Medication and Falls: How to Prevent Those Things That Go Bump in the Night

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Objectives

• At the conclusion of the presentation, the participant will be able to:
  • identify medication or medication classes that increase the risk for falls.
  • assess medication risk when doing a falls risk assessment.
  • suggest approaches that can be used to reduce/mitigate falls due to medications.

Prevalence of Falls

• Age 65 and older: 30% of elders per year.
• Age 80 and older: 40-50% of elders per year.
• 50% of nursing home residents fall each year and more than 40% have more than 1 fall.
• 60% of seniors with cognitive impairment fall annually
• 60% of falls occur at home, 30% occur in public places, 10% occur in institutions
• Two-thirds of older adults who fall will fall again within the next 6 months.
Negative Outcomes from Falls

• 40% of all traumatic injuries in the elderly
• 1 in 10 falls results in serious injury
• Account for an estimated 10,000 deaths annually
• Account for 87% of all fractures in the elderly
• 50% of those hospitalized for hip fracture never return home or live independently
• Fear of falling
• Caregiver stress

What causes falls?

• Intrinsic
  • Weakness
  • Poor balance/postural sway
  • Impaired proprioception
  • Vision, hearing, vestibular
  • Medical conditions
    • Cardiac/vascular, TIA/stroke, autonomic instability, hyperventilation, dementia / delirium, seizures, Parkinson's disease, peripheral neuropathy, diseases affecting gait, syncope or near syncope, incontinence
  • Medications
• Extrinsic
  • Lighting
  • Uneven/slippery surfaces
  • Loose rugs
  • Steep Stairs
  • Objects in pathways
  • No handrails
  • Furniture
  • Clothing
  • Foot and footwear

Do your patients/residents have....

• lower extremity (muscle) weakness?
• gait and balance abnormalities?
• a history of previous falls?
• functional impairment?
• vision impairment?
• cognitive impairment (delirium/dementia)?
• depression?
• 4 or more prescription medications or psychoactive medications?
  • RR = 1.1-2.4; OR = 1.7-2.7 [Tinetti and Kumar, 2010]
• potentially inappropriate medications on their profile that increase the risk for falls?
  then, they have one or more risk factors for falls.
Sounding the Alarm

• If a profile review identifies a medication that may cause or contribute to
  • sedation, fatigue or lethargy
  • decreased alertness
  • orthostatic hypotension
  • dizziness
  • decreased neuromuscular function or ataxia or impaired balance
  • decreased memory/cognitive impairment or confusion
  • blurred vision
  • arrhythmias
  • syncope
  • urinary urgency

then the patient/resident may have an increased risk for falls

Conditions That Pose a Risk for Falling:
Treatment can be a Double Edged Sword

• Anemia
• Heart Failure
• Infection
• Pain
• Depression
• Hypertension
• Urinary Incontinence

Dementia and Falls

• Non-pharmacologic contributors to fall risk
  • Impaired gait and balance
  • Limited attention
  • Behavioral risk factors
  • Orthostatic hypotension
• Pharmacological
  • Psychotropics for behavior management
  • Cholinesterase inhibitors
    • Increased risk of syncope, but not falls
  • Memantine
    • No increased risk of falls
Falls-related Websites and Assessment Tools

- http://www.mnfallsprevention.org/professional/index.html
- http://www.fallpreventiontaskforce.org/tools.htm
- http://www.dhs.wisconsin.gov/health/InjuryPrevention/FallPrevention/

Assessing Medication as the Cause

- Was the medication started/changed before the fall or after the fall?
- If started prior to the fall, how close to the fall was the suspected medication first administered?
- Have other reversible/correctible causes been ruled out?
- Is the fall due to the aggregate affect of multiple medications associated with falls?
- Evaluate and monitor the patient for 72 hours after the fall.
- Evaluate and monitor the patient after a medication change.
- If a medication is suspected that is known to affect blood pressure, perform orthostatic blood pressure check.

Commonly Referenced Classes of Medications Associated with Falls

- Antipsychotic/Neuroleptic
- Antidepressant
- Antiepileptic (anticonvulsants for pain management)
- Cardiovascular (esp. antihypertensive, including diuretics)
- Antiparkinson
- Analgesics (narcotic and non-narcotic)
- Sedative/hypnotic (esp. benzodiazepines)
- Antiarrhythmic
- Anticholinergics/Bladder relaxant

See list of high risk medications in appendix
Analgesics

- Overall risk is low
- Opioids
- Non-narcotic
- NSAIDs
- ASA

Anticonvulsants

- Limited direct evidence of increased falls risk
- Dizziness, postural sway, somnolence and ataxia
- Anticonvulsants known to increase risks for falls; phenytoin, Phenobarbital, and carbamazepine
- Carbamazepine can also be used as a mood stabilizer for agitation and to treat certain types of neuropathic pain
- Levetiracetam and gabapentin do not appear to increase imbalance
- Gabapentin reported to cause dizziness and somnolence

Antidepressants

- Increased risk and rate of falls
- Tricyclics
  - Sedation, anticholinergic effects, orthostasis
- SSRIs
  - SSRIs preferred if antidepressant indicated, but also can increase risk that may be comparable to TCAs
  - Preference for SSRIs a function of incidence of drug-drug interactions and overall adverse effects profile
  - SSRIs may increase fracture risk by decreasing BMD
- Dose and indication relationship
- Increased risk when given with cardiovascular agents.
- Depression itself is a variable due to postural abnormalities
Antipsychotic/Neuroleptic Agents

• Probable increased falls risk
• Anticholinergic effects, Parkinsonian-like effects, sedation, orthostasis, dizziness
• Absence of controlled trials
• Findings inconsistent
• Not generalizable to all agents
• Atypical antipsychotics have comparable risk
• Dose effect

Benzodiazepines

• Dose may be more predictive than half-life.
• Conflicting evidence for risk associated with long vs. short-acting agents.
  • Some evidence in hospitalized patients that shorter acting benzos (lorazepam, alprazolam) increase fall risk more than long acting
• Alter postural sway (postural instability)
• Impair reaction time
• Impair cognitive function
• Cause sedation or dizziness

Cardiovascular Agents

• Absence of controlled clinical trials; mostly observational
• Inconsistencies between studies
• Evaluated as a group rather than individual classes
  • Commonly includes the class 1A antiarrythmics (quinidine, procainamide, disopyramide), digoxin, and diuretics + other blood pressure lowering medications.
• Chronic antihypertensive therapy at a stable dose is less likely to increase the risk for falls than starting an antihypertensive or increasing the dose.
• Best, but inconsistent, evidence for falls risk may be with thiazide diuretics
  • Effect is strongest in the first 3 weeks of therapy (Gribbin et al. Pharmacoepidemiol Drug Saf. 2011;20:879-884.)
Hypnotics (other than benzodiazepines)

- Zolpidem, Zaleplon, Eszopiclone
- Impair balance, impair reaction time, and alter the performance of other sensorimotor functions.
- Increased body sway, but less than benzos
- Differences in risk between agents may be due to GABA receptor affinity.
- Best evidence with zolpidem, but others implicated

Miscellaneous Drugs

- Statins: myopathy
- Incontinence medications (anti-muscarinics): Confusion/cognitive impairment
- Antihistamines: Somnolence; cognitive impairment
- Dopaminergic drugs to treat PD: Daytime sleepiness
- Corticosteroids: muscle weakness
- Anti-vertigo: somnolence; confusion/cognitive impairment

Classes of Medications with a Significant Association with Falls

<table>
<thead>
<tr>
<th>Medication Class</th>
<th>Odds Ratio (adjusted)</th>
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</thead>
<tbody>
<tr>
<td>Neuroleptics and Antipsychotics</td>
<td>1.39</td>
</tr>
<tr>
<td>Sedatives and Hypnotics</td>
<td>1.47</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>1.41</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>1.36</td>
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</tbody>
</table>


Fall risk from CNS active meds may be greatest during the 3 days following a medication change (Sorens et al. Geriatr Nurs. 2009;30:334–340).
Other Classes Associated with Falls

<table>
<thead>
<tr>
<th>Medication Class</th>
<th>Odds Ratio (unadjusted)</th>
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<tbody>
<tr>
<td>Antihypertensives</td>
<td>1.24</td>
</tr>
<tr>
<td>Diuretics</td>
<td>1.07</td>
</tr>
<tr>
<td>Beta Blockers</td>
<td>1.01</td>
</tr>
<tr>
<td>Narcotics</td>
<td>0.96</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>1.21</td>
</tr>
</tbody>
</table>


Odds Ratios: Drugs and Falls

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Psychotropic</td>
<td>1.73</td>
</tr>
<tr>
<td>Neuroleptic</td>
<td>1.30</td>
</tr>
<tr>
<td>Sedative Hypnotics</td>
<td>1.64</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>1.48</td>
</tr>
<tr>
<td>Short acting</td>
<td>1.46</td>
</tr>
<tr>
<td>Long acting</td>
<td>1.52</td>
</tr>
<tr>
<td>Antidepressives</td>
<td>1.64</td>
</tr>
<tr>
<td>TCAs</td>
<td>1.51</td>
</tr>
<tr>
<td>Type 1A antiarrhythmics</td>
<td>1.59</td>
</tr>
<tr>
<td>Digoxin</td>
<td>1.22</td>
</tr>
<tr>
<td>Cardiac acting antiarrhythmics</td>
<td>1.46</td>
</tr>
<tr>
<td>Beta Blockers</td>
<td>1.34</td>
</tr>
<tr>
<td>Calcium Channel Blockers</td>
<td>1.20</td>
</tr>
<tr>
<td>Beta Blockers</td>
<td>0.93</td>
</tr>
<tr>
<td>Calcium Channel Blockers</td>
<td>0.89</td>
</tr>
<tr>
<td>Any Diuretic</td>
<td>1.69</td>
</tr>
<tr>
<td>Thiazides</td>
<td>1.06</td>
</tr>
<tr>
<td>Loop</td>
<td>0.90</td>
</tr>
<tr>
<td>Narcotics</td>
<td>0.97</td>
</tr>
<tr>
<td>Non-narcotics</td>
<td>1.09</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>1.16</td>
</tr>
<tr>
<td>Aspirin</td>
<td>1.12</td>
</tr>
</tbody>
</table>


How can Falls be Prevented?

- Modification of intrinsic & environmental factors
- Match the intervention to the risk factor
- Assistive devices
- Exercises
- Consultation about adverse drug effects
- Education
- Avoid high risk drugs
- Lower doses for drugs associated with falls
- Discontinue risky drugs
- Discontinue slowly to prevent withdrawal symptoms
- Reduction in total number of medications
- Safer therapeutic alternative if available
Non-pharmacologic approaches to High Risk Medications

- Psychotropics
  - Aroma therapy, Cognitive/Behavioral Therapies,
  - Relaxation strategies
  - Exercise
  - Diet (avoid caffeine, alcohol)
  - Sleep hygiene
  - Biofeedback
  - Psychotherapy

Interventions with the Best Evidence for Falls Prevention

- Program of muscle strengthening & balance retraining.
- 15-week Tai Chi group exercise program.
- Home hazard assessment & modification for elders with a falls history.
- **Withdraw psychotropic medications.**
- Cardiac pacing for fallers where medically indicated.
- Multidisciplinary, multifactorial, health/environment risk factor screening/intervention program in the community.
- Multidisciplinary assessment and intervention program in residential care facilities.

USPSTF Statement on Prevention of Falls in Community Dwelling Elderly: 2012

- Exercise
- Physical Therapy
- Vitamin D supplementation
Vitamin D to Prevent Falls

• Vitamin D deficiency is common in advancing age.
• Approx. 15-19% lower risk of falls when taking vitamin D
  • Effect more prominent when pt. vit D deficient
• Findings apply to home and institutional settings.
• Doses of vitamin D2 or D3 ranged from 700 units per day to a one time dose of 300,000 units. In most cases, vitamin D was combined with calcium.
• Benefits: increased physical performance, increased muscle strength, and improved physical functioning (balance).
• Total vitamin D level > 30 ng/mL

Murad et al. J Clin Endocrinol Metab. 2011; doi:10.1210/jc.2011-1193,

Vitamin D Protocols (one of several)

• Replacement
  • A dose of at least 800 units daily to prevent falls.
  • 1000 to 2000 units per day commonly recommended for adequate vitamin D supplementation
    • 1000 units per day can increase vitamin D level by 10ng/mL within 6 weeks
  • Can give 50,000 units monthly
• Deficiency
  • 50,000 units once weekly for 6-8 weeks.
  • Stage 3 and 4 chronic kidney disease
    • Severe deficiency: 50,000 units once weekly for 12 weeks, then once monthly for 3 more months (total of 6 months)
    • Mild deficiency: 50,000 units once weekly for 4 weeks, then once monthly for 5 more months (total of 6 months).
    • Insufficiency: 50,000 units monthly for 6 months

Vitamin D Dosing. Pharmacist’s Letter. September 2012

Caveats for Managing Medication Risk

• Dose reduction
• Drug withdrawal (discontinue)
• Substitute safer drug
• Topical route for lower drug concentration in blood
• Limit duration of use
• Non-pharmacologic management including environmental changes
• Short acting rather than long acting agents within a class
The Risk/Benefit Conundrum

- Risk/Benefit assessment after comprehensive medication review and assessment.
- Clear indications and treatment targets
- Medication contribution to fall risk versus effective management of other co-morbidity (symptom control vs. side effects): A trade off
- Risk of sub-optimal prescribing
- Overall drug burden
  - For a low drug burden index, odds ratio = 1.61*
  - For a high drug burden index, odds ratio = 1.90*
- Importance of routine monitoring


Safer Alternatives

- Buspirone for anxiety instead of benzodiazepines or antidepressants if depression is not present
- Melatonin instead of “z” drugs or benzos used for sleep
- Possibly doxepin low dose (3-6 mg)
- Avoid alpha blockers (terazosin, doxazosin) and clonidine for hypertension
- Tamsulosin instead of terazosin or doxazosin for BPH
- ACE-Is, Beta-blockers, or CCBs for hypertension
- SSRIs for depression instead of TCA
- Solifenacin, darifenacin, trospium, oxybutynin XL, transdermal, or gel rather than oxybutynin immediate release or tolterodine immediate release
- Tramadol instead of opiates (renal function a consideration)

Evidence for Fall Reduction: Withdrawal of Fall Risk Increasing Drugs

  - Subjects had history of 1 or more falls in the previous year
  - 75 out of 139 patients had one or more fall risk increasing drugs withdrawn or the dose reduced
  - Fall incidence was assessed within 3 months
  - Mean number of falls in the patients with no change = 3.6
  - Mean number of falls in the intervention group = 0.3
  - Absolute risk reduction = 19% and Relative Risk Reduction = 49%
Barriers to Drug Withdrawal

- Poor awareness by prescriber about the risk factors
- Medication prescribed by a different provider
- No evidence that the medication has or will cause harm.
- Absence of data regarding discontinuation effects
- Conflict between managing other co-morbidities and the use of drugs that increase the risk for falls
- Convincing patients about the importance of medication changes to lower the falls risk.
- Reluctance to implement fall prevention interventions.
- Feeling of abandonment
- Medications represent hope


Medications Associated with Falls with Adverse Drug Withdrawal Events

<table>
<thead>
<tr>
<th>Medication</th>
<th>Withdrawal Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha blocking anti-hypertensives</td>
<td>Agitation, HA, hypertension, palpitations</td>
</tr>
<tr>
<td>ACE-inhibitors</td>
<td>Heart failure, hypertension</td>
</tr>
<tr>
<td>Antihypertensive</td>
<td>Angina (myocardial ischemia)</td>
</tr>
<tr>
<td>Anticonvulsant</td>
<td>Anxiety, depression, seizures</td>
</tr>
<tr>
<td>Antidepressant</td>
<td>Akathisia, anxiety, chills, cornea, GI distress, HA, insomnia, irritability, malaise, myalgia, recurrence of depression</td>
</tr>
<tr>
<td>Anti-Parkinson</td>
<td>Hypotension, psychosis, pulmonary embolism, rigidity, tremor</td>
</tr>
<tr>
<td>Antipsychotic</td>
<td>Dizziness, insomnia, nausea, restlessness</td>
</tr>
<tr>
<td>Benzodiazepine</td>
<td>Agitation, anxiety, confusion, delirium, insomnia, seizures</td>
</tr>
<tr>
<td>Beta-blocker</td>
<td>Angina, anxiety, hypertension, MI, tachycardia, arrhythmia</td>
</tr>
</tbody>
</table>

A Practical Guide to Stopping Medications in Older People. BPJ. Issue 27, 2010

Medications Associated with Falls with Adverse Drug Withdrawal Events

<table>
<thead>
<tr>
<th>Medication</th>
<th>Withdrawal Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digoxin</td>
<td>Heart failure, palpitations</td>
</tr>
<tr>
<td>Diuretics</td>
<td>Heart failure, hypertension</td>
</tr>
<tr>
<td>Narcotic analgesic</td>
<td>Abdominal cramping, anger, anxiety, chills, diarrhea, insomnia, restlessness</td>
</tr>
<tr>
<td>Nonsteroidal anti-inflammatory</td>
<td>Recurrence of arthritis and gout symptoms</td>
</tr>
<tr>
<td>Sedative/hypnotics</td>
<td>Anxiety, dizziness, muscle twitches, tremor</td>
</tr>
</tbody>
</table>

Regulatory/Statutory

- F-Tag 329
- DHS 83

The CMS View on Unnecessary Medications

- Excessive dose including duplicate therapy
- Excessive duration
- Inadequate monitoring
- Inadequate indication for use
- Presence of adverse consequences which indicate the dose should be reduced or the drug should be discontinued.
- Any combination of the above

Organizational Interventions

- Falls Risk Assessment
  - Conditions that could result in injury if a fall occurs
- Fall prevention protocol
  - Address intrinsic and extrinsic factors
  - Medication as a contributing cause
- Non-punitive reporting culture
- Analysis of falls and fall-related injuries to determine root cause(s)
- Post-fall problem-solving conferences
- Report to staff with results of a fall analysis
- Communicate falls incidence data, injury data, and improvement data
- Staff education about falls
- Documentation systems
- Medication reconciliation
Wisconsin Initiatives

- Fall Prevention Among Older Adults: An Action Plan for Wisconsin, DHS
- Healthiest Wisconsin 2020
  - Fall prevention a priority
- Electronic Medical Records and Computerized Medication Ordering
  - Role for decision support tools
- Prospective and retrospective DUR
- Education for patients, providers, and caregivers

Outcomes and Outcome Measures

- Outcomes
  - Falls prevention
    - Initial and recurrent (risk reduction)
  - Mitigate fall-related injuries
    - Fractures
    - Head trauma
- Outcome Measures
  - Number of residents who fall
  - Number of falls
  - Time to occurrence of first fall
  - Number of injuries resulting from falls
    - Fractures
    - Head Trauma
    - Bleeding/Hemorrhage
  - Number of ED visits/hospitalizations

Predicting Impact on Future Falls

- Period of observation after a medication change to assess falling.
- Tension between wholesale changes and targeted medication changes.
- Concomitant risk reduction of other factors increasing falls risk.
- Extent and quality of communication and education
- Willingness of the patient and provider to make changes in falls risk medications
- Frequency of medication use that increases risk.
Summary/Conclusions

- Falls and fall prevention are multi-factorial
- Difficult to separate drug induced from diagnosis-related falls.
- Best evidence for falls with antidepressants, neuroleptics, benzodiazepines, anticonvulsants, and type 1A antiarrythmics.
- Risk may be greatest within first 30 days of starting a new drug or dose increase.
- Medication regimen review and med management should be a cornerstone of a fall assessment with an appropriate risk/benefit approach.
  - Safer alternatives when appropriate
  - Dose reduction
  - Discontinue carefully to prevent ADEs
  - May take weeks to months depending on duration, dose and half-life

Case Discussion Instructions

For your assigned case, determine the patient’s history of falls, identify suspected non-drug-related risk factors for falling (intrinsic and extrinsic), identify potential drug-related causes, and design a fall prevention program for the patient in the case to include a monitoring and follow up plan. Document what additional information would help you design your plan. If appropriate, your plan could include the addition of medications to treat co-morbidities that are potential contributors to falling.

Select References

Select References


Select References

### Fall Prevention in Older Adults

**Figure 1.** Fall risk assessment instrument

| Abbreviations used: CHF, congestive heart failure; NSAID, nonsteroidal anti-inflammatory drug. | Original work not copyrighted; please copy and use in your practice. |

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**History of falls:**

<table>
<thead>
<tr>
<th>Ambulation status</th>
<th>CIRCLE: Up, Bed, Walker, Wheelchair</th>
</tr>
</thead>
<tbody>
<tr>
<td>One to two falls in a month/quarter</td>
<td>2</td>
</tr>
<tr>
<td>More than two falls in a month/quarter</td>
<td>8</td>
</tr>
<tr>
<td>Fall-related facture (date)</td>
<td>5</td>
</tr>
</tbody>
</table>

**Conditions:**

- Postural hypotension (orthostasis) | 2 |
- Syncope/dizziness | 1 |
- Sensory deficits: decreased hearing (1), vision (1), aphasia (1) |
- Unsteady or shuffling gait | 2 |
- Confusion/delirium/disorientation/impaired cognition | 2 |
- Agitation/increased anxiety | 2 |
- Chronic pain state | 3 |

**Medications:**

- Cardiac (1), Antihypertensives (1), Diuretic (1), Antipsychotics or metoclopramide (2), Hypnotics (2), Antidepressant or antihistamine (H-1 or H-2 blockers) (2), Antianxiety except buspirone (2), NSAID (1), Narcotic analgesic: mild (1), moderate (2), Anticonvulsant (1), Muscle relaxants (1) |

**Diagnoses:**

- Incontinence: bowel (2), bladder (2), anemia (2) |

**Cardiac diseases:**

- Dysrhythmia (1) CHF (1) |

**Neurologic/psychiatric diseases:**

- Dementia (1), Parkinsonism (1), Seizures (1), Stroke (1) |

**Musculoskeletal disease:**

- Arthritis (1) Casts/splints/slings (1), Prosthesis (1) |

**Risk ranges:**

- Minimal: 0–3, Moderate: 4–7, High: 8 or more

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**Signature of assessor**

---

**Date:**

**Describe Interventions below and reassess every quarter if above score of 7 or more**

**Med changes:**

**Fracture sites:**

**Hospital date(s) and reasons:**
## APPENDIX D

### FALLS RISK ASSESSMENT

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Yes</th>
<th>No</th>
<th>Risk Factor</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age:</strong> Is the individual &gt; 65</td>
<td></td>
<td></td>
<td><strong>Incontinence/frequent toileting/nocturia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of fall/near fall:</td>
<td></td>
<td></td>
<td><strong>Feet/footwear:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the individual had 2 or more falls in the past 6 months?</td>
<td>Yes</td>
<td>No</td>
<td>Does the individual have corns, bunions, etc.?</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Does the individual wear improper footwear?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Medications:</strong></td>
<td></td>
<td></td>
<td><strong>Chronic conditions:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the individual taking 4 or more medications?</td>
<td></td>
<td></td>
<td>Does the individual have any of the following conditions that affect their balance and mobility?</td>
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<td></td>
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<tr>
<td>Does the individual take any of the following types of medication?</td>
<td>Yes</td>
<td>No</td>
<td>Respiratory</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>□ Psychotropic</td>
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<td>□ Cardiac</td>
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<td>□ Antidepressant</td>
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<td>□ Neurologic (Seizure disorder, stroke, cerebral palsy, Parkinson’s, etc)</td>
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<td>□ Antiepileptic</td>
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<td>□ Vestibular disorder (Meniere’s Disease, inner ear infection, etc.)</td>
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<td>□ Arthritis</td>
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<td>□ Diabetes</td>
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<td>□ Peripheral neuropathy</td>
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<td>□ Sedative/Hypnotic</td>
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<td>□ Diuretic</td>
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<td></td>
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<tr>
<td>□ Antiarrhythmic</td>
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<td>□ Vasodilator</td>
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<td><strong>Mental status:</strong></td>
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<td>Does the individual have difficulty with ambulation?</td>
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<td>Does the individual have any of the following:</td>
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<td>Does the individual use an assistive device?</td>
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<td>□ Confusion</td>
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<td>□ Disorientation</td>
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<td>□ Depression</td>
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<td>□ Fallophobia</td>
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<td><strong>Home modification required</strong></td>
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<td>Vision</td>
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### Functional behavior:
- Is the individual fearful of activity, have rigid posture, over-reach to “furniture walk”, have poor foot lift when ambulating, reluctant to stand straight when ambulating?
- Does the individual overestimate their abilities?

<table>
<thead>
<tr>
<th>□ Yes □ No</th>
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### Acute illness:
- Does the individual have any acute illness (UTI, chest infection, etc.)

- 11 or more risk factors identified indicate an individual at high risk of falling.
- All risk factors should be addressed individually.
Targeted High Risk Medications (alpha listing)

Alprazolam (Xanax)  Meprobamate (Miltown, Equanil)
Amitriptyline (Elavil)  Mesoridazine (Serentil)
Amobarbital (Amytal)  Metadoxone (Selaxin)
Amoxapine (Asendin)  Methadone (Dolophine)
Aripiprazole (Abilify)  Methocarbamol (Robaxin)
Baclofen (Lioresal)  Methsuximide (Celonin)
Bupropion (Wellbutrin, Wellbutrin SR)  Mirtazapine (Remeron)
Buspirone (Buspar)  Molidone (Mohan)
Butabarbital  Morphine (MS Contin)
Carbamazepine (Tegretol, Tegretol XR, Carbarrol)  Nefazodone (Serzone)
Carisoprodol (Soma)  Nor triptyline (Aventyl)
Chloral Hydrate  Olanzapine (Zyprexa, Zyprexa Zydus)
Chlorazepate (Tranxene)  Opioids Codeine (Tylemol with Codeine)
Chlordiazepoxide  Oxazepam (Serax)
Chlorpromazine (Compazine)  Oxcarbazepine (Trileptal)
Citalopram (Celexa)  Oxybutynin immediate release (Ditropan)
Clidinium-chlordiazepoxide (Librax)  Oxycodone (Percocet)
Clomipramine (Anafranil)  Oxymorphone (Numophan)
Clonazepam (Klonopin)  Paraldehyde (Paral)
Clozapine (Clozaril)  Paroxetine (Paxil)
Codeine (Tylemol with Codeine)  Pentobarbital (Nem butal)
Cyclobenzaprine (Flexeril)  Perphenazine (Trilafon)
Desipramine (Norpramin)  Phenobarbital
Diazepam (Valium)  Phenytion (Dilantin)
Dicyclomine (Bentyl)  Pimozide (Orap)
Digoxin (Lanoxin)  Pregabalin (Lyrica)
Disopyramide (Norpace)  Primidone (Myoline)
Divalproex sodium (Dekapote, Dekapote ER)  Propoxyphene (Darvon, Darvocet)
Doxepin (Sinequan)  Protriptyline (Vivactil)
Duloxetine (Cymbalta)  Quazepam (Doral)
Escitalopram (Lexapro)  Quetiapine (Seroquel)
Estazolam (Prosom)  Risperidone (Risperdal)
Ethosuximide (Zarontin)  Secobarbital (Seconal)
Felbamate (Felbatol)  Sertraline (Zoloft)
Fentanyl (Duragesic)  Temazepam (Restoril)
Fluoxetine (Prozac)  Thioridazine (Mellaril)
Fluvoxamine (Luvox)  Thiophene (Navane)
Fluphenazine (Permitil, Prolixin)  Tia gabine (Gabitril)
Flurazepam (Dalmane)  Topiramate (Topamax)
Gabapentin (Neurontin)  Tizanidine (Zanaflex)
Halazepam (Paxipam)  Trazodone (Desyrel)
Haloperidol (Haldol)  Triazolam (Halcion)
Hydrocodone (Vicodin)  Trifluoperazine (Stelazine)
Hydromorphone (Dilaudid)  Trimipramine (Surmontil)
Hyoscyamine (Levisin, Levisinex)  Venlafaxine (Effexor, Effexor XR)
Imipramine (Tofranil)  Ziprasidone (Geodon)
Levetiracetam (Keppra)  Zolpidem (Ambien)
Levorphanol (Levo-Dromoran)  Zonisamide (Zonegran)
Lorazepam (Ativan)  
Loxapine (Loxitane, Loxitane C)  
Maprotiline (Ludomiil)  
Meperidine (Demerol)  
Mepobarbital  

The Case of Mrs. A

Mrs. A. is a 78 year old woman in your practice with congestive heart failure, osteoarthritis, atrial fibrillation, and hypertension. She comes in with a bruised knee sustained during a fall in her home. She sustained no other injuries. She says that the fall occurred when she got up at 2AM to go to the bathroom. PMH: as above, EF 28% with global hypokinesis, AF for two years with failed cardioversion, rate controlled by beta blockers

Meds:
Enalapril 10 mg QD, Celebrex 100 mg BID, warfarin 4 mg QD, furosemide 40 mg BID, temazepam 30 mg HS and atenolol 25 mg QD (last time you saw her 3 months ago, she was on Enalapril 10 mg QD, warfarin 4 mg QD, furosemide 40mg QD, and atenolol 25 mg QD. ROS: No headaches or neurologic changes. Notes slight increase in edema and shortness of breath for past month. Increased OA pain in her knees for past few months. Increased urinary urgency over past few years, now with accidents 1-2 times a week, has nocturia 1-2 times a night for the past month or so.

Physical Examination:
In general: Slightly obese, does not look acutely ill
BP 160/90 with no orthostatic changes P64 R18
Lungs Bibasilar rales
CV Irregular, murmur consistent with aortic sclerosis
Abd Nontender
Extr 1+ edema, ecchymoses over right knee, no effusion or deformity
Neuro Alert and oriented
  MMSE 26/30 (missed 3 serial 7’s and 1/3 objects)
  Gait Difficulty with sitting to standing
  Steps slightly short and hesitant, slightly wide based
  Balance fairly normal, but sways with eyes closed
Pelvic examination
  Absolutely normal
  PVR 5 cc
  Normal pad test
Labs (others upon request)
CBC normal, Na 140 K 4.9, BUN 32, Cr 1.1, INR 2.2
UA normal
The Case of BB

BB, a 72 yo white female presented to the clinic for interdisciplinary review. She had a history significant for numerous falls, many of which occurred at night or early in the morning and were associated with getting out of bed. She experienced more than 25 falls in the year prior to her clinic appointment, with no fractures. Her past medication history was significant for depression, hypothyroidism, neuropathic pain, edema, hot flashes, back pain disorder, fibromyalgia, GERD, diabetes, osteoporosis, sleep movement disorder and hyperlipidemia. The patient gave a history of 14 prescription medications and two additional over-the-counter vitamin supplements.

Bupropion XL, 300 mg once daily in the morning for depression
Hydrochlorothiazide 25 mg once daily in the morning for peripheral edema
Rabeprazole 20 mg once daily each morning for reflux
Pregabalin 75 mg twice daily for neuropathic pain
Duloxetine 60 mg once daily in the morning for neuropathic pain/depression
Tamoxifen 20 mg once daily in the morning for history of breast cancer
Cyclobenzaprine 20 mg once daily in the evening for restless leg syndrome
Atorvastatin 40 mg once daily in the evening for elevated cholesterol
Clonidine 0.1 mg once daily in the evening for sweats secondary to tamoxifen
Clonazepam 0.5 mg once daily in the evening for restless legs.
Levothyroxine 112 mcg once daily in the morning for hypothyroidism.
Atropine/diphenoxylate 0.025 mg/2.5 mg as needed for colitis. Has not needed for 2 years.
Fentanyl patch 75 mcg per hour every 3 days for back pain
Hydromorphone tab 4mg four times daily as needed for pain
Meloxicam 7.5 mg twice daily as needed for fibromyalgia
Multivitamin 1 tablet each morning
Calcium citrate + vitamin D, 630 mg (elemental calcium) three times daily.
**Case of the Falling Septuagenarian:**

EF is a very active 78-year-old widower and retired insurance adjuster who lives in town. He was seen in the emergency room yesterday following a fall, in which he suffered a Colles’ fracture of his right wrist. A cast was placed on his wrist then. Today, he comes for follow-up care. EF reports that during the weeks before falling, he felt weaker than usual and lightheaded on standing. Nevertheless he had remained able to weed his garden and paint his porch windows. He reports that he fell onto the sidewalk while descending his front steps, extending his hand to break his fall. He denies other recent falls except one at a grandson’s wedding reception, when he tripped over a rug. He is not sure why he fell but says he does not notice things the way he used to. He is worried that if he is so accident prone, he will not be able to take care of his house.

**PMH:** A partial gastrectomy 10 years ago for PUD; BPH; hypertension; degenerative arthritis of the knees (he is status-post bilateral knee replacement); an esophageal stricture, for which he receives dilations periodically from a gastroenterologist; and poor vitamin B12 absorption secondary to the gastrectomy. He is functionally independent.

**Meds:** Doxazosin 4 mg po daily, amlodipine 5mg once daily, diclofenac 75 mg po BID, acetaminophen 1 gm po TID prn, and Zaleplon 5 mg po qhs prn sleep. He has no known allergies.

**SH/FH:** He has never smoked and rarely drinks any alcohol. His wife died about 5 years ago of Alzheimer’s disease and its complications. He had cared for her in their home for 10 years. His married daughter lives in town, and one son lives in New York. He is active in his church and Rotary Club. His review of symptoms is unremarkable except for slightly less endurance. He has recurrent abdominal pain, which is attributed to reflux esophagitis and spasm. He denies cardiovascular or neurological symptoms. He has had more loose stools, which he attributes to eating more fresh garden produce.

**PE:** A thin elderly man with a cast on his right forearm; oral temperature 98.6; respiratory rate 18; height 5’11”; weight 148 lbs; blood pressure and pulse lying 132/70, 78 regular; sitting 124/66, 80; and standing at 3 minutes 112/58, 88. Head, neck, throat, skin, and neuro exams are WNL. The eye examination reveals vision of 20/40 in both eyes and bilateral cataracts. His auditory acuity is diminished for high frequencies, but his ear examination is otherwise normal. The cardio-respiratory examination is normal except for orthostatic hypotension. Abdominal examination reveals vague voluntary guarding in the midepigastrium, but there are no masses or organomegaly. Bowel sounds are present, and his surgical scar is well healed. The rectum has normal sphincter tone; the stool is dark and guaiac positive. The GU exam reveals a prostate enlarged to 30 g, but there are no palpable nodules. On gait and balance testing, Mr. Fritz is able to arise from a chair without assistance on his second attempt. He walks and turns normally, except for decreased floor clearance in the swing phase of his gait. He can tandem walk and has no difficulty with heel- or toe-walking. He sits normally. He is able to reach an object from a shelf above his head and pick up an object off the floor without difficulty.
**Labs:** Hgb of 8.8 g/dL, an albumin of 3.4 g/dL, and total protein of 5.6 g/dL. Calcium, phosphorous, electrolyte levels, glucose, liver function tests, thyroid screen, and urinalysis are normal. The ECG shows a normal sinus rhythm with a rate of 90. Results of abdominal flat plate and upright x-rays are normal. Because of his gastrointestinal bleeding, Mr. Fritz sees a gastroenterologist. Upper endoscopy reveals gastritis, but no active bleeding. He is begun on iron supplements 325 mg po BID and on ranitidine 150 mg po BID. The cerumen is removed.

Arrangements are made for an occupational therapist to evaluate his home for safety. At a follow-up appointment 2 weeks later, his daughter accompanies him. She asks to see you alone. She is concerned because Dad has stopped going to church and Rotary meetings. EF confirms this, admitting to feeling afraid of falling again and unsure of himself.

The physician reviews his follow-up wrist x-ray, which reveals good alignment of the bones and early new callus formation. The reticulocyte count is elevated at 2.1, his hemoglobin is 9.4 g% and stool guaiac is negative. He still has a slight orthostatic drop to his blood pressure. The occupational therapy evaluation identifies a loose plank on the front steps, lack of a handrail, and loose throw rugs in several rooms, and concurs with the need for grab bars in the bathroom. Because of Mr. Fritz’ lack of confidence and poor leg strength, his physician refers him to physical therapy for gait training and exercises to strengthen his quadriceps muscles. The physician also calls the local Area Agency on Aging for assistance fixing EF’s front porch. Two months later, EF returns and brings in a bag of sweet corn. He has been back at work in his garden and busy with church and Rotary activities and feels great!
The Case of FL

FL is a 74-year-old female resident of an assisted living facility who is transported to the ED following a nighttime fall. At the ED she gives the following history: She had been experiencing fever, cough, and malaise for the past 3 days. The fall occurred occurred 1 hour after retiring, while she was walking to the bathroom. She was feeling particularly unsteady and toppled backward in a short open area where there were no handholds. She did not experience lightheadedness, dizziness, or other symptoms at the time of the fall. She completed her trip to the bathroom and returned to her bed despite back pain, but she was unable to get up the next morning.

On examination, Ms. Lamond's temperature is 100.2° F, pulse 94 beats per minute, and respiratory rate 24. On prompting, the patient is able to expectorate yellow, obviously purulent sputum. She is unable to sit up because of her back pain. There is tenderness overlying the second lumbar vertebra. The white cell count in the ED is 13,400 per ml, and a chest x-ray examination is then ordered, which shows a left lower lobe pulmonary infiltrate. Sputum gram stain shows many WBCs with mixed gram-positive and gram-negative organisms, and the culture grows Haemophilus influenzae.

FL was admitted to the hospital. After 3 days of intravenous antibiotics and bed rest, FL is able to attempt walking. She requires moderate assistance to arise from a chair and shows strong retropulsion when attempting to walk. Romberg's test is positive to the rear.

You ask Ms. Lamond about her activity and walking abilities before this last illness. She reports chronic unsteadiness since the last of two prior small strokes. She has markedly reduced her level of physical activity because, she says, I am afraid I will fall."

You assess cognitive status using the Mini-Mental State examination and discern mild cognitive impairment. An examination finds moderate diffuse cogwheel rigidity, with diminished facial expression suggestive of Parkinson's disease. A physical therapist is consulted and performs a complete neuromuscular evaluation, which confirms these findings and fails to identify muscular or sensory deficits.

You decide to treat the parkinsonism with carbidopa-levodopa (Sinemet 25/100), 3 times daily. This results in slight improvement in the speed of movement, but FL remains retropulsive, causing safety concerns. She is moved to a nursing home where ongoing daily physical therapy is provided. Over the next 2 weeks her safety and balance gradually improve and she is taught transfer techniques and the use of a rolling walker, to which she adapts easily.
Medications in addition to carbidopa-levodopa include:

- Hydrochlorothiazide 25 mg once daily for high blood pressure
- Enalapril 20 mg once daily for mild heart failure
- Simvastatin 20 mg once daily at bedtime for elevated cholesterol and LDL
- Aspirin 81 mg once daily for stroke prevention
- Metformin 500 mg twice daily for type 2 DM
- Xalatan 0.005%, one drop each eye at bedtime for glaucoma
- Citalopram 40 mg once daily in the morning for depressed mood
- Hydrocodone/Acetaminophen 325mg/5mg, 1-2 every 4 hours as needed for back pain.
- Naproxen 250 mg twice daily as needed for back pain
- Moxifloxacin 400 mg once daily for 7 days for pneumonia

After 2 weeks in the nursing home, she is returned to the assisted living facility from which she came.
The Case of Mrs. James

Mrs. Henrietta James is an 86 year old retired primary school teacher. Her husband was a salesman and died of lung cancer five years ago. Since then she has continued to live alone in a two-story house several miles from the local town where she taught for many years. She has one son who is a carpenter and lives with his wife and one adult son in the next town over which is 50 miles away. On his weekly visit with his mother, he notices that she has a black eye and bruising on her left hand. She finally admits that she fell last week but wasn’t really injured, and otherwise says “I have very little to complain about, just getting older”. He has been trying for several years to encourage her to move into an apartment closer to where he lives but Mrs. James is very reluctant to give up her house and the independence she associates with it. Mrs. James currently receives private homemaking help once a week; her son has felt that she would benefit from additional help but she refuses saying that she is fine. The son insists that she see her family doctor and she finally agrees after much persuasion.

Home Health Services receive a referral from her family physician to see Mrs. James. The physician sends a letter saying that she has not seen Mrs. James for six months as she has been refusing to come into the office; so she has had her medications renewed by phone. The doctor received a call from the patient’s son expressing concern that Mrs. James has been falling. The family physician states that Mrs. James has a history of hypertension, congestive heart failure, diabetes mellitus type 2, osteoarthritis and dizziness.

The home care nurse was designated to do the initial visit to Mrs. James’ house. Her son made sure that he was there during the assessments.

The son reviewed with the nurse his mother’s recent falling and her minimizing the injuries that she received. He also stated that Mrs. James started showing signs of increasing forgetfulness when her husband died. He feels that her memory is now worsening. He says that she complains of pain in her knees and back, and does not sleep well.

Her son is also worried that she has fallen three times in the last two weeks, and has not left the house in the last month.

Mrs. James finally admits that she has been falling, but puts it all down to “getting old and decrepit”. Her son says that the one time he was with her when she fell, her legs appeared to “give out” as she walked from the living room to the kitchen. She does complain of being dizzy when she gets up from the sofa, and looks unsteady. She has never had a seizure or fainted that she or the son can recall. She admits that she becomes short of breath at night and is up to the bathroom at least 4 times a night. She does not check her blood sugars any more as it is too much trouble. Her son has noticed that she eats poorly even when food is brought in.

The nurse observed that she “furniture walked” to get anywhere in her house. There was only one railing on the stairs and the lighting was very poor. Her son said that he is so embarrassed about the poor state of the house and his mother’s worn out clothing. She feels that it is a waste of money to buy new shoes or clothes.

Her son is buying her groceries and paying her bills. Mrs. James is still cooking for herself. She is only taking sponge baths. The house is quite cluttered. Her old dog is her only company.
The medications she shows you include:
- Naprosyn (naproxen) 250mg TID,
- Prednisone off and on for many years, but is not taking any now,
- Tylenol #3 (acetaminophen + codeine) 1 tablet as needed (takes about 2 a day),
- Ativan (lorazepam) 2mg 1 tablet at bedtime and as needed,
- Hydrochlorothiazide 25mg daily,
- Furosemide 40mg daily,
- Digoxin 0.125mg daily,
- Meclizine 25 mg up to TID prn vertigo
- Captopril 25mg BID,
- Glyburide 5mg BID,
- Cough syrup PRN,
- Robaxacet (methocarbamol + acetaminophen) muscle relaxant PRN,
- Senna with docusate, 1-2 tablets prn constipation

Her blood pressure was 160/90 lying, 130/75 standing with slight light-headedness, respiratory rate is 16/minute and pulse 82 and irregular. Her random glucometer reading is 6.7mmol/L.

MMSE was 25/30 losing two points on date and day of the week, one on WORLD backwards, repetition and immediate recall. The Geriatric Depression Scale short form indicates a possibility of depression despite her denial of feeling so.

Clock-drawing was accurate.

Affect flattened and mood sad.

She does not want to go to any day hospital or inpatient program, but is willing to continue to have homemaking and assessments in her home.

The outreach geriatrician sees Mrs. James. She finds that she has poor vision for reading-left eye acuity 80/20, right eye 25/20. She has bilateral cataracts and presbycusis.

Physical exam reveals a II/VI systolic ejection murmur in the aortic area. Soft S3 heard at the apex. Chest clear. Moderate kyphosis of spine with two wedge fractures of T10 and T12. Wasting of quadriceps bilaterally. Strength hip flexors and knee extensors 4-/5 bilaterally. Poor proprioception both toes. Vibration sense decreased in toes, normal in ankle. A MoCA is 24/30 and her GDS is 8/15, indicating that she has mild cognitive impairment and may be clinically depressed.

Blood work reveals a slightly increased creatinine of 1.5 mg/dL; otherwise normal blood work including CBC, electrolytes, calcium, B12, TSH, albumin, liver enzymes and digoxin level. Her HbA1C is 5.5%. Spinal x-rays reveal multiple old compression fractures. Her CT head shows a small old subdural hematoma and several old deep lacunar infarcts.

The son purchased a glucometer, and the nurse finds she has occasional hypoglycemic episodes (BG 2.5, 2.8).

She is seen by the physiotherapist who finds her Berg balance scale is 33/56, she has difficulty transferring, turning, reaching, and balancing on one foot.
The OT completes an inside and outside assessment of the environment. She also does a functional assessment for activities for daily living (ADLs) and instrumental activities of daily living (IADLs). She finds Mrs. James very distractible with poor attention span and concentration. When making a cup of tea for them, she forgets that she had put the kettle on and asks what the whistling noise is. This is the kettle boiling. She says that she is embarrassed and completed the tea preparation without any further problems. When kept on task, she was able to complete her ADLs well. She said that her son does all her banking; so she is fine.
The Case of RS

RS is an 83-year-old female who has been residing in a nursing home for three years as her health had reached a point where her children felt it was for the best; primarily because she was showing signs of mild dementia, incontinence and of being susceptible to pneumonia. Ms. Smith in her first two years at the nursing home had not fallen; however, over the last six months her health had deteriorated and she had fallen on two occasions, fortunately neither of which resulted in serious injury. Her change in condition most notably was the result of worsening Alzheimer’s, Parkinson’s, a mild stroke, osteoporosis and agitation which prevented her from conducting many activities of daily living on her own and from ambulating independently. Other medical problems included atrial fibrillation, and hypertension. For some reason, Ms. Smith’s care plan had not been updated to reflect these changes. For example, the care plan indicated that Ms. Smith was able to ambulate without assistance and there was no reference to a toileting program.

Medications included:  
- Carbidopa/Levodopa 25/100 four times daily  
- Alendronate 70 mg once weekly  
- Vitamin D 400 units once daily  
- Calcium elemental 500 mg twice daily  
- Aspirin 81 mg once daily  
- Risperidone 1 mg at bedtime  
- Lorazepam 1 mg every 6 hours if needed for agitation  
- Warfarin 2.5 mg daily  
- Metoprolol 25 mg twice daily  
- Amlodipine 5 mg once daily in the morning  
- Oxybutynin 5 mg twice daily

As it turns out, early on a Tuesday morning Ms. Smith awoke in her bed needing to use the restroom. The only certified nursing aide on duty on the 300 hall that night was not at the nursing station when Ms. Smith hit the call light. In addition, the bed alarm was not properly connected so it failed to go off. Ms. Smith then proceeded to climb over the full bed rails without assistance. How she did this safely is unclear. However, as she was ambulating to the bathroom, she lost her balance causing her to fall to the floor and fracture her right hip. After ten minutes of lying on the floor in pain, her roommate awoke and got the attention of the nurse aide who proceeded to come to Ms. S’s side and sit her up causing her even more pain and injury. Shortly thereafter, the charge nurse arrived with two additional certified aides, at which time the four providers transferred Ms. S back to her bed. The charge nurse then, without conducting a full physical examination gave Ms. Smith lorazepam to allow her to calm down. It was not until the next day when the day shift charge nurse noticed bruising on Ms. Smith’s right hip when conducting a skin exam for pressure sores that a physician was contacted and a complete physical examination was conducted, along with a mobile X-ray that revealed the fracture. Ms. Smith was subsequently taken to the emergency room and following surgery returned to the nursing home under the care of hospice only to pass away ten days later.
The Case of Mr. Y (Tinetti and Kumar. JAMA. 2010;303:258).

Mr Y, an 89-year-old retired salesman, lived independently until 3 years ago. He had a right humeral fracture in 2006 and a left hip fracture 3 months later. After hip fracture repair and rehabilitation, he moved in with his daughter, a physical therapist.

Mr Y's medical history includes coronary artery bypass grafting and porcine aortic valve replacement in 2003; dementia; hypertension; gout; peptic ulcer disease; macular degeneration; and bilateral hearing aids. In 1992, Mr Y fractured his right hip in a bar brawl; he used alcohol heavily until a few years ago.

On arrival at his daughter's home, Mr Y reported left hip pain and an unsteady gait. He became delirious when taking oxycodone ER, 10 mg every 12 hours. In June 2007, his daughter brought Mr Y to see Dr C, a geriatrician, who noted pruritus, chronic rhinorrhea, and weight loss. Mr Y scored 28 of 30 on the Folstein Mini-Mental State Examination; he missed the date and recalled 2 of 3 objects at 5 minutes. Mr Y's recall of 2 words, plus his abnormal clock drawing, indicated a positive screen for dementia. Mr Y denied depressed mood or loss of interest with the 2-item depression screen. He was independent in his basic activities of daily living (ADL) but dependent in his instrumental ADL. His medications included aspirin, 81 mg; metoprolol XR, 100 mg; lisinopril, 40 mg; hydrochlorothiazide, 12.5 mg; simvastatin, 20 mg; omeprazole, 20 mg twice a day; allopurinol, 100 mg; acetaminophen/hydrocodone, 1 tablet as needed; docusate, 250 mg twice a day; and nitroglycerin, 0.4 mg sublingually for chest pain.

Mr Y's blood pressure was 148/61 mm Hg without orthostatic changes. He weighed 158 lb. A grade 3/6 systolic ejection murmur was present without signs of heart failure. Mr Y's strength and sensation were normal except for left hip and knee weakness. There was tenderness to palpation over the left greater trochanteric region; the hardware from his hip surgery was palpable. The Romberg test result was negative. A mobility screen provided evidence that Mr. Y was very slow and unsteady getting out of the chair during a Get Up and Go Test and he had flexed posture and a slow shuffling gait.

Results of urinalysis, complete blood cell count, and routine serum chemistries were normal. A left hip radiograph revealed nonunion and bony collapse. A magnetic resonance imaging scan of the brain revealed multiple infarcts.

First round of changes......

Over the next few months, he continued to fall. One fall occurred after he took a cold medication containing diphenhydramine. Another fall occurred in July 2008 after he inadvertently took several sublingual nitroglycerin tablets and developed dizziness and headache. In the emergency department, his initial blood pressure reading while sitting was 130/60 mm Hg, with a pulse rate of 67/min; the corresponding values while standing were 90/50 mm Hg and 58/min. An echocardiogram showed an ejection fraction of 65% and an aortic valve area of 1.7 cm2. Results of computed tomography of the head were unremarkable. Mr Y was sent home but continued to feel dizzy.

Second round of changes....
The fall in July 2008 exacerbated Mr Y’s left hip pain. In November he underwent removal of his left hip fixation plate and screws and restarted PT. The dose of vitamin D was increased to 800 IU daily. He had no further falls.

Mr Y denied that his falls were a significant problem. He declined a paid attendant or referral to adult day care but agreed to a personal emergency response system when it was explained that this would give his daughter peace of mind.