

ABC's of Minimizing Fall Risks in Healthcare Facilities

**FOCUS 2012 Special Session:
The Art and Science of Fall Prevention**

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Introductions



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Today's Objectives

By the conclusion of today's presentation, clinicians will be ready to:

- 1) Understand that fall risk and falls prevention is a multifactorial issue.
- 2) Recognize the pressing need to screen all older adults for fall risk BEFORE the first fall immediately upon admission to any facility and prior to discharge.
- 3) Consider pros and cons of current fall risk tools available for this population.
- 4) Knowledgeably discuss administrative changes needed to adopt universal use of fall risk assessments and prevention in your facility.

Definition of a Fall

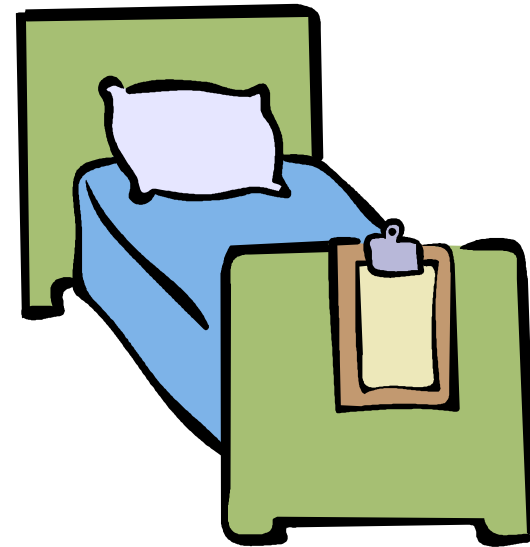


- **A fall is defined as any event that leads to an unplanned, unexpected contact with a supporting surface.** (Shumway-Cook, 1997: *PHYS THER.* 1997; 77:812-819)
- Falls are the leading cause of unintentional injury for older adults.
- Falls are **vastly** under-reported. When you ask about falls, you must first define what a fall is for your patient.

Statistics and Costs of In-Patient Falls

Falls in Hospitals

- Varied by service, age, length of stay
- 7.5% of all patients experienced at least one fall
- **24.8% of all patients aged 65+ experienced at least one fall**
- Of those that fell, 30.1% experienced an injury
- Impaired cognition and narcotic use where universal risk factors across services.²⁹
- **HALF of ALL hospital falls were related to going to the bathroom.**³⁰



Falls in Nursing Homes

- In 2003, 1.5 million people aged 65 and older lived in nursing homes.² If current rates continue, by 2030 this number will rise to about 3 million.³
- About 5% of adults 65 and older live in nursing homes, but nursing home residents account for about 20% of deaths from falls in this age group.⁴
- Each year, a typical nursing home with 100 beds reports 100 to 200 falls. Many falls go unreported.⁴
- Between half and three-quarters of nursing home residents fall each year.⁵ That's twice the rate of falls for older adults living in the community.
- Patients often fall more than once. The average is 2.6 falls per person per year.⁶
- About 35% of fall injuries occur among residents who cannot walk.⁷
- Visit: <http://www.cdc.gov/HomeandRecreationalSafety/Falls/nursing.html>

Epidemiology of Adverse Events in LTC³⁵

- Of the 3,309 adverse events studied over 1 year in one facility:
 - Falls were the most frequently reported incidents
 - While many falls were in ambulatory patients (47%); the majority occurred during falls from bed, wheelchair, toilet, etc. (53%)
 - Incidence varied with patient care level
 - Circadian patterns varied with patient care level



Where to find YOUR statistics

- **Web-based Injury Statistics Query and Reporting System (WISQARS)**
- www.cdc.gov/injury/wisqars
WISQARSTM (Web-based Injury Statistics Query and Reporting System) is an interactive database system that provides customized reports of injury-related data.
- **Behavioral Risk Factor Surveillance System (BRFSS)**
- www.cdc.gov/brfss/
The Behavioral Risk Factor Surveillance System (BRFSS) is the world's largest, on-going telephone health survey system, tracking health conditions and risk behaviors in the United States yearly since 1984. Currently, data are collected monthly in all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam.
- **CDC WONDER (Wide-ranging Online Data for Epidemiologic Research)**
- <http://wonder.cdc.gov>
WONDER is an easy-to-use, menu-driven system that makes the information resources of the Centers for Disease Control and Prevention (CDC) available to public health professionals and the public at large. It provides access to a wide array of public health information.
- **CDC Data & Statistics**
- www.cdc.gov/DataStatistics
The CDC Data & Statistics web site features interactive tools, surveys, publications, databases, and more.

Falls Risk Factors in the In-Patient Environment

Falls are multifactorial. What are the more common causes of falls for the older adult living in each institution?

What is your experience?

- Take a moment and list the top 3 causes of falls in your experience for older adults who are currently living in your institution.

1. _____
2. _____
3. _____

- If you could change ONE thing about the **environment** to reduce falls, what would that one change be? (Expense does not matter)
- If you could change ONE thing about **administrative processes** that would reduce falls, what would that change be?

Multifactorial Causes of Falls

- It is widely accepted that falls are a multifactorial event resulting from multiple risk factors ^{2,10,11}
- We all need to understand that a multifactorial assessment does not mean an assortment of balance and gait assessments; but rather an assessment of a very wide array of both intrinsic and extrinsic factors.
- Evidence regarding fall prevention supports:
 - Multifactorial falls prevention programs
 - Interventions should be individualized and aimed at specific risk factors ^{3,12,13,14}
- There is a need for a simple to administer, quick, multifactorial assessment tool to classify a patient's fall risk that also provides direction to the treatment team for further assessment and/or targeted intervention ^{8,15}

Each Profession Has Its Own Focus



- Physical Therapists think about balance, strength and endurance.
- Occupational Therapists think about environmental risks; especially in the home.
- Doctors and Pharmacists think about polypharmacy and/or possible drug interactions.
- Nurses think about incontinence and issues related to pain.
- Social workers think about support systems, mood and caregiver issues.
- Psychologists think about depression, anxiety, risk-taking behaviors and cognition....

• **FALLS ARE A RESULT OF MANY OF THESE RISK FACTORS WORKING IN CONCERT**

Fall Risk Factors: Two Types

Internal Risk Factors

- History of falls; especially falls within the past 2 mos.
- Age: risk increases with age
- Orthostatic hypotension/dizziness
- Cognitive issues/decline
- Polypharmacy
- Psychotropic/ active medications: especially new agents
- Transfer status
- Incontinence/Urgency
- Agitation/ confusion/ depression
- Tethers: oxygen, catheters, etc.
- Diminished strength
- Diminished sensation, vision, hearing
- Risk of injury from fall: osteoporosis

External Risk Factors

- Wet and/or cluttered floors and pathways
- Floor surface
- Foot wear
- Distance to bathroom
- Height of toilet
- Bathroom layout/grab bars
- Response to call light and staffing ratios
- Poor lighting
- Incorrect bed height
- Poorly fit w/c's
- Improper fit or use of assistive devices
- Tethers: oxygen, IV's, catheters, etc.
- Staff not using gait belts
- Not having eyeglasses, hearing aids

Leading Causes of Falls in NH



- **Muscle weakness and walking or gait problems** are the most common causes of falls among nursing home residents. These problems account for about 24% of the falls in nursing homes.⁵
- **Environmental hazards** in nursing homes cause 16% to 27% of falls among residents.^{1,5} Such hazards include
 - wet floors
 - poor lighting
 - incorrect bed height
 - improperly fitted or maintained wheelchairs.^{5,10}
- **Medications** increase the risk of falls and fall-related injuries.
 - Drugs that affect the CNS such as sedatives and anti-anxiety drugs, are of particular concern.^{11, 12}
 - Fall risk is significantly elevated during the three days following any change in these types of medications.¹³
- Other causes of falls include
 - **difficulty in moving** from one place to another (transfer activities) such as bed to a chair and/or toilet
 - poor foot care
 - poorly fitting shoes and/or loose slippers
 - improper or incorrect use of walking aids.^{10, 14}

Fall Risk Factors in LTC³³

- Being able to walk
- Age > 90 years
- History of falling
- Rx vasodilator
- Polypharmacy
- Combination of history of falling, being able to walk, and being over 90 years old resulted in very high fall risk.



Fall Risk Factors in LTC ³⁴



- In this study, the most important fall risk factors included:
 - Fallen in past 3 mos.
 - Residing in a secured unit
 - Living in LTC > 2 yrs
 - Potential to cause injury to others
 - Having an illness, disease &/or behavior that may cause a fall.
 - Altered mental state was greatest risk for injury from the fall.

Medications in Hospital In-Pts³⁹

- Literature review to determine medications resulting in high fall risk.
 - 81 meds assoc. with falls
 - 151 patients fell with 144 of them (95%) taking at least one high risk medication; mean of 2.2 meds/patient
 - 74 (49%) of fallers had begun a new high-risk medication **within 7 days before fall**
 - Most common drugs were **lorazepam and zopiclone** and their use should be carefully considered and reviewed.



Psychotropic/active Medications³⁶

- Review of SNF patients who were residents > 30 days over a 19 month period found that:
 - Falls occurred in 107 of the 177 (61%) patients reviewed
 - Total of 428 falls documented
 - **Fall rates appear to be directly related to the number of psychotropic drugs and/or 2+ psychoactive drugs used concurrently.**



Psychotropic Drug-Induced Falls³⁸

- Psychotropic drugs identified as an important independent risk factor. Literature search showed:
 - Need to stop meds and substitute with non-drug alternatives
 - If need to continue, try to taper and/or monitor for time when they can be d/c'ed
 - Effectiveness of psychotropics in some groups of older adults has been questioned
 - Benzodiazepines (particularly long-acting) have very high fall risk as well as antidepressants and antipsychotic drugs
 - **The largest effect of any randomized trial of falls prevention to date was achieved with a single intervention consisting of weaning psychotropic drug users off their medications!**

Review slide 11

- What did you list as fall risk factors in your facility?
- Compare your list with the people to each side of you.
 - How are they the same and different?
 - Why are these similarities significant?
 - Did you have some that nobody else did?
- Now find two people who work in facilities like yours. Repeat the above.

Fall Risk Tools for Older Adults in Institutions

When selecting a fall risk assessment tool, be careful to choose a tool that is validated for your population and not for community-dwelling older adults.

Various Tools

- Tools may assess:
 - Environment
 - Person
 - Balance and Gait
 - ADL's
 - Combination
- There is not one tool validated for all in-pt settings to date
- **Best outcomes with combination of tool, staff assessment, and history of falls.** ⁴³



Elements of the Ideal Tool

- Validated and found to be reliable for the target population and setting
- Simple enough to be utilized
- Detailed enough to be beneficial
- Include interventions for individual risk factors identified as problematic



Instruments for Measuring Fall Risk in LTC⁴⁰

- Fall Risk instruments must be specific to the environment in which they are used.
- One integrative review of the existing literature on instruments for use in LTC revealed 16 tools covered in 13 articles.⁴⁰
- Of the 13, only 6 reported sensitivity, specificity, and interrater reliability⁴⁰
- **Only two demonstrated high predictive values**
 - **Morse Fall Scale⁴¹**
 - **Mobility Interaction Fall Chart (MIF)⁴³**
- Note: The STRATIFY falls risk tool (commonly used) was significantly related to incidence of accidental falls in a large cohort but was a poor predictor of falls and cannot be recommended for routine use in acute hospital settings.⁴²

Morse Fall Scale

Variables	Numeric Values	Score
1. History of falling	No 0 Yes 25	_____
2. Secondary diagnosis	No 0 Yes 15	_____
3. Ambulatory aid None/bed rest/nurse assist Crutches/cane/walker Furniture	0 15 30	_____
4. IV or IV Access	No 0 Yes 20	_____
5. Gait Normal/bed rest/wheelchair Weak Impaired	0 10 20	_____
6. Mental status Oriented to own ability Overestimates or forgets limitations	0 15	_____

Morse Fall Scale Scoring

- **Morse Fall Scale Variable Descriptions and Scoring Hints**

- **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 aid**

- 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 bed rest and does not get out of bed at all. If the patient uses crutches, a cane, or a walker, this variable scores 15; if the patient ambulates clutching onto the furniture for support, score this variable 30.

- **IV or IV Access**

- This is scored as 20 if the patient has an intravenous apparatus or a saline/heparin lock inserted; if not, score 0.

- **Gait**

- The characteristics of the three types of gait are evident regardless of the type of physical disability or underlying cause.
- A normal gait is characterized by the patient walking with head erect, arms swinging freely at the side, and striding without hesitation. This gait scores 0.
- With a weak gait (score 10), the patient is stooped but is able to lift the head while walking without losing balance. If support from furniture is required, this is with a featherweight touch almost for reassurance, rather than grabbing to remain upright. 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 and/or 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. Steps are short and the patient shuffles.
- If the patient is in a wheelchair, the patient is scored according to the gait he or she used when transferring from the wheelchair to the bed.
- **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 to the bathroom alone or do you need assistance?" If the patient's reply judging his or her own ability is consistent with the activity order on the Kardex, the patient is rated as "normal" and scored 0. If the patient's response is not consistent with the activity order 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 is scored as 15.

Morse Fall Scale Scores

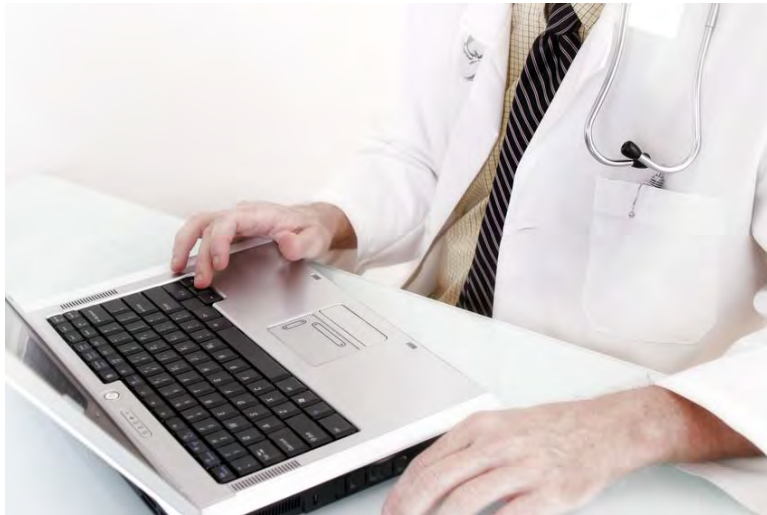
- **Risk Levels based upon MFS scores:**

- Low Risk 0 – 24
- Medium Risk 25 – 44
- High Risk 45 and higher

- Your facility should decide on defined response and interventions for each level of fall risk and for the risks identified for each individual.
- To see the Veteran’s Administration fall prevention strategy, please visit:

<http://www.patientsafety.gov/CogAids/FallPrevention/index.html#page=page-1>

MFS Pros and Cons



- What factors are considered in the MFS?
- What important fall risk factors are missed by the MFS?
- How could you use the MFS and add to its efficacy in your environment?
- What can you learn from your fall incident reports?
 - For the facility
 - For the individual patient

Nursing Assessment

- Utilize a standard falls tool such as the MFS
- R/O orthostatic hypotension and dizziness
- Assess for incontinence/ urgency issues
- Meet with family/caregiver
- Check feet and shoes
- Can any tethers be removed or set up in a safer way? Catheter leg bag, portable O2 use, hep loc IV, etc.
- Set up medication review with MD/ PharmD
- Create list of suggested referrals for practitioner



Practitioner Assessment



- Review nursing fall risk assessment, interventions, and referral list
- Is there a history of falls?
- Is there a complaint of dizziness?
- Carefully review medications for opportunities to decrease, replace, change times/dosing, etc.
- Consider nutritional/dietary needs to reduce risk of injury from falls (Ca, B12, D3, etc.) and from bed rest (protein, etc.)
- Carefully consider need for and make all appropriate referrals to PT, OT, SLP, auditory, eye MD, etc.
- Consider Rx of hip protectors, appropriate foot wear, scheduled toileting, volunteer/family schedule for one-to-one assistance for patient, etc.

Administrative Assessment

- Review nursing and practitioner fall risk assessments and interventions
- Is room assignment appropriate for fall risk? Proximity to nursing station, bathroom, etc.
- Can any environmental adjustments be made to improve safety?
- Can any administrative changes be made to improve safety?
- Are eyeglasses, hearing aids, gait belt, assistive device needs all posted in room?
- Have all decisions been communicated to the right people?
- Does family understand the patient's fall risk and their roles?



Preventing the Fall

Anticipating the Cause and Being Proactive in ALL environments

What is your goal?

- Is it realistic to aim for 0% falls for in-patients? What is realistic? Where are you now?
- What was the fall risk for these patients even prior to admission?
- How does admission increase fall risk?
- What can we do to reduce fall risk?
 - **Environment:** actual structure of the surroundings
 - **Administration:** policies and procedures (P&P)
 - **Patient:** education, medications, therapy, etc.
 - **Staff & Caregivers:** involve ALL staff and caregivers in problem solving to promote buy in and big picture analysis



Lessons to be Learned

- Assign a multidisciplinary team to carefully look at your incident reports for all falls for the past calendar year.
- Are there any repeating etiologies that can be addressed facility wide?
 - Shift/staffing
 - Related to toileting/eating
 - Type of room or part of facility
 - Are there “themes” around those that resulted in injury?
- Are architectural and/or administrative abatements required?
- What is the estimated cost to the facility for these falls?
- How much money should be budgeted for targeted abatements?



Targeted Interventions

- What specific fall risk factors were identified for this particular individual?
- Does our tool consider enough of these factors?
- What are the best evidence-based interventions available to us NOW that could help to reduce each risk factor?
- Let's think outside of the proverbial box. How can we reduce the risks to this patients by engaging:
 - The practitioner's involved
 - Referring to other practitioners
 - Modifying the environment
 - Engaging the family/caregivers
 - Setting up schedules for bathroom, checking on patient, walking to meals and maintaining physical activity, utilizing ALL staff and problem solving with ALL staff. Include housekeeping, dietary staff, volunteers, transport staff, etc.
- Can anything be done to modify the environment to improve safety?
- Can anything be done for the patient to improve safety?

Evidence-Based Environmental Design⁴⁴

Patient falls, which are common in hospitals, can result in

- serious injuries, extend a patient's stay, and drive up the cost of care significantly. By 2020 the estimated annual cost of fall injuries for older people will exceed \$30 billion.
- Now that the Centers for Medicare and Medicaid Services no longer reimburse hospitals for the cost of patient falls that occur in their facilities, and insurers are likely to follow its lead, hospitals will bear a greater portion of this cost.
- Patient falls can be avoided. Poor placement of handrails and small door openings are two primary causes of patient falls.
- Many falls can be reduced through providing well-designed patient rooms and bathrooms and creating decentralized nurses' stations that allow nurses easier access to at-risk patients.
- Please visit <http://www.ahrq.gov/qual/transform.pdf> and request a DVD and/or print manual.

Medication Intervention for Fall Prevention ³⁷

- Drug changes that may effect fall risk:
 - Taper, d/c, or replace psychotropic drugs
 - Avoid those that cause orthostatic hypotension
 - Manage anemia
 - Add Calcium and Vit D to decrease both falls and fall fracture risk
 - Evaluate and treat osteoporosis



Diminished gait/balance/transfers

- **Refer to physical therapy (PT) ASAP**
- Follow PT with cont'd rehab/activity/ exercise
- Use of **gait belts** by ALL staff becomes the corporate culture (gait belt in every room mounted in same place)
- Regular toileting schedules if not independent
- Hip protector use for pts with high fracture risk
- Increase protected walking such as to/from all meals
- Rooms with safer flooring choices
- Footwear
- Walker baskets
- Room with bed closer to bathroom and nursing station



Physical Activity

- Having patients sit down and limit walking will result in MORE falls, not less!!
- Does this mean you just allow people to walk who have a high fall risk? No.
- Do all falls happen in those patients who are walking? No.
- Refer to PT or rehab aide if needed.
- Schedule walking to/from meals and activities with staff.
- Teach family how to safely walk with the patient and set up schedule.



Incontinence &/or Urgency



- Some studies state that almost 50% of falls are related to toileting! ³⁰
- Be sure toilets are high enough, have grab bars, are close to beds, and floors are dry.
- When possible, have OT's make recommendations for structural updates
- Establish P&P for patients that need scheduled toileting assist and recognize staff that follow the schedule
- Be careful that patients do not have tethers, cluttered floors, wet floors, bare feet, etc.
- **Have all incontinent patients evaluated by PT to see if neuromuscular retraining is possible and by OT to see if AE would be helpful ASAP**

Dependence in ADLs



- Refer to **Occupational Therapy ASAP**
- Arrange room to facilitate safe independence
- Be sure that CNAs train with OTs and f/u on schedules, modifications, and use of assistive equipment (AE)
- Set up administrative P&P that let all staff know where AE will be and who needs to use it without diminishing privacy.

Vision Problems



- Always assume that vision is impaired and may not be treated and/or up to date
- **Refer to eye doctor ASAP**(ophthalmologist will be paid by Medicare; optometrist may require vision plan)
- Be aware of multifocal lenses and their danger for falling
- Try to move patients toward walking with single vision glasses
- Make sure that P&P are set that let ALL staff know which patients need glasses and where the glasses will be kept.
- Signage that does not threaten privacy but promotes use of glasses
- Update eye exams and create reminder systems for annual consultations

Hearing

- Diminished hearing may be misinterpreted as cognitive issues, refusal to comply with care, etc.
- Poor hearing impedes communication, learning, and following instructions
- Staff need to know who has hearing aids, where they will be kept, and who will maintain them
- Appropriate signage must be in each room with checks to be sure they are being used and cared for.
- Hearing aids should be evaluated every 6 months.
- **Refer patients with hearing issues to Speech and Language Pathologist (SLP) and audiology ASAP.**



Involve the Family/Caregiver

- How have they been involved and how do they meet the patient's needs at home?
- When does the family expect to visit?
- How can they become part of the treatment team?
- What training do they need for now and for later if d/c is planned?
- Who will do this training? When? Why?
- Who will be primarily responsible to work with the family and involve them actively?



Nursing Fall Prevention Measures



- Establish toileting schedules for patient's who are not fully independent and expect all staff to use them
- Remove/reroute tethers to facilitate ease of mobility and transfers
- Use portable O2 not concentrators during day
- Use leg bags for catheters during day
- Hep lock IV's not in use during the day
- Unplug charged IV pumps to allow mobility
- Gait belt use required of all staff at all times and hanging in each patient room (or on patient while out of bed)
- Evaluate for orthostatic hypotension regularly
- Increase fall risk measures first 5 days of new medications
- Regularly ask prescriber if psychotropic medications can be decreased, d/c' ed, or used at bed time
- Evaluate fall risk with admission, change of status, illness, change of meds, room change, falls, MDS, etc.

Practitioner fall prevention measures

- Medications must be reviewed regularly in light of what can be decreased, d/c' ed, given at bed time, etc.
- Proactively prevent osteoporosis, muscle atrophy, depression, vitamin deficiencies, anemia, etc. (Ca, B12, D3, iron, protein q.i.d., etc.)
- Monitor and reinforce nursing and administration fall prevention strategies
- Refer patients liberally for rehabilitation, eye exams, hearing evaluation, dental exams, etc.
- Promote use of evidence-based group fall prevention classes in the building and community
- Ask PT's to offer the Otago Exercise Program as part of their PT plan of care.
- Treat the injury from the fall but don't forget to discern what the etiology of the fall was and treat that as well!
- Evaluate for mild TBI following falls



Administrative Fall Prevention Measures

- Establish a facility-wide corporate culture for fall prevention throughout ALL practitioners, staff, family/caregivers, visitors.
- Promote vigilance through positive reinforcers such as awards and recognition for preventing falls. Floor to floor or shift to shift competition for reducing falls can be very effective. Use current statistics for benchmarks.
- Train and retrain all staff regularly (q 3 months) in fall prevention measures that they each can be responsible for. This could be washing floors while patients are out of their rooms for housekeeping, where to place refuse containers for CNA's, or use of gait belts and w/c brakes for transport staff.
- Debrief the entire team following a fall. Engage the team to problem solve and help to prevent future falls.
- Look at all falls in the facility and try to find similar issues that may be addressed for the entire facility. Include families, visitors, etc.

Set attainable goals

- Begin with current experience and look for small but significant and measureable improvements
- Look for patterns that could prevent groups of falls
- Reward proactive prevention from ALL staff groups
- Engage family, caregivers, volunteers to spread staff
- Set your outlook calendar to remind you of times to reassess and reset goals
- **Remember: reinforce positive behavioral change through recognition and reward programs that are on-going.**



Questions?

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References

1. Rubenstein LZ, Robbins AS, Schulman BL, Rosado J, Osterweil D, Josephson KR. Falls and instability in the elderly. *Journal of the American Geriatrics Society* 1988;36:266–78.
2. National Center for Health Statistics. Health, United States, 2005. With Chartbook on Trends in the Health of Americans. Hyattsville (MD): National Center for Health Statistics; 2005.
3. Sahyoun NR, Pratt LA, Lentzner H, Dey A, Robinson KN. The changing profile of nursing home residents: 1985–1997. *Aging Trends*; No. 4. Hyattsville (MD): National Center for Health Statistics; 2001.
4. Rubenstein LZ, Josephson KR, Robbins AS. Falls in the nursing home. *Annals of Internal Medicine* 1994;121:442–51.
5. Rubenstein LZ. Preventing falls in the nursing home. *Journal of the American Medical Association* 1997;278(7):595–6.
6. Rubenstein LZ, Robbins AS, Josephson KR, Schulman BL, Osterweil D. The value of assessing falls in an elderly population. A randomized clinical trial. *Annals of Internal Medicine* 1990;113(4):308–16.
7. Thapa PB, Brockman KG, Gideon P, Fought RL, Ray WA. Injurious falls in nonambulatory nursing home residents: a comparative study of circumstances, incidence and risk factors. *Journal of the American Geriatrics Society* 1996;44:273–8.
8. Bedsine RW, Rubenstein LZ, Snyder L, editors. *Medical care of the nursing home resident*. Philadelphia (PA): American College of Physicians; 1996.
9. Ejaz FK, Jones JA, Rose MS. Falls among nursing home residents: an examination of incident reports before and after restraint reduction programs. *Journal of the American Geriatrics Society* 1994;42(9):960–4.
10. Ray WA, Taylor JA, Meador KG, Thapa PB, Brown AK, Kajihara HK, et al. A randomized trial of consultation service to reduce falls in nursing homes. *Journal of the American Medical Association* 1997;278(7):557–62.
11. Mustard CA, Mayer T. Case-control study of exposure to medication and the risk of injurious falls requiring hospitalization among nursing home residents. *American Journal of Epidemiology* 1997;145:738–45.
12. Ray WA, Thapa PB, Gideon P. Benzodiazepenes and the risk of falls in nursing home residents. *Journal of the American Geriatrics Society* 2000;48(6):682–5.
13. Sorock GS, Quigley PA, Rutledge MK et al. Central nervous system medication changes and falls in nursing home residents. *Geriatr Nurs* 2009;30:334-340.
14. Tinetti ME. Factors associated with serious injury during falls by ambulatory nursing home residents. *Journal of the American Geriatrics Society* 1987;35:644–8.
15. Quigley P, Bulat T, Kurtzman E, et al. Fall prevention and injury protection for nursing home residents. *J Am Med Dir Assoc* 2010;11:284-293.
16. Neyens JCL, Dijcks BPJ, Twisk J, et al. A multifactorial intervention for the prevention of falls in psychogeriatric nursing home patients, a randomized controlled trial (RCT). *Age and Ageing* 2009;38:194-199.

References Cont'd

17. Cooper JW. Consultant pharmacist fall risk assessment and reduction within the nursing facility. *Consulting Pharmacist* 1997;12:1294–1304.
18. Cooper JW. Falls and fractures in nursing home residents receiving psychotropic drugs. *International Journal of Geriatric Psychology* 1994;9:975–80.
19. Kannus P, Parkkari J, Niem S, Pasanen M, Palvanen M, Jarvinen M, Vuori I. Prevention of hip fractures in elderly people with use of a hip protector. *New England Journal of Medicine* 2000;343(21):1506–13.
20. Nowalk MP, Prendergast JM, Bayles CM, D'Amico MJ, Colvin GC. A randomized trial of exercise programs among older individuals living in two long-term care facilities: the FallsFREE program. *Journal of the American Geriatrics Society* 2001;49:859–65.
21. Vu MQ, Weintraub N, Rubenstein LZ. Falls in the nursing home: are they preventable? *Journal of the American Medical Directors Association* 2005;6:S82–7.
22. Bischoff-Ferrari HA, Dawson-Hughes B, Staehelin HB, et al. Fall prevention with supplemental and active forms of vitamin D: a meta-analysis of randomized controlled trials. *BMJ* 2009;339:b3692 doi:10.1136/bmj.b3692.
23. Mansdorf IJ, Sharma R, Perez M, Lepore AM. Falls reduction in long-term care facilities: A preliminary report of a new Internet-based behavioral technique. *J Am Med Dir Assoc* 2009;10:630-633.
24. Capezuti E, Evans L, Strumpf N, Maislin G. Physical restraint use and falls in nursing home residents. *JAGS* 1996;44:627-633.
25. Castle NG, Engberg J. The health consequences of using physical restraints in nursing homes. *Med Care* 2009;47:1164-1173.
26. Online Survey, Certification and Recording. Arlington, VA: Health Care Financing Administration; 2008.
27. Healy F, Oliver D, Milne A, Connelly JB. The effect of bedrails on falls and injury: a systematic review of clinical studies. *Age and Ageing* 2008;37:368-378.
28. [Gerontology](#). 2008;54(6):342-8. Epub 2008 May 6.
29. Characteristics of hospital inpatient falls across clinical departments. [Schwendimann R](#), [Bühler H](#), [De Geest S](#), [Milisen K](#). *AJN, American Journal of Nursing*: March 2011 - Volume 111 - Issue 3 - p 14doi: 10.1097/10.1097/01.NAJ.0000395221.34058.ec In the News
30. Preventing Falls in Acute Care Hospitals, Potera, Carol, Section Editor(s): Pfeifer, Gail M. MA, RN

References Cont'd

31. Preventing Falls in Assisted Living Facilities at <http://www.assistedlivingfacilities.org/blog/life-in-assisted-living/preventing-falls/> accessed 11/19/12.
32. Preventing falls in Assisted Living Facilities from Annals of Internal Medicine available at <http://www.hawaii.edu/hivandaids/Preventing%20Falls%20in%20Assisted%20Living%20Facilities.pdf> and accessed on 11/19/12.
33. Myers AH, Baker SP, Van Natta ML, Abbey H, Robinson EG, Risk factors associated with falls and injuries among elderly institutionalized persons, *Am J Epidemiol* 1991 Jun 1; 133(11): 1179-90.
34. Krueger PD, Brazil K, Lohfeld LH, Risk factors for falls and injuries in a long-term care facility in Ontario, *Can J Public Health*, 2001 Mar-Apr; 92(2); 117-20.
35. Gurwitz JH, Sanchez-Cross MT, Eckler MA, Matulis J, The epidemiology of adverse and unexpected events in the long-term care setting, *J Am Geriatr Soc* 1994, Jan; 42(1): 33-8.
36. Cooper JW, Freeman MH, Cook CL, Burfield AH, Assessment of psychotropic and psychoactive drug loads and falls in nursing facility residents. *Consult Pharm* 2007 Jun; 22(6); 483-9.

References Cont'd

37. Cooper JW, Burfield AH, Medication Interventions for fall prevention in the older adult. *J Am Pharm Assoc* (2003) 2009 May-Jun 49(3); e70-82; quiz e83-4.
38. Hill KD, Wee R, Psychotropic drug-induced falls in older people: a review of interventions aimed at reducing the problem. *Drugs Aging*, 2012 Jan 1; 29(1): 15-30.
39. Cashin RP, Yang M, Medications prescribed and occurrence of falls in general medicine inpatients. *Can J Hosp Pharm*, 2011, Sep; 64(5): 321-6.
40. Kehinde JO, Instruments for measuring fall risk in older adults living in long-term care facilities: an integrative review. *J Gerontol Nurs*, 2009 Oct; 35(10): 46-55.
41. The Morse Fall Scale is available on the internet at http://www.patientsafety.gov/SafetyTopics/fallstoolkit/media/morse_falls_pocket_card.pdf and was accessed 11/16/12.
42. Webster J et al, Should elderly patients be screened for their 'falls risk'? Validity of the STRATIFY falls screening tool and predictors of falls in a large acute hospital. *Age Ageing* (2008) 37 (6): 702-706.
43. Lundin-Olsson L, Nyberg L., Gustafson Y. The Mobility Interaction Fall chart. *Physiother Res Int* 2000; 5(3): 190-201. available at <http://www.ncbi.nlm.nih.gov/pubmed/10998775>

References Cont'd

44. Transforming Hospitals: Designing for Safety and Quality from the AHRQ is available at <http://www.ahrq.gov/qual/transform.pdf> and was accessed 11/16/12.