement a Fall Reduction Program to the facility. The program is to include: • Educating team members across disciplines • Post fall data • Reviewing work flow and acuity for staff assignments contributing to falls • Providing additional 1:1 and small group education as needed (and document). 2. Review Fall Prevention Program to determine if (all) team members understand what it means for individual residents.			

Change (Action to be Taken): Refinement or Alteration:	By Whom?	Completion Date & Goal	Resources Needed?
3. Assign Fall Reduction Work Group leader(s). Should be clinically oriented but do not have to be nurse leaders. Should have a strong grasp on Root Cause Analysis (RCA) for the individual as well as for aggregate data to generate richer systems review. a. Assign staff members for weekend management and fall review in "real time" on weekends. Care plan interventions updated in "real time" in response to fall event. b. Hold fall meetings on the units; involve direct line staff in fall review as much as possible. 4. IDT will formulate RCA using data gathered during the IR and post-fall evaluation process. Continue education to IDT on investigative process and RCA. 5. RCA tools—5 Whys and Fishbone diagram (center may choose other tools). 6. The IDT continues to meet daily to review and complete fall assessment as well as reviewing falls prior to weekend. 7. Weekly tracking and trending of aggregate (group) data is calculated with graphs, visual mapping, fall wheel, or other tools for analysis. If system patterns are identified plans of action are developed. This data is compiled monthly and a summary of findings reported to QAPI Committee and process revisions are revised based on outcomes. 8. Areas of analysis that help determine the RCA and/or contributive underlying factors include but are not limited to: a. Time; location; day of week; hours of falls; b. Fall events with interventions in place and effective; c. Fall events without interventions in place;			

Change (Action to be Taken): Refinement or Alteration:	By Whom?	Completion Date & Goal	Resources Needed?
d. Assistive devices in use; assistive device needed; e. Rate of falls with injuries; f. Rate of observed versus unobserved falls; g. Particular staff members assigned; experience; h. Sleep hygiene studies and practices; use of night lights; access to sunlight; i. Bowel and bladder restorative programs in place; j. Hydration programs; dehydration risk assessment; k. PT/OT involvement and restorative programs; l. Life enrichment activities; m. Depression; pain present; n. Supervision pre- and post-meals; o. Five P's – pain, proprioception, presence, personal needs/possessions, position. 9. Extended activities times on dementia unit; specialized dementia training for activity staff. 10. Extended briefs implemented and being trialed (date started); avoid waking residents during hours of sleep for toileting/peri care unless assessed as necessary. 11. Evaluate falls at the end of X (date) to determine effectiveness of PIP to date; revise as needed.			

Fall Reduction Protocol/Policy

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FALL REDUCTION PROTOCOL

Protocol:

The facility will make a good faith effort to fulfill regulatory and person-centered standards to reduce risk factors for falling. The process of reducing fall risks includes the creation of an individualized care plan.

For purposes of this protocol, "fall" is defined as an unintentional change of plane from a higher to a lower position that is not the result of an external force.

Assessment and Care Planning:

1. Upon admission and per RAI/MDS requirements, and after a fall or suspected fall event, the resident will be assessed for internal and external risks of falling.
2. Based on findings of the fall assessment, a resident-centered care plan will be developed and implemented. The resident's identified risk factors and strengths will be included in an attempt to reduce risk for falling and will be updated as needed after fall risk assessments based on resident status.
3. During the first 72 hours post-admission, the resident will be assessed each shift to establish baseline functional status. Team members should observe for fall risk behaviors and review the fall risk care plan for new admissions.
4. The Fall Reduction Protocol is resident centered and interventions are not based on specific fall risk scores, but established by contributive factors for fall risk. Team members are directed to resident care plans for specific interventions and approaches to reduce fall risk.

Following a Fall Event/Suspected Fall Event:

5. An incident report and fall investigation will be completed after a fall or suspected fall (i.e., unwitnessed, resident is not able to explain what occurred).
6. The attending physician and responsible party will be notified of the fall event.
7. Post-fall interventions will be initiated by the nurse on duty, after the fall risk assessment has been completed, to reduce the likelihood for recurrence of fall.
8. The manager on duty will be notified if the resident sustained an injury or required hospitalization following the event and will direct the nurse to initiate an investigation as needed including but not limited to developing a time line of the event and resident location and activities prior to the event.
9. The leadership team (fall team)/manager on duty, under direction of the QAPI Committee, will review the fall event the next business day to initiate an analysis of contributive factors and determine if additional interventions should be implemented. Based on findings, the following may be included in determining contributive factor analysis and the care plan update:
    a. Referral to Physical and/or Occupational Therapy, to evaluate contributive factors or therapy service screen.
    b. Review diagnosis, including depression, to determine impact on fall risk.

c. Medication Regimen Review including, if possible, determination of resident receiving medications on the BEERs Criteria List. Notify physician with findings.
d. Evaluate pain and, if present, effectiveness of pain management.
e. Review positioning and assistive devices.
f. Review lab work, weights, and vital signs to determine if there are changes in baseline status.
g. Review CNA documentation for changes in bowel and bladder habits, food and hydration habits, behavioral symptoms, and sleep habits.
h. Evaluate resident room/location of event to determine if environmental factors contributed to the event.

10. The leadership team (fall team) will provide a summary of fall review information at the monthly QAPI Committee Meetings. The QAPI Committee will determine further action based on findings of the report.

Education and Training

11. Based on human resource evaluation, team members will be educated on fall risk and fall protocols upon hire and annually thereafter.

12. Under direction of the QAPI Committee, the members of the leadership team (fall team) will be educated on fall risk, fall assessments, fall protocols, care plan development, and investigation of fall events to determine contributive factors as able.

Origination date:

Review date(s):

Revision date(s):

Team Leader Fall Reduction Protocol Checklist

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TEAM LEADER FALL REDUCTION PROTOCOL CHECKLIST

1. Designated Leader manages the Fall Reduction program (coordinates investigations, keeps team on track)
    a. Designated Leaders assigned to spearhead daily Safety Huddles. Weekend Manager leads on weekends.
    b. Daily meeting & review of Incident Reports (Weekend Manager reviews on weekends).
        i. Preferred – Fall Team conducts bedside reviews for each resident involved in a fall to ensure the care plan accurately reflects the resident's needs, the room arrangement is appropriate, and discusses the event with the staff and resident.
        ii. As needed, the team may re-enact the event.
        iii. Ensure the post-fall evaluation and incident report are complete, the care plan and CNA cardex/in-room care plan are updated and revised as needed.
        iv. Conduct documented Safety Huddle; communicate information on 24-hour report.
2. Documented *weekly* review of events to evaluate effectiveness of interventions before weekend; update care plans as needed and communicate to floor team.
3. Establish responsible team members to coordinate investigations. Establish QAPI privilege and formalize as needed.
    a. Periodically review investigative process under QAPI direction.
    b. Witness statement process – assign leader to take witness statement, read back to witness and both sign and date to verify accuracy.
    c. Underlying causative factors (aka Root Cause Analysis) – documenting and implementing meaningful interventions.
4. Calculate fall and injury rates; tracking and trending; use aggregate (group) data and individual resident data. Report summary of findings to QAPI Committee *monthly* for further review.

    Origination date:

    Review date(s):

    Revision date(s):

Team Leader Fall Reduction Protocol Checklist

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Designated Leader Fall Reduction Protocol Checklist

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DESIGNATED LEADER FALL REDUCTION PROTOCOL CHECKLIST

1. At stand-up the **Designated Leader** coordinates the Fall Reduction Review
    a. Brief review of 24-hour report for the Leadership Team.
    b. Review Incident Reports for accuracy and completion; assign follow up as needed.
2. Establish resident list for review (investigation)–take Fall Team to bed/patient side:
    a. Have clinical record present; verify the following:
        i. Post fall evaluation accuracy and completion. Addend information/assign and follow up as needed.
        ii. Care plan interventions are updated with logical, individualized interventions related to contributive factors of fall. If not updated assign staff member to follow up with documented education/learning opportunity. Care plan should "match" resident, room layout, assistive devices and interventions. If there are no changes needed, enter the date and initial the intervention column.
        iii. In-room Care plan is updated to reflect changes, signed and dated.
    b. As a team, complete QAPI analysis of fall–may take more than one day but typically should have grasp of underlying factors.
3. If further investigation is necessary, **Designated Leader** will assign Fall Reduction Team members to complete the investigation and assist in summary statement of findings.
4. At stand-down **Designated Leader** confirms fall reduction process is in place.
5. On weekends, holidays and other "off shifts", the manager on duty will be the **Designated Leader**.

Origination date:

Review date(s):

Revision date(s):

Designated Leader Fall Reduction Protocol Checklist

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Post-Fall Event Roadmap

1 Assessment

Perform a thorough assessment of the resident; ask the resident what happened

2 Injury

If the resident sustained an injury or required hospitalization, notify the manager on duty

3 Notify

Notify the attending physician and responsible party

4 Intervention

Nurse on duty initiates post-fall interventions to reduce likelihood for recurrence of fall

5 Report

Complete incident report

6 Investigate

Initiate investigation including time-line of the event, resident location, and activities prior to the event

7 Review

Conduct bedside review—reenact the event if needed. Ensure care plan accurately reflects resident's needs and room arrangement is appropriate. Discuss event with staff and resident.

Next Business Day

Initiate root cause analysis

Determine if additional interventions should be implemented.

Fall Huddle: Team Member Review and Feedback

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FALL HUDDLE: TEAM MEMBER REVIEW AND FEEDBACK

Date:

Signatures:

Resident:

Unusual Occurrence:

Interventions:

Care Plans Updated:

24-Hour Report Reflects Occurrence:

Other information that may be helpful to reduce likelihood of recurrence:

This is an informal communication tool and does not replace care plan updates or documentation in the resident record; if new information is determined, it should be added to the care plan or clinical notes.

Origination date:

Review date(s):

Revision date(s):

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What is a SAFETY HUDDLE?

Safety Huddles are based on After Action Review (AAR), a highly successful method of knowledge transfer that is used in high performing organizations, such as the United States Army. AAR is a method for transferring knowledge a team has learned from doing a task in one setting to the next time that team does the task in different setting (Dixon, 2000). This process moves unique knowledge that an individual holds into a group setting so that the knowledge can be integrated, understood by the whole team and used when individuals face similar circumstances. Often, knowledge generated in work settings is not shared and therefore not usable. Safety Huddles provide a structured method for making tacit knowledge explicit among team members, thus usable next time a similar situation is faced. Safety Huddles offer an effective means for learning from both safety mishaps and near misses. It is an informal process in which there are no recriminations, reports are not forwarded to supervisors, and meetings are facilitated locally. In Safety Huddles staff should feel free to share knowledge without fear of embarrassment or recrimination.

Safety Huddles are compatible with established mechanisms for dealing with errors and near misses such as incident-reporting and root cause analysis. The advantage to a Safety Huddle is that it becomes part of the routine way that a work team goes about its business to maximize patient safety.

When Should Safety Huddles Be Conducted?

Safety Huddles are most successful when held on a regular basis. Either schedule them at the same time every day or after some defined unit of work, e.g. after morning care is completed. The more frequently you conduct them the more comfortable you will become with learning from experience without placing blame. Routine meetings held frequently may be easier to keep brief and highly focused.

Who Should Attend Safety Huddles?

Everyone involved in direct care should be involved in Safety Huddle meetings. Each person's information and ideas are necessary to get a full picture of what happened and to generate ideas about how to incorporate the learning into future actions. Not attending will suggest that the Safety Huddle results are not a product of everyone involved, and that some members can not contribute to learning from experience.

How Long Should Safety Huddles Last?

Keep the meetings brief. They may be accomplished in as little as 15 minutes. The group asks:

1. What happened to threaten patient or staff safety,
2. What should have happened,
3. What accounted for the difference,
4. How could the same outcome be avoided the next time, and
5. What is the follow-up plan?

Assign one person to take responsibility for making sure that follow up is done.

Engage in open discussion based on objective facts without blaming individuals.

Should Minutes Be Recorded?

Keep only informal notes, and make them available to other staff if it will help them to avoid patient errors and staff injuries. Do not formalize notes, nor send them to supervisors. Keep in mind that the focus of Safety Huddles is to help the team itself learn from its own experiences. One person should be responsible for making sure that corrective actions were taken.

Points to Remember

Hold Safety Huddles regularly—either at a regularly scheduled time or at the end of a defined part of work, e.g. after morning care is completed. Schedule them at a time that is best for your particular unit and staff.

Department of Veterans Affairs
VHA Patient Safety Center of Inquiry (118M)
Grand Oak Plaza, 8900 Grand Oak Circle
Tampa, FL 33637-1022

Phone: 813-558-3911
Fax: 813-5583900

www.visn8.va.gov/patientsafetycenter/

Dixon, N. (2000). Common knowledge: How companies thrive by sharing what they know. Boston: Harvard Business School Press.

Caregiver Investigative Checklist

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CAREGIVER INVESTIGATIVE CHECKLIST

Resident Name:_____ Date & time of event:_____

Caregiver assigned to the resident:_____

Location of resident & position at event time:_____

Was the event witnessed? Yes / No Witness:_____

Time last toileted and/or seen by team member:_____

Chair (wheel, Geri- or sitting) _____ Not applicable (Move to next section if checked)

Consider: Was resident in chair prior to event, locked/auto-lock brakes, anti-tippers, foot pedals, positioning upright: _____

Bed _____ Not applicable (Move to next section if checked)

Specialty mattress care planned? Yes / No Was it in place? Yes / No

Was mat-to-floor care planned? Yes / No Was it in place? Yes / No

Pillows/devices used for positioning? Yes / No If yes, what was used?_____

Was bed at resident appropriate height and locked? Yes / No

Assistive Devices _____ Not applicable (Move to next section if checked)

Were assistive devices (enabler bars, hand pedals, wedge cushions, etc.) in use? Yes / No

If yes, what devices(s): _____

Ambulation _____Not applicable (Move to next section if checked)

Was resident walking prior to event? Yes / No Staff member present? Yes / No

Gait belt used? Yes / No

Walker used? Yes / No

Wheelchair used? Yes / No

Call light _____Not applicable (Move to next section if checked)

Call light on? Yes / No In place? Yes / No

Within reach? Yes / No Working? Yes / No

Signature(s) _____ Date: _____

This document has been created by and for the quality assurance committee for the purpose of monitoring and evaluating the quality of care in the facility.

Caregiver Investigative Checklist

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Fishbone Diagram and Instructions

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CREATING A CAUSE & EFFECT ("FISHBONE") DIAGRAM

Intent:

A fishbone diagram graphically displays potential causes of a problem. The layout shows cause and effect relationships between potential causes and is used in the Analysis phase of event investigation.

Instructions:

1. Place the problem or outcome statement on the right side of the paper, half-way down; draw a horizontal line across the paper with an arrow pointing to the effect or problem statement.

2. Determine general, major categories for the causes; connect them to the horizontal line with the diagonal lines.

   a. Sometimes one or more of the following are included as major branches personnel, process, rules/procedures and similar. Use at least five inputs of every process:
      - Person
      - Method
      - Machine
      - Materials
      - Environment

3. Note the major causes and place them under the general categories. Use brainstorming techniques as needed for different categories.

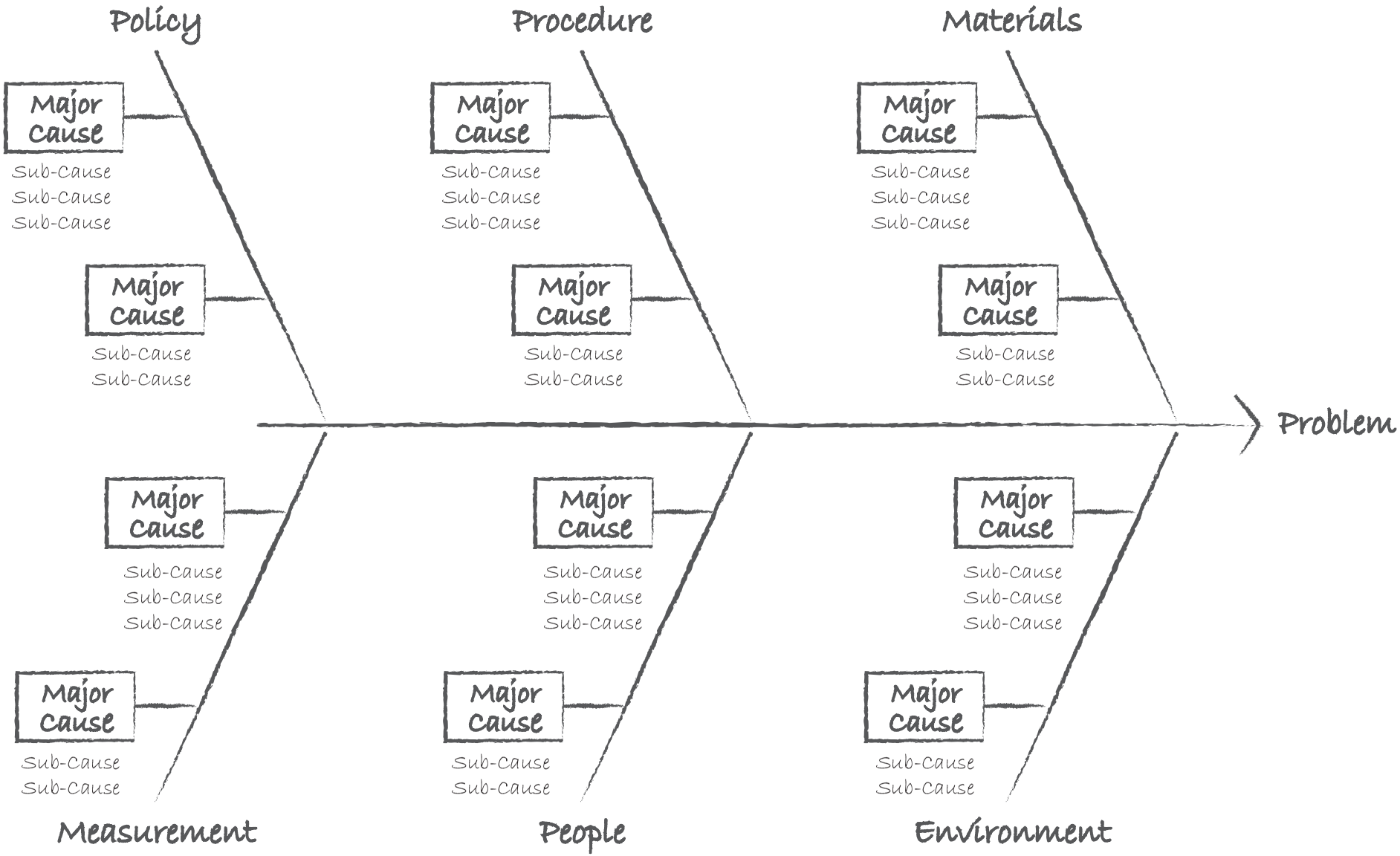
4. List sub-causes under the main cause if appropriate. To determine sub-causes, ask why five times. Focus on "drilling down" during the 5-why question review versus becoming broader. For example: WHY did the resident fall? Because she was weak? WHY is she weak? Due to deconditioning? WHY did she become deconditioned? Because she has pain and unstable blood pressure making her dizzy. WHY does she have pain/WHY can't it be treated? WHY is her blood sugar unstable?

5. Evaluate the diagram. Are the branches on the cause and effect diagram labeled and arranged in a logical sequence?

Most Effective Use includes:

- A narrowly defined problem or outcome as a starting point
- Causes are verified with data to confirm that they are real causes versus coincidence
- Not using the diagram as an alternative form of outlining facts and information
- Not using this tool to list potential solutions

Fishbone Diagram and Instructions



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The 5 Whys Tool

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THE 5 WHYS TOOL

The 5-Whys is a simple Quality Assurance Performance improvement tool that helps identify the root cause(s) of a problem. Once a general problem has been recognized (either using the Fishbone Diagram or Process Mapping), ask "why" questions to drill down to the root causes. Asking the 5-Whys allows teams to move beyond obvious answers and reflect on less obvious explanations or causes.

Step-by-step instructions

1. State the problem you have identified as needing work.
2. Start asking "why" questions related to the problem. Keep asking "why" in response to each suggested cause.
3. Ask as many whys as needed to gain insight to drill down to tangible actions (asking five times is typical). The final "why" (or whys) occurs when it does not make logical sense to ask why again.
4. The 5-Whys is a strategy often used after an issue has been identified using another tool, such as a Fishbone Diagram or Process Mapping. Use the 5-Whys questions with other tools to avoid a narrow focus or bias.
5. The 5-whys provides individualized contributive factors allowing the Root Cause Analysis (RCA) to be developed.
6. **Evaluate** outcomes after implementation to determine success.

Problem: Josie has fallen in her room at least 6 times in 2 months.

Why is she falling?

She's unsteady on her feet and walks around her room – she's tripped on the O2 tubing.

Why doesn't she have portable oxygen for easier movement?

She doesn't remember to ask.

Why is she unsteady?

She's deconditioned and has shortness of breath, which is a factor in her deconditioning.

Why isn't she receiving services to address deconditioning?

She had skilled therapy when she first arrived.

Why does she have shortness of breath?

A respiratory therapist worked with her at the hospital and no one has followed up here although she uses oxygen regularly.

This methodology is closely related to the Cause & Effect (Fishbone) diagram and can be used to complement the analysis necessary to complete a Cause & Effect diagram.

EXAMPLE ROOT CAUSE ANALYSIS: Josie is unsteady on her feet and has long oxygen tubing, both contribute to falls. Restorative Nursing for gait, balance and strength training programs was added to her care plan. A portable oxygen tank was tried but was not effective because she could not, or would not, follow (written and verbal) direction to use the portable tank. The charge nurses have added respiratory care to the TAR and her physician was consulted about ideas to improve airway exchange. The physician changed her nebulizer treatments and anti-inflammatory medication. During the in-room observation and interview the following information was gathered: Josie likes to wear tight "Daisy Duke" shorts over pantyhose – the staff don't like to assist her with this because the clothing is so tight. The daughter was called and she explained Josie's always been like that but she'll bring looser "Daisy Dukes" and hose. Another observation related to Josie's application of makeup; she stood at the bathroom sink applying mascara and closed her mouth, holding her breath – then she'd sway and say she felt dizzy. The Occupational Therapist requested the daughter bring a vanity table set and a lighted magnifying mirror; the room was rearranged and a motion sensor night light was added to the bathroom door.

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ASKING POWERFUL QUESTIONS - 5 WHYS WORKSHEET

Define the Problem:

Why is it Happening?

1.

WHY IS THAT?

2.

WHY IS THAT?

3.

WHY IS THAT?

4.

WHY IS THAT?

5.

Don't list 5 different reasons. Go deeper to determine the primary contributive factors.

CAUTION:
If your last answer is something you can't control, go back up to the previous answer
Cannot be due to a person!

Action:

The 5 Whys Tool

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Proof of Investigation Incidents and Accidents

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Proof of Investigation of Incidents and Accidents

INVESTIGATION PROCEDURE SUMMARY

INCIDENT / ACCIDENT INVESTIGATION

An Investigation should be made and this form should be completed when there is a situation or incident in which a resident or visitor may have suffered physical or other harm for reasons which are unknown, unclear, or not adequately explained.

This document shows investigatory procedure, findings, and proper information for incidents which require review under state and/or federal law

FACILITY

Name: _____

Street Address: _____

_____

City: _____ State: _____ Zip Code: _____

Administrator: _____

Director of Nursing: _____

Person in Charge of Investigation: _____

Staff Member Competing Form: _____

Resident/Visitor Identifier: _____

REPORTING

Under what circumstances did the reporting person become aware of the alleged incident?

_____

_____

_____

To whom was it reported? _____

Date: _____ Time: _____

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ALLEGED INCIDENT

Date: Time: Location:

Identifiers of Persons Involved:

Brief Description of Alleged Incident:

INVESTIGATION

1. Was the site of alleged incident examined?

_____ No (Explain)

_____ Yes

Date: Time:

Name of Examiner: Site Examined:

2. Was the Resident/Visitor involved in alleged incident questioned?

_____ No (Explain)

_____ Yes

Date: Time:

Identifier of Resident/Visitor Name of Examiner:

3. Was there an examination by a Physician?

_____ No (Explain)

_____ Yes

Date: Time:

Resident Identifier: Name of Physician:

Physician's Findings:

4. Was the Resident File reviewed?

_____ No (Explain)

_____ Yes

Date: Time:

Resident Identifier: Name of Physician:

5. **Was any other documentation reviewed?**

_____ No (Explain)

_____ Yes

Please Identify:

6. Were additional interview performed?

_____ No (Explain)

_____ Yes

ADDITIONAL INTERVIEWS

Name of Interviewee: Title: Date:

Name of Interviewee: Title: Date:

Name of Interviewee: Title: Date:

Name of Interviewee: Title: Date:

Name of Interviewee: Title: Date:

CONCLUSION

AFTER this investigation the following conclusion was drawn (please check A or B)

A. Decisive Conclusion Made

_____ Incident was NOT the result of abuse, harmful neglect, or misappropriation

Brief description of conclusion:

B. Decisive Conclusion Cannot be Made

_____ NO DECISIVE CONCLUSION can be drawn concluding that the harm was not the result of abuse, harmful neglect, or misappropriation

QUALITY ASSURANCE REFERRAL

A. Regulatory Requirements Identified with Potential for Quality Improvement:

List potential F-Tags that may be affected: _____

Referral made to QA Committee? _____ Yes _____ No Date: _____

B. Quality Assurance Action Plan:

Systemic changes or measures to address regulatory requirements identified with potential for quality improvement:

Staff Training: Yes No Date:

Method for monitoring effectiveness:

How often:

Date of Completion: Staff Responsible:

Sample of Injury Reduction Interventions

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Sample of Injury Reduction Interventions

INTERVENTIONS FOR INCIDENT REDUCTION (not all inclusive)

Schedule/Routine

- Toilet at the same times of the day and night and/or in accordance with resident habit and preferences
- Evaluate use of extended wear briefs if disrupting sleep is a concern
- Evaluate sleep hygiene/conduct sleep study
- Provide access to natural sunlight/outdoors if possible to stimulate diurnal rhythm (sleep cycle)
- Place resident on timed visual checks
- Provide opportunity to lay down in bed for a nap following meals
- Get the resident up in accordance to their preference – provide naps and sleep schedule as resident prefers
- Plan activities during increased periods of risk (Sun downing, prior to meals, after meals, shift change, etc.)
- Schedule showers and bathing as resident prefers and it is calming and beneficial to the resident
- Adopt a daily schedule for a consistent routine and increased supervision based on assessed needs, habits and routines
- Wear non-slip shoes or gripper socks based on assessed needs
- Do not leave alone in bathroom if resident requires assistance with toilet transfers
- Use of prosthesis per physician order

Sensory

- Provide a Snoezlen or sensory environment based on Facility Assessment and resident assessed needs
- Provide aroma therapy
- Cueing: visual, tactile, and/or auditory
- Post signage such as, “Call, Don’t Fall,” “Ring For Help” or similar based on ability to comprehend
- Purposely use a different background on signage to enhance visibility; elderly eyes generally see black lettering on a white background most clearly; increase font size and bold letters as needed
- Glasses, hearing aids in place; adaptive equipment in use
- Paint wall behind toilets darker cooler to increase visibility

Evaluate

- Reduce or eliminate overhead paging which might agitate the resident(s)
- Remove any throw rugs/pads; provide non-glare flooring
- Adaptive call light – button, touch, sensitive pad, etc.
- Provide a bell to ring instead of the call light
- Assess location of bed in room and rearrange room if needed
- Place detached wheelchair footrests in a safe place so as not to pose a trip hazard
- Apply non-skid strips next to bed, on pathway to bathroom, and/or on bathroom floor based on resident’s needs and cause of falls
- Determine if etching bathroom and shower room floors would reduce slippery conditions
- Evaluate if night lights would be helpful
- Check night lights for proper functioning
- Increase brightness of night lights
- Place motion activated lights in room/bathroom

- Install lights below handrails to illuminate the walkway in hallways
- Check room for unnecessary items to reduce the clutter or other hazards
- Complete periodic environmental rounds to remove/reduce identified hazards
- Re-arrange room to reduce the distance to the bathroom or to clear a walkway based on resident's habits or preferences
- Evaluate brakes on bed wheels/casters
- Remove overbed table if being used as an assist device
- Provide a bedside commode
- In-service staff to identify and immediately clean up any spills or liquid on floor
- Identify and use wet floors with signs
- In areas being re-modeled/re-decorated, provide protection and surveillance from repairs, construction, and equipment
- Turn down hall lights during times when most residents are sleeping and resting
- Use full spectrum lights to mimic "natural" lighting
- Implement an alarm reduction program
- DO NOT TURN LIGHTS OFF DURING WAKING HOURS, this can increase confusion and fall risk

Physical

- DO NOT place gripper socks on resident when in bed – they increase fall risk by "gripping" the blankets and sheets
- Hydration program in concert with Restorative Nursing toileting program
- Increased exercise programs with physician order in place
- Increased gait and balance training programs with physician order in place
- Call light/alerting system is within reach
- Glasses are clean and on resident
- Place and remove hearing aid(s); hearing amplifier
- Take into consideration the transfer needs of the resident for bed placement (hemi, transfer board needs, room for mechanical lift, etc.)
- No side rails on bed unless assessed with risk benefit analysis established and physician order is in place:
    - Single side rail, also ¼ and ½ rail
    - Personal assist bar(s)
    - Standing poles

      *Follow FDA guidelines for any adaptive equipment on a bed

Medical

- Liberalize medication administration to reflect resident centered needs and preferences
- Review lab value
- Review medications
- Include Pharmacist in fall reviews
- Referrals to Physiatrist or rehabilitation associates as needed
- If providing a Gradual Dose Reduction, provide high nutrition foods and keep well hydrated to offset withdrawal symptoms

Behavioral

- Do not leave resident in wheelchair in room facing the side of the bed
- Provide the resident with something to do while in his/her room; do not just leave sitting idly without TV, music, book, photo album, etc.
- Provide meaningful, resident-specific activities BEFORE behavioral symptoms escalate
- Place familiar objects and pictures in room to help orient and remind resident of home
- Refer to Social Services
- Offer calming music during periods of increased risk
- Provide headphones and the resident's favorite music (i.e., Music & Memory)
- Offer resident non-alcoholic beer; just the thought might reduce agitation
- Provide wine or beer with physician order

Communication

- Review system for informing staff of new falls and any changes in interventions to ensure timely and accurate exchange of information
- Seek input for ideas from family members
- Post signs for cueing
- In-service staff to report any needed equipment repairs when first noticed
- Develop a communication board for compromised residents. Periodically re-evaluate for its effectiveness
- Discuss the status with the primary care physician as opposed to just notifying them of the incident
- Did you ask the resident what he/she thinks might help?
- Post-event review on the unit, talk to the resident and staff about the event, visit the location
- Implement the 5Ps of rounding:
    - Pain – is the resident comfortable
    - Position – are devices comfortable, is bed in position, devices in place
    - Personal needs – bathroom needs, hands washed, bathed, etc.
    - Possessions – remote control, books, items used regularly nearby
    - PRESENCE – check in with the resident regularly, return when you say you will

Programming

- Provide consistent opportunities for daily (frequent) supervised ambulation
- Provide massage therapy
- Ensure meaningful activities based on resident interests are available
- Scheduled, meaningful activities are available for residents with different cognitive levels
- Dementia training for the staff and meaningful Dementia/Cognitive Impairment Programs
- Restorative Nursing Program based on resident assessments
    - Refer to the Restorative Nursing Program for interventions

Supervision

- Identify if permanent Nursing Assistant assignments would be beneficial
- Provide direct supervision for residents with history of falling while on toilet or commode
- 1:1 supervision during determined periods of highest risk for only short term emergent intervention
- Audio/video monitors in nursing areas, not accessible to viewing by visitors, etc.
- Change room location nearer the nursing station for closer observation
- Increase level of supervision during restraint reduction
- Use gait belts for all non-mechanical lifts and assists with transfers and ambulation

Assessment

- Bowel/bladder patterning for establishing routine toileting
- Behavior monitoring for periods while in increased risk
- Assess for a pattern of fatigue during the day and provide rest periods accordingly
- Assure glasses fit properly and are of a recent/accurate prescription
- Check hearing aid for proper functioning
- Identify resident routine prior to admission and from work history (Did they work midnights, day shift, dress professionally, wore casual clothes, etc.)
- Assess for the need for pain management
- Check oxygen saturation levels
- Assess for the need for constipation interventions
- Evaluate for adequate lighting in environment
- Assess for hunger and/or thirst
- Refer to skilled therapy – Occupational, Physical and/or Speech and Language
- Assess wheelchair for proper alignment, support, and safety
- Determine if resident is hungry and provide snacks/nourishments
- Are hip protectors appropriate based on assessed needs
- Use of long sleeves or geri sleeves
- Take, document, and evaluate postural blood pressures
- Take, document, and evaluate blood glucose testing
- Evaluate for proper use and fit of walker, crutch(es), cane
- Evaluate shoes for proper fit
- Evaluate new shoes for thicker soles which could interfere with ambulation
- Consider consultations with pharmacist, podiatrist, psychiatry, optometrist, ophthalmologist, audiologist, or other specialist

Positioning

- Remove footrests from wheelchair for all transfers
- Use leg rests at all times when transporting a resident
- Wheelchair cushions – wedge, pressure reducing, Roho, etc.
- Evaluate wheelchair for proper fit
- Recline in space chair
- Geri-chair
- Perimeter mattress
- Side wedges for bed
- Winged mattress
- Provide a wider bed, such as a double bed

- Horseshoe pillow
- Side of bed bolster pillows
- Helmet

Equipment

- Replace tips on cane, walker and/or crutches
- Provide bedside urinal based on assessed needs including acute condition(s)
- Provide raised toilet seat, versi-rails, additional handrails at toilet as needed
- Place oxygen tubing out of the way during transfers
- Clear hallways to allow access to handrails
- Posey grip/Dycem to hold items in place (above and/or below wheelchair cushion, wheelchair footrest, plate, bowl, or cup)
- Adaptive equipment – reacher, covered cups, double handled cups, weighted bottom cups, divided plates, scoop plates, door closure strap, built-up handles, weighted silverware, elastic shoelaces
- Personal silent call bell that alerts to a device that the nurse or aid carries, such as a beeper
- Evaluate wheelchair for proper functioning and possible need for repairs or adjustments
- Wheelchair adaptations –
    - Front and/or back anti-tippers
    - Brake extensions
    - Drop seat
    - Automatic brakes
    - Hand pedals
    - Hemi-wheelchair
    - Lateral supports
    - High back or extension to back
    - Reclining back
    - Swing-away leg rests
    - Head support
- Assistive device adaptations such as walker bags, cup holder, walker with seat
- Evaluate for proper height of bed based on height and ability of resident, then place a mark on the bed frame to indicate height
- Evaluate if a low bed is needed; determine if risk of falling is greater with low bed
- Place landing mat or another mattress on floor next to bed
- Transfer/standing pole
- Schedule routine wheelchair clinics to maintain good operating condition

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Interventions for Incident Reduction

Schedule

- Toilet at the same times
- Provide naps and sleep schedule as resident prefers
- Provide access to natural sunlight/outdoors as able to stimulate sleep cycle
- Place resident on timed visual checks

Schedule

Sensory

- Signage with white background and large bold, black lettering
- Paint wall behind toilets darker color to increase visibility
- Provide aroma therapy

Sensory

Evaluate

- Eliminate overhead paging (agitates the residents)
- Provide non-glare flooring without throw rugs
- Provide a bell instead of a call light
- Turn down lights during sleeping times, leave lights on during waking times

Evaluate

Physical

- No gripper socks when in bed
- Call light/alerting system within reach
- Glasses & hearing aids clean and on resident
- No side rails on bed

Physical

Medical

- Review medications and lab value
- Include Pharmacist in fall reviews

Medical

Behavioral

- Provide meaningful resident-specific activities
- Place familiar objects in room
- Offer calming music
- Offer non-alcoholic beer, or wine/beer with physician order

Behavioral

Communication

- Inform staff of new falls and changes in interventions
- Seek input from family and resident
- Post signs for cueing

Communication

Programming

- Frequent supervised ambulation
- Provide massage therapy
- Provide meaningful activities

Programming

Supervision

- Permanent nursing assistant assignments if beneficial
- 1:1 supervision during high risk periods
- Room location near nursing station

Supervision

Assessment

- Bowel/bladder patterning
- Behavior monitoring
- Assess fatigue pattern during the day – provide rest
- Assess need for pain management
- Assess for hunger and/or thirst
- Evaluate new shoes for thicker soles that could interfere with ambulation

Assessment

Positioning

Wheelchair:
- Remove footrests during transfers
- Use Wheelchair cushions
- Proper fit

Mattress:
- Perimeter mattress
- Side wedges for bed
- Winged mattress
- Wider bed

Positioning

Equipment

- Replace tips on cane, walker and/or crutches
- Provide bedside urinal
- Adaptive equipment
- Low bed
- Landing mat on floor next to bed

Equipment

Fall Care Plan Samples

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Problem for the Resident	Resident's Goal	Resident Centered Interventions
00/00/2018 I have a history of falling and I'm at risk for falls due to my deconditioning, erratic sleep patterns and dementia. I have fallen out of bed because I have unstable gait and balance when getting up and out of bed. 00/00/2018 I have fallen out of bed a few times and out of my wheelchair.	I would like to have minimized risk for falling and sustaining an injury through personalized interventions by 00/00/0000.	I had a sleep cycle study and I usually sleep 2-3 hours at a time; it's better to get me up and out of bed than try to keep me in the bed during night hours. -Because I have impaired proprioception (impairment in ability to know where my body is in space) and because of my impaired standing, I have a lower bed with one side against the wall (right side). This is not a restraint for me because I cannot get out of bed, but it does help me know where I am in the bed; I have a mat on the floor to the left side of my bed. Do your best to keep my furniture away from my bed since I have a history of falling out of bed, this will help reduce my risk falling and striking it. I have a wheelchair cushion that secures to the chair and will not slide forward. I have B foot pedals for my wheelchair if someone is transporting me. I transfer with assist x 1 person. Two people may assist me with transfers as needed. [CNA] H My bed controls are placed at the foot of my bed due to not knowing how to work them. [CNA] H Staff will observe me while I am wheeling myself around the facility in my wheelchair to intercept me deter from entering other resident's rooms when able. I don't use my personal items although the staff still try to keep my room "personalized" with my remote control and bible on the overbed table.

Problem for the Resident	Resident's Goal	Resident Centered Interventions
I have a risk for falling r/t (CHOOSE ETIOLOGY to PERSONALIZE); I have been assessed and you can review my fall assessment indicating low/high fall risk (PERSONALIZE BASED ON RESIDENT NEEDS and ASSESSMENT).	(PERSONALIZE as Needed but examples include the following) Assistive devices used to minimize my risks for falling will be the least restrictive possible, will treat my medical symptoms and/or will improve my functional status by the review date. I will have minimized risk factors for (serious)(minor) injury related to falls through the review date I will have reduced risk factors related to falling through improved (balance/ strength/gait – PERSONALIZE) through next review. I will have reduced risk for factors contributing to falls as evidenced by interventions in place through next review. .	PERSONALIZE THESE EXAMPLES As much as possible, based on my preferences, try to anticipate my needs. Educate me, my family, and my caregivers about fall risks and what to do if I fall. (If I cannot remember, help me organize my room and my daily schedule as much possible because I do not remember directions or retain information.) Encourage me to participate in activities I enjoy to minimize my risk for falling and provide distraction and/ or supervision. I like to wear shoes (describe if possible). I need to be evaluated for _____ (PT/OT or Restorative Nursing, etc.). Conduct a sleep hygiene study for me; I like to sleep (long, short, sleep in, get up early, etc.). Review my medications for dose and timing and evaluate my medical conditions; notify my physician as needed of findings. IF ABLE TO REMEMBER: Place my call light within reach and ask me to use it. IF UNABLE TO REMEMBER: I have a call light but cannot remember to use it, please remember to check on me when you make rounds and are walking in the hallway, even it it's just to say "hi". If I fall, ask the nurse about the Fall Protocol. I like to walk to my closet, please keep a clear pathway and install a motion sensitive light to my closet (and my bathroom because I'll get up during the night to go). Please provide me with a reacher tool to get things out of my closet. SPECIFY: Bed height is specific to my needs and lets me place my feet on the ground OR I have a low bed because I cannot stand or get out of it and the low bed reduces my risk for serious injury. Since I have a low bed, my furniture is moved away to reduce my risk for striking it if I roll or fall out of bed. Arrange my room and furniture to maximize my personal space.

Frailty and Sarcopenia and Fall Risk Articles

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Frailty and Falls in the Elderly

by Angie Szumlinski, Director HealthCap Risk Management Services

Resident falls continue to challenge our communities, it is the highest cause of rehospitalizations, negative outcomes, immobility and claims in long-term/post-acute care. There are many products on the market that appear to have some promise in early identification of fall risk including the use of assessment tools to measure the level of frailty. The American Medical Director's Association has also taken an interest in frailty and its relationship to falls.

In a recent article published by the Journal of Post-Acute and Long-Term Care Medicine (Buckinx et al, 2018), an analysis was performed based on the data from the "Sample of Elderly Nursing Home Individuals" (SENIOR), a prospective longitudinal study of Belgian nursing home residents in which participants are evaluated each year. The selection criteria for participants include 1). Be oriented (i.e., get informed consent), 2.) Be able to stand and walk (i.e., walking technical assistance allowed) and 3.) Be a volunteer.

The initial data collected was based on the "diagnosis of frailty". At baseline, all participants received a diagnosis of frailty based on 11 different operational definitions. This is based on a clinical evaluation in the domains of mobility, energy, physical activity and function, using descriptors and figures to stratify elderly adults according to their level of vulnerability.

Other sociodemographic and clinical data were collected at a baseline: age, sex, anthropometric measurements (assesses the size, shape and composition of the human body including BMI, waist-to-hip ratio, skin-fold test, bioelectrical impedance*), technical assistance for walking, drug consumption and the patient's medical history. Of interest, none of the operational definitions of frailty has shown its ability to predict falls at 1 year. However, the results are consistent with the literature regarding the independent risk factors for falls among the elderly. The SENIOR study revealed 3 important variables associated with the occurrence of falls:

1. The Tinetti Balance Assessment Tool (Tinetti, Williams & Maywski, 1986) – this is a tool designed to assess the risk of falls in the elderly. The Tinetti score was significantly associated with recurrent falls in a population of community-dwelling older people followed during one year. These results are consistent with confirming the importance of optimal body balance and gait in the prevention of falls.
2. The Grip Strength – This is thought to reflect general body strength and has been used as a predictor of falls in epidemiologic studies. A 3-year prospective cohort study of 1365 community dwelling persons aged 65 years and older highlighted that grip strength was an independent predictor of recurrent falls.
3. Isometric strength of the elbow extensors – Although poorly investigated in scientific literature related to the risk of falls, the hypothesis is that participants weak at the tricep level have more difficulty reacting when they lose balance or when they stumble and are more likely to fall.

Buckinx et al (2018) detail recognition that maximal isometric strength is associated with physical functional capacity among elderly people. The maintenance of adequate strength could, therefore, be favorable for the mobility and for the risk of falls among the elderly.

In conclusion, within the scope of the operational definitions of frailty assessed, none is predictive of short-term occurrence of falls and deaths among nursing home residents. When

taking into account potential confounding characteristics, after a 12-month follow-up period, the Tinetti test, grip strength and isometric strength of the elbow extensors are associated with the occurrence of falls. There is a potential to reduce falls and deaths significantly by means of strategical public health and clinical interventions.

If you have experience with the frailty assessment process and would like to share your outcomes, we would love to hear from you! It takes a village and we are here to support each other!

To access this study in its entirety, please contact JAMDA (The Journal of Post-Acute and Long-Term Care Medicine) at https://www.jamda.com/article/S1525-8610(17)30357-2/fulltext

*Khalil, Mohktar, and Ibrahim (2104) describe bioelectrical impedance analysis (BIA) also called bioimpedence analysis as an applied approach using body composition measurements and healthcare assessment systems to evaluate disease prognosis and monitoring physical status.

References:

Buckinx, F., et al. (January 2018). Prediction of the Incident of Falls and Deaths Among Elderly Nursing Home Residents: The SENIOR Study. *JAMDA, The Journal of Post-Acute and Long-Term Care Medicine, Vol. 19, Issue 1, Pages 18 -24.* https://doi.org/10.1016/j.jamda.2017.06.014

Khalil SF, Mohktar MS, Ibrahim F. The Theory and Fundamentals of Bioimpedance Analysis in Clinical Status Monitoring and Diagnosis of Diseases. *Sensors (Basel, Switzerland).* 2014;14(6):10895-10928. doi:10.3390/s140610895.

Tinetti, M.E., Williams, T.F., Mayewksi, R. (1986). Tinetti Balance Assessment Tool. http://hdcs.fullerton.edu/csa/Research/documents/TinettiPOMA.pdf

Sarcopenia

by Angie Szumlinski, Director HealthCap Risk Management Services

As caregivers, we often describe our residents as "frail elders" because with age, the body is depleted of muscle mass often contributing to the risk of increased falls. The medical term for this frailty is Sarcopenia and it is a condition that is identified frequently in both long-term/post-acute care settings as well as community-based seniors.

Watson (2012) describes sarcopenia as not having a clearly agreed upon definition despite it being an important clinical problem affecting millions of older. Causes may include the decline in hormones and numbers of neuromuscular junctions, increased inflammation, decreased activity, and inadequate nutrition (Watson, 2012). There are recent discoveries on the molecular level indicating changes in mitochondrial biology, the angiotensin system and apoptosis (the death of cells that occurs as a normal and controlled part of an organism's growth or development) may impact sarcopenia. Watson (2012) explains pharmaceutical development for the treatment of sarcopenia has been slow due to not having a consensus definition but other interventions being developed focus on exercise and nutritional approaches.

Watson's (2012) key points regarding sarcopenia in older adults are:

- Sarcopenia is a common condition contributing to functional decline, disability, frailty, and falls.
- There is no consensus definition for sarcopenia and recommendations have been proposed for a definition based on both muscle mass measurement and physical function.
- Sarcopenia has a multifactorial cause, with declines in activity and nutrition, disease states, inflammation, declines in neuromuscular junctions, and aging related changes in mitochondria, apoptosis, and the angiotensin system recently found to be contributory.
- Rheumatological conditions are highly associated with sarcopenia/skeletal muscle mass decline, likely due to the high levels of inflammatory cytokines.
- Clinical interventions have focused on exercise and nutrition, with pharmaceutical testing lagging in part because of the lack of a consensus definition.

Strength, assistance walking, rising from a chair, climbing stairs and falls are the five items comprising the SARC-F screening tool used to rule out sarcopenia. A group of researchers recently studied the validation of a Korean version of the SARC-F for older people living in a community setting (Kim, Kim & Won, 2018) and found the tool is useful for ruling out sarcopenia in a clinical setting.

The SARC-F Questionnaire was translated into Korean to ask the following questions in a culturally competent format (Kim, Kim & Won, 2018):

1. **Strength –** How difficult is it for you to lift up and carry 4.5 KG (approximately 10 pounds)?
2. **Assistance walking –** How difficult it is for you to walk fro one corner of a room to another?
3. **Rising from a chair** – How difficult is it for you to get up from a chair (wheelchair) and get on the bed (floor mattress) or if you get up from your bed and sit on a chair?

4. **Climbing stairs** – How difficult is it for you to climb a flight of 10 stairs without a break?
5. **Falls** – How many times did you fall in the last year?

Each item is scored (0 = not difficult at all, 1—a bit difficult, 2—very difficult, unable to do it). And the scores were added to calculate the total score. A total score of 4 points and greater was classified as having sarcopenia.

So, in a perfect world, wouldn't it be a wonderful thing if we could not only assess the risk of falls but actually have concrete, evidence-based data to assist us? There is hope, there are many different products, assessment tools, etc. available for us to begin the journey of redefining the way we provide care for our residents

References

Kim, S., Kim, M., Won, C.W. (January 2018). Validation of the Korean Version of the SARC-F Questionnaire to Assess Sarcopenia: Korean Frailty and Aging Cohort Study. *JAMDA, The Journal of Post-Acute and Long-Term Care Medicine,* Vol. 19, Issue 1, Pages 40-45. Doi:10.1016/j.jamda.2017.07.006.

Walston, J.D. Sarcopenia in older adults. C*urrent opinion in rheumatology*. 2012;24(6):623-627. doi:10.1097/BOR.0b013e328358d59b

Family
Falls Information Pamphlet

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Why are we interested in falls?

alls...

Are one of the most common causes of injury to seniors

Are frequently the primary reason a person is admitted to our communities

Often cause a person to lose confidence and "give up".

The Team Approach to Fall Management

The *TEAM* includes you, your loved ones, and the people caring for you in the center. We have a shared goal to manage fall risk. By collaborating, we can develop person-centered approaches to reduce risk for falls.

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Still Falling for You

Understanding the Risk for Falls

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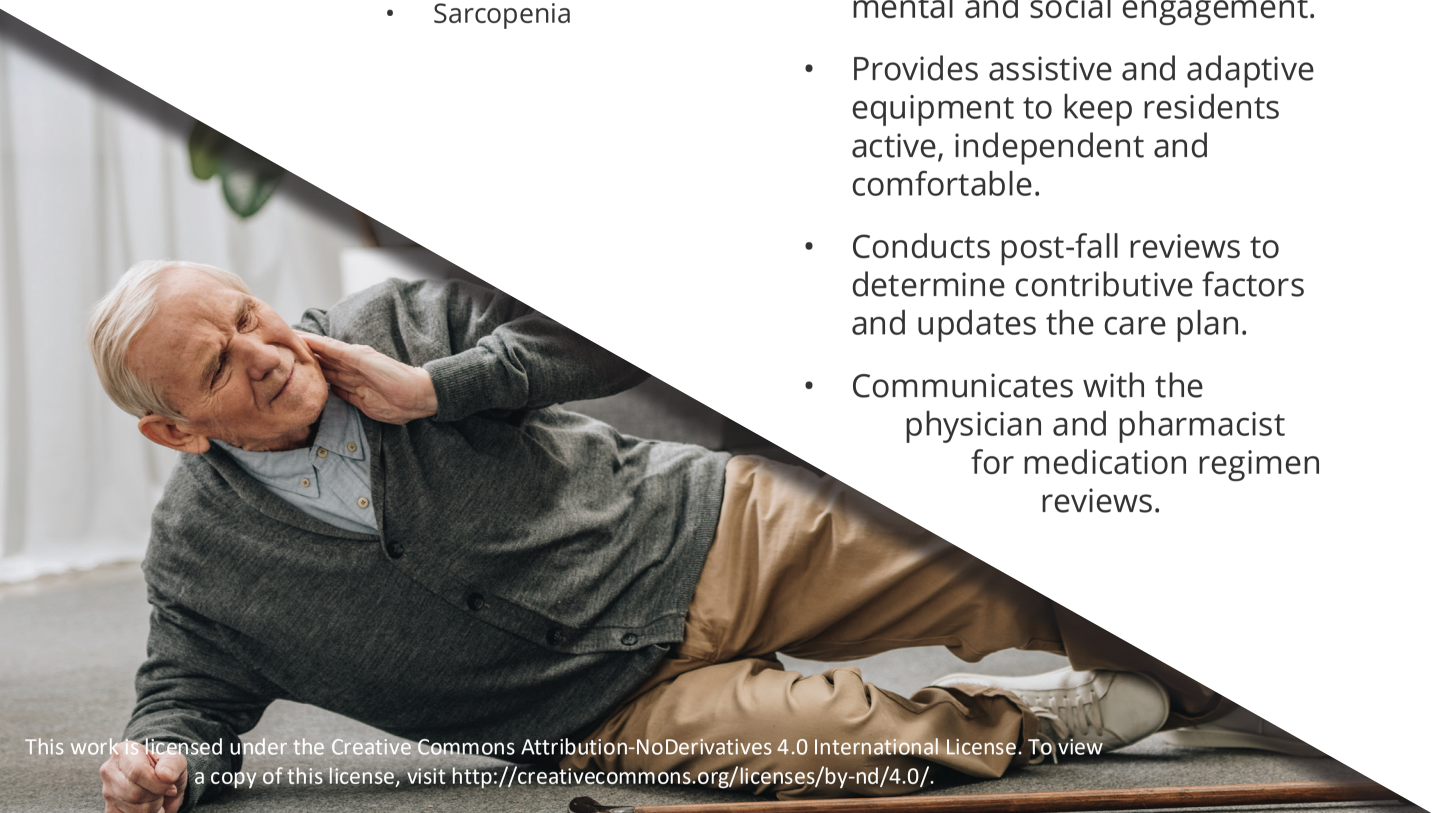
Help Us Help You Manage Fall Risk

If you or your loved one fell at home, there is a greater risk for falls here. Working together can help us manage fall risk.

FALL FACTS

People at risk for falling include, but are not limited to:

- Over the age of 65
- Taking multiple medications
- Medications such as cardiac, psychotropic and others
- Deconditioned, out of shape
- Medically fragile or have multiple medical conditions
- Dementia or cognitive impairment
- Currently experiencing falls
- Incontinence
- Dizziness/syncope
- Difficulty walking, standing, balancing
- Vision/hearing impaired
- Acute illness and recovery
- Recently receiving anesthesia
- Malnourished, dehydrated
- Depression
- Sarcopenia



THE INTERDISCIPLINARY TEAM APPROACH

- Asks for your ideas and feedback to identify fall risk.
- Assesses upon admission and on a scheduled basis for fall risk to address identified risk factors.
- Develops a person-centered care plan addressing identified risks for falls with your assistance and/or feedback.
- Provides Physical, Occupational and Recreational Therapy Programs to improve physical, mental and social engagement.
- Provides assistive and adaptive equipment to keep residents active, independent and comfortable.
- Conducts post-fall reviews to determine contributive factors and updates the care plan.
- Communicates with the physician and pharmacist for medication regimen reviews.

SHARE YOUR KNOWLEDGE

- Were there falls or “wobbles”/ “near falls” prior to admission?
- Are there falls outside of the center?
- Notify staff when you end your visit.
- Are there medication side effects such as: dizziness, unable to balance, or a change in their ability to walk? (Please discuss with the attending physician).
- Let us know if you think there is a change of condition.
- What worked at home to reduce fall risk?

INCREASE YOUR KNOWLEDGE

- We can train you on transferring and positioning during off-site visits (never attempt a transfer while on-site).
- Instruct your loved one to move slowly from a lying or sitting position to standing to prevent dizziness.
- Encourage your loved one to walk, stand, balance – **MOVE!** - often using assistive devices.

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Assessment Tools

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The Activities-specific Balance Confidence (ABC) Scale*

Administration:
The ABC can be self-administered or administered via personal or telephone interview. Larger typeset should be used for self-administration, while an enlarged version of the rating scale on an index card will facilitate in-person interviews. Regardless of method of administration, each respondent should be queried concerning their understanding of instructions, and probed regarding difficulty answering specific items.

Instructions to Participants:
For each of the following, please indicate your level of confidence in doing the activity without losing your balance or becoming unsteady from choosing one of the percentage points on the scale form 0% to 100%. If you do not currently do the activity in question, try and imagine how confident you would be if you had to do the activity. If you normally use a walking aid to do the activity or hold onto someone, rate your confidence as it you were using these supports. If you have any questions about answering any of these items, please ask the administrator.

Instructions for Scoring:
The ABC is an 11-point scale and ratings should consist of whole numbers (0-100) for each item. **Total the ratings (possible range = 0 – 1600) and divide by 16 to get each subject's ABC score.** If a subject qualifies his/her response to items #2, #9, #11, #14 or #15 (different ratings for "up" vs. "down" or "onto" vs. "off"), solicit separate ratings and use the lowest confidence of the two (as this will limit the entire activity, for instance the likelihood of using the stairs.)

- 80% = high level of physical functioning
- 50-80% = moderate level of physical functioning
- < 50% = low level of physical functioning

Myers AM (1998)

- < 67% = older adults at risk for falling; predictive of future fall

LaJoie Y (2004)

1. Powell, LE & Myers AM. The Activities-specific Balance Confidence (ABC) Scale. *J Gerontol Med Sci* 1995; 50(1): M28-34
2. Myers AM, Fletcher PC, Myers AN, Sherk W. Discriminative and evaluative properties of the ABC Scale. J Gerontol A Biol Sci Med Sci. 1998;53:M287-M294.
3. Lajoie Y, Gallagher SP. Predicting falls within the elderly community: comparison of postural sway, reaction time, the Berg balance scale and ABC scale for comparing fallers and non-fallers. Arch Gerontol Geriatr. 2004;38:11-26.

THE BARTHEL INDEX

Patient Name: _____
Rater Name: _____
Date: _____

Activity	Score

FEEDING
0 = unable
5 = needs help cutting, spreading butter, etc., or requires modified diet
10 = independent _____

BATHING
0 = dependent
5 = independent (or in shower) _____

GROOMING
0 = needs to help with personal care
5 = independent face/hair/teeth/shaving (implements provided) _____

DRESSING
0 = dependent
5 = needs help but can do about half unaided
10 = independent (including buttons, zips, laces, etc.) _____

BOWELS
0 = incontinent (or needs to be given enemas)
5 = occasional accident
10 = continent _____

BLADDER
0 = incontinent, or catheterized and unable to manage alone
5 = occasional accident
10 = continent _____

TOILET USE
0 = dependent
5 = needs some help, but can do something alone
10 = independent (on and off, dressing, wiping) _____

TRANSFERS (BED TO CHAIR AND BACK)
0 = unable, no sitting balance
5 = major help (one or two people, physical), can sit
10 = minor help (verbal or physical)
15 = independent _____

MOBILITY (ON LEVEL SURFACES)
0 = immobile or < 50 yards
5 = wheelchair independent, including corners, > 50 yards
10 = walks with help of one person (verbal or physical) > 50 yards
15 = independent (but may use any aid; for example, stick) > 50 yards _____

STAIRS
0 = unable
5 = needs help (verbal, physical, carrying aid)
10 = independent _____

TOTAL (0–100): _____

The Barthel ADL Index: Guidelines

1. The index should be used as a record of what a patient does, not as a record of what a patient could do.
2. The main aim is to establish degree of independence from any help, physical or verbal, however minor and for whatever reason.
3. The need for supervision renders the patient not independent.
4. A patient's performance should be established using the best available evidence. Asking the patient, friends/relatives and nurses are the usual sources, but direct observation and common sense are also important. However direct testing is not needed.
5. Usually the patient's performance over the preceding 24-48 hours is important, but occasionally longer periods will be relevant.
6. Middle categories imply that the patient supplies over 50 per cent of the effort.
7. Use of aids to be independent is allowed.

References

Mahoney FI, Barthel D. "Functional evaluation: the Barthel Index."
Maryland State Medical Journal 1965;14:56-61. Used with permission.

Loewen SC, Anderson BA. "Predictors of stroke outcome using objective measurement scales."
***Stroke.* 1990;21:78-81.**

Gresham GE, Phillips TF, Labi ML. "ADL status in stroke: relative merits of three standard indexes."
***Arch Phys Med Rehabil.* 1980;61:355-358.**

Collin C, Wade DT, Davies S, Horne V. "The Barthel ADL Index: a reliability study."
***Int Disability Study.*1988;10:61-63.**

Copyright Information

Berg Balance Scale

The Berg Balance Scale (BBS) was developed to measure balance among older people with impairment in balance function by assessing the performance of functional tasks. It is a valid instrument used for evaluation of the effectiveness of interventions and for quantitative descriptions of function in clinical practice and research. The BBS has been evaluated in several reliability studies. *A recent study of the BBS, which was completed in Finland, indicates that a change of eight (8) BBS points is required to reveal a genuine change in function between two assessments among older people who are dependent in ADL and living in residential care facilities.*

Description:
14-item scale designed to measure balance of the older adult in a clinical setting.

Equipment needed: Ruler, two standard chairs (one with arm rests, one without), footstool or step, stopwatch or wristwatch, 15 ft walkway

Completion:

Time: 15-20 minutes

Scoring: A five-point scale, ranging from 0-4. "0" indicates the lowest level of function and "4" the highest level of function. Total Score = 56

Interpretation:
41-56 = low fall risk
21-40 = medium fall risk
0 –20 = high fall risk

A change of 8 points is required to reveal a genuine change in function between 2 assessments.

Berg Balance Scale

Name: _____ Date: _____

Location: _____ Rater: _____

ITEM DESCRIPTION	SCORE (0-4)
Sitting to standing	_____
Standing unsupported	_____
Sitting unsupported	_____
Standing to sitting	_____
Transfers	_____
Standing with eyes closed	_____
Standing with feet together	_____
Reaching forward with outstretched arm	_____
Retrieving object from floor	_____
Turning to look behind	_____
Turning 360 degrees	_____
Placing alternate foot on stool	_____
Standing with one foot in front	_____
Standing on one foot	_____

Total _____

GENERAL INSTRUCTIONS

Please document each task and/or give instructions as written. When scoring, please record the lowest response category that applies for each item.

In most items, the subject is asked to maintain a given position for a specific time. Progressively more points are deducted if:

- the time or distance requirements are not met
- the subject's performance warrants supervision
- the subject touches an external support or receives assistance from the examiner

Subject should understand that they must maintain their balance while attempting the tasks. The choices of which leg to stand on or how far to reach are left to the subject. Poor judgment will adversely influence the performance and the scoring.

Equipment required for testing is a stopwatch or watch with a second hand, and a ruler or other indicator of 2, 5, and 10 inches. Chairs used during testing should be a reasonable height. Either a step or a stool of average step height may be used for item # 12.

Berg Balance Scale

SITTING TO STANDING
INSTRUCTIONS: Please stand up. Try not to use your hand for support.
( ) 4 able to stand without using hands and stabilize independently
( ) 3 able to stand independently using hands
( ) 2 able to stand using hands after several tries
( ) 1 needs minimal aid to stand or stabilize
( ) 0 needs moderate or maximal assist to stand

STANDING UNSUPPORTED
INSTRUCTIONS: Please stand for two minutes without holding on.
( ) 4 able to stand safely for 2 minutes
( ) 3 able to stand 2 minutes with supervision
( ) 2 able to stand 30 seconds unsupported
( ) 1 needs several tries to stand 30 seconds unsupported
( ) 0 unable to stand 30 seconds unsupported

If a subject is able to stand 2 minutes unsupported, score full points for sitting unsupported. Proceed to item #4.

SITTING WITH BACK UNSUPPORTED BUT FEET SUPPORTED ON FLOOR OR ON A STOOL
INSTRUCTIONS: Please sit with arms folded for 2 minutes.
( ) 4 able to sit safely and securely for 2 minutes
( ) 3 able to sit 2 minutes under supervision
( ) 2 able to able to sit 30 seconds
( ) 1 able to sit 10 seconds
( ) 0 unable to sit without support 10 seconds

STANDING TO SITTING
INSTRUCTIONS: Please sit down.
( ) 4 sits safely with minimal use of hands
( ) 3 controls descent by using hands
( ) 2 uses back of legs against chair to control descent
( ) 1 sits independently but has uncontrolled descent
( ) 0 needs assist to sit

TRANSFERS
INSTRUCTIONS: Arrange chair(s) for pivot transfer. Ask subject to transfer one way toward a seat with armrests and one way toward a seat without armrests. You may use two chairs (one with and one without armrests) or a bed and a chair.
( ) 4 able to transfer safely with minor use of hands
( ) 3 able to transfer safely definite need of hands
( ) 2 able to transfer with verbal cuing and/or supervision
( ) 1 needs one person to assist
( ) 0 needs two people to assist or supervise to be safe

STANDING UNSUPPORTED WITH EYES CLOSED
INSTRUCTIONS: Please close your eyes and stand still for 10 seconds.
( ) 4 able to stand 10 seconds safely
( ) 3 able to stand 10 seconds with supervision
( ) 2 able to stand 3 seconds
( ) 1 unable to keep eyes closed 3 seconds but stays safely
( ) 0 needs help to keep from falling

STANDING UNSUPPORTED WITH FEET TOGETHER
INSTRUCTIONS: Place your feet together and stand without holding on.
( ) 4 able to place feet together independently and stand 1 minute safely
( ) 3 able to place feet together independently and stand 1 minute with supervision
( ) 2 able to place feet together independently but unable to hold for 30 seconds
( ) 1 needs help to attain position but able to stand 15 seconds feet together
( ) 0 needs help to attain position and unable to hold for 15 seconds

Berg Balance Scale continued…

REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING
INSTRUCTIONS: Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can. (Examiner places a ruler at the end of fingertips when arm is at 90 degrees. Fingers should not touch the ruler while reaching forward. The recorded measure is the distance forward that the fingers reach while the subject is in the most forward lean position. When possible, ask subject to use both arms when reaching to avoid rotation of the trunk.)
( ) 4 can reach forward confidently 25 cm (10 inches)
( ) 3 can reach forward 12 cm (5 inches)
( ) 2 can reach forward 5 cm (2 inches)
( ) 1 reaches forward but needs supervision
( ) 0 loses balance while trying/requires external support

PICK UP OBJECT FROM THE FLOOR FROM A STANDING POSITION
INSTRUCTIONS: Pick up the shoe/slipper, which is in front of your feet.
( ) 4 able to pick up slipper safely and easily
( ) 3 able to pick up slipper but needs supervision
( ) 2 unable to pick up but reaches 2-5 cm(1-2 inches) from slipper and keeps balance independently
( ) 1 unable to pick up and needs supervision while trying
( ) 0 unable to try/needs assist to keep from losing balance or falling

TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING
INSTRUCTIONS: Turn to look directly behind you over toward the left shoulder. Repeat to the right. (Examiner may pick an object to look at directly behind the subject to encourage a better twist turn.)
( ) 4 looks behind from both sides and weight shifts well
( ) 3 looks behind one side only other side shows less weight shift
( ) 2 turns sideways only but maintains balance
( ) 1 needs supervision when turning
( ) 0 needs assist to keep from losing balance or falling

TURN 360 DEGREES
INSTRUCTIONS: Turn completely around in a full circle. Pause. Then turn a full circle in the other direction.
( ) 4 able to turn 360 degrees safely in 4 seconds or less
( ) 3 able to turn 360 degrees safely one side only 4 seconds or less
( ) 2 able to turn 360 degrees safely but slowly
( ) 1 needs close supervision or verbal cuing
( ) 0 needs assistance while turning

PLACE ALTERNATE FOOT ON STEP OR STOOL WHILE STANDING UNSUPPORTED
INSTRUCTIONS: Place each foot alternately on the step/stool. Continue until each foot has touched the step/stool four times.
( ) 4 able to stand independently and safely and complete 8 steps in 20 seconds
( ) 3 able to stand independently and complete 8 steps in > 20 seconds
( ) 2 able to complete 4 steps without aid with supervision
( ) 1 able to complete > 2 steps needs minimal assist
( ) 0 needs assistance to keep from falling/unable to try

STANDING UNSUPPORTED ONE FOOT IN FRONT
INSTRUCTIONS: (DEMONSTRATE TO SUBJECT) Place one foot directly in front of the other. If you feel that you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot. (To score 3 points, the length of the step should exceed the length of the other foot and the width of the stance should approximate the subject's normal stride width.)
( ) 4 able to place foot tandem independently and hold 30 seconds
( ) 3 able to place foot ahead independently and hold 30 seconds
( ) 2 able to take small step independently and hold 30 seconds
( ) 1 needs help to step but can hold 15 seconds
( ) 0 loses balance while stepping or standing

STANDING ON ONE LEG
INSTRUCTIONS: Stand on one leg as long as you can without holding on.
( ) 4 able to lift leg independently and hold > 10 seconds
( ) 3 able to lift leg independently and hold 5-10 seconds
( ) 2 able to lift leg independently and hold ≥ 3 seconds
( ) 1 tries to lift leg unable to hold 3 seconds but remains standing independently.
( ) 0 unable to try of needs assist to prevent fall

( ) TOTAL SCORE (Maximum = 56)

Bladder & Bowel Continence Assessment

Date Assessment Initiated: _____
Information Source *(please circle)* – Resident (R), Family (F) _____, Chart (C), RN, RPN, PSW, other.

Addressograph

A. RELEVANT MEDICAL &/OR SURGICAL CONDITIONS
(From **R**esident, **F**amily, **C**hart)

- ☐ **Immobility Issues**
- ☐ Arthritis
- ☐ Other_____
- ☐ **Neurological Conditions**
- ☐ Stroke
- ☐ Parkinson's Disease
- ☐ Multiple Sclerosis
- ☐ Spinal Cord injury
- ☐ Other_____
- ☐ **Medical Conditions**
- ☐ Diabetes
- ☐ Hypertension
- ☐ Hypothyroidism
- ☐ Heart Problems

Weight : _____ (kg)

- ☐ **Cognitive Problems**
- ☐ Dementia
- ☐ Other_____
- ☐ **Genito-Urinary (GU) Problems**
- ☐ Recurrent Urinary Tract Infections
- ☐ Previous G/U Surgery or Injury
- ☐ Prostate Problems
- ☐ Other_____
- ☐ **Gastro-Intestinal (GI) Problems**
- ☐ Chronic constipation
- ☐ Diverticular disease
- ☐ Hemorrhoids/fissures
- ☐ Previous colon surgery
- ☐ Irritable bowel syndrome
- ☐ Other_____

B. MEDICATIONS

See over	Y	N	Comments
Antacids with aluminum			
Analgesics/NSAIDS			
Anticholinergic/ Antispasmodic/ Anti-emetics			
Antidepressants			
Antihistamines			
Anti-hypertensives			
Anti-Parkinson agents			
Anti-psychotics			
Calcium Channel Blockers			
Cholinergic			
Diuretic			
Histamine-2 blockers			
Iron supplements			
Laxatives			
Narcotic analgesic			
Sedative/hypnotic			
Other			

C. URINARY CONTINENCE HISTORY

Urinary Incontinence Pattern	**Urinary Incontinence (UI) Frequency and Timing**	☐ No daytime UI ☐ Once a day or less ☐ 1-2 times a day ☐ 3 times a day or more ☐ Nighttime only ☐ Both day and night UI
	Urinary Incontinence (UI) Volume	☐ Entire bladder contents: large volume ☐ Small volume: leaks, drips, spurts ☐ Continuous bladder leakage ☐ Unable to determine
Urinary Incontinence History	**Onset**	☐ Sudden ☐ Gradual
	Duration	☐ < 6 months ☐ 6 months – 1 year ☐ > 1 year ☐ Unknown
	Symptoms over the past 6 months	☐ Worsening ☐ Stable ☐ Improving ☐ Fluctuating ☐ Unknown
Has a physician been consulted with above urinary problems? ☐ Yes ☐ No		

D: SYMPTOMS ASSOCIATED WITH URINARY INCONTINENCE

Type of Urinary Incontinence	Symptoms	Y	N	N/A	*Total number of "yes" answers
Stress UI	Leakage with cough, sneeze, physical activity				
	UI in small amounts (drops, spurts)				
	UI during daytime only				
	Fecal incontinence may be present				
Urge UI	Strong, uncontrolled urge prior to UI				
	UI moderate/large volume (gush)				
	Frequency of urination				
	Nocturia > 2 times				
	Nocturnal enuresis – bedwetting				
Overflow UI	Difficulty starting urine stream or straining to void				
	Weak or stop/go stream				
	Post-void dribbling				
	Prolonged voiding				
	Fullness after voiding				
	Suprapubic pressure and pain				
	Spurt of urine with movement				
Functional UI	Limited mobility				
	Requires assistance with toileting				
	Assistive aids/devices required (e.g., mechanical lift, 1-2 staff to assist, high seat, commode, support bars, hand rail, etc.)				
	Unable to get to the toilet on time/toilet too far				
	Can't hold urinal or sit on toilet				
	Can't reach/use call bell				
	Restraints or gerichair				
	Poor vision				
	Altered mental status				
	Pain poorly managed				
	Can't manage clothing				

*Follow interventions for the type of urinary incontinence that has the most "yes" answers. Take note that mixed incontinence (feature of both stress and urge incontinence) may be possible and interventions should focus on both types of incontinence. Refer to Physician and/or Nurse Continence Advisor for complex urinary incontinence issues.

Drugs that affect Bowel/Bladder Control

The purpose of this list is to give examples of drugs that can affect incontinence. It is not a comprehensive list.

Blood pressure/Heart
Anti-hypertensives
(Postural hypotension leads and functional urinary incontinence).

ACE inhibitors
- Benazepril
- Captopril
- Enalapril
- Fosinopril
- Lisinopril
- Quinapril
- Ramipril

ACE II inhibitors (ARB's)
- Candesartan
- Eprosartan
- Irbesartan
- Losartan
- Telmisartan
- Valsartan

Alpha Adreneurgics
- Clonidine

Diuretics
(Diruresis causes overflow incontinence)
- Acetazolamide
- Amiloride
- Bumetanide
- Chlorthalidone
- Hydrochlorothiazide
indapamide
- Metolazone
- Spironolactone

Calcium Channel Blockers
(Constipation, diarrhea)
- Amlodipine
- Diltiazem
- Felodipine
- Nifedipine
- Verapamil

Digestion/Excretion:
Antacids with aluminum
(laxative effect, can cause diarrhea or loose stools)

-Various Alumina compounds
-Aluminum Hydroxide
-Calcium Carbonate
-Calcium Carbonate and Magnesia
-Calcium Carbonate, Magnesia, and Simethicone
-Calcium and Magnesium Carbonates
-Magaldrate
-Magaldrate and Simethicone
-Magnesium Carbonate and Sodium Bicarbonate
-Magnesium Hydroxide

Laxatives
(Diarrhea, intestinal cramping, fecal incontinence)
- Polycarbophil
- Psyllium; Hydrophilic Mucilloid and Senna
- Lactulose
- Polyethylene glycol 3350
- Magnesium Citrate
- Magnesium Hydroxide (Milk of magnesia)
- Magnesium Sulfate
- Sodium Phosphate
- Milk of Magnesia & Mineral Oil
- Mineral Oil
- Bisacodyl
- Cascara Sagrada; and Aloe; and Bisacodyl
- Castor Oil
- Senna
- Sennosides
- Bisacodyl and Docusate
- Casanthranol and Docusate
- Danthron and Docusate
- Sennosides and Docusate
- Docusate

Mood/Behaviour:
Antidepressant
(Constipation, especially in elderly. Contributes to overflow and functional urinary incontinence. Problems with urination and loss of bladder control. Monoamine oxidase inhibitors (MAO's) can cause urinary retention.)

Tricyclic antidepressants
- Amitriptyline
- Clomipramine
- Desipramine
- Doxepin
- Imipramine
- Maprotiline (tetracyclic)
- Nortriptyline
Protriptyline
- Trimipramine

MAO Antidepressants
- Amoxapine
- Bupropion
- Citalopram
- Fluoxetine
- Fluvoxamine
- Mirtazapine
- Nefazadone
- Paroxetine
- Sertraline
- Trazodone
- Venlafaxine

Anti-psychotics
(Constipation, confusion, sedation, rigidity and immobility leading to overflow and functional urinary incontinence).

- Chlorpromazine
- Clozapine*
- Fluphenazine
- Haloperidol
- Loxapine
- Olanzapine*
- Perphenazine
- Pimozide
- Quetiapine*
- Risperidone*
- Thioridazine
- Trifluoperazine
*atypicals

Sedative/Hypnotic/ Barbiturate
(Can cause excessive sedation and decreased mobility in elderly people predisposing them to functional urinary incontinence. Not commonly used in long term care.)

- Butabarbital

Pain; Analgesics
Narcotic
Constipation and confusion leading to overflow and functional urinary incontinence.
- Codeine
- Hydrocodone
- Hydromorphone
- Levorphanol
- Meperidine
- Morphine
- Oxycodone
- Pentazocine
- Propoxyphene
- Nalbuphine

NSAIDS
-Urinary retention in elderly and or arthritic patients (on large doses)
Oral
- Diclofenac
- Diflunisal
- Etodolac
- Fenoprofen
- Floctafenine
- Ibuprofen
- Indomethacin
- Ketoprofen
- Meclofenamate
- Mefenamic Acid
- Nabumetone
- Naproxen
- Oxaprozin
- Piroxicam
- Sulindac
- Tenoxicam
- Tiaprofenic Acid
-Tolmetin

Other

Anticholinergic/ Antispasmodic/ Anti-emetics
(Constipation and urinary retention leading to overflow and functional urinary incontinence)
- Benztropine
- Oxybutynin
- Procyclidine
- Scopolamine
- Tolterodine
- Trihexyphenidyl

1st Generation Antihistamines
- Chorpheniramine
- Dephenhydramine
- Dimenhydrinate
- Hydroxyxine

Cholinergic
(Cause urge incontinence due to bladder relaxation. Not commonly used in long term care).
- Bethanechol

Anti-Parkinson agents
(Constipation, diarrhea)
- Levadopa
- Carbadopa
- Pergolide

Sources: AHCPR. 2006. Urinary Incontinence. http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat6.section.10079.; **Brigham & Women's Hospital.** 2004, Urinary incontinence http://www.brighamandwomens.org/medical/HandbookArticles/Urinaryincontinence.pdf.; **The Hartford Institute for Geriatric Nursing.** 2001. Urinary incontinence. http://www.hartfordign.org/publications/trythis/issue11.pdf.; **IC-5 Continence Project,** 2005, http://www.hospitalreport.ca/projects/QI_projects/IC5.html**. Rehabilitation Nursing Foundation.** 2002. Constipation. www.rehabnurse.org.; **RNAO.** 2005, Preventing Constipation; Prompting Continence. http://www.rnao.org/bestpractices. ; **Royal Women's Hospital**. 2005. Urinary incontinence, http://www.rwh.org.au/rwhcpg/womenshealth.cfm?doc_id=3661. ; **Singapore Ministry of Health**. 2003, http://www.moh.gov.sg/cmaweb/attachments/publication/Nursing_Management_of_Patients_with_Urinary_Incontinence_1-2003.pdf**. U.S. National Library of Medicine and U.S. National Institute of Health**. 2006. Drugs, supplements. < http://www.nlm.nih.gov/medlineplus/druginformation.html>.

Addressograph

D. BOWEL CONTINENCE HISTORY

Bowel Pattern	Comments
☐ Normal ☐ Constipation ☐ Diarrhea ☐ Fecal incontinence ☐ Irritable bowel pattern ☐ Impaction ☐ Laxative use/ suppositories/enemas – type and frequency: _____ ☐ Other remedies used to help with bowel movement: _____	Frequency: Usual time of day: Triggering meal: Nature & consistency: Other factors that have caused loss of bowel control:
Has a physician been consulted with above bowel problems? ☐ Yes ☐ No	

E. MISCELLANEOUS RISK FACTORS

Caffeine use (coffee/tea/colas) ☐ Yes ☐ No	Amount: Frequency: Time of Day:
Alcohol use ☐ Yes ☐ No	Amount: Frequency: Time of Day:
Fiber intake ☐ Yes ☐ No	Amount: Frequency: Time of Day:
Exercise ☐ Yes ☐ No	Type of Activity: Frequency: Time of Day

G. TOILETING PATTERN AND PRODUCT USE

	Day	Evening	Night
Toileting pattern	☐ Toilet ☐ Commode ☐ Urinal ☐ Bed pan	☐ Toilet ☐ Commode ☐ Urinal ☐ Bed pan	☐ Toilet ☐ Commode ☐ Urinal ☐ Bed pan
Frequency of Toileting			
Identify type of pads, briefs or other incontinent products worn including size			

H. ABILITIES

Cognitive	Y	N	Comments
Aware of urge to void			
Aware of the urge to defecate			
Socially aware of appropriate place to pass urine/stool			
Able to find the toilet			
Able to understand reminders or prompts			
Aware of when wet and/or urine is being passed			
Motivated to be continent			
Preferences about toileting			
Aware of the risk factors related to not emptying bladder and bowel completely and regularly and the importance of doing so			

I. PHYSICAL ASSESSMENT

Voided Volume		**Residual Urine**	
Send for C & S	☐ Yes ☐ No	**Voiding Record Initiated**	☐ Yes ☐ No
Perineum	☐ Intact ☐ Redness ☐ Excoriation ☐ Other _____	**Bowel Record Initiated**	☐ Yes ☐ No
Unusual Urine Odour	☐ Yes ☐ No	**Discharge Post Voiding**	☐ Yes ☐ No
Unusual Stool Odour	☐ Yes ☐ No	**Discharge Post BM**	☐ Yes ☐ No

J. FLUID & FOOD INTAKE (Obtain from initial bladder and bowel record)

Fluid/food Intake in 24 hours	Type of fluid	Quantity (1 cup=250 mls)	Type of food	Quantity
Breakfast				
Mid am				
Lunch				
Mid pm				
Supper				
Evening				
Night				
Total				

K. SUMMARY – CONTINENCE STATUS

Bladder

☐ Continent

☐ Incontinent : ☐ Stress UI ☐ Urge UI ☐ Overflow UI ☐ Functional UI

☐ Care Plan Initiated/Updated ☐ Voiding Record Initiated

☐ Referral required:
- ☐ Dietitian ☐ Physician ☐ OT ☐ PT

☐ Treatment Options:
- ☐ Prompted Voiding
- ☐ Fluid Intake Changes
- ☐ Caffeine Reduction
- ☐ Intermittent Catheterization
- ☐ Bedside Commode
- ☐ Personal Hygiene
- ☐ Incontinent Product
- ☐ Other: _____

Bowel

☐ Continent

☐ Incontinent

☐ Care Plan Initiated/Updated

☐ Bowel Record Initiated

☐ Referral required:
- ☐ Dietitian ☐ Physician ☐ OT ☐ PT

Contributing Factors

☐ Urinary Tract Infection
☐ Constipation
☐ Weight
☐ Cognitive – Mini Mental Status Examination (MMSE) Score: ____
☐ Fluid Intake
☐ Medications
☐ Environmental Factors
☐ Caffeine Intake
☐ Alcohol Intake
☐ Mobility
☐ Other

L. CONTINENCE CARE PLAN

Problems Identified	Interventions

Date of Assessment: _____

Assessor: _____

Urinary Incontinence Types and Interventions (Adapted from: RNAO, 2005. Orientation Program for Nurses in Long-Term Care Workbook. Toronto, Canada: RNAO)

	Stress UI	Urge UI	Overflow UI	Functional UI
Cause	Failure to store	Failure to store	Failure to empty	Failure to store
Frequency	20% of all cases	50% of all cases	10% of all cases	20% of all cases
Symptoms	-Small amount of urine loss frequently when residents coughs, laughs, changes position -Wet during day -Dry at night, no distention	-Large amounts of urine loss frequently "can't get to bathroom in time" -Wet day and night -No distention	-Small amounts of urine loss frequently -Wet day and night -Distention	-Bladder and sphincter are normal -Wet day and night -No distention
Pathology	Weakness of sphincter	Result of neurological and/or urological disease	-Female: result of cystocele -Male: result of enlarged prostrate, fecal impaction	Other factors cause incontinence: -Drugs -Environment -Psychological
Prevalence	Mostly female	Both male and female	Both male and female	Both male and female
Treatments/ Interventions	-Medications (e.g., Premarin & Entex-LA) -Kegel exercises -Prompted voiding	-Medications (e.g., Ditropan & antibiotics) -Surgery -Bladder training routines -Toileting routines -Prompted voiding	-Medications (e.g., Prazosin & Proscar) -Surgery -Double voiding -Crede maneuver -Bowel maintenance program -Disimpaction	-Medications -Surgery -Environment -Mobility -Psychological -Prompted voiding

Critical Pathway for Urinary Incontinence (Stress, Urge, and Functional Types)

Nursing Diagnosis	Assessment	Goals	Intervention
Alteration in urinary elimination: urinary incontinence, -Stress -Urge -Functional	-History and physical exam to determine causes, contributing factors to UI. -Record voiding and incontinence pattern 3-day bladder diary. -Assess bladder symptoms. -Assess urine character, odour, colour. -Rule out urinary retention – Post Void Residual (PVR).	-Reduction or resolution of UI episodes. -Incontinence well managed to promote independence, comfort, quality of life. -Prevention of adverse sequela of UI.	Teach resident: -Toileting schedules. -Pelvic muscle exercises. -Urge control. -Appropriate selection and use of absorbent products. -Toileting devices. -Clothing adaptations. -Bowel management.
Alteration in urinary elimination: urinary retention	-Assess and document urinary retention. -Assess resident's skill in self-management of voiding and catheter use if indicated. -Monitor bladder diary to assess progress with self-care interventions for bladder emptying.	-Schedule of regular bladder emptying and fluid intake. -Utilization of voiding maneuvers and catheterization, as indicated. -Prevention and early recognition of UTI.	Teach resident: -Voiding maneuvers: Crede' and double voiding. -Intermittent catheterization. -UTI prevention. -Sign/Symptom of UTI.
Alteration in fluid volume: fluid volume deficit	-Assess fluid intake from bladder diary recorded for 3 days. -Calculate fluid intake goals based on body weight and activity. -Develop fluid hydration protocol.	-Fluid intake adequate for urine dilution, bladder and bowel function, metabolic needs. -Treatment plan is acceptable to resident.	-Teach resident to implement fluid management protocol to meet individual fluid goals.
Alteration in nutritional intake: bladder irritants	-Assess consumption of bladder irritants: caffeine, artificial sweeteners, carbonated drinks, alcohol, spicy foods, milk, acidic juices. -Assess preferences for substitutions for irritants.	-Elimination or titration of bladder irritants. -Substitution of non-irritating beverages of choice.	-Instruct resident on rationale for avoidance of bladder irritants. -Teach resident ways to reduce and eliminate bladder irritants. -Monitor for effect of elimination.
Alteration in bowel elimination: constipation or fecal impaction	-Assess bowel elimination pattern, fibre and fluid intake, activity, and bowel aides.	-Establish regular bowel schedule. -Establish adequate fluid and fibre intake. -Minimize, avoid use of laxatives or enemas. -Reinforce good hygiene-wiping front to back, change after UI.	-Teach resident bowel program with dietary and fluid adjustments and fibre supplementation. -Develop exercise program within capacity of resident. -Augment toileting with knee-chest position using footstool.
Knowledge deficit related to self-care strategies for bladder health promotion	-Assess baseline knowledge of UI and self-care strategies. -Teach self-care strategies to improve or restore continence and bowel function. -Teach early recognition of UI-related problems: UTI, dermatitis, fecal impaction, urinary retention. -Teach self-monitoring of medication for UI, therapeutic, side and adverse effects.	-Resident describes causes and contributing factors to UI and bowel dysfunction. -Resident demonstrates effective self-care behaviours for urinary and bowel function.	-Instruct resident about UI status and rationale for interventions. -Modify interventions to allow for resident to implement gradually. -Set short term goals. -Reinforce resident behaviours that are health-promoting.
Self-care deficit	-Assess need for skill training to promote independence in toileting, e.g., exercises or physical therapy. -Assess need for equipment to promote independence in toileting, e.g., bedside commode, urinal, external devices. -PT/OT consults to assess need for muscle strengthening/ADL skill training for ambulation, transfer, or use of devices.	-Adaptive equipment and devices are acceptable, feasible, and appropriate for resident's needs. -Resident achieves highest level of physical function with exercise and rehabilitation therapies. -Resident assisted to achieve maximum independence in toileting skills.	-Select and instruct resident in use of adaptive equipment or devices. -Counsel resident about personal goal-setting related to toileting and continence.
Alteration in skin integrity: urine contact dermatitis	-Assess skin integrity for inflammation, maceration, infection, abrasion, and breakdown. -Asses resident's usual hygiene pattern. -Assess absorbent product usage for adequacy and appropriateness.	-Skin remains intact. -Absorbent product usage is appropriate for amount and frequency of urine loss. -Absorbent product is acceptable to the resident.	-Individualize skin care. -Monitor for sign/symptom of yeast, urine dermatitis. -Barrier ointment for fecal incontinence.
Alteration in urinary elimination: urinary tract infection	-Assess for signs/symptoms of UTI. -Assess fluid intake and voiding pattern. -Assess intake and output. -Assess bowel pattern for impaction, constipation, fecal incontinence.	-Resident is free of UTI. -Early recognition of signs/symptoms of UTI and urosepsis. -Prompt treatment of UTI.	-Reinforce good hygiene. -Increase fluid intake to 2000 – 4000 a day. -Change pad after each UI episode. -Bowel management. -Vitamin C BID per MD order. -Cranberry juice 8-12 oz. daily. -Re-culture as indicated.

Dynamic Gait Index

Name: Date:
Score:____/24 Fall Risk (<20) __Y __N

1. Gait on level surface.

Instruction: "Walk at your normal speed from here to the next mark (20')".

(3) Normal: Walks 20'. no assistive devices. good speed. no evidence of imbalance. normal gait pattern.
(2) Mild Impairment: Walks 20'. uses assistive device. slower speed. mild gait deviations.
(1) Moderate Impairment: Walks 20'. slow speed. abnormal gait pattern, evidence of imbalance.
(0) Severe Impairment: Cannot walk 20' without assistance. severe gait deviations or imbalance.

2. Change in gait speed.

Instruction:" Begin walking at your normal pace (for 5'). When I tell you 'go '. walk as fast as you can (for 5'). When I tell you 'slow', walk as slowly as you can (for 5').

(3) Normal: Able to smoothly change walking speed without loss of balance or gait deviations. Shows a significant difference in walking speeds between normal fast and slow speeds.
(2.) Mild Impairment: Is able to change speed but demonstrates mild gait deviations, or no gait deviations but unable to achieve a significant change in velocity or uses an assistive device.
(1) Moderate Impairment: Makes only minor adjustments to walking speed or accomplishes a change in speed with significant gait deviations, or changes speed but loses balance but is able to recover and continue walking.
(0) Severe Impairment: Cannot change speeds or looses balance and has to reach for wall or be caught.

3. Gait with horizontal head turns.

Instruction:. Begin walking at your normal pace. When I tell you to look to the right. keep walking straight but turn your head to the right. Keep it there until I tell you to look to the left, then keep walking straight but turn your head to the left. Keep your head there until I tell you to look forward, then keep walking straight but return your head to the center".

(3) Normal: Performs head movements smoothly with no change in gait speed.
(2) Mild Impairment: Performs head movements smoothly with slight change in gait speed, minor disruption in smooth gait path or uses walking aid.

(1) Moderate Impairment: Performs head turns with moderate change in speed, slows down. staggers but recovers. can continue to walk.
(0) Severe Impairment: Performs task with severe disruption in gait. staggers outside of 15" path. loses balance. stops. reaches for wall.

4. Gait with vertical head turns.

Instruction: " Begin walking at your normal pace. When I tell you to look up. keep walking straight but tip YOUR head up toward the ceiling. Keep it there until I tell you to look down, then keep walking straight but turn your head down. Keep your head there until I tell you to look forward then keep walking straight, but return your head to the center".

(3) Normal: Performs head movements smoothly with no change in gait speed.
(2) Mild Impairment: Performs head movements smoothly with slight change in gait speed, minor disruption in smooth gait path or uses walking aid.
(1) Moderate Impairment: Performs head turns with moderate change in speed, slows down, staggers but recovers can continue to walk.
(0) Severe Impairment: Performs task with severe disruption in gait, staggers outside of 15" path. loses balance, stops, reaches for wall.

5. Gait with pivot turn.

Instruction: "Begin walking at your normal pace. When I tell you to turn and stop. turn as quickly as you can to face the opposite direction and stop".

(3) Normal: Pivot turns safely within 3 seconds and stops quickly with no loss of balance.
{2} Mild Impairment: Pivot turns safely in >3 seconds and stops with no loss of balance .
(1) Moderate Impairment: Turns slowly, requires verbal cueing and requires several steps to catch balance following turn and stop.
(0) Severe Impairment: Cannot turn safely. requires assistance to turn and stop .

6. Step over obstacle.

Instruction: "Begin walking at your normal speed. When you come to the obstacle, step over it. not around it, and then keep walking."

(3) Normal: Is able to step over obstacle without changing gait speed.
(2) Mild impairment: Is able to step over obstacle but must slow down and adjust steps in order to clear safely.
(1) Moderate Impairment: Is able to step over the box but must stop, then step over. May require verbal cueing.
(0) Severe Impairment: Cannot perform without assistance.

7. Step around obstacles.

Instructions: " Begin waking at your normal speed. When you come to the first cone (6') walk: around to the right side of it. When you come to the second cone (6' past the first cone). walk around to the left side it".

(3) Normal: Is able to walk around cones safely without changing gait speed. no evidence of imbalance.
(2) Mild Impairment: Is able to step around both cones but must slow down and adjust steps to clear cones.
(1) Moderate Impairment: Is able to clear cones but must significantly slow speed to accomplish task or requires verbal cueing.
(0) Severe Impairment: Unable to clear cones. walks into one or both cones. or requires physical assistance.

8. Steps.

Instructions: "Walk up these stairs as you would at home (i.e. using rail if necessary). At the top, turn around and walk down".

(3) Normal: Alternating feet. no rail.
(2) Mild Impairment: Alternating feet. must use railing.
(1) Moderate lrnpairmern: Two feet to a stair. must use railing.
(0) Severe Impairment: Cannot do safely.

Score:_____

Attachment A:

Equipment Safety Checklist

Wheelchairs		
Brakes	Secures chair when applied	_____
Arm Rest	Detaches easily for transfers	_____
Leg Rest	Adjusts easily	_____
Foot Pedals	Fold easily so that patient may stand	_____
Wheels	Are not bent or warped	_____
Anti-tip devices	Installed, placed in proper position	_____
Electric Wheelchairs/Scooters		
Speed	Set at the lowest setting	_____
Horn	Works properly	_____
Electrical	Wires are not exposed	_____
Beds		
Side Rails	Raise and lower easily	_____
	Secure when up	_____
	Used for mobility purposes only	_____
Wheels	Roll/turn easily, do not stick	_____
Brakes	Secures the bed firmly when applied	_____
Mechanics	Height adjusts easily (if applicable)	_____
Transfer Bars	Sturdy, attached properly	_____
Over-bed Table	Wheels firmly locked	_____
	Positioned on wall-side of bed	_____
IV Poles/Stands		
Pole	Raises/lowers easily	_____
Wheels	Rolls easily and turns freely, do not stick	_____
Stand	Stable, does not tip easily (should be five point base)	_____
Footstools		
Legs	Rubber skid protectors on all feet	_____
	Steady — does not rock	_____
Top	Non-skid surface	_____
Call Bells/Lights		
Operational	Outside door light	_____
	Sounds at nursing station	_____
	Room number appears on the monitor	_____
	Intercom	_____
	Room panel signals	_____
Accessible	Accessible in bathroom	_____
	Within reach while resident is in bed	_____
Walkers/Canes		
Secure	Rubber tips in good condition	_____
	Unit is stable	_____
Commode		
Wheels	Roll/turn easily, do not stick	_____
	Are weighted and not "top heavy" when a patient is sitting on it	_____
Brakes	Secure commode when applied	_____
Geri/Broda Chairs		
Chair	Located on level surface to minimize risk of tipping	_____
Wheels	Roll/turn easily, do not stick	_____
Breaks	Applied when chair is stationary	_____
	Secure chair firmly when applied	_____
Footplate	Removed when chair is placed in a non-tilt or non-reclined position	_____
	Removed during transfers	_____
Positioning	Chair is positioned in proper amount of tilt to prevent sliding or falling forward	_____
Tray	Secure	_____

References: Morse, J. 1997. *Preventing patient falls. Thousand Oakes, CA: Sage*

Broda. 1999. *Safety Operating Instructions*

Fall prevention program yields quick results

In December 2002, Northeast Health System (NHS), in Beverly, MA, launched a comprehensive fall prevention program at its two acute care hospitals, Addison Gilbert Hospital and Beverly Hospital. Immediately preceding the program's launch, a team comprised of quality improvement staff, nursing leadership and the patient safety committee reviewed the falls data from the two hospitals' nursing units and noticed an increase in the rate of falls — particularly in the rate of falls with injury. At about the same time, Massachusetts' Blue Cross/Blue Shield began a Quality Improvement Incentive Program and was seeking proposals for hospital/health system quality/patient safety initiatives. The timing could not have been better for the creation of a fall prevention project focused on the acute care population at Northeast Health System, utilizing the QI Project's Acute Care Indicator 13: *Documented Falls*.*

According to Diane Dick, NHS assistant vice president of quality/case management, patient falls data have been reported, investigated, and trended for years. "This spike in volume and severity of falls was troubling and it was clear that the entire falls program needed revising," says Dick. "We moved the objective of the program to prevention by identifying patients at risk early and implementing appropriate risk reduction strategies."

The goal of NHS' falls prevention program is to decrease the number and severity of inpatient falls to be consistent with national/state means. In order to be most effective, however, the NHS team — comprised of medical/surgical nursing leadership, performance improvement staff, staff nurses, representatives from the critical care unit, emergency department, obstetrics, physical therapy, education, and pharmacy — conducted a review of the literature, and, utilizing an evidence-based approach, set a measurable goal for the program. The QI Project's aggregate mean rates for documented medical/surgical falls per 100 patient days for January through September 2002 ranged from 0.36 to 0.39. At Northeast Health hospitals, the rate of falls per 100 patients ranged from 0.30 to 0.66. With this in mind, the NHS team's goal was to decrease the rate of falls per 100 patient days to below the project-wide mean rates by June 2003 and below .31 falls per 100 patient days by June 2004.

Remarkably, after the first six months of the project, as of June 30, 2003, the data showed a dramatic overall reduction in the rate of falls for the health system. In fact, for the first half of 2003, NHS' rate was below the project-wide mean rates. Northeast Health had met and exceeded its 18-month goal in only six months. {*See accompanying Figure 1. (.bmp) (845 KB) Data points for mean rates between January 200 and June 2003 are shown graphically for Northeast [facility] and the QI Project [sponsor]; numerical values highlight the study period and portray the dramatic improvement*}

How did NHS achieve this remarkable reduction in falls? Its multi-faceted approach to implementing changes and interventions included the following:

- **Using a reliable and valid instrument to predict and identify prone-to-fall-patients.** Northeast Health developed a risk assessment tool, which is used to assess patients at admission and at each shift change. The assessment is based on the Morse scale (*Preventing Patient Falls, Janice M. Morse, 1997*) and is recorded in an electronic log,

along with the appropriate risk-reduction strategies and interventions associated with each patient's risk level. Nurse managers now receive daily reports of at-risk patients and post them on the units and high-risk patients are identified with an easy-to-see gold star on the unit.

- **Developing a system to track incidence and type of falls institution-wide**. The team revised the falls report to include more information on the factors that contribute to falls. Additionally, an update to the administrative database allows better unit-specific information for trending and the ability to develop interventions that are appropriate to the patient population. Finally, the team established definitions for both fall and injury that could be used facility-wide.
- **Maintaining a safe environment**. The team worked with plant operations to examine potential environmental fall factors and performed checks on beds, wheelchairs, walkers, handrail placement, bathroom call bells, etc. The falls prevention program coincided with the purchase of many new beds that were equipped with bed alarms.
- **Developing and targeting interventions for those likely to fall.** A multi-pronged approach including administrative, direct care, environmental, and equipment initiatives included identifying patients with a high risk fall score by placing a gold star on the unit, then regularly toileting those patients, ensuring they had adequate lighting at night and appropriately placing patients near the nursing station, and equipping those patients' beds and chairs with alarms.
- **Reducing the risk of those likely to fall.** To achieve this, NHS created a falls committee and a clinical educator was assigned to provide ongoing falls education to staff and physicians. The committee conducts falls rounds, during which they provide direct education regarding current fall assessments. In addition, the educator is available to nursing units to conduct a falls prevention consult and recommend interventions.
- **Constantly monitoring patients who have fallen using a post-fall protocol**. NHS developed an assessment and reporting flow sheet for nurses and physicians to provide standardized monitoring, treatment, and physician/family notification after a fall. The flow sheet outlines very concise responsibilities and steps for staff to follow after a patient experiences a fall.

NHS has made tremendous strides in reducing and preventing falls, but its work is yet to be completed. In addition to working to sustain its improvements, NHS wants to expand the scope of the falls program. While the initial focus was the medical surgical areas, NHS is now customizing the assessment/treatment tools for use in the ambulatory and psychiatric settings. NHS is also working to create computer-based links between assessment and intervention — greatly enhancing the program's visibility with clinical staff. Other initiatives underway include implementing additional recommended environmental changes, expanding education beyond nursing to all ancillary departments, continued creation of falls reduction strategies by the multi-disciplinary falls team, and testing new interventions such as chair alarms.

"Sharing success with all of our staff is particularly important," comments Dick. "We want our whole organization to know about and learn from the falls prevention program. To do this, we are creating posters for each unit showing the reduction in falls, and are developing articles for placement in our organizational newsletter like the nursing newsletter."

According to Margaret Burns, nursing director for inpatient services, one of NHS' biggest ongoing challenges -- one encountered during the early months of the falls prevention program -- is *staff education*. "We underestimated both the time that it would take to educate the staff initially and the need for continuing education on the use of the assessment tool, interventions, documentation, and feedback from auditing," she says. "Now that we are expanding education beyond nursing, we are working to ensure that we have the resources necessary to meet the ongoing educational challenges."

The NHS team attributes the success of the program to its excellent nursing staff and team approach to patient care. While NHS has seen dramatic improvements from the falls prevention program, patient falls will continue be one of its highest-priority safety issues.

*The QI Project is a not-for-profit clinical performance measurement and outcomes research organization operated by the Maryland Hospital Association. The Project works with more than 1,000 acute care hospitals, long-term care facilities and psychiatric care facilities in the United States, in addition to over 300 international facilities that participate in the international division of the QI Project. The services provided to participants center largely around developing valid and reliable performance indicators, developing software for collecting and analyzing data, providing national comparative reports and research, and educating participants on how to put their data to work to oversee patient care quality and identify opportunities for improvement. Visit the Web site at www.qiproject.org for additional information.

Falls Efficacy Scale

Name:_____ Date:_____

On a scale from 1 to 10, with 1 being very confident and 10 being not confident at all, how confident are you that you do the following activities without falling?

Activity:	**Score:** 1 = very confident 10 = not confident at all
Take a bath or shower	
Reach into cabinets or closets	
Walk around the house	
Prepare meals not requiring carrying heavy or hot objects	
Get in and out of bed	
Answer the door or telephone	
Get in and out of a chair	
Getting dressed and undressed	
Personal grooming (i.e. washing your face)	
Getting on and off of the toilet	
Total Score	

A total score of greater than 70 indicates that the person has a fear of falling

Adapted from Tinetti et al (1990)

References:

Tinetti, M., D. Richman, et al. (1990). "Falls efficacy as a measure of fear of falling." Journal of gerontology **45**(6): P239.

Assessment of falls risk in older people (Side 1)
(Falls Risk Assessment Tool-FRAT)

Multi - professional guidance for use
by the primary health care team, hospital staff, care home staff and social care workers

This guidance has been derived from longitudinal studies of factors predicting falls in older people and randomised controlled trials that have shown a reduction in the risk of falling. (adapted for local use but originally designed by Queen Mary College, University of London)

Definition Fall- An event whereby an individual comes to rest on the ground or another lower level with or without loss of consciousness (NICE 2004)

Notes for users:

1) Complete assessment form below. The more positive factors, the higher the risk for falling.
2) If there is a **positive response to three or more of the questions on the form, then please see over** for guidance for further assessment, referral options and interventions for certain risk factors.
3) Some users of the guidance may feel able to undertake further assessment and appropriate interventions at the time of the assessment.
4) Consider which referral would be most appropriate given the patient's needs and local resources.

Name _____ Date of Birth _____

NHS Number : | | | | | | | | | | |

		YES	NO
1	Is there a history of any fall in the previous year? **How assessed?** Ask the person.		
2	Is the patient / client on four or more medications per day? **How assessed?** Identify number of prescribed medications.		
3	Does the patient / client have a diagnosis of stroke or Parkinson's Disease? **How assessed?** Ask the person.		
4	Does the patient / client report any problems with his/ her balance? **How assessed?** Ask the person.		
5	Is the patient/client **unable** to rise from a chair of knee height? **How assessed?** Ask the person to stand up from a chair of knee height without using their arms.		

Suggestions for further assessment, referral options and interventions

Assessment by nurse or doctor

Risk factor present	Further assessment	Referral Options	Interventions
1) History of falling in the previous year	♦ Review incident(s), identifying precipitating factors.	♦ Occupational Therapy ♦ Physiotherapy ♦ Falls Clinic/ICT (1)	♦ Discuss fear of falling and realistic preventative measures.
2) Four or more medications per day	♦ Identify types of medication prescribed. ♦ Ask about symptoms of dizziness.	♦ General Practitioner ♦ Falls Clinic (1)	♦ Review medications, particularly sleeping tablets (see www.bhps.org.uk/falls for more information on medication and falls ♦ Discuss changes in sleep patterns normal with ageing, and sleep promoting behavioural techniques.
3) Balance and gait problems	♦ Can they talk while walking? (2) ♦ Do they sway significantly on standing?(3) ♦ Do basic balance test such as Timed Up & Go test	♦ Occupational Therapy ♦ Physiotherapy ♦ Falls Clinic/ICT (1)	♦ Teach about risk. And how to manoeuvre safely, effectively and efficiently. ♦ Physiotherapy evaluation for range of movement, strength, balance and/or gait exercises. ♦ Transfer exercises. ♦ Evaluate for assistive devices. ♦ Consider environmental modifications (a) to compensate for disability and to maximise safety, (b) so that daily activities do not require stooping or reaching overhead.
4) Postural hypotension (low blood pressure)	Two readings taken 1. After rest five minutes supine 2. 1 minutes later standing Drop in systolic BP ≥ 20mmHg and or drop in diastolic ≥ 10mmgHg or more	♦ District Nurse ♦ Practice nurse ♦ General Practitioner ♦ Falls Clinic (1)	♦ Offer extra pillows or consider raising head of bed if severe. ♦ Review medications. ♦ Teach to stabilise self after changing position and before walking. ♦ Avoid dehydration

1. Consider Falls Clinic/ Intermediate Care Referral Form.
2. While the patient is walking ask them a question but keep walking while you do so. If the patient stops walking either immediately or as soon as they start to answer, they are at higher risk of falling.
3. The patient stands between the assessor and the examination couch (or something they can safely hold on to). First assess if the person sways significantly (raises arms or compensates foot placement) while standing freely. Then ask the person to take their weight on to one leg and try to lift the other foot off the floor by about an inch (allow a few practice attempts).

Falls Risk Assessment Tool (FRAT)
Instructions for use

Working together to prevent falls

Risk assessment tool developed by: Peninsula Health Falls Prevention Service

The Peninsula Health Falls Prevention Service developed the *Falls Risk Assessment Tool* (FRAT) for a DHS funded project in 1999, and is part of the FRAT Pack <link to FRAT Pack>. A study evaluating the reliability and validity of the FRAT has been presented at a number of conferences, and is being prepared for publication. The FRAT has been distributed to approximately 400 agencies worldwide.

The FRAT has three sections: Part 1 - falls risk status, Part 2 – risk factor checklist and Part 3 – action plan. The complete tool (including the instructions for use) is a full falls risk assessment tool. However, Part 1 can be used as a falls risk screen. An abbreviated version of the instructions for use has been included on this website. For a full copy of the instructions for use please refer to the FRAT Pack <link to FRAT Pack> or contact the Peninsula Health Falls Prevention Service.

The FRAT is a validated tool, therefore changes to Part 1 of the tool are not recommended.

Please note: The cognitive status question in Part 1 on the FRAT refers to the Abbreviated Mental Test Score (AMTS). This can be obtained by referring to the following website: http://www.nevdgp.org.au/division/mens/pdf_docs/Mini_Mental.rtf.

(Downloadable)

In 2005 the Department of Human Services funded the National Ageing Research Institute to review and recommend a set of falls prevention resources for general use. The materials used as the basis for this generic resource were developed by Peninsula Health Falls Prevention Service under a Service Agreement with the Department of Human Services. This and other falls prevention resources are available from the department's Aged Care website at: http://www.health.vic.gov.au/agedcare.

FRAT instructions for use:

History of falls:
Although this section is located at the rear of the tool, it may be useful to do this first before completing Part 1. Information obtained by completing this section will enable accurate completion of the scored section, to establish risk status. The history of falls, particularly if occurring in the donor facility, will highlight whether the falls were associated with particular activities, problems or time of day. Information regarding strategies previously used to reduce risk can also be useful when developing the Action Plan in Part 3.

The following information should be obtained:
- Were falls a problem before entering the residential aged care facility and how did they occur?
- Information from the donor facility or transfer documents regarding previous falls and what seemed to work and not work with regards to risk minimisation.
- The circumstances of the most recent falls, such as time, activity, environment, symptoms and whether a gait aid was used.

It is recommended that the information obtained regarding history of falls is confirmed via a carer or family member.

Part 1:
How to obtain a score:
- Circle one score ONLY in each of the four categories in Part 1.

  If the person's condition fluctuates you need to circle the score representing their lowest functional level.

  Determine the client's risk classification level (risk status) by adding the four scores from Part 1

Low risk	5-11
Medium risk	12-15
High risk	16-20

- Complete the Automatic High Risk Status section.

  This section allows for clinical judgement of risk status that would not otherwise be detected. A tick in either box in this section will categorise the person at automatic high risk. Persons with automatic high-risk status should be reviewed regularly, at intervals deemed appropriate by the assessor, as the risk can change and settle quickly when issues are addressed.

  If ticked, circle high risk at the end of Part 1 and list fall alert protocol in the Action Plan in Part 3.

Risk classification:
Low risk:
- Provide standard care and follow general resident safety principles.

Medium risk:
- Provide standard care, but risk factors that have been identified and strategies that have been integrated are to be put in the care plan.

High risk:
- Commence Fall Alert Protocol. Resident has a high likelihood of a fall occurring.

Part 2:
Complete the risk factor checklist by placing a tick in the appropriate boxes.

Risk factors identified need targeting for management by listing in the Action Plan in Part 3.

Part 3:
- In the left column, list problems, as identified in Parts 1 and 2.
- Identify strategies to minimise the risk for each problem.
- Transfer appropriate strategies to the care plan.

Review:
Review does not involve repeating the FRAT tool. The tool is for initial assessment purposes only.

Review should involve discussion with the team regarding whether current status and strategies, should for any reason, be altered.

Questions to ask as part of the resident review include:
- Have any issues or observations of resident led to a need to alter the current risk status and strategies?
- Are there any additional strategies that need to be considered?

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FALLS RISK ASSESSMENT TOOL (FRAT)

UR NUMBER ……

SURNAME ……

GIVEN NAMES……

DATE OF BIRTH ……

Please fill in if no patient/resident label available

(see instructions for completion of FRAT in the FRAT PACK-Falls Resource Manual)

PART 1: FALL RISK STATUS

RISK FACTOR	LEVEL	RISK SCORE
RECENT FALLS *(To score this, complete history of falls, overleaf)*	none in last 12 months……	2
	one or more between 3 and 12 months ago……	4
	one or more in last 3 months……	6
	one or more in last 3 months whilst inpatient / resident….	8
MEDICATIONS *(Sedatives, Anti-Depressants Anti-Parkinson's, Diuretics Anti-hypertensives, hypnotics)*	not taking any of these……	1
	taking one ……	2
	taking two ……	3
	taking more than two……	4
PSYCHOLOGICAL *(Anxiety, Depression ↓Cooperation, ↓Insight or ↓Judgement* ***esp. re mobility)***	does not appear to have any of these……	1
	appears mildly affected by one or more……	2
	appears moderately affected by one or more……	3
	appears severely affected by one or more……	4
COGNITIVE STATUS *(AMTS: Hodkinson Abbreviated Mental Test Score)*	AMTS 9 or 10 / 10 **OR** intact……	1
	AMTS 7-8 mildly impaired……	2
	AMTS 5-6 mod impaired……	3
	AMTS 4 or less severely impaired ……	4
(Low Risk: 5-11 Medium: Risk: 12-15 High Risk: 16-20)	**RISK SCORE**	**/20**

Automatic High Risk Status: *(if ticked then circle* **HIGH** *risk below)*

☐ Recent change in functional status and / or medications affecting safe mobility (or anticipated)
☐ Dizziness / postural hypotension

FALL RISK STATUS: *(Circle):* **LOW / MEDIUM / HIGH** → **List Fall Status on Care Plan/ Flow Chart**

IMPORTANT: IF **HIGH,** *COMMENCE FALL ALERT*

PART 2: RISK FACTOR CHECKLIST

		Y/N
Vision	Reports / observed difficulty seeing - objects / sings / finding way around	
Mobility	Mobility status unknown or appears unsafe / impulsive / forgets gait aid	
Transfers	Transfer status unknown or appears unsafe ie. over-reaches, impulsive	
Behaviours	Observed or reported agitation, confusion, disorientation Difficulty following instructions or non-compliant (observed or known)	
Activities of Daily Living (A.D.L's)	Observed risk-taking behaviours, or reported from referrer / previous facility	
	Observed unsafe use of equipment	
	Unsafe footwear / inappropriate clothing	
Environment	Difficulties with orientation to environment i.e. areas between bed / bathroom / dining room	
Nutrition	Underweight / low appetite	
Continence	Reported or known urgency / nocturia / accidents	
Other		

Part 2 Continued

HISTORY OF FALLS *Note: For an accurate history, consult patient/resident / family / medical records.*

Falls prior to this admission (*home or referring facility*) **and/or during current stay** ☐

If ticked, detail most recent below)

CIRCUMSTANCES OF RECENT FALLS: Information obtained from_____

		(Circle below)					**(Where? / Comments)**
Last fall:	Time ago _____	Trip	Slip	Lost balance	Collapse	Leg/s gave way	Dizziness _____
Previous:	Time ago _____	Trip	Slip	Lost balance	Collapse	Leg/s gave way	Dizziness _____
Previous:	Time ago _____	Trip	Slip	Lost balance	Collapse	Leg/s gave way	Dizziness _____

→ **List History of Falls on Alert Sheet in Patient/Resident Record**

PART 3: ACTION PLAN

(for Risk factors identified in Part 1 & 2, list strategies below to manage falls risk. ***See tips in FRAT PACK****)*

PROBLEM LIST	INTERVENTION STRATEGIES / REFERRALS

→ **Transfer care strategies to Care Plan / Flow Chart**

PLANNED REVIEW _____ **Date of Assessment**:_____

INITIAL ASSESSMENT COMPLETED BY:

PRINT NAME _____ **Signed:** _____

REVIEW

(Falls Review should occur at scheduled Patient/Resident Review meetings or at intervals set by the Initial assessor)

Review Date	Risk Status	Revised Care plan (Y or N)	Signed	Review Date	Risk Status	Revised Care plan (Y or N)	Signed

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Best Practices in Nursing Care to Older Adults

From The Hartford Institute for Geriatric Nursing, New York University, College of Nursing

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Series Editor: Marie Boltz, PhD, GNP-BC
Series Co-Editor: Sherry A. Greenberg, MSN, GNP-BC
New York University College of Nursing

Assessment of Fear of Falling in Older Adults: The Falls Efficacy Scale-International (FES-I)

By: Sherry A. Greenberg, MSN, GNP-BC; University of Pennsylvania School of Nursing

WHY: Any older adult who falls, with or without sustained injury, may develop a fear of falling. This may cause curtailment of activities, leading to reduced mobility and physical fitness, and increasing risk of falling and injury (CDC, 2008; Vellas et al., 1997). Assessment of fear of falling, followed by appropriate interventions, is crucial to promote independence, function, wellness, and safety of older adults.

BEST TOOL: The Falls Efficacy Scale-International (FES-I) is a short, easy to administer tool that measures the level of concern about falling during social and physical activities inside and outside the home whether or not the person actually does the activity. The level of concern is measured on a four point Likert scale (1=not at all concerned to 4=very concerned) (Yardley et al., 2005). The FES-I was developed in a collaborative effort with members of the Prevention of Falls Network Europe (ProFaNE), European Committee focused on fall prevention and the psychology of falling. The group tested the FES-I using different samples in different countries and translated the tool into several languages.

TARGET POPULATION: Older adults with or without a history of fear of falling.

VALIDITY AND RELIABILITY: Upon initial development and validation, the FES-I had excellent internal validity (Cronbach's alpha=0.96) as well as test-retest reliability (ICC=0.96) (Yardley, Beyer et al, 2005). This tool was developed to expand on the initial Falls Efficacy Scale (FES) (Tinetti et al., 1990) to include social activities that may be considered more challenging by more active people, thereby potentially causing more concerns about falling than the basic activities presented in the initial FES. These additional activities correspond to items 11-16 on the FES-I. The FES-I was developed with factor analysis and demonstrates excellent psychometric properties in comparison to the FES.

STRENGTHS AND LIMITATIONS: The wording of the items on the FES-I accounts for cross-cultural differences (Yardley et al., 2005) and has been translated into many languages. Current research is being conducted to study its use with cognitively-impaired older adults (Hauer et al., 2010).

FOLLOW UP: As needed or on a yearly basis to assess for fear of falling.

MORE ON THE TOPIC:

Best practice information on care of older adults: www.ConsultGeriRN.org.

Prevention of Falls Network Europe (ProFaNE) home page: http://www.profane.eu.org/.

Department of Health and Human Services. Centers for Disease Control and Prevention (CDC). (2008). Falls in nursing homes. Retrieved March 2, 2011 from http://www.cdc.gov/ncipc/factsheets/nursing.htm#why%20fall%20occur.

Department of Health and Human Services. Centers for Disease Control and Prevention (CDC). (2008). Falls among older adults: An overview. Retrieved March 2, 2011 from http://www.cdc.gov/HomeandRecreationalSafety/falls/adultfalls.html.

Hauer, K.A., Kempen, G.I., Schwenk, M., Yardley, L., Beyer, N., Todd, C., Oster, P., & Zijlstra, G.A. (Online Oct 22, 2010). Validity and sensitivity to change of the Falls Efficacy Scales International to assess fear of falling in older adults with and without cognitive impairment. *Gerontology*, 1-11. doi: 10.1159/000320054.

Kempen, G.I., Todd, C.J., Van Haastregt, J.C., Zijlstra, G.A., Beyer, N., Freiberger, E., Hauer, K.A., Piot-Ziegler, C., & Yardley, L. (2007). Cross-cultural validation of the Falls Efficacy Scale International (FES-I) in older people: Results from Germany, the Netherlands and the UK were satisfactory. *Disability and Rehabilitation, 29*(2), 155-162.

Tinetti, M.E., Mendes de Leon, C.F., Doucette, J.T., & Baker, D.I. (1994). Fear of falling and fall-related efficacy in relationship to functioning among community-living elders. *Journal of Gerontology: Medical Sciences, 49*(3), M140-M147.

Tinetti, M.E., Richman, D., & Powell, L. (1990). Falls efficacy as a measure of fear of falling. *Journal of Gerontology, 45*(6), P239-P243. doi:10.1093/geronj/45.6.P239.

Yardley, L., Beyer, N., Hauer, K., Kempen, G., Piot-Ziegler, C., & Todd, C. (2005). Development and initial validation of the Falls Efficacy Scale-International (FES-I). *Age and Ageing, 34*(6), 614-619. doi:10.1093/ageing/afi196.

Falls Efficacy Scale-International (English)

I would like to ask some questions about how concerned you are about the possibility of falling. For each of the following activities, please circle the opinion closest to your own to show how concerned you are that you might fall if you did this activity. Please reply thinking about how you usually do the activity. If you currently don't do the activity (example: if someone does your shopping for you), please answer to show whether you think you would be concerned about falling IF you did the activity.

		Not at all concerned 1	Somewhat concerned 2	Fairly concerned 3	Very concerned 4
1	Cleaning the house (e.g. sweep, vacuum, dust)				
2	Getting dressed or undressed				
3	Preparing simple meals				
4	Taking a bath or shower				
5	Going to the shop				
6	Getting in or out of a chair				
7	Going up or down stairs				
8	Walking around in the neighborhood				
9	Reaching for something above your head or on the ground				
10	Going to answer the telephone before it stops ringing				
11	Walking on a slippery surface (e.g. wet or icy)				
12	Visiting a friend or relative				
13	Walking in a place with crowds				
14	Walking on an uneven surface (e.g. rocky ground, poorly maintained pavement)				
15	Walking up or down a slope				
16	Going out to a social event (e.g. religious service, family gathering, or club meeting)				
	Sub Total				
				TOTAL	**/64**

Reference: Yardley, L., Beyer, N., Hauer, K., Kempen, G., Piot-Ziegler, C., & Todd, C. (2005). Development and initial validation of the Falls Efficacy Scale-International (FES-I). *Age and Ageing, 34*(6), 614-619. doi:10.1093/ageing/afi196.

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Fukuda Stepping Test: Sensitivity and Specificity

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Fukuda Stepping Test: Sensitivity and Specificity

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Abstract

Background: A vestibulospinal test known as the Fukuda stepping test (FST) has been suggested to be a measure of asymmetrical labyrinthine function. However, an extensive review of the performance of this test to identify a peripheral vestibular lesion has not been reported.

Purpose: The purpose of this study was to evaluate the sensitivity and specificity of the standard FST and a head shaking variation for identification of a peripheral vestibular system lesion.

Research Design: In this retrospective review, we compared performance on the FST with and without a head shaking component to electronystagmography (ENG) caloric irrigation unilateral weakness results.

Study Sample: We studied these factors in 736 chronic dizzy patients.

Results: Receiving operating characteristics (ROC) analysis and area under the curve (AUC) indicated no significant benefit to performance from the head shaking variation compared to the standard FST in identifying labyrinthine weakness as classified by caloric unilateral weakness results.

Conclusions: These findings suggest that the FST with and without head shake component is not a reliable screening tool for peripheral vestibular asymmetry in chronic dizzy patients; however, future research may hold promise for the FST as a tool for patients with acute unilateral disorders.

Key Words: Caloric irrigations, Fukuda stepping test, head shake, unilateral weakness

Abbreviations: AUC = area under the curve; FST = Fukuda stepping test; ROC = receiving operating characteristics; UW = unilateral weakness

The ability to close one's eyes and step in place without turning depends on normal vestibulospinal and proprioceptive function. In particular, vestibulospinal tests such as stepping tests evaluate motor reactions of the head and neck that are dependent on vestibular sensory input. A variation on the tretversuch test by Unterberger (1938) and the waltzing test by Hirsch (1940) was proposed by Fukuda in 1959 and named the stepping test. The test is suggested to identify the weaker of the labyrinths (not necessarily the side with the lesion) by the direction of the rotation of a patient while walking in place with eyes closed. In the original work by Fukuda, 500 normal subjects were blindfolded and asked to extend both arms and march in place for 50 to 100 steps. The maximum rotation noted was 30° to either side with 50 steps; a deviation of greater than 30° about the vertical axis suggested asymmetrical labyrinthine function with the weaker side identified by the direction of rotation.

Peitersen (1964) used a modified version of the Fukuda stepping test (FST) to observe individuals with chronic unilateral inner ear or vestibular nerve damage. Individuals with unilateral dysfunction were noted to rotate to the side of the unilateral deficit. Jordon (1963) examined the reliability of a modified FST on 49 air-crew candidates. Each subject was instructed to perform two 30-step tests at two-hour intervals. A poor correlation between the test performances was noted as the angle of rotation varied for each subject on the two trials. The authors questioned the reliability of predicting imbalance of the labyrinthine system based on the poor reliability scores.

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Bonanni and Newton (1998) evaluated the test-retest reliability of the FST in 30 healthy adults. Subjects performed a 50-step FST and a 100-step FST, with a 10-minute rest between each. During these tests, the direction of postural sway and any movement from the starting position was recorded. The results supported the work performed by Fukuda in 1959. It was noted that the subjects in this study demonstrated greater variability in degrees turned and distance moved than Fukuda's original work. Although the 50-step test was more reliable than the 100-step test, the authors concluded that this method should not be used alone as a screening measure for labyrinthine paresis but, rather, with other tests for the vestibular system.

An extensive review of the performance of the FST to identify a peripheral vestibular lesion has not been reported. In the current atmosphere of containment of medical costs, knowledge of the performance of low-cost, low-technical clinical "bedside" tests could be very useful. The purpose of this study was to evaluate the stepping test in a large series of patients with chronic balance disorder using the standard Fukuda stepping test and a head shaking variation. Development of sensitivity and specificity performance figures for identification of a peripheral vestibular system lesion using caloric irrigation results as the "gold standard" was performed.

METHODS

In this retrospective chart review, 736 chronic balance disorder patients were included in this analysis. Of those patients selected, 702 consecutive chronic balance disorder patients (299 males and 403 females; 15–89 years) were referred to the vestibular testing center at the University of Michigan Medical Center and 34 to the University of Cincinnati (16 males and 18 females; 20–65 years). These patients were extensively evaluated using electronystagmography (ENG) with alternating, bithermal (44° C and 30°C) open loop caloric irrigations and ocular motor testing. Caloric unilateral weakness (UW) was determined by use of Jongkee's formula (Jongkee et al, 1962) Asymmetric slow-component velocity results between ears of ≥25% were indicative of UW. Caloric irrigations are highly reliable in detecting unilateral peripheral vestibular loss (Barber and Stockwell, 1980; Baloh and Honrubia, 1989; Bhansoli and Honrubia, 1999; Brandt and Strupp, 2005) and have served as "gold standard" according to the American Academy of Neurology for presence of peripheral vestibular hypofunction (Fife et al, 2000).

Fukuda Stepping Test

Prior to caloric irrigation, the patients were evaluated using the Fukuda stepping test with eyes closed and 50 steps in the standard format described by Fukuda (1959). The examiner stood directly behind the patient during the test in a quiet room and instructed the patient to maintain eyes closed following the standard stepping test. The patient's head was then rotated by the examiner for 10–15 sec at a frequency of 3–4 Hz. Patients who could not perform the stepping test or who had incomplete balance function testing were omitted from the study. Of the total 736 subjects, one subject recruited from the University of Michigan did not perform the head shake option, and the 34 recruited from the University of Cincinnati did not undergo the head shake option.

Statistical Analysis

For the gold standard outcomes of unilateral weakness abnormality (UW% ≥25), logistic regression and ROC (receiving operating characteristics) analysis were performed to assess the usefulness of Fukuda stepping tests for predicting peripheral vestibular paresis. Ideally, the test with the best performance demonstrates a ROC curve furthest from the diagonal to the left (Hanley and McNeil, 1982). Areas under the curve (AUCs) were compared using the method of DeLong et al (1988). The area under an ROC curve summarizes overall diagnostic accuracy: AUCs at approximately 1.0 represent excellent diagnostic accuracy; AUCs closer to 0.5 represent chance performance at detecting those with and those without the condition.

The Fukuda stepping test optimal cut point was identified. The sensitivity, specificity, false negative proportion (1-sensitivity), false positive proportion (1-specificity), and likelihood ratio were reported at this cut point. Likelihood ratios measure degree of confidence that a person has a disorder if the test is positive (Sensitivity ÷ [100% − specificity]). Analyses were performed using JMP (Version 7.0.1, SAS Institute Inc., Cary, NC) and R (Version 2.6.1, R Foundation for Statistical Computing, Vienna, Austria). P values <0.05 were considered statistically significant.

The various testing conditions were grouped according to the criteria used to determine peripheral system involvement. Criteria used for peripheral system involvement and the test conditions were as follows:

Caloric Unilateral Weakness ≥25%

1. Stepping test without head shaking—turn toward the weaker labyrinthine side
2. Stepping test without head shaking—independent of turn direction
3. Stepping test following head shaking—turn toward the weaker labyrinthine side
4. Stepping test following head shaking—independent of turn direction

Table 1. Results of ROC Analysis of Fukuda Stepping Test Conditions

Condition	AUC	Cut Point*	Sensitivity	False Negative Rate (1-sensitivity)	Specificity	False Positive Rate (1-specificity)	Likelihood Ratio
FST turn toward weaker labyrinth	0.54	5	0.5	0.5	0.61	0.39	1.29
FST independent of turn direction	0.54	45	0.43	0.57	0.65	0.35	1.24
FST + HS turn toward weaker labyrinth	0.53	10	0.69	0.31	0.37	0.63	1.11
FST + HS independent of turn direction	0.54	85	0.19	0.81	0.91	0.09	2.05
SUM FST + HS independent of turn direction	0.55	50	0.57	0.43	0.54	0.46	1.22

Note: FST = Fukuda stepping test. HS = head shake.

*Cut-point scores are represented as degree of turn discriminating between peripheral vestibular system involvement or not as compared to gold standard caloric unilateral weakness results ≥25%.

5. Sum of stepping test results without head shaking plus following head shaking—independent of turn direction

RESULTS

The final sample consisted of 736 participants. The average age range group of the 736 subjects was 40–49 years of age. During the Fukuda stepping test without head shake (n = 736), 323 (44%) showed a tendency to rotate to the right, 264 (36%) showed a tendency to rotate to the left, and 147 (20%) indicated no turn or zero deviation. For the Fukuda with head shake (n = 701), 217 (31%) showed a tendency to rotate to the right, 379 (54%) showed a tendency to rotate to the left, and 105 (15%) did not deviate from the starting position.

The ROC curves were constructed to determine if FST with and without head shaking component could discriminate between those patients with and without a significant caloric unilateral weakness. The results of ROC analysis of each Fukuda stepping condition with reference to caloric unilateral weakness (≥25%) were the standard to determine peripheral system involvement and are summarized in Table 1.

When comparing area under the curve to determine if the Fukuda stepping test with and without head shake can identify the weaker labyrinth, there was no significant difference between tests (comparison of AUC, p value = .949). Further, no significant benefit to performance was derived from the head shaking variation compared to the standard stepping test independent of turn direction (comparison of AUC, p-value = 0.860). The sum of the angular rotation independent of turn side without head shaking plus the rotation angle following head shaking did not provide an increase in the performance (comparison of AUC, p-value = 0.622).

DISCUSSION

The Fukuda stepping test has been widely used for evaluating labyrinthine function; however, our data do not support conclusions by Fukuda (1959) and Peitersen (1964) that individuals with unilateral vestibular lesions tend to deviate toward the affected ear. The addition of the head shaking variation did not significantly improve performance over the standard test; that is, identification of a different population of patients with peripheral involvement was not observed. Support for this was indicated by comparing the areas under the curve for conditions 2, 4, and 5 (p value = 0.622, no difference).

Some limitations with this study must be underlined. First, as we only included subjects with chronic disorders (symptom complaint for eight weeks or longer) our results cannot be extrapolated to all patients with peripheral vestibular lesions. Second, our study did not define our sample in terms of compensations (i.e., compensated vs. uncompensated peripheral lesion resulting in caloric weakness ≥25%). It should be noted that our study population consisted of partially compensated chronic balance disorder patients; however, data on spontaneous and positional nystagmus was not collected for analysis in our study. While it would be anticipated that the greater the lack of physiologic compensation, the more likely a positive result on a test of vestibulo-spinal function like the stepping test, our data analysis was not designed to evaluate this hypothesis. Third, other research studies (Peitersen, 1963, 1964; Hickey et al, 1990) involving patients with vestibular deficits have shown an increased angle of deviation as compared to age-matched controls with no complaints of dizziness or problems with balance. In our study, a control group was not included.

From the results of this study, the FST did not provide significant findings that would support the use of this test as a reliable screening tool for peripheral vestibular asymmetry in chronically dizzy patients. Our results agree with previous reports by Bonanni and Newton (1998) stating that the FST should not be used alone as a screening method. However, Peitersen (1967) and Bonanni and Newton (1998) have suggested the use of the FST in combination with other clinical tests (e.g., electronystagmography, rotational chair, head thrust, and head-shaking tests) in the assessment of vestibular pathologies. We suggest its use

solely as part of a parallel strict (i.e., all additional clinical tests are positive to suggest peripheral vestibular lesion) test protocol.

Normal FST results in the presence of caloric unilateral weakness ≥25% may not rule out the possibility of a unilateral peripheral vestibular pathology but may simply imply adequate vestibulo-spinal compensation (Hickey et al, 1990). While the FST was not an accurate predictor of unilateral vestibular dysfunction in our cohort of patients with chronic balance disorders, it may serve as a tool for patients with acute unilateral labyrinthine disorders. Further studies regarding the diagnostic usefulness of the FST in patients with acute (symptom complaints for less than two weeks) vestibular dysfunction are warranted.

REFERENCES

Baloh RW, Honrubia V. (1989) *Clinical Neurophysiology of the Vestibular System*. Philadelphia: FA Davis.

Barber HO, Stockwell CW. (1980) *Electronystagmography*. St. Louis: CV Mosby.

Bhansoli SA, Honrubia V. (1999) Current status of electronystagmography testing. *Otolaryngol Head Neck Surg* 120:419–426.

Bonanni M, Newton R. (1998) Test-retest reliability of the Fukuda stepping test. *Physiother Res Int* 3(1):58–68.

Brandt T, Strupp M. (2005) General vestibular testing. *Clin Neurophysiol* 116:406–426.

DeLong ER, DeLong DM, Clarke-Pearson DL. (1988) Comparing the areas under two or more correlated receiver operating characteristic curves: a nonparametric approach. *Biometrics* 44: 837–845.

Fife TD, Tusa RJ, Furman JM, Zee DS, Frohman E, Baloh RW, Hain T, Goebel J, Demer J, Eviatar L. (2000) Assessment: vestibular testing techniques in adults and children: Report of the Therapeutics and Technology Subcommittee of the American Academy of Neurology. *Neurology* 55:1431–1441.

Fukuda T. (1959) The stepping test. *Acta Otolaryngol (Stockholm)* 50:95–108.

Hanley JA, McNeil BJ. (1982) The meaning and use of the area under a receiver operating characteristic (ROC) curve. *Radiology* 143(1):29–36.

Hickey SA, Ford GR, Buckley JG, Fitzgerald O'Connor AF. (1990) Unterberger stepping test: a useful indicator of peripheral vestibular dysfunction? *J Laryngol Otol* 104(8):599–602.

Hirsch C. (1940) A new labyrinthine reaction: the waltzing test. *Ann Otol Rhinol Laryngol* 49:232–238.

Jongkee LB, Maas J, Philipszoon A. (1962) Clinical nystagmography: a detailed study of electronystagmography in 341 patients with vertigo. *Pract Otorhinolaryngol (Basel)* 24:65–93.

Jordan P. (1963) Fukuda's stepping test: a preliminary report on reliability. *Arch Otolaryngol* 77:243–245.

Peitersen E. (1963) Vestibulospinal reflexes: acute disturbances of vestibular function after operations on the stapes, especially as evaluated by the stepping test. *Acta Otolaryngol* 78:642–684.

Peitersen E. (1964) Vestibulospinal reflexes: alterations in the stepping test in various disorders of the inner ear and vestibular nerve. *Acta Otolaryngol* 79:481–486.

Peitersen E. (1967) Vestibulospinal reflexes. X. Theoretical and clinical aspects of the stepping test. *Arch Otolaryngol* 85:192–198.

Unterberger S. (1938) Neue objective registrierbare vestibulariskorper-drehreaktion, erhalten durch treten auf der stelle. Der "tretversuch." *Arch Ohren-usw Heilk* 145:478.

Name of Assessment Tool: FUNCTIONAL REACH (FR)

Type of test:

- ***Time to administer:*** This test takes a few minutes and is very reliable
- ***Clinical Comments:*** There are some recent discussions whether this test examines limits of stability. This test may predict falling in some community dwelling populations better than patient populations.

Purpose/population for which tool was developed: Developed as a clinically feasible measure of the margin of stability (in balance assessment) in adults. The forward reach was chosen as the test task because it is a common functional movement and because it is similar to the leaning movements used to measure the excursion of the center of pressure on a force platform (an accepted dynamic balance measure). [1] A recent article challenges that FR and limits of stability should not be used interchangeably. [2]

When appropriate to use: 1) to document change over time in patients with balance problems, 2) to assess likelihood that patient will fall , 3) to complete a balance assessment.

Scaling: Results in the literature have been reported in **inches** and centimeters. The functional reach score equals the difference (in inches or centimeters) between the 'end' and the 'start' hand positions. (2.54 cm = 1 inch)

Equipment needed:

- Yardstick and/or large paper, tape. Mackenzie (1999) suggests a modified form of the measuring device using a self-recording tape measure connected to a handle. [3]

Directions: Subject must be able to stand 1 minute without support in order to have this test administered

Set-up/Instructions:
Tape a level yardstick to wall at patient's acromion height. Patient stands perpendicular to yardstick, with arm flexed to 90 degrees and hand in a fist. Record position of 3rd metacarpal head on the yardstick. Instruct pt. to reach as far forward as possible without losing his/her balance,, lifting his heels, or taking a step. Record position of 3rd metacarpal head on the yardstick. [*Note: pt. needs to keep hand at level of yardstick when reaching forward but cannot be allowed to touch the wall. Beyond these restrictions, DO NOT control the method of reach]*. A large piece of paper could be taped to the wall for marking the start & end positions. Allow 2 practice trials then average the next 3 trials to obtain the score for the session. A paper by Billek-Sawhney (2005) found the reliability between 2 trials to be r=.975 meaning one can use 2 trials. [4]

Arnadottir and Mercer (2000) [5] found 35 women age 65 to 93 performed better on FR when they were barefoot or wore walking shoes than when subjects wore dress shoes regardless of whether they performed the test on carpet or linoleum. There was no difference between barefoot walking shoe conditions on either floor surface.

The foot placement is the typical stance of the client. No studies were found that compared foot placement for FR. An article by Mcllroy and Maki (1996) [6] suggests the wide range of preferred foot placements highlights the need for standardization during foot placement. Functional reach increases significantly with additional sensory information from the fifth metacarpal surface of the dominant hand [7] and if a target is given. [8]

Contraindications: Blurred vision has less of an effect on FR than the Tinetti or TUG. [9]

Learning Effect: Clients who have a target reach further than those who do not. [8]

Reliability:

Reference	*N =*	*Sample description*	*Reliability statistic*
Intrarater reliability**:** same rater within one session (or one day)			
Mecagni, 2000[10]	8	2 trials	ICC =.96
Franchignoni, 1998[11]	45	healthy women 55-71	$ICC_{(2,1)}$ = .97
Rockwood, 2000 [12]	1161	3 trials: persons with cognitive impairment	ICC=.92
Interrater Reliability			
Duncan, 1990 [1]	17	normal subjects, age 20-87	ICC = .98
Franchignoni, 1998 [11]	45	healthy women 55-71	$ICC_{(2,1)}$ = .86
Light, 1995 [13]	30	5 trials each for 2 subjects, in community-dwelling elderly	r = .98

Reference	*N =*	*Sample description*	*Reliability statistic*
Wolf, 1999 [14]	56	For 4 raters observing the same test,	ICC = .99
Kileff, 2005 [15]	8	(2 raters) people with MS	Friedman Test Mean difference; .5 on FR left arm and .25 FR right arm
Giorgetti, 1998 [16]	21	Mean age = 73, without disability	ICC = .73
	21	(2 examiners) Mean age = 75, with disability	ICC = .79
Holbein-Jenny, 2005 [17]	26	Community-dwelling	ICC $_{(1,1)}$ Forward = .98; Backward = .96 Right = .94; Left = .91
Schenkman, 1997 [18]	15	patients with early to middle stages of PD.	ICC = .90
Frzovic, 2000 [19]	28	(N=14) people with MS ; (N=14) Control	ICC=.89

Reference	*Population*	*Time Btw. Testing*	*Mean (cm)*	*SD (cm)*	*Test-retest Reliability*	*MDC (cm)*
Duncan, 1990 [1]	Community-dwelling elderly (n=128)	1 week			Forward ICC= 0.92	Unable to calculate-no X or SD given
Franchignoni, 1998 [11]	(n=45) Females, ages 55-75	24 hrs.			Forward ICC= 0.87	Unable to calculate—no X or SD given
Hageman, 1995 [20]	Community-dwelling healthy adults (n=12)	1 week			Forward ICC= 0.92	Unable to calculate—no X or SD given
Holbein-Jenny, 2005 [17]	Elderly (n=21), ages 74-92	1-2 weeks	14.22, 7.37, 8.38, 9.40	6.54, 5.59, 6.35, 7.87	Forward ICC= 0.75 Backward ICC= 0.71 Right ICC= 0.66 Left ICC= 0.83	Forward= 10.54 Backward= 8.33 Right= 10.26 Left= 8.99
Lim, 2005 [21]	Idiopathic Parkinson's Disease (n=26)	1 week			Forward ICC= 0.74	SDD= 11.5
Marsh, 2005 [22]	Community-dwelling elderly (n=44)	2 weeks			Lateral ICC= 0.86	unable to calculate- X and SD not given for subset
Schenkman, 1998 [23]	Parkinson's Disease, (n=14) 74.5 yrs (mean age)	1 day	32.3		Forward ICC= 0.84	Unable to calculate- no SD given for initial measurement
Sherrington, 2005 [24]	Hopital inpatients and community dwelling elderly, fallers and previous fallers (n=30)	1 day	14	9.6	Forward ICC= 0.89	8.83

Based on a review of 9 articles, test-retest reliability on functional reach has been shown to vary from low to high, with intraclass correlation coefficients (ICC) ranging from .42-.93. The time between testing varying greatly from 1 day to 1 month.[1, 11, 17, 18, 20, 21, 24-26] Only 3 studies examining test-retest reliability had a sample size over 30.[1, 11, 22] Nine studies examined forward reach[1, 11, 17, 18, 20, 21, 24-26] and 1 examined backward reach.[17] 3 studies reported test-retest reliability in subjects with PD.[18, 21, 25] One study of 26 subjects with idiopathic PD reported an ICC of .74 for forward reach with a testing interval of one week,[21] while a second study of 14 subjects with PD reported an ICC of .84 for forward reach with a testing interval of one day.[18] Another study of 10 elderly and 20 subjects with PD subjects, using a testing interval of one week, reported an $ICC_{2,1}$ of .62 in the elderly, .93 for subjects with PD who had a history of falls, and .42 for subjects with PD with no history of falls.[25]

Of the current studies examining test-retest reliability, Four provided data to calculate MDC_{95}, which ranged from 4 to 11 cm.[17, 24-26] Two studies reporting test-retest reliability of forward functional reach, one week apart, in 20 people with PD found MDC_{95} of 4 cm of people who had fallen and 8 cm for people who had not fallen and 12 cm for 26 people with a diagnosis of idiopathic PD.[21, 25]

Validity:

Construct / Concurrent Validity: It is difficult to always differentiate between these 2 types of validity. Evaluating this property requires a "gold standard" measure with which to compare the tests results. Such a "gold standard" is often not available.		
Population	***N =***	***Support for Validity***
Concurrent validity:		
Adult volunteers (ages 21-87)	128	FR correlated with: force plate measures of the excursion of the center of pressure (.71). [1]
Community-dwelling elderly	45	FR correlated with: gait speed (.71); the hierarchical mobility skills protocol (.65); IADL scores (.66). (n=45) [26] These authors concluded that FR correlates with physical frailty more than with age.
	34	FR correlated with: dorsiflexion ROM with knee extended (.47) and plantarflexion (.16). Women, age 64-87 [10]
	45	Change in FR after rehabilitation correlated with: change in the Mobility Skills Score (.37); change in FIM (.38); change in walking speed (r = -.20). [27]
	50	FR was not significantly associated with strength gains in frail elderly (mean age 78) who underwent home strengthening exercise 3 times/week for 10 weeks [28]
Older adults with c/o disequilibrium	30	Clinical (yardstick) recording of FR correlated with: videotape analysis of FR (.98) (n=15 with c/o disequilibrium; 15 without c/o disequilibrium. [13]
	28	FR correlated with: single leg stance (.65) (in people with peripheral vestibular disease). [29]
s/p LE amputation	30	FR correlated with: PPT (.66) (in people with diabetes and transmetatarsal amputation). [30]
Rural, aged Japanese	383	No significant association between anterior FR or lateral FR and falls. [31]; mean age = 79
Osteoarthritis	130	No significant association between knee pain and FR [31]; mean age = 80
Osteoporosis or Osteopenia	16	Spearman rank correlation coefficients of kyphosis index and FR (-.60). [32]
Geriatric Rehabilitation	52	The FR did not discriminate between levels of ambulation by ambulatory aid or on the FIM [33]
Balance Deficits	20	FR and TUG (.56), BBS and FR no significance. [34]
Osteoarthritis of the knee	50	Community-dwelling women (mean age = 69) -.52 FR and age, -.35 FR and self report function, .48 FR and self efficacy. [35]
Parkinson's Disease	35	FR correlated .44 - .51 with balance master items [36]
***Predictive Validity*:**		
Population	***N =***	***Support for Validity***
LTC residents	303	Thapa (1996) found FR did not predict falls. [37]
Dx/o Parkinson's Disease	37	12 of 37 subjects (mean age = 68) had a FR of less than 11.8 inches; these 12 subjects were referred to physical therapy as they were deemed at risk for falling. Four of those twelve subjects did subsequently fall. The falls were generally related to noncompliance with the physical therapy recommendations and use of an assistive device. [38]
Fallers	217	Duncan, 1992 [39] found FR to have predictive validity in identifying recurrent fallers (i.e., 2 or more falls during the 6-month follow up period); n= 217 community-dwelling male veterans (age 70-104). Logistic regression shows that: • If FR = 0 inches: 8 times more likely to have 2 falls in 6 mos than person with FR=10" • If FR < or equal to 6 inches: 4 times more likely to have 2 falls • If FR > 6 inches but < 10 inches: 2 times more likely to have 2 falls
	16	Cho & Kamen (1998) [40] found no group differences on FR for 8 healthy older subjects compared to 8 age-matched idiopathic fallers.
	705	Having a long functional reach (≥ 35 cm) and being able to perform a full tandem stand with eyes closed for at least 10 seconds were associated with decreased rates of falls. [41]
	67	Any improvement in FR during PT Rx in a geriatric day hospital can predict subsequent decrease in falling [42]
Older adults	436	FR did not predict disability in a large cohort study of women. [43]
	705	FR was positively associated with quadriceps and grip strength; [44] as well as BMI in studies of 705 elderly Japanese women in Hawaii. [41]
Community-dwelling	402	FR was not associated with falls [45] which averaged 24 cm

Population	*N =*	*Support for Validity*	
Fallers	15	Mean age = 73 [46]	No difference on FR between 2 groups
Non-Fallers	10	Mean age = 75 [46]	
Community-dwelling elderly	99	Duncan (1990) found that only 3/99 male veterans who could ascend/descend stairs foot over foot had FR of 6 inches or less. [1]	
	45	No subject with FR less than 7 inches: was able to complete more than 6/11 items on the mobility skills protocol; could balance for greater than 1 second during SLS; was able to tandem walk; or was able to leave his/her neighborhood without help. [26]	
Women community-dwelling	99	Mean age = 71 [47] Non-fallers (N=65): FFR= 30(1) Right FR = 20(1) Fallers (N=35): FFR= 29(1) Right FR= 20(1) Frequent Fallers (N=16): FFR= 29(2) Right FR= 19(1) Recurrent Fallers (N=19): FFR= 29(2) Right FR= 20(1)	No significant differences between groups
Community-dwelling	15	Steady patients	No statistical differences between 2 groups
	23	Unsteady patients [48]	

Sensitivity/specificity:

Population	*N =*	*Cutoff Score and Description*	*Results*
Fallers	54	Cutoff of 25 cm: (identifying multiple fallers vs nonmultiple fallers (N=54; outpatients over the age of 65 attending community rehab) [49]	Sensitivity of 63% Specificity of 59%
Dx/o Parkinson's Disease	58	Cutoff of 25.4 cm: (identifying fallers) [50]	Sensitivity of 30% Specificity of 92%.
Day Hospital	30	Using cut off of 18.5 to predict fall; Mean score fallers (N=18) 15.5(6.5); non-fallers (N=12) 19.4(4.2); Mean age = 80-81 [51]	Sensitivity of 75% Specificity of 67% OR 5.28, p < .08
Community dwelling elderly	203	Using a cutoff of 30 for able vs. not able [52]	Sensitivity 86% Specificity 38%
		Using a cutoff of 24 for decreased disability vs. disabled [52]	Sensitivity 81% Specificity 52%
NOTE: Clinicians need to choose a cut-off score based on the specific purpose for which the test is used			

Responsiveness / sensitivity to change:

Population Descriptor	*N =*	*Reference and Intervention*	*Responsive* *Yes/No*	*Data Supporting Responsiveness*
Community-dwelling elderly	42	***Okumiya, 1996*** [53] Healthy Japanese elderly; mean age = 79 *Experimental group*: Exercisers *Control group*: Non-exercising Length / frequency of intervention 6 months; 1 hour, 2x/week	Yes	Exercisers improved significantly greater than controls
	12	***Rogers, 2001*** [54] Balance intervention program; mean age=70 Length / frequency of intervention 10 weeks	Yes	Significant Improvement from 33 cm initial to 40 cm
	20	***Barrett, 2002*** [55] Healthy elderly persons Progressive resistive exercise program Flexibility training; 2x per wk; 10 weeks	Yes	Progressive Initial: 34 (5) cm Final: 38 (3) cm; p < .003 Flexibility Initial 33(5) to 33(6); NS Significant change between groups

Population Descriptor	*N =*	*Reference and Intervention*	*Responsive* *Yes/No*	*Data Supporting Responsiveness*
Community-dwelling elderly (Continued)	14	***Shigematsu, 2001*** [56] Exercise program Length / frequency of intervention 60 min, 3x/week for 3 months	Yes	Initial: 23 (5) to 27(3); p<.05 Control 26(8) to 25(7); NS
	19	***Dennis, 1999*** [57] Health ambulatory women over 65 Intervention: Alexander Technique Instruction Length / frequency of intervention 1 hr, 2x/week, 4 weeks	Yes	Initial: 7 (3) inches Final: 8(2) inches; p <.025 Control: FR decreased by .74 inches; p<.005
	134	***Morey, 1999*** [58] Group 1: spinal flexibility plus aerobic exercise Group 2: aerobic only exercise	No	Both with baseline measure of 13"; No significant gains in either group
	52	***Simmons, 1996*** [59] Subjects mean age=80, with a fear of falling 4 groups: water exercisers, land exercisers, water sitters, land sitters	Yes	Significant improvement in water exercisers (p<.001), land exercisers (p<.03) No change in other 2 groups
	94	***Hakim, 2004*** [60] Healthy older adults Control group: no exercise Group 1: structured exercise Group 2: Tai Chi intervention	Yes	Group 1: Better FR (p<.01) Group 2: Better at Forward (p<.01), Backward (p<.001) and Left FR (p<.001)
	256	***Li, 2004*** [61] *Control (N=131):* Exercise stretching *Exp (N=125):* Tai Chi grp Length / frequency of intervention 60 min sessions, 3x/wk for 6 months	Yes	Ave. change after intervention Control showed no change in score; Tai Chi grp showed increase (p<.001) 6 mo follow-up: Tai Chi grp showed less decline (p=.02) Group differences significant? Tai Chi grp showed greater change in FR scores (p<.001)
	40	***Sousa, 2005*** [62] Mean age =73; strengthening 3x/week for 14 weeks Mean age = 75; control (N=20)	Yes	9.4% increase strength group No change control group
	22	***Robinson, 2004*** [63] *Control (N=5)*: No intervention *Exercise grp (N=10 fallers, N=7 non-fallers):* 6 week falls prevention program addressing strength, balance, flexibility and education Length / frequency of intervention 50 min 2x/wk for 6 wks plus daily exercise at their home	Yes	Control: Pre: 10.56" Post: 13.89" (p<.01) Fallers: Pre: 6.66" Post: 7.3", NS Non-fallers: Pre: 10.34" Post: 10.17", NS Group differences significant? Fallers and nonfallers differed sign from controls (p<.05)
	38	***Mak, 2003*** [64] Regular exercisers vs. Tai Chi practitioners	Yes	Exercisers: 27(4) Tai Chi: 30(3) p<.04 difference between 2 groups
	108	***Li, 2005*** [65] Mean age = 78 N=54 Coble stone mat walking N=54 Regular walking 60 min, 3x/week for 16 weeks	Yes	Cobble stone mat walking: 11(3) to 13(3) inches Regular walking: 11(3) to 11(3) inches Regular group x time interaction (p<.01)

Population Descriptor	*N =*	*Reference and Intervention*	*Responsive Yes / No*	*Data Supporting Responsiveness*
Community Dwelling Elderly (Continued)	175	***Li, 2004*** [61] Mean age = 77 26 week Tai Chi 40-50 min 26 week stretching Each group attend mean of 61 sessions	Yes (Randomized)	p < .001 between groups Does not give data points
MS	6	***Kileff, 2005*** [15] Mean age = 45; all female 30 min cycling at max.; exertion for 12 weeks, 2x/week.	No	Left FR = 25(4) to 27(4) Right FR = 27(4) to 28(4)
HIV/AIDS	38	***Galantino, 2005*** [66] Tai Chi (N=13) Aerobic Exercise (N=13) Control (N=12) 2x/week for 8 weeks	Yes	No difference between 2 exercise groups but significant difference over time in both groups (p<.000) and between controls (p<.003).
Chronic TBI	20	***Brown, 2005*** [67] BWSTT vs overground ambulation 30 minutes 2x/week	No	BWSTT 14(9) to 16(11) Overground 11(11) to 13(13)
PD	8	***Campbell, 2003*** [68] FR remains stable over the cycle of medication and over days		17.7cm = mean score of all tests on all participants
Older Women Age 65-89	19	***Gajdosik, 2005*** [69] Stretch (N=10) Control (N=9) 8 wks; 3x/wk	No	34(5) to 35(4) Control: 32(5) to 33(4)
Healthy	11	***Bellew, 2005*** [70] Mean age =76 15 minutes balance training for 5 wks	Yes/No	Significant change in lateral reaches (p<.017) <u>not</u> FFR.
	10	Control (Mean age = 71)		
Community-dwelling fallers	73	***Nitz, 2004*** [71] Mean age = 76 Balance group: 1x/week for 10 weeks Control group: 1x/week for 10 weeks	No	No Change in FFR
			Yes	Right Lateral Reach 15(1) to 17(1); p<.03 Control 16(1) to 16(1); NS
Community-dwelling but sedentary	6	***Ramsbottom, 2004*** [72] Training 2x/week for 24 weeks	Yes	Effect size training 1.27 22(8) to 33(6); p<.01
	10	Control		28(9) to 28(4); NS
Frail elderly	34	***Shimada, 2003*** [73] Control (N=9)	Yes	19(6) to 19(7); NS
		Exercise with balance (N=12)		19(6) to 23(4); p<.05
		Exercise with gait reduction (N=11)		16(6) to 15(7); NS
		40 minutes 2-3x/week, 12 weeks; both exercise groups		p<.022 significant difference between balance and gait exercise groups
Healthy Women	20	***Skelton, 1995*** [74] Training 1x/week for 12 weeks	No	Data appears to be reported incorrectly
	20	Control		
TBI	13	***Wade, 1997*** [75] In patient rehabilitation	No	28(12) to 33(9)cm
Community-Living Stroke	44	***Duncan, 2003*** [76] Intervention group	No	.53(.69)cm change
	48	Usual care group		.63(.76)cm change

Population Descriptor	*N =*	*Reference and Intervention*	*Responsive Yes / No*	*Data Supporting Responsiveness*
Dx/o peripheral neuropathy	10	***Richardson, 2001*** [77] Exercise regimen Length / frequency of intervention 3 weeks	No	FR did not change
s/p CVA	29	***Bernhardt, 1998*** [78] In-patient rehabilitation measured at 4 weeks and 8 weeks (Protocol used a target)	Yes	Improved significantly from 18.3 (10.6)cm to 23.1(9.1)cm; (p<.004)
s/p vertebral compression fx	10	***Lyles, 1993***[79] Control (women without hx/o fx) vs. women with fx	Yes	c/fx: 26.9 (5.8) cm s/fx: 34.5 (5.3) cm Significant differences between groups
s/p LE amputation	30	***Mueller and Salsich, 1997*** [80] Footwear changes in people with diabetes (DM) and transmetatarsal (TMA) amputation (N=15)	Yes	DM-TMA: 19.1(8.6) cm Controls: 31.5(9.1) cm Group differences significant? DM-TMA group significantly lower than control (p <.001)
	30	***Mueller and Strube, 1997*** [80] Six types of footwear tried on people with diabetes and transmetatarsal amputation	No	No differences in FR
Dx/o Parkinson Disease	46	***Schenkman, 1998*** [23] Mean age=71 Exercise group run by PT vs. control group 10 weeks (30 sessions)	Yes	Ave. change after intervention Exercise group: Improved by .62 (1.75) inches Control group: Declined by: -.11(1.64) inches Group differences significant? (p<.05)
Older adults in in-patient rehab	28	***Weiner, 1993*** [27] Male veterans *Experimental group (N=15)*: Receiving daily in-patient PT *Control group (N=13)*	Yes	Improved significantly over rehab duration; no improvement in controls
LTC Residents	47	***McMurdo, 2000*** [81] Seated balance exercises 2 times per week for 6 months	No	No change in FR
	15	***Taylor, 2003*** [82] Walking program Women in assistive living residence 9 weeks (frequency decided by resident)	Yes	Significant improvement from 4" to 5.7" (p<.001)
s/p hip fx	21	***Sherrington, 1997*** [83] Stepping exercises 5-50 reps; 1x/day at home for 1 month	No	No change in FR
Dx/o intellectual disability	17	***Carmeli, 2003*** [84] (Mean age =57); Ball exercises and treadmill training for 6 months	No	No change in FR

Population Descriptor	*N =*	*Reference and Intervention*	*Responsive Yes / No*	*Data Supporting Responsiveness*
Other	12	***Richardson, 2000*** [85] Halo vests on young adults vs. without it on	Yes	Limit FR from 15.1 (2.1) inches to 12.9 (1.4) inches; (p<.01)
	193	***Cummings, 1997*** [86] Older women with foot binding in China	Yes	24 cm (N=105) Normal 21cm (N=55) Bound p<.05
Drug Studies		Drug studies that used FR as an outcome measure: • diazepam effect on balance of older adults [87] • levodopa effect in pts with progressive supranuclear palsy.[88]		

Ceiling or floor effect: There is no ceiling or floor effect on this test.

Reference data: ***All studies that reported inches were converted to centimeters (cm)***

Resource	*N =*	*Subjects*	*FR Scores*
Duncan, 1990 [1]	131	volunteers; age 21-87; male and female	**Males**: means (SD) • 20-40 = 42.49cm (4.93) • 41-69 = 38.05cm (5.61) • 70-87 = 33.43cm (3.94)
			Females: means (SD) • 20-40 = 37.49cm (5.54) • 41-69 = 35.10cm (5.59) • 70-87 = 26.60cm (8.97)
Weiner, 1992 [26]	45	Community-dwelling elderly; male & female; mean age = 78 (8.4)	mean (SD) = 27.68cm (7.87)
Newton, 1997 [89]	251	Seniors; average age 74	mean (SD)= 22.60 (8.38) cm
Fried, 2000 [43]	436	Community-dwelling women, 70-80 years; not cognitively impaired	mean=29.1 cm
Shigematsu, 2000 [90]	373	Japanese women	mean(SD)= 28.8 (7.4) cm
Mecagni, 2000 [10]	34	Women, age 64-87	mean(SD) = 22.1 cm (7.1) or 8.7 inches (2.8)
Rockwood, 2000 [12]	1301	Mean age 78.1 years (range 69-104; in Canadian Study of Healthy Aging; nationwide representative sample) The farthest reach score was used.	Median: With cognitive impairment: 25 cm
			Median**:** Without cognitive impairment: 29 cm
Wolf, 1999 [14]	28	Subjects with stroke compared to 28 subjects without impairment. This study used the average of 3 trials.	s/p stroke: mean (SD) = 21.92 cm (6.57)
			without impairment: mean(SD) = 32.11 cm (5.88)
Grill, 1999 [38]	37	Persons with PD, mean age of 68	initial visit: mean (SD) = 34.04cm (6.86)
			one-year follow-up: mean (SD) =33.53cm (SD 8.13)

Resource	*N =*	*Subjects*	*FR Scores*
Smithson, 1998 [25]	30	Persons with PD, mean age of 71 This study compared persons with a history of falls to those with no history of falls.	with a history of falls: mean (SD) = 24.39cm (5.84) for the first test and 25.40cm (6.35) for the second test
			without a history of falls: mean(SD) = 29.97cm (3.81) for the first test and 32.00 cm (5.59) for the second test.
Schenkman, 2000 [91]	251	Community dwelling adults (mean age = 71) This study assessed spinal flexibility and balance. n=56 with PD n=195 without PD	subjects with PD: mean (SD) = 31.50cm (7.62)
			subjects without PD: mean(SD) =34.29cm (5.84)
Aoyagi, 2000 [92]	447	Community-dwelling Japanese persons (mean age =66). This was a study of bone mineral density (BMD).	Exercisers: Women = 29.6 (.5) cm Men= 29.5 (1.0) cm
			Non-exercisers: Women = 28.6 (.4) cm Men= 29.2 (.8) cm
Purser, 1999 [93]	185	Older women with osteoporosis and vertebral fractures.	Women with osteoporosis and vertebral fractures 28.96cm (5.84)
Lehmann, 2006 [94]	50	Persons with late effects of polio, mean age = 60	Men: 21.3(9.5)cm (N=21) Women: 25.2(8.9)cm (N=29) All: 23.5(9.3)cm (N=50)
Frzovic, 2000 [19]	14	Subjects with MS and 14 controls	in AM: 39.19 (5.88) cm
			in PM: 39.92 (6.66) cm
Davis, 1999 [41]	705	Japanese women in Hawaii (mean age = 74)	Mean (SD) =30.9 (6.1) cm
Stack, 2005 [95]	51	(N=33) Grade III, PD (N=18) Grade IV, PD	18cm (13-23) 15cm (7-21)
Marsh, 2005 [22]	140	Community dwelling; Mean age = 75	30.5(6.6)cm
Cim biz, 2005 [96]	30	Diabetic neuropathic; Mean age = 58	34(13)cm
	30	Control; Mean age = 67	44(14)cm
Chow, 2004 [32]	16	Females with osteoporosis/Osteopenia; Mean age=67	30(9)cm
Hageman, 1995 [20]	24	(N=12) Younger adults; Mean age = 25 (N=12) Older adults; Mean age = 65	43(4)cm 37(6)cm
Smith, 2004 [97]	75	Stroke	23(9)cm
Stankovic, 2004 [98]	30	PD — Mean age = 68	Without Falls: 30(6)cm
		PD — Mean age = 72	With Falls: 21(6)cm
	20	Control — Mean age = 70	32(6)cm
Teri, 1998 [99]	30	Alzheimer's	25(15)cm
Wolf, 2003 [100]	145	Tai Chi participants; Mean age = 81	30(8)cm
	141	Wellness Class; Mean age = 81	27(8)cm
Goldberg, 2005 [101]	8	Young; Mean age = 24	34.80cm (2.29)
	7	Balance unimpaired; Mean age = 74	26.16cm (1.52)
	8	Balance impaired; Mean age = 80	26.92cm (2.03)
Huang, 1996 [102]	569	Post-menopausal Japanese American women; ages 55-93; s/p vertebral compression fracture	Predicted performance on FR; average FR was 33.1 (6.1) cm
NOTE: FR declines with age in both genders. [1, 20, 92]			

Interpreting results:

It measures a subject's forward limit of stability, which is considered one part of postural control (or balance) assessment. Duncan (1990) [1] concludes that FR is a good clinical measure of the margin of stability and is "conceptually related" to the excursion of the center of pressure. Others are suggesting that FR is a weak measure of stability limits (low correlation with FR and displacement of center of pressure, .38). Movement of the trunk seems to influence the test more than displacement of center of pressure. [103]

When the Functional Reach [104] test and platform measures of postural sway were used with clients with hemiparesis, they appeared to be evaluating comparable standing-balance abilities. In a kinematic study of 34 young subjects (20-36) and 33 older subjects (60-76 years), spinal motion during forward FR was characterized by forward and lateral trunk flexion, thoracolumbar and lower body rotation. Young subjects displaced their center of pressure further forward (45.2 cm) and through a greater percentage of their initial base of support than older subjects (37.1 cm). The younger group had more forward trunk flexion and thoracolumbar rotation. [105] O'Brien, et al (1997) found a weak correlation between inclination of the upper thoracic spine and functional reach. [106] Wernick-Robinson (1999) found FR does not measure dynamic balance because people with vestibular hypofunction did as well. [107]

Daubney and Culham (1999) [108] found that ankle plantar-flexion force accounted for 13% of the score on the FR. Correlations were found between FR and hip extensor strength (.45) and hip flexor strength(.47). [30] Eight hundred thirty three community dwelling elderly 64-79 years old (457 were Mexican American) participated in a home assessment. For each degree increase in shoulder ROM, the likelihood of having a short reach was reduced by 3% and for each degree increase in elbow ROM, the likelihood of having a short reach was reduced by 2%. [109]

In a very large study (N=303) of people in community nursing homes significant difference in FR were found in height, age, and lower extremity weakness but not in assistive device, upper extremity weakness, ADL's, weight, MMSE, Depression, gender, hearing, vision or B.P. [110]

Other:

Reach in Four Directions:

In 1997, the first "reach in four directions" (RFDT) results were published. This study included a large minority population. (N=204-250) The mean forward reach was 8.9 inches, right 6.8 inches and left 6.6 inches. [89] A small study (N=7) found a .43 -.65 correlation between BFR and ankle dorsiflexion (df). Improvements in df improved BFR. [111]

Lateral Reach measurements were published in 1999. Validity of lateral reach results showed a significant correlation with COPE (r=0.33) measurements and laboratory measure of reach (r=.65). Test-retest reliability (r=0.94) was also found. [112] Lateral reaches to the right and left were not significantly different between the sides. For their analysis, right side measurements were used. Age was negatively correlated with Lateral Reach results. Results were not separated into cohorts. This study included 60 females (mean age=72.5). Lateral Reach in 22 community dwelling females (average age 81) was 14.3 (4.5) cm left and 14.9 (4.6) cm right. [113] Lateral reach in 383 Japanese (mean age = 79) 19(12)cm [31] Lateral reach in sitting of 18 elderly persons showed a -.63 correlation between rising time and lateral reach in sitting. [114]

Results of reach in four directions of 87community dwelling adults is reported in Table 5-1.

Functional Reach used for persons in wheelchairs:

Functional reach has been used to test the utility of different wheelchair belting techniques in people with spinal cord injuries [115] and to determine whether the test could be used to measure differences among levels of SCI injury. [116]

Forward, right and left functional reach on 53 seniors who sat in a wheelchair were compared for people sitting on a cushion vs a sling. [117] Forward and lateral reach for 31 healthy and 31 subjects with hemiparesis in a sitting position are published by Hsu (2005). [118]

Table 5-1

Means (X), Standard Deviations (SD) and 95% Confidence Intervals (CI) of the **Multi-Directional Reach Test** by Age and Gender Cohorts (in centimeters).

			Forward (cm)			Backward (cm)			Left (cm)			Right (cm)		
Age (yrs)	**Gender**	**N**	**X**	**SD**	**CI**	**X**	**SD**	**CI**	**X**	**SD**	**CI**	**X**	**SD**	**CI**
50-59	Male	9	37	6	32-41	28	6	24-32	22	4	19-26	22	4	19-25
	Female	15	32	6	28-35	20	6	16-23	18	4	16-20	18	4	16-20
60-69	Male	9	30	5	27-34	25	9	17-32	19	3	17-21	20	3	19-23
	Female	10	30	5	24-30	20	8	14-25	17	5	13-20	15	5	13-18
70-79	Male	10	29	5	26-32	19	7	14-24	18	4	15-21	17	4	15-19
	Female	14	29	7	25-33	15	7	11-19	15	7	11-19	16	7	12-19
80+	Male	4	27	9	13-40	16	4	9-23	17	7	6-28	16	7	8-23
	Female	12	22	6	18-26	11	4	8-13	12	3	10-14	13	3	11-15
TOTAL SAMPLE		83	29	7	28-29	19	8	17-20	17	5	16-18	17	5	16-18

Steffen, TM, Mollinger, LA (2005). Age-and gender-related test performance in community-dwelling adults: multi-directional reach test, berg balance scale, sharpened Romberg tests, activities-specific balance confidence scale, and physical performance test. Journal of Neurological Physical Therapy 29(4): 181-188.

References:

1. Duncan P, Weiner D, Chandler J, Studenski S. Functional Reach: A new clinical measure of balance. *J Gerontol Med Sci.* 1990;45:M192-197.

2. Clark S, Iltis PW, Anthony Cj, Toews A. Comparison of older adult performance during the functional-reach and limits-of-stability tests. *Journal of Aging and Physical Activity.* 2005;13:p. 266-275.

3. Mackenzie M. A simplified measure of balance by functional reach. *Physiotherapy Research International.* 1999;4(3):233-236.

4. Billek-sawhney B, Gay J. The functional reach test. Are 3 trials necessary? *Topics in Geriatric Rehabilitation.* 2005;vol 21:144-148.

5. Arnadottir S, Mercer V. Effects of footwear on measurements of balance and gait in women between the ages of 65 and 93 years. *Physical Therapy.* 2000;80(1):17-27.

6. Mcllroy W, Maki B. Prefered placement of the feet during quiet stance: development of standardized foot placement for balance testing. *Clin Biomech.* 1997;12(1):66-70.

7. Rugelj D. The relationship between innervation density and dynamic balance function. *Cell Mol Biol Lett.* 2002;7(1):149-150.

8. Chevan J, Atherton H, Hart M, Holland C, Larue B, Kaufman R. Nontarget-and target-oriented functional reach among older adults at risk for falls. *J Geriatr Phys Ther.* 2003;26(2):22-25.

9. Huang M, Burgess R, Weber M, Greenwald N. Performance of balance impaired elders on three balance tests under two visual conditions. *Journal of Geriatric Physical Therapy.* 2006;29(1):3-7.

10. Mecagni C, Smith JP, Roberts K, O'Sullivan S. Balance and ankle range of motion in community-dwelling women aged 64 to 87 years: A correlational study. *Phys Ther.* 2000;80:1004-1011.

11. Franchignoni F, Tesio L, Martino M, Ricupero C. Reliability of four simple, quantitative tests of balance and mobility in healthy elderly females. *Aging Clin Exp Res.* 1998;10:26-31.

12. Rockwood K, Awalt E, Carver D, MacKnight C. Feasibility and mesurement properties of the functional reach and the timed up and go tests in the Canadian study of health and aging. *J Gerontol Med Sci.* 2000;55A:M70-M73.

13. Light K, Purser J, Rose D. The functional reach test for balance: criterion-related validity of clinical observations. *Issues on Ageing.* 1995;18:5-9.

14. Wolf S, Catlin P, Gage K, Gurucharri K, Robertson R, Stephen K. Establishing the reliability and validity of measurements of walking time using the emory functional ambulation profile. *Phys Ther.* 1999;79:1122-1133.

15. Kileff J, Ashburn A. A pilot study of the effect of aerobic exercise on people with moderate disability multiple sclerosis. *Clin Rehabil.* 2005;19:165-169.

16. Giorgetti M, Harris B, Jette A. Reliability of clinical balance outcome measures in the elderly. *Physiother Res Intl.* 1998;3(4):274-283.

17. Holbein-Jenny M, Billek-sawhney B, Beckman E, Smith T. Balance in personal care home residents: a comparison of the berg balance scale, the multi-directional reach test, and the activities-specific balance confidence scale. *Journal of Geriatric Physical Therapy.* 2005;28(2):48-53.

18. Schenkman M, Cutson TM, Kuchibhatla M, Chandler J, Pieper C. Reliabilty of impairment and physical performance measures for person's with Parkinson's disease. *Phys Ther.* 1997;77:19-26.

19. Frzovic D, Morris M, Vowels L. Clinical tests of standing balance: Performance of persons with multiple sclerosis. *Arch Phys Med Rehabil.* 2000;81:215-221.

20. Hageman P. Gait characteristics of healthy elderly: A literature review. *Issues on Aging.* 1995;18:14-18.

21. Lim L, van Wegen E, de Goede C, et al. Measuring gait and gait-related activities in parkinson's patients own home environment: a reliability, responsiveness and feasibility study. *Parkinsonism & Related Disorders.* 2005;11:19-24.

22. Marsh AP, Rejeski JW, Hutton SL, Brown CL, Ip E, Guralnik JM. Development of a lateral mobility task to identify individuals at risk for mobility disability and functional decline. *Journal of Aging and Physical Activity.* 2005;vol. 13:p. 363-381.

23. Schenkman M, Cutson TM, Kuchibhatla M, et al. Exercise to improve spinal flexibility and function for people with Parkinson's disease: A randomized, controlled study. *J Am Geriatr Soc.* 1998;46:1207-1216.

24. Sherrington C, Lord S. Reliability of simple protable tests of physical performance in older people after hip fracture. *Clinical Rehabilitation.* 2005;19:496-504.

25. Smithson F, Morris M, Iansek R. Performance on clinical tests of balance in Parkinson's disease. *Phys Ther.* 1998;78(6):577-592.

26. Weiner D, Duncan P, Chandler J, Studenski S. Functional reach: A marker of physical frailty. *JAGS.* 1992;40(3):203-207.

27. Weiner D, Bongiorni D, Studenski S, Duncan P, Kochersberger G. Does functional reach improve with rehabilitation? *Arch Phys Med Rehabil.* 1993;74:796-800.

28. Chandler J, Duncan P, Kochersberger G, Studenski S. Is lower extremity strength gain associated with improvement in physical performance and disability in frail, community-dwelling elders? *Arch Phys Med Rehabil.* 1998;79:24-30.

29. Mann G, Whitney S, Redfern M, Borello-France D, Furman J. Functional reach and single leg stance in patients with peripheral vestibular disorders. *J Vestib Res.* 1996;6(5):343-353.

30. Salsich G, Mueller M. Relationship between measures of function, strength and walking speed in patients with diabetes and transmetatarsal amputation. *Clinical Rehabilitation.* 1997;11:60-67.

31. Takahashi T, Ishida K, Yamamoto H, et al. Modifications of the functional reach test: analysis of lateral and anterior functional each in community-dwelling older people. *Archives of Gerontology and Geriatrics.* 2006;vol. 42:p.167-173.

32. Chow S, Moffat M. Relationship of thoracic kyphosis to functional reach and lower-extremity joint range of motion and muscle length in women with osteoporosis or osteopenia: a pilot study. *Top Geriatr Rehabil.* 2004;20(4):297-306.

33. Brooks D, Davis A, Naglie G. Validity of 3 physical performance measures in inpatient geriatric rehabilitation. *Arch Phys Med Rehabil.* 2006;87:105-110.

34. Bennie S, Bruner K, Dizon A, Fritz H, goodman B, Peteson S. Measurements of balance: Comparison of the timed "Up and Go" test and Functional Reach with the Berg Balance Scale. *J Phys Ther Sci.* 2003;15:93-97.

35. Harrison A. The influence of pathology, pain, balance, and self-efficacy on function in women with osteoarthritis of the knee. *Phys Ther.* 2004;84:822-831.

36. Thomas M, Jankovic J, Suteerawattananon M, et al. Clinical gait and balance scale (GABS): validation and utilization. *J Neurol Sci.* 2004;217:89-99.

37. Thapa P, Gideon P, Brockman K, Fought R, Ray W. Clinical and biomechanical measure of balance as fall predictors in ambulatory nursing home residents. *Journal of Gerontology: Medical Sciences.* 1996;51A(5):M239-M246.

38. Grill S. Postural instabilty in Parkinson's disease. *Md Med J.* 1999;48(4):179-181.

39. Duncan P, Studenski S, Chandler J, Prescott B. Functional Reach: Predicitive validity in a sample of elderly male veterans. *J Gerontol Med Sci.* 1992;47(3):M93-98.

40. Cho C, Kamen G. Detecting balance deficits in frequent fallers using clinical and quantitative evaluation tools. *JAGS.* 1998;46:426-430.

41. Davis J, Ross P, Nevitt M, Wasnich R. Risk factors for falls and for serious injuries on falling among older Japanese women in Hawaii. *JAGS.* 1999;47:792-798.

42. Spilg E, Martin B, Mitchel S, Aitchison T. Falls risk following discharge from a geriatric day hospital. *Clin Rehabil.* 2003;17:334-340.

43. Fried L, Bandeen-Roche K, Chaves P, Johnson B. Preclinical mobility disability predicts incident mobility disability in older women. *J Gernotol.* 2000;55A(1):M43-M52.

44. Davis J, Ross P, Preston S, Nevitt M, Wasnich R. Strength, physical activity, and body mass index: relationship to performance-based measures and activities of daily living among older japanese women in Hawaii. *JAGS.* 1998;46:274-279.

45. Morita M, Takamura N, Kusano Y, et al. Relationship between falls and physical performance measures among community-dwelling elderly women in Japan. *Aging Clin Exp Res.* 2005;17:211-216.
46. Wallmann H. Comparison of elderly nonfallers and fallers on performance measures of functional reach, sensory organization, and limits of stability. *J Gerontol: Med Sci.* 2001;56A(9):M580-M583.
47. Brauer S, Burns Y, Galley P. A prospective study of laboratory and clinical measures of postural stability to predict community-dwelling fallers. *Gerontology.* 2000;55A(8):M469-M476.
48. Lin S, Tsai T, Lee I, Wu Y. Perception of unsteadiness in patients with dizziness: Association with handicap and imbalance. *J Biomed Sci.* 2002;9:428-435.
49. Dite W, Temple V. A clinical test of stepping and change of direction to identify multiple falling older adults. *Arch Phys Med Rehabil.* 2002;83:1566-1571.
50. Behrman A, Light K, Flynn S, Thigpen M. Is the functional reach test useful for identifying falls risk among individuals with Parkinson's Disease? *Arch Phys Med Rehabil.* 2002;83:538-542.
51. Thomas JI, Lane JV. A pilot study to explore the predictive validity of 4 measures of falls risk in frail elderly patients. *Arch Phys Med Rehabil.* 2005;vol 86:p 1636-1640.
52. Wang C, Olson S, Protas E. Physical-performance tests to evaluate mobility disability in community-dwelling elders. *J Aging Phys Activity.* 2005;13:184-197.
53. Okumiya K, Matsubayashi K, Wada T, Kimura S, Doi Y, Ozawa T. Effects of exercise on neurobehavioral functional in community-dwelling older people more than 75 years of age. *Exercise and Older People.* 1996;44(5):569-572.
54. Rogers ME, Fernandez J, Bohlken R. Training to reduce postural sway and increase functional rearch in the elderly. *Journal of Occupational Rehablitation.* 2001;11(4):291-298.
55. Barrett C, Smerdely P. A comparison of community-based resistance exercise and flexibility exercise for seniors. *Australian Journal of Physiotherapy.* 2002;48:215-219.
56. Shigematsu R, Tanaka K, Holland G, et al. Validation of the functional fitness age (FFA) index in older Japanese women. *Aging Clin. Exp. Res.* 2001;13:385-390.
57. Dennis R. Functional reach improvement in normal older women after alexander technique instruction. *Journal of Gerontology: Medical Sciences.* 1999;54A(1):M8-M11.
58. Morey M, Schenkman M, Studenski S, et al. Spinal-flexibility-plus-aerobic-only training: effects of a randomized clinical trial on function in at-risk older adults. *J Gerontol Med Sci.* 1999;54A(7):M335-M342.
59. Simmons V, Hansen P. Effectiveness of water exericse on postural mobility in the well elderly: an experimental study on balance enhancement. *Journal of Gerontology: Medical Sciences.* 1996;51A(5):M233-M238.
60. Hakim R, DiCicco J, Burke J, Hoy T, Roberts E. Differences in balance related measures among older adults participating in Tai Chi, structured exercise, or no exercise. *J Geriatr Phys Ther.* 2004;27(1):11-15.
61. Li F, Harmer P, Fisher K, Mcauley E. Tai Chi: improving functional balance and predicting subsequent falls in older persons. *Med Sci Sports Exerc.* 2004;36(12):2046-2052.
62. Sousa N, Sampaio J. Effects of progressive strength training on the performance of the functional reach test and the timed get-up-and-go test in an elderly population from the rural north of portugal. *American Journal of Human Biology.* 2005;vol 17:p. 746-751.
63. Robinson B, Gordon J, Wallentine S, Visio M. Relationship between lower-extremity joint torque and the risk for falls in a group of community dwelling older adults. *Physiotherapy Theory and Practice.* 2004;20:155-173.
64. Mak M, Ng P. Mediolateral sway in single-leg stance is the best discriminator of balance performance for Tai-Chi practitioners. *Arch Phys Med Rehabil.* 2003;84:683-686.
65. Li F, Fisher KJ, Harmer P. Improving physical function and blood pressure in older adults through cobblestone mat walking: a randomized trial. *Journal of American Geriatrics Society.* 2005;vol. 53:p. 1305-1312.
66. Galantino ML, Shepard K, Krafft L, et al. The effect of group aerobic exercise and t'ai chi on functional outcomes and quality of life for persons living with acquired immunodeficiency syndrome. *The Journal of Alternative and Complementary Medicine.* 2005;11(6):1085-1092.
67. Brown T, Mount J, Rouland B, Kautz K, Barnes R, Kim J. Body weight-supported treadmill training versus conventional gait training for people with chronic traumatic brain injury. *J Head Trauma Rehabil.* 2005;20(5):402-415.
68. Campbell F, Ashburn A, Thomas P. An exploratory study of the consistency of balance control and the mobility of people with Parkinson's disease (PD) between medication doses. *Clinical Rehabilitation.* 2003;17:318-324.
69. Gajdosik RL, Vander Linden DW, McNair PJ, Williams AK, Riggin TJ. Effects of an eight-week stretching program on the passive-elastic properties and function of the calf muscles of older women. *Clin Biomech.* 2005 2005;20:973-983.
70. Bellew J, Fenter P, Chelette B, Moore R, Loreno D. Effects of a short-term dynamic balance training program in healthy older women. *Journal of Geriatric Physical Therapy.* 2005;28(1):4-8.
71. Nitz J, Choy N. The efficacy of a specific balance-strategy training programme for preventing falls among older people: a pilot randomised controlled trial. *Age and Ageing.* 2004;33:52-58.

72. Ramsbottom R, Ambler A, Potter J, Jordan B, Nevill A, Williams C. The effect of 6 months training on leg power, balance, and functional mobility of independently living adults over 70 years old. *J Aging Phys Activity.* 2004;12:497-510.
73. Shimada H, Uchiyama Y, Kakurai S. Specific effects of balance and gait exercises on physical function among the frail elderly. *Clin Rehabil.* 2003;17:472-479.
74. Skelton D, Young A, Greig C, Malbut K. Effects of resistance training on strength, power, and selected functional abiliteis of women aged 75 and older. *JAGS.* 1995;43:1081-1087.
75. Wade L, Canning C, Fowler V, Felmingham K, Baguley I. Changes in postural sway and performance of functional tasks during rehabilitation after traumatic brain injury. *Arch Phys Med Rehabil.* 1997;78:1107-1111.
76. Duncan P, Studenski S, Richard L, et al. Randomized clinical trial of therapeutic exercise in subacute stroke. *Stroke.* 2003;34:2173-2180.
77. Richardson J, Sandman D, Vella S. A Focused Exercise Regimen Improves Clinical Measures of Balance in Patients With Peripheral Neuropathy. *Arch Phys Med Rehabil.* 2001;82(February):205-209.
78. Bernhardt J, Ellis P, S. D, Hill K. Changes in balance and locomotion measures during rehabilitation following stroke. *Physiotherapy Research International.* 1998;3(2):109-122.
79. Lyles K, Gold D, Shipp K, Pieper C, S M, Mulhausen P. Association of osteoporotic vertebral compression fractures with impaired functional status. *Am J Med.* 1993;94(6):595-601.
80. Mueller M, Salsich G, Strube M. Functional limitations in patients with diabetes and transmetatarsal amputations. *Phys Ther.* 1997;77:937-943.
81. McMurdo M, Millar A, Daly F. A randomized controlled trial of fall prevention strategies in old peoples' homes. *Gerontology.* 2000;46:83-87.
82. Taylor L, Whittington F, Hollingsworth C, et al. Assessing the effectiveness of a walking program on physical function of residents living in an assisted living facility. *J Community Health Nurs.* 2003;20(1):15-26.
83. Sherrington C, Lord S. Home exercise to improve strength and walking velocity after hip fracture: A randomized controlled trial. *Arch Phys Med Rehabil.* 1997;78:208-212.
84. Carmeli E, Bar-Chad S, Lotan M. Five clinical tests to assess balance following ball exercises and treadmill training in adult persons with intellectual disability. *J Gerontol.* 2003;58A:M767-M772.
85. Richardson J, Ross A, Riley B, Rhodes R. Halo vest effect on balance. *Arch Phys Med Rehabil.* 2000;81:255-257.
86. Cummings S, Ling X, Stone K. Consequences of foot binding among older women in beijing, china. *Am J Public Health.* 1997;87(10):1677-1679.
87. Cutson T, Gray S, Hughes M, Carson S, Hanlon J. Effect of a single dose of diazepam on balance measures in older people. *JAGS.* 1997;45:435-440.
88. Ondo W, Warrior D, Overby A, et al. Computerized posturography analysis of progressive supranuclear palsy. *Arch Neurol.* 2000;57(10):1464-1469.
89. Newton R. Balance screening of an inner city older adult population. *Arch Phys Med Rehabil.* 1997;78:587-591.
90. Shigematsu R, Tanaka K. Age scale for assessing functional fitness in older Japanese ambulatory women. *Aging Clin Exp Res.* 2000;12:256-263.
91. Schenkman M, Morey M, Kuchibhatla M. Spinal flexibility and balance control among community-dwelling adults with an without Parkinson's disease. *Journal of Gerontology.* 2000;55(8):M441-M445.
92. Aoyagi K, Ross PD, Hayashi T, et al. Calcaneus Bone Mineral Density is Lower Among Men and Women with Lower Physical Performance. *Calcified Tissue International.* 2000;67:106-110.
93. Purser J, Pieper C, Branch L, Shipp K, Gold D, Lyles K. Spinal deformity andmobility self-confidence among women with osteoporosis and vertebral fractures. *Aging Clin Exp Res.* 1999;11(4):235-245.
94. Lehmann K, Sunnerhagen KS, Willen C. Postural control in persons with late effects of polio. *Acta Neurol Scand.* 2006;vol 113:p.55-61.
95. Stack E, Ashburn A, Jupp K. Postural instability during reaching tasks in parkinson's disease. *Physio Research Inter.* 2005;10(3):146-153.
96. Cimbiz A, Cakir O. Evaluation of balance and physical fitness in diabetic neuropathic patients. *Journal of Diabetes and Its Complications.* 2005;19:160-164.
97. Smith P, Hembree J, Thompson M. Berg balance scale and functional reach: determining the best clinical tool for individuals post acute stroke. *Clin Rehabil.* 2004;18:811-818.
98. Stankovic I. The effect of physical therapy on balance of patients with Parkinson's disease. *Int J Rehab Res.* 2004;27(1):53-57.
99. Teri L, McCurry S, Buchner D, et al. Exercise and activity level in alzheimer's disease: a potential treatment focus. *Journal of Rehabilitation Research and Development.* 1998;35(4):411-419.
100. Wolf S, Sattin R, Kutner M, O'Grady M, Greenspan A, Gregor R. Intense Tai Chi exercise training and fall occurrences in older, transitionally frail adults: a ramdomized, controller trial. *J Am Geriatr Soc.* 2003;51:1693-1701.

101. Goldberg A, Hernandez M, Alexander N. Trunk repositioning errors are increased in balance-impaired older adults. *Journal of Gerontology.* 2005;60A(10):1310-1314.
102. Huang C, Ross P, Wasnich R. Vertebral fracture and other predictors of physical impairment and health care utilization. *Arch Intern Med.* 1996;156:2469-2475.
103. Jonsson E, Henriksson M, Hirschfeld H. Does the functional reach test reflect stability limits in elderly people? *J Rehabil Med.* 2002;35:26-30.
104. Fishman M, Colby L, Sachs L, Nichols D. Comparison of upper-extremity balance tasks and force platform testing in persons with hemiparesis. *Phys Ther.* 1997;77(10):1052-1062.
105. Cavanaugh J, Shinberg M, Ray L, Shipp K, Kuchibhatla M, Schenkman M. Kinematic characterization of standing reach: comparison of younger vs. older subjects. *Clinical Biomechanics.* 1999;14:271-279.
106. O'Brien K, Culham E, Pickles B. Balance and skeletal alignment in a group of elderly female fallers and nonfallers. *J Gerontol Biol Sci.* 1997;52A(4):B221-B226.
107. Wernick-Robinson M, Krebs D, Giorgetti M. Functional reach: Does it really measure dynamic balance? *Arch Phys Med Rehabil.* 1999;80(March):262-269.
108. Daubney M, Culham E. Lower-extremity muscle force and balance performance in adults aged 65 years and older. *Phys Ther.* 1999;79(12):1177-1185.
109. Escalante A, Lichtenstein M, Hazuda H. Determinats of shoulder and elbow flexion range: results from the San Antonio Longitudinal Study of Aging. *Arthritis Care and Research.* 1999;12(4):277-286.
110. Thapa P, Gideon P, Fought R, Kromicki M, Ray W. Comparison of clinical and biomechanical measures of balance and mobility in elderly nursing home residents. *JAGS.* 1994;42:493-500.
111. Petty J, Mercer V, Gross M, Riegger-Krugh C. Relationship between maximum ankle dorsiflexion range of motion and maximal posterior horizontal excursion in standing. *Issues on Ageing.* 2000;23(3):7-14.
112. Brauer S, Burns Y, Galley P. Lateral reach: A clinical measure of medio-lateral postural stability. *Physiother Res Intl.* 1999;4:81-85.
113. DeWaard B, Bentrup B, Hollman J, Brasseur J. Relationship of the functional reach and lateral reach tests in elderly females. *J Geriatr Phys Ther.* 2002;25:4-9.
114. Kaneko J, Morala D, Kurosawa K, et al. Relationship between movement patterns and physical fitness elements during rising from the supine to sitting postion in community-dwelling elderly persons. *J Phys Ther Sci.* 2003;15:87-91.
115. Curtis K, Kindlin C, Reich K, White D. Functional reach in wheelchair users: The effects of trunk and lower extremity stabilization. *Arch Phys Med Rehabil.* 1995;76:360-367.
116. Lynch S, Leahy P, Barker S. Reliability of measurements obtained with a modified functional reach test in subjects with spinal cord injury. *Phys Ther.* 1998;78(2):128-133.
117. Amos L, Brimner A, Dierckman H, et al. Effects of positioning on functional reach. *Physical and Occupational Therapy in Geriatrics.* 2001;20(1):59-72.
118. Hsu W-L, Yang Y-R, Hong C-T, Wang RY. Ankle muscle activation during functional reach in hemiparetic and healthy subjects. *American Journal of Physical Medicine & Rehabilitation.* 2005;84(10):p. 749-755.

GDS Short Form

Instructions:

Circle the answer that best describes how you felt over the past week.

1. Are you basically satisfied with your life?

   Yes

   No
2. Have you dropped many of your activities and interests?

   Yes

   No
3. Do you feel that your life is empty?

   Yes

   No
4. Do you often get bored?

   Yes

   No
5. Are you in good spirits most of the time?

   Yes

   No
6. Are you afraid that something bad is going to happen to you?

   Yes

   No
7. Do you feel happy most of the time?

   Yes

   No
8. Do you often feel helpless?

   Yes

   No
9. Do you prefer to stay at home, rather than going out and doing things?

   Yes

   No
10. Do you feel that you have more problems with memory than most?

Yes

No

11. Do you think it is wonderful to be alive now?

    Yes

    No

12. Do you feel worthless the way you are now?

    Yes

    No

13. Do you feel full of energy?

    Yes

    No

14. Do you feel that your situation is hopeless?

    Yes

    No

15. Do you think that most people are better off than you are?

    Yes

    No

Instructions:

Score 1 point for each bolded answer. A score of 5 or more suggests depression.

A score of > 5 suggests depression

Total Score

Ref. Yes average: The use of Rating Depression Series in the Elderly, in Poon (ed.): Clinical Memory Assessment of Older Adults, American Psychological Association, 1986

Get Up and Go Test

The “Get Up and Go Test” is an assessment that should be conducted as part of a routine evaluation when dealing with older persons. Its purpose is to detect “fallers” and to identify those who need evaluation.

The staff should be trained to perform the “Get Up and Go Test” at check-in and query those with gait or balance problems for falls.

INITIAL CHECK

All older persons who report a single fall should be observed as they:

- From a sitting position, stand without using their arms for support.
- Walk several paces, turn, and return to the chair.
- Sit back in the chair without using their arms for support.

Individuals who have difficulty or demonstrate unsteadiness performing this test require further assessment.

FOLLOW-UP ASSESSMENT

In the follow-up assessment, ask the person to:

- Sit.
- Stand without using their arms for support.
- Close their eyes for a few seconds, while standing in place.
- Stand with eyes closed, while you push gently on his or her sternum.
- Walk a short distance and come to a complete stop.
- Turn around and return to the chair.
- Sit in the chair without using their arms for support.

While conducting the test, pay attention to any abnormal movements. As you observe, answer the questions below. Record your assessment in the Yes or No boxes provided and/or on the "Falls Evaluation: Initial Visit" form.

Follow-Up Assessment Observations

- Is the person steady and balanced when sitting upright? Yes ☐ No ☐
- Is the person able to stand with the arms folded? Yes ☐ No ☐
- When standing, is the person steady in narrow stance? Yes ☐ No ☐
- With eyes closed, does the person remain steady? Yes ☐ No ☐
- When nudged, does the person recover without difficulty? Yes ☐ No ☐
- Does with person start walking without hesitancy? Yes ☐ No ☐
- When walking, does each foot clear the floor well? Yes ☐ No ☐
- Is there step symmetry, with the steps equal length and regular ? Yes ☐ No ☐
- Does the person take continuous, regular steps? Yes ☐ No ☐
- Does the person walk straight without a walking aid? Yes ☐ No ☐
- Does the person stand with heels close together? Yes ☐ No ☐
- Is the person able to sit safely and judge distance correctly? Yes ☐ No ☐

Additional Observations

try this: Best Practices in Nursing Care to Older Adults
from The Hartford Institute for Geriatric Nursing

Issue Number 8 Revised Winter 2006 Series Editor: Marie Boltz, APRN, GNP

Fall Risk Assessment: Hendrich II Scale

By: Deanna Gray-Miceli, DNSc, APRN, FAANP

WHY: Falls among older adults, unlike other ages tend to occur from multifactorial etiology such as acute1,2,3 and chronic4 illness, medications5 as a prodrome to other diseases6 or as idiopathic phenomena. Because the rate of falling increases proportionally with increased number of pre-existing conditions and risk factors,7 fall risk assessment is a useful guideline for practitioners. Determining the "why" the fall occurred however, involves critical analysis of potential underlying etiology (i.e. a comprehensive post-fall assessment) extending beyond fall risk assessment, but inclusive of it. Fall risk assessment and post-fall assessment are two interrelated, but distinct approaches to fall evaluation, both recommended by the American Geriatrics Society Guidelines8 (2001) for fall prevention.

BEST PRACTICE APPROACH: In the acute care setting, the best practice approach incorporates use of the Hendrich II Scale9 for it is quick to administer and provides a determination of risk for falling based on mental status, emotional status, symptoms of dizziness, gender, and is inclusive of categories of known increased risk medications. It can serve as a screen for primary prevention of falls or following a fall, as an integral component of the post-fall assessment used for their secondary prevention.

TARGET POPULATION: The Hendrich II Fall Risk Model is intended to be used in the acute care and the skilled nursing environment to identify adults at risk for falls. This includes rehabilitation, emergency department, and the behavioral care areas. The tool is being validated for further application of the specific risk factors in pediatrics and obstetrical populations and it is being used successfully in the home setting as well.

VALIDITY AND RELIABILITY: The Hendrich II Fall Risk Model was validated in a large case control study in an acute care tertiary facility with skilled nursing and rehabilitation populations. The risk factors in the model had a statistically significant relationship with patient falls (Odds Ratio 10.12-1.00, .01 > p <.0001). The instrument is sensitive (74.9%) and specific (73.9%).10 Inter-rater reliability was measured in 17 randomly selected patients and was found to be 100% agreement negating the need for further matching during the study period. Content validity was established through an exhaustive literature review, use of accepted nursing nomenclature and the extensive experience of the principal investigators in this area.

STRENGTHS AND LIMITATIONS: The major strengths of the Hendrich II Scale are its brevity, the inclusion of medications, and that the instrument focuses interventions on specific areas of risk rather than on a single, summed general risk score. Medication risk is included in the tool in two ways 1) categories of 'true' increased fall risk medications (benzodiazepines and antiepileptics) are built into the tool and 2) the risk model construction found the most common side effects of drug therapies (confusion, dizziness, altered elimination, gait and mobility disturbances) were contained within intrinsic fall risk factors. This model assures medication risk is measured while preventing the over targeting of fall risk or duplication in medication risk assessment. The tool can be inserted into existing documentation forms or a single document and it has been built into electronic health records with targeted interventions that prompt and alert the caregiver to modify and/ or reduce specific risk factors' presence.9

References

1. Ooi, W.L., Hossain, M., Lipsitz, L.A. (2000). The association between orthostatic hypotension and recurrent falls in nursing home residents. American Journal of Medicine 108(2): 106-11.
2. Davies, A.J., Steen, N., Kenny, R.A. (2001). Carotid sinus hypersensitivity is common in older patients presenting to an accident and emergency department with unexplained falls. Age and Ageing 30 (4): 273-4.
3. Heitterachi, E., Lord, S.R., Meyerkort, P., McCloskey, I., Fitzpatrick, R. (2002). Blood pressure changes on upright tilting predict falls in older people. Age and Ageing 31 (3): 181-6.
4. Stolze, H., Klebe, S., Zechlin, C., Baecker, C., Friege, L., Deuschl, G. (2004). Falls in frequent neurological diseases-prevalence, risk factors and etiology. Journal of Neurology 251(1): 79-84.
5. Leipzig, R.M., Cumming, R.G., Tinetti, M.E. (1999). Drugs and falls in older people: a systematic review and meta-analysis: Cardiac and analgesic drugs. JAGS 47 (1): 40-50.
6. Gray-Miceli, D., Waxman, H., Cavalieri, T., Lage, S. Prodromal falls among older nursing home residents. Applied Nursing Research 7:1, 18-27.
7. Tinetti, M.E., Williams, T.S., Mayewski, R. (1986). Fall risk index for elderly patients based on number of chronic disabilities. American Journal of Medicine 80 (3): 429-34.
8. American Geriatrics Society, et al (2001). Guidelines for the prevention of falls in older persons. JAGS 49: 664-672.
9. Hendrich, A., Nyhuuis, A., Kippenbrock, T., Soga, M.E. (1995). Hospital falls: development of a predictive model for clinical practice. Applied Nursing Research 8: 129-139.
10. Hendrich, A.L. Bender, P.S. & Nyhuis, A. (2003). Validation of the Hendrich II Fall Risk Model: A Large Concurrent CASE/Control Study of Hospitalized Patients. Applied Nursing Research 16 (1), 9-21.

CASE EXAMPLE: Fall Risk Assessment with prior falls history

An 80 year-old woman with new onset confusion and urinary incontinence who has fallen repeatedly at home in the past 2 months is hospitalized for further observation and possible long-term care placement. On admission she is anxious and confused, and unable to move. Medications include Haldol 0.5 mg BID started 1 week prior to admission. Admission laboratory work shows a normal CBC and SMA-12. The urinalysis has 50 WBC per high power field and +2 Bacteria. The Hendrich risk score was 9. A comprehensive post-fall evaluation and review of the high risk parameters led to a presumptive diagnosis of the underlying cause of the fall: acute confusion due to urinary tract infection. Haldol was stopped and Bactrim DS BID was started. Two weeks later, the urinary incontinence and confusion lessened and the falling stopped. She was discharged home to live with her daughter.

CASE DISCUSSION: This woman possesses several "red flag" areas of a dynamic nature, e.g., falls occurring on an acute, potentially reversible basis, acute urinary incontinence, urinary track infection, poly-pharmacy and delirium. Falling is related to these dynamic events and once treated the falling stopped. Note that the FRAT surfaced no past or static events associated with falls, such as non-reversible past medical problems like dementia or Parkinson's disease. But, use of the Hendrich scale captured significant risk factors including confusion (4 points), prescribed benzodiazepines (1 point) and inability to rise (4 points). These risks elicited from the Hendrich Scale coupled with a comprehensive post-fall assessment informed the nursing interventions

Patient Age (if < 89): Days since admission: Student Name: Date:

Hendrich II Fall Risk Model

Risk factor	*Risk Points*	
Confusion / Disorientation	4	☐
Depression	2	☐
Altered Elimination	1	☐
Dizziness / Vertigo	1	☐
Gender (Male)	1	☐
Any administered prescribed antiepileptics (anticonvulsants) (carbamazepine, divalproex sodium, ethotoin, ethosuximide, felbamate, fosphenytoin, gabapentin, lamotrigine, mephenytoin, methsuximide, phenobarbitol, phenytoin, primidone, topiramate, trimethadione, valproic acid)	2	☐
Any administered prescribed benzodiazepines (alprazolam, buspirone, chlordiazepoxide, clonazepam, clorazepate dipotassium, diazepam, fl urazepam, halazepam, lorazepam, midazolam, oxazepam, temazepam, triazolam)	1	☐
Get-up-and-go Test ("Rising from Chair") (select one) *If unable to assess (unconscious, drug-induced coma, traction, extreme debiltationdebilitation/atrophy), monitor for change in activity level and use all other risk factor scores.		
Able to rise in a single movement	0	☐
Pushes up, successful in one attempt	1	☐
Multiple attempts but successful	3	☐
Unable to rise without assistance	4	☐
	TOTAL (5 or greater = High Risk)	

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Intervention Strategies									
Intervention	**Level of Risk**			**Area of Risk**					
	High	Med	Low	Frequent Falls	Altered Elimination	Muscle Weakness	Mobility Problems	Multiple Medications	Depression
Low beds	X	X	X	X	X	X	X	X	X
Non-slip grip footwear	X	X	X	X	X	X	X	X	X
Assign patient to bed that allows patient to exit toward stronger side	X	X	X	X	X	X	X	X	X
Lock movable transfer equipment prior to transfer	X	X	X	X	X	X	X	X	X
Individualize equipment to patient needs	X	X	X	X	X	X	X	X	X
High risk fall room setup	X	X		X	X	X	X	X	X
Non-skid floor mat	X	X		X	X	X	X	X	X
Medication review	X	X		X	X	X	X	X	X
Exercise program	X	X		X	X	X	X	X	X
Toileting worksheet	X	X			X				
Color armband / Falling Star etc	X			X	X	X	X	X	X
Perimeter mattress	X			X	X	X	X		
Hip protectors	X			X		X	X		
Bed/chair alarms	X			X		X	X		

Note: this list is not all-inclusive, nor is it required to be used.

Facilities should use their best judgment in implementing recommendations.

try this: Best Practices in Nursing Care to Older Adults
from The Hartford Institute for Geriatric Nursing

Issue Number 3, January 1999 Series Editor: Meredith Wallace, PhD, RN, MSN, CS

The Mini Mental State Examination (MMSE)

By: Lenore Kurlowicz, PhD, RN, CS and Meredith Wallace, PhD, RN, MSN

WHY: Cognitive impairment is no longer considered a normal and inevitable change of aging. Although older adults are at higher risk than the rest of the population, changes in cognitive function often call for prompt and aggressive action. In older patients, cognitive functioning is especially likely to decline during illness or injury. The nurses' assessment of an older adult's cognitive status is instrumental in identifying early changes in physiological status, ability to learn, and evaluating responses to treatment.

BEST TOOL: The Mini Mental State Examination (MMSE) is a tool that can be used to systematically and thoroughly assess mental status. It is an 11-question measure that tests five areas of cognitive function: orientation, registration, attention and calculation, recall, and language. The maximum score is 30. A score of 23 or lower is indicative of cognitive impairment. The MMSE takes only 5-10 minutes to administer and is therefore practical to use repeatedly and routinely.

TARGET POPULATION: The MMSE is effective as a screening tool for cognitive impairment with older, community dwelling, hospitalized and institutionalized adults. Assessment of an older adult's cognitive function is best achieved when it is done routinely, systematically and thoroughly.

VALIDITY/RELIABILITY: Since its creation in 1975, the MMSE has been validated and extensively used in both clinical practice and research.

STRENGTHS AND LIMITATIONS: The MMSE is effective as a screening instrument to separate patients with cognitive impairment from those without it. In addition, when used repeatedly the instrument is able to measure changes in cognitive status that may benefit from intervention. However, the tool is not able to diagnose the case for changes in cognitive function and should not replace a complete clinical assessment of mental status. In addition, the instrument relies heavily on verbal response and reading and writing. Therefore, patients that are hearing and visually impaired, intubated, have low English literacy, or those with other communication disorders may perform poorly even when cognitively intact.

MORE ON THE TOPIC:

Folstein, M., Folstein, S.E., McHugh, P.R. (1975). "Mini-Mental State" a Practical Method for Grading the Cognitive State of Patients for the Clinician. *Journal of Psychiatric Research,* 12(3); 189-198.

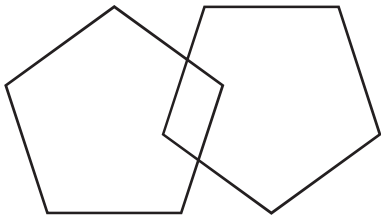
Foreman, M.D., Grabowski, R. (1992). Diagnostic Dilemma: Cognitive Impairment in the Elderly. *Journal of Gerontological Nursing,* 18; 5-12.

Foreman, M.D., Fletcher, K., Mion, L.C., & Simon, L. (1996). Assessing Cognitive Function. *Geriatric Nursing,* 17; 228-233.

The Mini-Mental State Exam

Patient_____ Examiner _____ Date_____

Maximum	Score	
		Orientation
5	( )	What is the (year) (season) (date) (day) (month)?
5	( )	Where are we (state) (country) (town) (hospital) (floor)?
		Registration
3	( )	Name 3 objects: 1 second to say each. Then ask the patient all 3 after you have said them. Give 1 point for each correct answer. Then repeat them until he/she learns all 3. Count trials and record. Trials _____
		Attention and Calculation
5	( )	Serial 7's. 1 point for each correct answer. Stop after 5 answers. Alternatively spell "world" backward.
		Recall
3	( )	Ask for the 3 objects repeated above. Give 1 point for each correct answer.
		Language
2	( )	Name a pencil and watch.
1	( )	Repeat the following "No ifs, ands, or buts"
3	( )	Follow a 3-stage command: "Take a paper in your hand, fold it in half, and put it on the floor."
1	( )	Read and obey the following: CLOSE YOUR EYES
1	( )	Write a sentence.
1	( )	Copy the design shown.



_____ Total Score

ASSESS level of consciousness along a continuum _____

Alert Drowsy Stupor Coma

"MINI-MENTAL STATE." A PRACTICAL METHOD FOR GRADING THE COGNITIVE STATE OF PATIENTS FOR THE CLINICIAN. *Journal of Psychiatric Research*, 12(3): 189-198, 1975. Used by permission.

try this: Best Practices in Nursing Care to Older Adults

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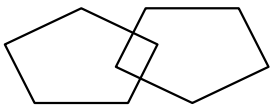
Mini-Mental State Examination (MMSE)

Patient's Name: _____ Date: _____

Instructions: ***Ask the questions in the order listed. Score one point for each correct response within each question or activity.***

Maximum Score	Patient's Score	Questions
5		"What is the year? Season? Date? Day of the week? Month?"
5		"Where are we now: State? County? Town/city? Hospital? Floor?"
3		The examiner names three unrelated objects clearly and slowly, then asks the patient to name all three of them. The patient's response is used for scoring. The examiner repeats them until patient learns all of them, if possible. Number of trials: _____
5		"I would like you to count backward from 100 by sevens." (93, 86, 79, 72, 65, …) Stop after five answers. Alternative: "Spell WORLD backwards." (D-L-R-O-W)
3		"Earlier I told you the names of three things. Can you tell me what those were?"
2		Show the patient two simple objects, such as a wristwatch and a pencil, and ask the patient to name them.
1		"Repeat the phrase: 'No ifs, ands, or buts.'"
3		"Take the paper in your right hand, fold it in half, and put it on the floor." (The examiner gives the patient a piece of blank paper.)
1		"Please read this and do what it says." (Written instruction is "Close your eyes.")
1		"Make up and write a sentence about anything." (This sentence must contain a noun and a verb.)
1		"Please copy this picture." (The examiner gives the patient a blank piece of paper and asks him/her to draw the symbol below. All 10 angles must be present and two must intersect.) 
30		TOTAL

(Adapted from Rovner & Folstein, 1987)

Instructions for administration and scoring of the MMSE

Orientation (10 points):

- Ask for the date. Then specifically ask for parts omitted (e.g., "Can you also tell me what season it is?"). One point for each correct answer.
- Ask in turn, "Can you tell me the name of this hospital (town, county, etc.)?" One point for each correct answer.

Registration (3 points):

- Say the names of three unrelated objects clearly and slowly, allowing approximately one second for each. After you have said all three, ask the patient to repeat them. The number of objects the patient names correctly upon the first repetition determines the score (0-3). If the patient does not repeat all three objects the first time, continue saying the names until the patient is able to repeat all three items, up to six trials. Record the number of trials it takes for the patient to learn the words. If the patient does not eventually learn all three, recall cannot be meaningfully tested.
- After completing this task, tell the patient, "Try to remember the words, as I will ask for them in a little while."

Attention and Calculation (5 points):

- Ask the patient to begin with 100 and count backward by sevens. Stop after five subtractions (93, 86, 79, 72, 65). Score the total number of correct answers.
- If the patient cannot or will not perform the subtraction task, ask the patient to spell the word "world" backwards. The score is the number of letters in correct order (e.g., dlrow=5, dlorw=3).

Recall (3 points):

- Ask the patient if he or she can recall the three words you previously asked him or her to remember. Score the total number of correct answers (0-3).

Language and Praxis (9 points):

- Naming: Show the patient a wrist watch and ask the patient what it is. Repeat with a pencil. Score one point for each correct naming (0-2).
- Repetition: Ask the patient to repeat the sentence after you ("No ifs, ands, or buts."). Allow only one trial. Score 0 or 1.
- 3-Stage Command: Give the patient a piece of blank paper and say, "Take this paper in your right hand, fold it in half, and put it on the floor." Score one point for each part of the command correctly executed.
- Reading: On a blank piece of paper print the sentence, "Close your eyes," in letters large enough for the patient to see clearly. Ask the patient to read the sentence and do what it says. Score one point only if the patient actually closes his or her eyes. This is not a test of memory, so you may prompt the patient to "do what it says" after the patient reads the sentence.
- Writing: Give the patient a blank piece of paper and ask him or her to write a sentence for you. Do not dictate a sentence; it should be written spontaneously. The sentence must contain a subject and a verb and make sense. Correct grammar and punctuation are not necessary.
- Copying: Show the patient the picture of two intersecting pentagons and ask the patient to copy the figure exactly as it is. All ten angles must be present and two must intersect to score one point. Ignore tremor and rotation.

(Folstein, Folstein & McHugh, 1975)

Interpretation of the MMSE

Method	Score	Interpretation
Single Cutoff	<24	Abnormal
Range	<21	Increased odds of dementia
	>25	Decreased odds of dementia
Education	21	Abnormal for 8th grade education
	<23	Abnormal for high school education
	<24	Abnormal for college education
Severity	24-30	No cognitive impairment
	18-23	Mild cognitive impairment
	0-17	Severe cognitive impairment

Sources:

- Crum RM, Anthony JC, Bassett SS, Folstein MF. Population-based norms for the mini-mental state examination by age and educational level. *JAMA*. 1993;269(18):2386-2391.
- Folstein MF, Folstein SE, McHugh PR. "Mini-mental state": a practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res*. 1975;12:189-198.
- Rovner BW, Folstein MF. Mini-mental state exam in clinical practice. *Hosp Pract*. 1987;22(1A):99, 103, 106, 110.
- Tombaugh TN, McIntyre NJ. The mini-mental state examination: a comprehensive review. *J Am Geriatr Soc*. 1992;40(9):922-935.

Modified Falls Efficacy Scale (MFES)

Developed by: National Ageing Research Institute (adapted from Tinetti et al, 1990)
Format: Form
Availability: Download form <PDF version> <Word version>
Download guidelines <PDF version> <Word version>

A one-page form, consisting of 14 questions each related to a particular activity (for example getting dressed, taking a bath, crossing roads etc). Unlike the original Falls Efficacy Scale (developed by Tinetti et al, 1990), this scale includes a greater range of outdoor activities. The questions aim to determine how confidently clients feel they are able to undertake each activity on a scale of 0 (not confident at all) to 10 (completely confident).

An evaluation of the MFES was reported in: Hill, K., J. Schwarz, et al. (1996). 'Fear of falling revisited.' *Archives of Physical Medicine and Rehabilitation* 77: 1025-1029. These preliminary findings indicated that the MFES was both a reliable and valid measure of falls self-efficacy.

In 2009 the Department of Health funded Northern Health, in conjunction with National Ageing Research Institute, to review falls prevention resources for the Department of Health's website. The materials used as the basis of this generic resource were developed by National Ageing Research Institute under a Service Agreement with the Department of Human Services, now the Department of Health. Other resources to maintain health and wellbeing of older people are available from www.health.vic.gov.au/agedcare

The Modified Falls Efficacy Scale

Adapted from Tinetti et al, 1990; Hill et al, 1996

On a scale of 0 to 10, how confident are you that you can do each of these activities without falling, with 0 meaning "not confident/not sure at all", 5 being "fairly confident/fairly sure", and 10 being "completely confident/completely sure"?

NOTE:

- If you have stopped doing the activity at least partly because of being afraid of falling, score a 0;
- If you have stopped an activity purely because of a physical problem, leave that item blank (these items are not included in the calculation of the average MFES score).
- If you do not currently do the activity for other reasons, please rate that item based on how you perceive you would rate if you had to do the activity today.

Not confident at all — Fairly confident — Completely confident

0 1 2 3 4 5 6 7 8 9 10

1. Get dressed and undressed
2. Prepare a simple meal
3. Take a bath or a shower
4. Get in/out of a chair
5. Get in/out of bed
6. Answer the door or telephone
7. Walk around the inside of your house
8. Reach into cabinets or closet
9. Light housekeeping
10. Simple shopping
11. Using public transport
12. Crossing roads
13. Light gardening or hanging out the washing*
14. Using front or rear steps at home

* rate most commonly performed of these activities

Average score/item rated = ……../…….

= ……..

1. Hill K, Schwarz J, et al. Fear of falling revisited. Archives Phys Med Rehabil 1996; 77:1025-1029.
2. Tinetti M, Richman D, Powell L. Falls efficacy as a measure of fear of falling. J Gerontology 1990; 45:P239-43.

In 2009 the Department of Health funded Northern Health, in conjunction with National Ageing Research Institute, to review falls prevention resources for the Department of Health's website. The materials used as the basis of this generic resource were developed by National Ageing Research Institute under a Service Agreement with the Department of Human Services, now the Department of Health. Other resources to maintain health and wellbeing of older people are available from www.health.vic.gov.au/agedcare

Modified Falls Efficacy Scale (MFES)

Population: Elderly with balance or mobility dysfunction

Description: The Modified Falls Efficacy Scale (MFES) is a 14 activity questionnaire that is an expanded version of the original 10 activity Falls Efficacy Scale (FES). The MFES includes outdoor activities, which the FES does not cover. (closer to ABC now)

Mode of Administration: Either the patient or the clinician can complete the test.

Scoring:

Time to Complete: Less than 5 minutes.

Time to Score: Less than 5 minutes.

Scoring: Each item is scored on a 10 point visual analogue scale. 0=not confident/not sure at all, 5=fairly confident/fairly sure, and 10=completely confident/ completely sure. Scores can fall in between 0, 5, and 10.

Interpretation: Higher scores reflect more confidence, less fear of falling. Lower scores reflect less confidence and more fear of falling.

Reliability: Cronbach's alpha was used to demonstrate internal consistency of the items on the questionnaire and the result was 0.95. Test-retest reliability was measured for every question as well as the overall test by testing two groups twice, one week apart. Intraclass correlation coefficients were calculated. The lowest ICC was .54 for the individual items. The overall ICC for the MFES was .93.

Validity: In order to evaluate the discriminative validity of the MFES, subjects from two separate samples were scored. The one sample consisted of healthy elderly and the other sample included patients from a Falls and Balance Clinic (FBC). Significant differences were found between the two groups using multivariate analysis of variance (MANOVA) with post hoc univariate ANOVA.

Reference: Hill, K.D., Schwarz, J.A., Kalogeropolous, A.J., & Gibson, S.J. (1996). Fear of Falling Revisited. Arch Phys Med Rehabil, 77, 1025-1029.

The Modified Falls Efficacy Scale

	Not Confident At All (0)	(1)	(2)	(3)	(4)	Fairly Confident (5)	(6)	(7)	(8)	(9)	Completely Confident (10)
Items from Tinetti et al[1]											
1. Get dressed and undressed											
2. Prepare a simple meal											
3. Take a bath or shower											
4. Get in/out of a chair											
5. Get in/out of bed											
6. Answer the door or telephone											
7. Walk around the inside of your house											
8. Reach into cabinets or closets											
9. Light house keeping											
10. Simple shopping											
Additional items											
11. Using public transportation											
12. Crossing roads											
13. Light gardening or hanging out the wash*											
14. Using front or rear steps at home											

The items on the scale are scored from 0 to 10, with 0 meaning "not confident/not sure at all," 5 being "fairly confident/fairly sure," and 10 being "completely confident/completely sure." Subjects are asked, "How confident/sure are you that you do each of the activities without falling?"

* Rate most commonly performed of these activities

[1] Tinetti M, Richman D, Powell l. Falls efficacy as a measure of fear of falling. J Gerontol 1990; 45:P239-43.

Morse Fall Scale

(Adapted with permission, SAGE Publications)

The Morse Fall Scale (MFS) is a rapid and simple method of assessing a patient's likelihood of falling. A large majority of nurses (82.9%) rate the scale as "quick and easy to use," and 54% estimated that it took less than 3 minutes to rate a patient. It consists of six variables that are quick and easy to score, and it has been shown to have predictive validity and interrater reliability. The MFS is used widely in acute care settings, both in the hospital and long term care inpatient settings.

Item	***Scale***	***Scoring***
1. History of falling; immediate or within 3 months	No 0 Yes 25	_____
2. Secondary diagnosis	No 0 Yes 15	_____
3. Ambulatory aid Bed rest/nurse assist Crutches/cane/walker Furniture	0 15 30	_____
4. IV/Heparin Lock	No 0 Yes 20	_____
5. Gait/Transferring Normal/bedrest/immobile Weak Impaired	0 10 20	_____
6. Mental status Oriented to own ability Forgets limitations	0 15	_____

The items in the scale are scored as follows:

History of falling: This is scored as 25 if the patient has fallen during the present hospital admission or if there was an immediate history of physiological falls, such as from seizures or an impaired gait prior to admission. If the patient has not fallen, this is scored 0. Note: If a patient falls for the first time, then his or her score immediately increases by 25.

Secondary diagnosis: This is scored as 15 if more than one medical diagnosis is listed on the patient's chart; if not, score 0.

Ambulatory aids: This is scored as 0 if the patient walks without a walking aid (even if assisted by a nurse), uses a wheelchair, or is on a bed rest and does not get out of bed at all. If the patient uses crutches, a cane, or a walker, this item scores 15; if the patient ambulates clutching onto the furniture for support, score this item 30.

Intravenous therapy: This is scored as 20 if the patient has an intravenous apparatus or a heparin lock inserted; if not, score 0.

Gait: A *normal gait* is characterized by the patient walking with head erect, arms swinging freely at the side, and striding without hesitant. This gait scores 0. With a *weak gait* (score as 10), the patient is stooped but is able to lift the head while walking without losing balance. Steps are short and the patient may shuffle. With an impaired gait (score 20), the patient may have difficulty rising from the chair, attempting to get up by pushing on the arms of the chair/or by bouncing (i.e., by using several attempts to rise). The patient's head is down, and he or she watches the ground. Because the patient's balance is poor, the patient grasps onto the furniture, a support person, or a walking aid for support and cannot walk without this assistance.

Mental status: When using this Scale, mental status is measured by checking the patient's own self-assessment of his or her own ability to ambulate. Ask the patient, "Are you able to go the bathroom alone or do you need assistance?" If the patient's reply judging his or her own ability is consistent with the ambulatory order on the Kardex®, the patient is rated as "normal" and scored 0. If the patient's response is not consistent with the nursing orders or if the patient's response is unrealistic, then the patient is considered to overestimate his or her own abilities and to be forgetful of limitations and scored as 15.

Scoring and Risk Level: The score is then tallied and recorded on the patient's chart. Risk level and recommended actions (e.g. no interventions needed, standard fall prevention interventions, high risk prevention interventions) are then identified.

Important Note: The Morse Fall Scale should be calibrated for each particular healthcare setting or unit so that fall prevention strategies are targeted to those most at risk. In other words, risk cut off scores may be different depending on if you are using it in an acute care hospital, nursing home or rehabilitation facility. In addition, scales may be set differently between particular units within a given facility.

Sample Risk Level

Risk Level	MFS Score	Action
No Risk	0 - 24	Good Basic Nursing Care
Low Risk	25 - 50	Implement Standard Fall Prevention Interventions
High Risk	≥ 51	Implement High Risk Fall Prevention Interventions

Post Fall Evaluation Tool
Michigan CPGs
Origination Date: 8/9/2011

Post Fall Evaluation

Resident Name: _____

Room Number: _____

FACTORS		YES	NO	NA
Fall History	Recent or recurrent falls?			
Medications	Currently receiving: antianxiety/hypnotic agents, anticholinergics, anticoagulants, antidepressants, antihypertensives, cardiovascular, diuretics?			
Underlying Conditions	Medical Conditions that predispose to falls or that could increase risk of falls?			
Underlying Conditions	Assess for orthostatic hypotension and manage predisposing risk factors.			
Functional Status	Significant changes in gait, mobility, and standing/sitting balance and lower extremity joint function?			
Functional Status	Reassess use of ambulatory assistive device (e.g. cane, walker) and modify as indicated.			
Functional Status	Review current restraints.			
Functional Status	Significant changes in activity tolerance?			
Functional Status	Review bowel and bladder continence status.			
Functional Status	Footwear contributed to fall?			
Neurological Status	Visual and auditory impairments?			
Neurological Status	Assess new or progressive neurological impairments.			
Psychological Factors	Significant changes in cognition, safety awareness, or decision-making capacity?			
Environmental Factors	Environmental factors that could have caused or contributed to fall?			

Date: _____

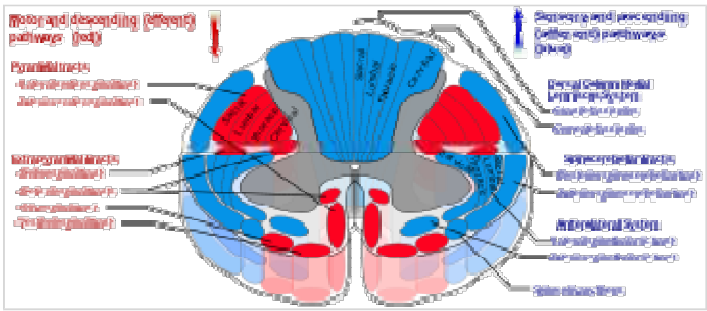
Signature(s): _____

_____

Romberg's test

From Wikipedia, the free encyclopedia

Romberg's test or the **Romberg maneuver** is a test used by doctors in a neurological examination, and also as a test for drunken driving. The exam is based on the premise that a person requires at least two of the three following senses to maintain balanced while standing:



Tracts. Dorsal columns are labeled in in blue at top.

Proprioception (the ability to know one's body in space); Vestibular function (the ability to know one's head position in space); and Vision (which can be used to monitor [and adjust for] changes in body position).

A patient who has a problem with proprioception can still maintain balance by using vestibular function and vision. In the Romberg test, the patient is stood up and asked to close his eyes. A loss of balance is interpreted as a positive Romberg sign.

The Romberg test is a test of the body's sense of positioning (proprioception), which requires healthy functioning of the dorsal columns of the spinal cord.[1]

The Romberg test is used to investigate the cause of loss of motor coordination (ataxia). A positive Romberg test suggests that the ataxia is **sensory** in nature, that is, depending on loss of proprioception. If a patient is ataxic and Romberg's test is not positive, it suggests that ataxia is **cerebellar** in nature, that is, depending on localized cerebellar dysfunction instead.

It is used as an indicator for possible alcohol or drug impaired driving and neurological decompression sickness.[2][3] When used to test impaired driving, the test is performed with the subject estimating 30 seconds in his head. This is used to gauge the subject's internal clock and can be an indicator of stimulant or depressant use.

Contents

Procedure

Ask the subject to stand erect with feet together and eyes closed. Stand close by as a precaution in order to stop the person from falling over and hurting himself or herself. Watch the movement of the body in relation to a perpendicular object behind the subject (corner of the room, door, window etc). A positive sign is noted when a swaying, sometimes irregular swaying and even toppling over occurs. The essential feature is that the patient becomes more unsteady with eyes closed.

The essential features of the test are as follows:

1. the subject stands with feet together, eyes open and hands by the sides.
2. the subject closes the eyes while the examiner observes for a full minute.

Because the examiner is trying to elicit whether the patient falls when the eyes are closed, it is advisable to stand ready to catch the falling patient. For large subjects, a strong assistant is recommended.

Romberg's test is positive if the patient sways or falls while the patient's eyes are closed. [4]

Patients with a positive result are said to demonstrate Romberg's sign or *Rombergism*. They can also be described as *Romberg's positive*. The basis of this test is that balance comes from the combination of several neurological systems, namely proprioception, vestibular input, and vision. If any two of these systems are working the person should be able to demonstrate a fair degree of balance. The key to the test is that vision is taken away by asking the patient to close their eyes. This leaves only two of the three systems remaining and if there is a vestibular disorder (labyrinthine) or a sensory disorder (proprioceptive dysfunction) the patient will become much more imbalanced.

Physiology

Maintaining balance while standing in the stationary position relies on intact sensory pathways, sensorimotor integration centers and motor pathways.

The main sensory inputs are:

1. Joint position sense (proprioception), carried in the dorsal columns of the spinal cord;
2. Vision
3. Vestibular apparatus

Crucially, the brain can obtain sufficient information to maintain balance if any two of the three systems are intact.

Sensorimotor integration is carried out by the cerebellum and by the dorsal column-medial lemniscus tract. The motor pathway is the corticospinal (pyramidal) tract and the medial and lateral vestibular tracts.

The first stage of the test (standing with the eyes open), demonstrates that at least two of the three sensory pathways is intact, and that sensorimotor integration and the motor pathway are functioning.

In the second stage, the visual pathway is removed by closing the eyes, known as a "sharpened Romberg".[3] If the proprioceptive and vestibular pathways are intact, balance will be maintained. But if proprioception is defective, two of the sensory inputs will be absent and the patient will sway then fall.[3]

The sharpened Romberg does have an early learning effect that will plateau between the third and fourth attempts.[3]

Positive Romberg

Romberg's test is positive in conditions causing sensory ataxia such as:

- Conditions affecting the dorsal columns of the spinal cord, such as tabes dorsalis (neurosyphilis), in which it was first described.[1]
- Conditions affecting the sensory nerves (sensory peripheral neuropathies), such as chronic inflammatory demyelinating polyradiculoneuropathy (CIDP).
- Friedreich's Ataxia

Romberg and cerebellar function

Romberg's test is not a test of cerebellar function, as it is commonly misconstrued. Patients with cerebellar ataxia will, generally, be unable to balance even with the eyes open;[5] therefore, the test cannot proceed beyond the first step and no patient with cerebellar ataxia can correctly be described as Romberg's positive. Rather, Romberg's test is a test of the proprioception receptors and pathways function. A positive Romberg's test has been shown to be 90% sensitive for lumbar spinal stenosis.[6]

History

The test was named after the German neurologist Moritz Heinrich Romberg[1] (1795-1873), who also gave his name to Parry-Romberg syndrome and Howship-Romberg sign.

References

1. ^ [a] [b] [c] Khasnis A, Gokula RM (1 April 2003). "Romberg's test" (http://www.jpgmonline.com/article.asp?issn=0022-3859;year=2003;volume=49;issue=2;spage=169;epage=72;aulast=Khasnis) . *Journal of Postgraduate Medicine* **49** (2): 169–72. PMID 12867698 (http://www.ncbi.nlm.nih.gov/pubmed/12867698) . http://www.jpgmonline.com/article.asp?issn=0022-3859;year=2003;volume=49;issue=2;spage=169;epage=72;aulast=Khasnis.
2. ^ Bridge, Carl J. (1972). *Alcoholism and Driving*. Charles C Thomas. ISBN 0-398-02243-7.
3. ^ [a] [b] [c] [d] Lee CT (September 1998). "Sharpening the Sharpened Romberg" (http://archive.rubicon-foundation.org/5943) . *SPUMS Journal* **28** (3): 125–32. PMID 11542272 (http://www.ncbi.nlm.nih.gov/pubmed/11542272) . http://archive.rubicon-foundation.org/5943.
4. ^ Lanska DJ, Goetz CG (October 2000). "Romberg's sign: development, adoption, and adaptation in the 19th century" (http://www.neurology.org/cgi/pmidlookup?view=long&pmid=11071500) . *Neurology* **55** (8): 1201–6. PMID 11071500 (http://www.ncbi.nlm.nih.gov/pubmed/11071500) . http://www.neurology.org/cgi/pmidlookup?view=long&pmid=11071500.
5. ^ Blumenfeld H. Romberg Test. neuroexam.com. URL: http://www.neuroexam.com/content.php?p=37. Accessed on: April 22, 2007.
6. ^ Katz JN, Harris MB (February 2008). "Clinical practice. Lumbar spinal stenosis". *N. Engl. J. Med.* **358** (8): 818–25. doi:10.1056/NEJMcp0708097 (http://dx.doi.org/10.1056%2FNEJMcp0708097) . PMID 18287604 (http://www.ncbi.nlm.nih.gov/pubmed/18287604) .

Categories: Neurology procedures | Physical examination | Otology

Fall rate calculations

A. The Number of Patients at Risk Rate

$$\frac{\text{Number of patient falls}}{\text{Number of patients at risk}} \times 1{,}000$$

This rate is commonly used in long-term care facilities

B. The Number of Patients Who Fell Rate

$$\frac{\text{Number of patients who fell}}{\text{Number of patients at risk}} \times 1{,}000$$

In this formula repeated falls experienced by the same person are only included once in the numerator

C. The Number of Falls per Bed

$$\frac{\text{Number of patient falls (for a given time period)}}{\text{Number of beds}}$$

Short Physical Performance Battery

1. Repeated Chair Stands

Instructions: Do you think it is safe for you to try and stand up from a chair five times without using your arms? Please stand up straight as quickly as you can five times, without stopping in between. After standing up each time, sit down and then stand up again. Keep your arms folded across your chest. Please watch while I demonstrate. I'll be timing you with a stopwatch. Are you ready? Begin

Grading: Begin stop watch when subject begins to stand up. Count aloud each time subject arises. Stop the stopwatch when subject has straightened up completely for the fifth time. Also stop if the subject uses arms, or after 1 minute, if subject has not completed rises, and if concerned about the subject's safety.. Record the number of seconds and the presence of imbalance.. Then complete ordinal scoring.

Time: _____sec (if five stands are completed)
Number of Stands Completed: 1 2 3 4 5

Chair Stand Ordinal Score: _____

0 = unable
1 = > 16.7 sec
2 = 16.6-13.7 sec
3 = 13.6-11.2 sec
4 = < 11.1 sec

2. Balance Testing

Begin with a semitandem stand (heel of one foot placed by the big toe of the other foot). Individuals unable to hold this position should try the side-by-side position. Those able to stand in the semitandem position should be tested in the full tandem position. Once you have completed time measures, complete ordinal scoring.

a. Semitandem Stand

Instructions: Now I want you to try to stand with the side of the heel of one foot touching the big toe of the other foot for about 10 seconds. You may put either foot in front, whichever is more comfortable for you. Please watch while I demonstrate.

Grading: Stand next to the participant to help him or her into semitandem position. Allow participant to hold onto your arms to get balance. Begin timing when participant has the feet in

position and lets go.

Circle one number

2. Held for 10 sec
1. Held for less than 10 sec; number of seconds held _____
0. Not attempted

b. Side-by-Side stand

Instructions: I want you to try to stand with your feet together, side by side, for about 10 sec. Please watch while I demonstrate. You may use your arms, bend your knees, or move your body to maintain your balance, but try not to move your feet. Try to hold this position until I tell you to stop.

Grading: Stand next to the participant to help him or her into the side-by-side position. Allow participant to hold onto your arms to get balance. Begin timing when participant has feet together and lets go.

Grading

2. Held of 10 sec
1. Held for less than 10 sec; number of seconds held_____
0. Not attempted

c. Tandem Stand

Instructions: Now I want you to try to stand with the heel of one foot in front of and touching the toes of the other foot for 10 sec. You may put either foot in front, whichever is more comfortable for you. Please watch while I demonstrate.

Grading: Stand next to the participant to help him or her into the side-by-side position. Allow participant to hold onto your arms to get balance. Begin timing when participant has feet together and lets go.

Grading

2. Held of 10 sec
1. Held for less than 10 sec; number of seconds held_____
0. Not attempted

Balance Ordinal Score: _____

0 = side by side 0-9 sec or unable
1 = side by side 10, <10 sec semitandem

2 = semitandem 10 sec, tandem 0-2 sec

3 = semitandem 10 sec, tandem 3-9 sec

4 = tandem 10 sec

3. 8' Walk (2.44 meters)

Instructions: This is our walking course. If you use a cane or other walking aid when walking outside your home, please use it for this test. I want you to walk at your usual pace to the other end of this course (a distance of 8'). Walk all the way past the other end of the tape before you stop. I will walk with you. Are you ready?

Grading: Press the start button to start the stopwatch as the participant begins walking. Measure the time take to walk 8'. Then complete ordinal scoring.

Time: _____ sec

Gait Ordinal Score: _____

0 = could not do

1 = >5.7 sec (<0.43 m/sec)

2 = 4.1-6.5 sec (0.44-0.60 m/sec)

3 = 3.2-4.0 (0.61-0.77 m/sec)

4 = <3.1 sec (>0.78 m/sec)

Summary Ordinal Score: _____

Range: 0 (worst performance) to 12 (best performance). Shown to have predictive validity showing a gradient of risk for mortality, nursing home admission, and disability.

Reprinted from Guralnik JM, Simonsick EM, Ferrucci L, Glynn RJ, Berkman LF, Blazer DG, Scherr PA, Wallace RB. A short physical performance battery assessing lower extremity function: association with self-reported disability and prediction of mortality and nursing home admission. J Gerontol Med Sci 1994; 49(2):M85-M94

THE STRATIFY FALLS RISK ASSESSMENT TOOL

This tool was developed and validated in the UK to predict falls.[1]

Scoring

The tool contains five clinical risk factors associated with falling, and has a simple scoring system. These factors can be readily assessed by ward nurses based upon their day-to-day observation of patients admitted to hospital. A score range of 0 to 5 is derived by scoring 1 point for each of the five factors. The scoring requires no formal measurements, additional training or equipment.

Time taken

It takes 1 minute to administer this tool. ***Time taken***

It takes 1 minute to administer this tool.

Sensitivity and specificity

The ability of the STRATIFY tool to predict falls had 93% sensitivity and 88% specificity amongst the phase 2 population cohort and 92% sensitivity and 68% specificity amongst the phase 3 cohort population studied.[1] The authors found that this tool has high predictive validity. The tool shows reproducibility with the predictive variables tested in different geriatric settings.

Clinical application

A score of 2 as a definition of high risk identified 93% of falls.[1] This can allow targeting of strategies to prevent falls of patients on the ward. Thus the STRATIFY falls risk assessment tool may be applicable to many acute elderly patients in hospital.

Limitations

Falls rather than patients were used as outcomes in the STRATIFY study, and this could inflate the predictive validity. Certain patient characteristics may have greater value in predicting falls. The term 'agitation' could have varying interpretations. A prospective cohort study showed that the STRATIFY tool performed poorly as a predictor of falls in stroke patients.[2]

A STRATIFY tool with some modifications and re-weighting of items has been used and developed in a Canadian hospital setting, where it showed good predictive validity in identifying fallers.[3]

STRATIFY FALLS RISK ASSESSMENT TOOL
Person's name: . . . . . .
Date of assessment: . . . . . .
Choose **one** of the following options which best describes the person's level of capability when transferring from a bed to chair:

Answer Score
Unable 0
Needs major help 1
Needs minor help 2
Independent 3

Choose **one** of the following options which best describes the person's level of mobility:

Answer Score
Immobile 0
Independent with the aid of a wheelchair 1
Uses walking aid 2
Walks with the aid of one person 2
Independent 3

Total the transfer and mobility score: _____

1. Is the combined transfer and mobility score 3 or 4? *Answer Score*

Yes 1

No 0

2. Has the person had any falls in the last 3 months? *Answer Score*

Yes 1

No 0

3. Is the person visually impaired to the extent that everyday function is affected? *Answer Score*

Yes 1

No 0

4. Is the person agitated? *Answer Score*

Yes 1

No 0

Timed Up & Go Test (TUG)

Research Report
Author: Anne Shumway-Cook, Sandy Brauer, and Marjorie Woollacott

Description of the Instrument
Patients are timed (in seconds) when performing the TUG—3 conditions

1. TUG alone-from sitting in a chair, stand up, walk 3 meters, turn around, walk back, and sit down..
2. TUG Cognitive-complete the task while counting backwards from a randomly selected number between 20 and 100.
3. TUG manual-complete the task while carrying a full cup of water.
    - The time taken to complete the task is strongly correlated to level of functional mobility, (i.e. the more time taken, the more dependent in activities of daily living).
    - **The cutoff levels for TUG is 13.5 seconds or longer with an overall correct prediction rate of 90%**; for TUG manual is 14.5 seconds or longer with a 90% correct prediction rate; and Tug cognitive is 15 seconds or longer with an overall correct prediction rate of 87%.

Form of instrument:

- Hazard/Risk Assessment Tools
- To identify/screen elderly individuals who are prone to falls
- Interrater reliability was very high, with *r*=.98, .99, and .99 for the TUG, TUGmanual, and TUGcognitive respectively
- The TUG alone correctly classified 13/15 fallers (87% sensitivity) and 13/15 nonfallers (87% specficity).

Validity Measures
Older adults who take longer than 14 seconds to complete the TUG have a high risk for falls. This cutoff is different from Podsiadlo and Richardson, which is 30 seconds.

Reference
Lundlin-Olsson, L., Nyberg, L., & Gustafson, Y. (1998). Attention, frailty, and falls: the effect of a manual task on basic mobilty. Journal of the American Geriatrics Society, 46, 758-761.

Podsiadlo, D., & Richardson, S. (1991). The timed “up & go”: A test of basic functional mobility for frail elderly persons. Journal of the American Geriatrics Society, 39, 142-148.

Shumway-Cook, A., Brauer, S., & Woollacott, M. (2000). Predicting the probability for falls in community-dwelling older adults using the timed up & go test. Physical Therapy, 80(9), 896-903.

Timed "Up and Go"*

Directions

The timed "Up and Go" test measures, in seconds, the time taken by an individual to stand up from a standard arm chair (approximate seat height of 46 cm [18in], arm height 65 cm [25.6 in]), walk a distance of 3 meters (118 inches, approximately 10 feet), turn, walk back to the chair, and sit down. The subject wears their regular footwear and uses their customary walking aid (none, cane, walker). No physical assistance is given. They start with their back against the chair, their arms resting on the armrests, and their walking aid at hand. They are instructed that, on the word "go" they are to get up and walk at a comfortable and safe pace to a line on the floor 3 meters away, turn, return to the chair and sit down again. The subject walks through the test once before being timed in order to become familiar with the test. Either a stopwatch or a wristwatch with a second hand can be used to time the trial.

Instructions to the patient

"When I say 'go' I want you to stand up and walk to the line, turn and then walk back to the chair and sit down again. Walk at your normal pace."

Variations

You may have the patient walk at a fast pace to see how quickly they can ambulate. Also you could have them turn to the left and to the right to test any differences.

*Podsiadlo D, Richardson S. The timed "up and go": a test of basic functional mobility for frail elderly persons. *JAGS* 1991; 39: 142-148.

Scoring

Time for 'Up and Go' test _____sec.
Unstable on turning?
Walking aid used? Type of aid: _____

Tinetti Performance Oriented Mobility Assessment (POMA)*

Description:
The Tinetti assessment tool is an easily administered task-oriented test that measures an older adult's gait and balance abilities.

Equipment needed: Hard armless chair
Stopwatch or wristwatch
15 ft walkway

Completion:

Time: 10-15 minutes

Scoring: A three-point ordinal scale, ranging from 0-2. "0" indicates the highest level of impairment and "2" the individuals independence.
Total Balance Score = 16
Total Gait Score = 12
Total Test Score = 28

Interpretation:
25-28 = low fall risk
19-24 = medium fall risk
< 19 = high fall risk

* Tinetti ME. Performance-oriented assessment of mobility problems in elderly patients. *JAGS* 1986; 34: 119-126. (Scoring description: PT Bulletin Feb. 10, 1993)

Tinetti Performance Oriented Mobility Assessment (POMA)

- Balance Tests -

Initial instructions: Subject is seated in hard, armless chair. The following maneuvers are tested.

1. **Sitting Balance** — Leans or slides in chair =0; Steady, safe =1 _____

2. **Arises** — Unable without help =0; Able, uses arms to help =1; Able without using arms =2 _____

3. **Attempts to Arise** — Unable without help =0; Able, requires > 1 attempt =1; Able to rise, 1 attempt =2 _____

4. **Immediate Standing Balance** (first 5 seconds)
   Unsteady (swaggers, moves feet, trunk sway) =0
   Steady but uses walker or other support =1
   Steady without walker or other support =2 _____

5. **Standing Balance**
   Unsteady =0
   Steady but wide stance(medial heals > 4 inches apart) and uses cane or other support =1
   Narrow stance without support =2 _____

6. **Nudged** (subject at maximum position with feet as close together as possible, examiner pushes lightly on subject's sternum with palm of hand 3 times)
   Begins to fall =0
   Staggers, grabs, catches self =1
   Steady =2 _____

7. **Eyes Closed** (at maximum position of item 6)
   Unsteady =0
   Steady =1 _____

8. **Turing 360 Degrees** — Discontinuous steps =0; Continuous steps =1 _____; Unsteady (grabs, staggers) =0; Steady =1 _____

9. **Sitting Down**
   Unsafe (misjudged distance, falls into chair) =0
   Uses arms or not a smooth motion =1
   Safe, smooth motion =2 _____

BALANCE SCORE: _____/16

Tinetti Performance Oriented Mobility Assessment (POMA)

- Gait Tests -

Initial Instructions: Subject stands with examiner, walks down hallway or across room, first at "usual" pace, then back at "rapid, but safe" pace (using usual walking aids)

10. **Initiation of Gait** (immediately after told to "go"

Any hesitancy or multiple attempts to start =0
No hesitancy =1 _____

11. **Step Length and Height**

Right swing foot
- Does not pass left stance foot with step =0
- Passes left stance foot =1 _____
- Right foot does not clear floor completely
  - With step =0
- Right foot completely clears floor =1 _____

Left swing foot

Does not pass right stance foot with step =0
Passes right stance foot =1 _____
Left foot does not clear floor completely
- With step =0

Left foot completely clears floor =1 _____

12. **Step Symmetry**

Right and left step length not equal (estimate) =0
Right and left step length appear equal =1 _____

13. **Step Continuity**
- Stopping or discontinuity between steps =0
- Steps appear continuous =1 _____

14. **Path** (estimated in relation to floor tiles, 12-inch diameter; observe excursion of 1 foot over about 10 ft. of the course)
- Marked deviation =0
- Mild/moderate deviation or uses walking aid =1
- Straight without walking aid =2 _____

15. **Trunk**
- Marked sway or uses walking aid =0
- No sway but flexion of knees or back or
  - Spreads arms out while walking =1
- No sway, no flexion, no use of arms, and no
  - Use of walking aid =2 _____

16. **Walking Stance**
- Heels apart =0
- Heels almost touching while walking =1 _____

GAIT SCORE = _____/12

BALANCE SCORE = _____/16

TOTAL SCORE (Gait + Balance) = _____/28

{< 19 high fall risk, 19-24 medium fall risk, 25-28 low fall risk}

The Activities-specific Balance Confidence (ABC) Scale

For each of the following activities, please indicate your level of self-confidence by choosing a corresponding number from the following rating scale:

0% 10 20 30 40 50 60 70 80 90 100%

no confidence **completely confident**

"How confident are you that you will not lose your balance or become unsteady when you…

1. …walk around the house? ____%
2. …walk up or down stairs? ____%
3. …bend over and pick up a slipper from the front of a closet floor ____%
4. …reach for a small can off a shelf at eye level? ____%
5. …stand on your tiptoes and reach for something above your head? ____%
6. …stand on a chair and reach for something? ____%
7. …sweep the floor? ____%
8. …walk outside the house to a car parked in the driveway? ____%
9. …get into or out of a car? ____%
10. …walk across a parking lot to the mall? ____%
11. …walk up or down a ramp? ____%
12. …walk in a crowded mall where people rapidly walk past you? ____%
13. …are bumped into by people as you walk through the mall?____%
14. … step onto or off an escalator while you are holding onto a railing? ____%
15. … step onto or off an escalator while holding onto parcels such that you cannot hold onto the railing? ____%
16. …walk outside on icy sidewalks? ____%

Resources

Buckinx, F., et al. (January 2018). Prediction of the Incident of Falls and Deaths Among Elderly Nursing Home Residents: The SENIOR Study. *JAMDA, The Journal of Post-Acute and Long-Term Care Medicine, Vol. 19, Issue 1, Pages 18 -24.* https://doi.org/10.1016/j.jamda.2017.06.014

Falls Prevention Facts. (2018). https://www.ncoa.org/news/resources-for-reporters/get-the-facts/falls-prevention-facts/

Khalil SF, Mohktar MS, Ibrahim F. The Theory and Fundamentals of Bioimpedance Analysis in Clinical Status Monitoring and Diagnosis of Diseases. *Sensors (Basel, Switzerland)*. 2014;14(6):10895-10928. doi:10.3390/s140610895.

Kim, S., Kim, M., Won, C.W. (January 2018). Validation of the Korean Version of the SARC-F Questionnaire to Assess Sarcopenia: Korean Frailty and Aging Cohort Study. *JAMDA, The Journal of Post-Acute and Long-Term Care Medicine, Vol. 19, Issue 1, Pages 40-45.* Doi:10.1016/j.jamda.2017.07.006.

Prevent Falls and Fractures. (2017.) https://www.nia.nih.gov/health/prevent-falls-and-fractures

The Falls Management Program: A Quality Improvement Initiative for Nursing Facilities. (December 2017.) Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/professionals/systems/long-term-care/resources/injuries/fallspx/index.html

Walston, J.D. Sarcopenia in older adults. *Current opinion in rheumatology*. 2012;24(6):623-627. doi:10.1097/BOR.0b013e328358d59b

Tinetti, M.E., Williams, T.F., Mayewksi, R. (1986). Tinetti Balance Assessment Tool. http://hdcs.fullerton.edu/csa/Research/documents/TinettiPOMA.pdf