The Prevention of Falls and Prevention of Harm from Falls

An Integrative Review of the Evidence

October 2010 – February 2011

A Topic Summary of the Evidence

**Clinical Question:** For adults in the acute care setting, what strategies are effective in (a) preventing falls and (b) preventing harm from falls?

**Evidence Search Strategies:** An integrative review on the selected clinical question was conducted from October to November 2010 to determine the quality of the evidence. This review examined the effective strategies involved in (a) fall prevention and (b) preventing harm from falls. A review of the research evidence from open years and 2000-2010 was conducted via electronic databases (Agency for Healthcare Research and Quality, Cochrane Library, Institute of Healthcare Improvement, Joanna Briggs Institute, Kaiser Permanente Clinical Guidelines, Ovid/Medline, Proquest, PsycNet, PubMed, Registered Nurses Association of Ontario) the appropriate search terms, either alone, mixed, or in combination. This review yielded 131 relevant hits and, after eliminating duplicates, 42 articles were selected as relevant for inclusion. 8 other articles were located via contextual and reference links, for a total of 50 articles. After careful examination, 8 articles were eliminated, as they did not answer the clinical question or targeted inappropriate patient populations and/or institutional settings. Article inclusion and exclusion was confirmed by an independent reviewer. The remaining 42 articles pertained to the clinical area of inquiry and were reviewed in detail over a two-month period by a dedicated group of 6 nurses committed to the integrative review process. The strength of the research evidence evaluated for this integrative review ranges from insufficient to fair, with the majority of the evidence as insufficient. Result limitations include a lack of randomized controlled trials, varied and mixed research methodologies with conflicting results, insufficient sample size, and a multitude of diverse interventions for falls prevention/prevention of harm from falls, as well as the inability to generalize some research results to the KP patient population.

**Evidence Summary:** Clinical expertise, coupled with an evidence-based strategic falls awareness and prevention framework, is needed to ensure the continuation of quality patient care while also reducing falls/injury from falls rates (See Appendix A, Page 23) (2,5,10,27). Professional nurses are integral for the development and implementation of evidence-based practices to prevent falls/injury from falls and improve the outcomes of patients (19,25). However, in order to achieve the full impact of a multipronged and multifaceted falls program, the traditional manner in which interdisciplinary staff thinks about falls may need to be changed (18,29). Instead of assuming all patients are at risk, regardless of intrinsic or extrinsic risk factors, staff may need to target individualized interventions for those patients most at risk for falling and injury via careful assessment and reassessment on a regular and routine basis (2,9,18,24). Regardless of the design, the success of a falls prevention program depends upon interdisciplinary staff, unit-level management, and senior leadership alignment with the high priority organizational goal of falls prevention (4,6,9,19,33). This heightened sense of awareness throughout multiple organizational levels not only assists in the identification of high-risk patients, but also promotes the central mission of protecting patient from falls at all entry points within the Kaiser Permanente healthcare system (14,20,32,36).

There is conflicting evidence surrounding the board topic of (a) falls preventions and (b) prevention of harm/injury from falls (1-4;6-10;12;14;18;24;25;28;36;38). The evidence focused on several falls-related areas, which included prevention strategies (1,2,4-6,33,38,39), risk stratification and identification (2,6,9,20,24,29), risk assessment (2,5,6,9,10,17,24,36,37), risk factor characteristics (2,4-7,12,13,15,17,24,26,27,30,32-38,41,42), and nursing care implications and strategies (2,5,9,14,17-20-22,27,28,33,36,37-39,42), as well as suggestions for future research (3,5,6,9,10,13,15-17,18,32,33,38,40,41). The risk factors vary between falls prevention versus prevention of harm/injury from falls, as do the specific recommendations for falls prevention strategies and programs. Falls result from a myriad of factors that complicate program evaluation and management (27). To date, a ubiquitous fall and injury prevention strategy has not been identified for hospitalized patients, which may reflect the difficulties in introducing multifaceted strategies and interventions within complex clinical environments (5,6). The contradictory results may represent the lack of high quality research studies and the difficulty conducting randomized control trials for this vulnerable hospitalized patient population (3,8,10,12,28). However, multimodal programs have been endorsed by clinical experts as foundational to the design of evidence-based strategies needed to both standardize and individualize patient care with the acute care setting (2,5,6,9,17-20,23,24,30,33,38).

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Topic Summary

Organizational Factors

- In order for a falls program to be successful, the staff, unit management and senior leadership must remain in alignment with the goals of the project and keep fall prevention as a priority.
- Setting organizational targets for both process and outcomes keep project leadership focused with a heightened awareness.
- Healthcare organizations must become more resourceful in keeping elderly patients safe by protecting these patients from falls at all entry points into healthcare system.
- Hospital-wide interventions and unit-based changes in bedside practice combine to form powerful mechanisms for improving patient safety outcomes by reducing falls.
- Identifying patients at risk for falls, combined with a multifactorial assessment of predisposing factors, allow health care teams to formulate plans to prevent falls in acute care setting.

Falls Prevention/Preventing Harm from Falls Strategies

- 2 conditions and 6 concepts are necessary to a fall protection program to safeguard hospitalized patients and reduce patient falls.
  - **Condition 1: Knowledge/Communication:**
    - Patient report
    - Information Access
    - Signage
  - **Condition 2: Capability/Actions**
    - Environment
    - Teamwork
    - Involving Patient/Family

- **Assess Fall Risk And Risk For Injury**
  - Perform standardized fall risk assessment on admission for all patients and whenever patient’s clinical status changes.
  - Every shift: Identify patients most at risk of moderate to serious injury from falls.

- **Communicate & Educate About Patient Fall Risk**
  - Communication systems of handoffs, rounds, coaching, and feedback enable staff on pilot units to plan test and evaluate the interventions as test of change.
  - Use broad communication strategies and systems to reach all hospital staff beyond bedside caregivers in order to contribute to a continuous decline in the number of falls and injury from falls.
  - Educate patient/family and staff about fall injury risk on admission, throughout LOS, and how they can help prevent a fall. (See Patient Education Section, Page 2)
  - Typical communication failures include:
    1. Failure to communicate new/changed risk assessment & interventions to staff and pt/family
    2. Failure to incorporate/document prevention interventions
    3. Unclear/incomplete handoffs
    4. Unclear/insufficient safety instructions
    5. Patient/family confusion safety instruction and precautions as taught by RN
    6. Assuming pt is key or sole learner
    7. Safety education that fails to meet individualized patient/family needs

- **Both Individualize and Standardize Fall Risk Interventions**
  - Implement hospital wide and patient level improvement to care environment to prevent falls and severity of fall injury.
  - Perform hourly or every 2 hour comfort rounds to assess/address pain relief, toileting, positioning.
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- Visual identification of high risk patients
  - Customize Interventions For Patients At Highest Risk Of Injury From Falls
    - Increase intensity and frequency of observation
    - Visual identification of high risk patients
    - Adapt environment and provide personal devices to reduce risk of fall related injuries
    - Target interventions to reduce side effects of medications
    - Typical failures
      - Lack of nurse observation
      - Failure to Identify high risk patients (fall-related injury due to change in status)
      - Failure to individualize plan of care
      - Lack of reliable intervention implementation
      - Lack of staff knowledge about intervention for challenging patient populations (confused, impulsive, wanderers, previously fallen)

- Falls Prevention Interventions
  - Organizational Specific Interventions
    - Walk-Throughs with Hospital Leaders on an initial and scheduled quarterly basis
    - Participate in national reporting activities such as ANA-NDNQI
    - Ensure default systems for fall prevention are in place when using a sitter program
  - Falls Injury Specific Interventions
    - Limiting restraint use
    - Lowering bedrails
    - Lowering bed height
    - Calcium with Vitamin D
  - Patient Specific Single Interventions
    - No statistically significant differences in risk of falling or fall rates for the single interventions of:
      - Medication (Vitamin D plus Calcium)
      - Psychological (pharmacological to manage behavior)
      - Environmental (carpet vs. vinyl floors)
      - Identification bracelets
      - Bed exit alarms
    - Exercise (Conflicting Evidence)
      - Effective components of exercise programs cannot be identified, due to variability across research studies and inadequate descriptions of exercise interventions
      - *Falls prevention exercise program comprised tai chi, functional movements and activity visualization was not supported by evidence
      - *For older patient admitted to hospital, exercise sessions may not lead to any difference in function, harms, LOS, discharge to home or nursing home or other type of care facility
      - *For patients hospitalized for more than a few weeks, interventions targeting multiple risk factors and supervised exercise are effective
        - *Supervised exercise in subacute hospital setting appears effective
    - Transfer closer to nurses station
      - Line of sight and improved surveillance of at-risk patients
      - Busy environment at station can worsen agitation in some patients
    - Avoid using bladder catheters
    - Double sided slippers
    - Remove IVs when no longer needed
    - Activity apron for patients with dementia
    - Avoid sedative use
    - Back rub & warm milk at HS to promote sleep
    - Call light in reach at all times
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- **Staff Specific Single Interventions** 2,4,25
  - Unit Fall Champion and/or Champion for geriatric awareness 2,25
  - Safety huddles 2
  - Rounding: 2,4,25
    - Combine frequent and regular toileting rounds with existing patient care tasks 2,4
    - Assign a specific staff member to routine rounding to ensure that task responsibility is clear 2

- **Multidisciplinary/Interdisciplinary Interventions** 5,6,9,17,19,23,30,33
  - Most effective interventions are multimodal that 6
    - Address specific areas of risk 6
    - Work with interdisciplinary fall teams 6,9,23
  - Teamwork 19
    - Evidence based protocols combined with interdisciplinary collaboration can assist in performance improvement efforts 19
    - Interdisciplinary team successfully improved the care of the hospitalized elderly patient via the reduction in falls, restraint usage, and sedative medications 19
  - Interdisciplinary collaborative projects with teams who “hit the ground running” are the best performers in the long run, demonstrating: 33
    - Early progress reports (first month) 33
    - More staff frontline support 33
    - Stronger team leadership 33
    - Better conflict management skills 33
    - Come together as a working unit more quickly 33
    - More use of information from other teams 33
    - Gain a broad base of support from other staff 33
  - Teams must successful at reducing major injuries were able to: 33
    - Identify systemic problems via postfall and environmental assessments 33
    - Enact specific solutions 33
    - Participate in staff education for fall prevention programs 5,17,23,30
    - Toileting programs 33
    - Use of signs identifying patients at high risk for falling – most highly correlated with performance measure 33
    - Use of hips pads 33

- **Multifactorial/Multimodal Interventions** 3,6,8,14,16,18,24,25,28,30,31,34,42 (*Conflicting Evidence)
  - Implementation of multifaceted strategies is often difficult to introduce in complex clinical environments 6
  - *A ubiquitous fall and injury prevention strategy has not been identified for hospitalized patients* 6
    - No recommendations can be made regarding any particular components of a multifactorial falls prevention program 3,8,42
    - Despite a multifaceted, customized implementation strategy for fall prevention, no statistically significant reductions in fall rates were found 16,28
    - Small positive effects of these types of programs may be explained by: 8
      - Increased medical, nursing, allied health interventions 8
      - Increased awareness of staff to prevent patient falls 42
      - Combination of improved team goal setting and discharge planning 8
      - And/or increased patient contact time during hospitalization 8
  - *Multipronged intervention involving staff/patient education, exercise program, and use of hip protectors in a subacute hospitalized setting saw a 22 % decrease in falls and 28 % decrease in injuries 6
    - Multimodal process improvement plan decreased fall rate 19% and injuries 77% after 3 years, with effect sustained with continued use 6

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- Multifactorial approach and interventions reduce falls and risk of falling in hospitals
  - Rate of falls (RR 0.69, 95% CI 0.49 - 0.96; 4 trials, 6478 participants)  
  - Risk of falling (RR 0.73, 95% CI 0.56 – 0.96; 3 trials, 4824 participants)  
  - Interventions were most effective for patients hospitalized for more than a few weeks  
  - Key to multifactorial interventions:  
    - Individualized to patient needs  
    - Staff champion  

- Effective multimodal interventions include:
  - Medication adjustment  
  - Environmental adjustment  
  - Strength training  
  - Hip protectors  
  - Fall risk alert card  
  - Education programs  
  - Inclusion of patient and families in fall prevention  
  - Calcium & Vitamin D  
    - Significant reduction (49%) in the number of falls in patients identified as at risk of Vitamin D deficiency  
    - Provide information to clients on the benefits of Vitamin D supplementation in relation to reducing fall risk  
  - Exercise interventions  
    - Treatment of other underlying disorders  

- Statistically Significant Multifactorial Interventions:  
  - Medication  
  - Social environment  
  - Knowledge  
  - Other interventions (nutritional supplements, Vitamin D+Calcium+osteoporosis treatment, oxygen rich air 1st day post-op, blood transfusions prn)  

- Not Statistically Significant Multifactorial Interventions:  
  - Exercise  
  - Environmental/assistive technology  
  - Knowledge interventions  
  - Medication+environmental/assistive technology  
  - Other interventions: Fall risk assessment checklist  

- Multifactorial intervention program for older adults not supported by evidence:
  - Falls risk assessment  
  - Staff and patient education  
  - Medication review  
  - Alterations to the ward environment  
  - Exercise program  

- Fall Prevention Program Implementation  
  - No conclusive evidence of the effectiveness of hospital falls prevention programs in reducing the number of falls or fallers  
    - Interventions seemed to be useful only on long stay care units  
    - Moderate non-statistically significant decrease in fall rates, with no change in injury rates, before and after fall prevention program implementation  

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- Step-wise additions of nursing interventions during the implementation of a falls prevention program over 4 years resulted in a decline from 4.04 falls/1000 patient days to 2.27 falls/1000 patient days. 7
- Post fall prevention program implementation for a head trauma and neurologically compromised patient population showed a decrease in fall average of 14.18 falls per 1000 patient days to 2 falls per 1000 patient day 4

- Sitters 1,4,39
  - Sitters have a marginal impact on falls 1
    - Possible causal factor in fall phenomenon may be that other risk-minimizing tools (e.g. bed checks monitors) are deemphasized when sitters are used 1
      - If sitters steps away or break in sitter coverage, other systems are not in place and falls occur 1,39
  - When more personnel (nurse, nursing assistant, and sitter) share the caring for a patient, negative outcomes such as patient falls can be aggravated 39
  - Fall risks can be decreased by: 1,4
    - Increased nursing observation and vigilance to ensure patient safety 1,4
    - Proactive nursing assistance with toileting, hydration, and movement 1,4
  - Use of soft limb holders decreased after PAAT adoption, but rate of fall injuries did not decrease 39

- Medication 2,30
  - Review current medication lists with prescribing providers to eliminate or replace unnecessary drugs contraindicated in elderly, increase fall risk, or severity of fall related injury 2,30

- Equipment 2,3,5,6,18,38
  - Nurse Dependent 2,3,5
    - Bedrails 5
      - Bedrail removal did not increase fall rates 5
    - Beds 2
      - Height adjustable beds, in low position with brakes locked when patient is resting 2
    - Wheelchairs with anti-tipping devices 2
    - High impact, beveled edge floor mats to bedside; stow it safely when patient is out of bed 2
    - Bed, chair, tab alarms 2,3
      - Does not prevent falls 2,3, but rather alerts staff for need of quick attendance/early rescue of pts who have fallen 2
  - Nurse Interdependent 2,6
    - Restraints
      - Restraints limit mobility, contribute to falls, associated with increased injuries, and don’t prevent falls 6
    - Gait Belts for ambulating patients with mobility concerns 2
  - Environmental 18,38
    - Handrails, glow strips, improved lighting, motion sensor lights, lever door knobs, cord bundling 18,38

- Monitoring of Falls/Injury from Falls 2,4,20,36
  - Monitor and evaluate all patient falls and implement changes to the program in response to evaluation 36
  - Constant monitoring and reassessment remains crucial and involve: 4,20
    - Hourly rounding 2,4
    - Early frequent ambulation 4
    - Encourage patients to call for help 4
    - Frequent toileting 2,4
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- Typical Failures Associated with Interventions
  - Older physical environment with trip hazards
  - Lack of leadership support for environment improvement
  - Silos between service lines and departments
  - Insufficient staff accountability for a safe environment
  - Failure to specify individualized interventions
  - Assuming family presence in room constitutes a fall prevention program
  - Unreliable comfort/toilet round schedule (tasks not completed)
  - Fall risk alarm device problems (alarm failure, lack of timely response, over-reliance on alarms, failure to reset alarms, lack of response to staff report of faulty alarms)
  - Missing/inconvenient placement of intervention supplies
  - Failure to arrange room to favor patients’ stronger or unaffected side or shortest trip to bathroom

- Falls/Injury Prevention Education
  - Staff Education
    - Educating staff about the intrinsic and extrinsic factors leading to patient falls and injuries from falls eliminates the blame and guilt staff often associate with patient fall
    - Evidence-based interventions based on fall risk assessment reduce falls and fall-related injuries
    - Restraint minimization programs involving effective staff education can 1) reduce injuries and 2) do not increase fall rates
    - Education on the prevention of falls/fall injuries should be included in nursing curricula and ongoing education on promoting:
      - Safe mobility
      - Risk assessment
      - Multidisciplinary strategies
      - Risk management including post-fall follow-up
      - Alternatives to restraints and/or other devices
  - Patient Education
    - Educate patient and family about high falls risk via a one-on-one patient education package entailing information on risk factors and preventative strategies for falls, as well as goal setting
    - Educational Components:
      - Teach Back
      - Return Demonstration/Show Back
      - Ask Me 3 (patient questions to providers)
      - What is my main problem?
      - What do I need to do (for that problem?)
      - Why is that important?
    - Fall Prevention for Consumers:
      - Maintain a well light uncluttered environment
      - Know if your medications can affect your mobility needs
      - Have appropriate foot wear
      - Nurses to minimize the use of restraints
      - Familiarize yourself with your surroundings and the layout of the ward
      - Ask staff for help when necessary with the call bell
      - Take your time when moving in the hospital
      - Know your medications
      - Caution when using restraints to prevent falls
Falls Prevention Resources and Tools 2,4,5,7,9,10,18,19,20,22,25,27,28,32,33,36,38

- Fall Prevention Protocols/Guidelines 2,19,22,27,32 (*Conflicting Evidence)
  - *Evidence based protocols combined with interdisciplinary collaboration can assist in performance improvement efforts 19
    - Protocols to decrease use of sleep promoting medications that contribute to falls and injury 2
  - *However, one study demonstrated no significant difference in fall rates before and after the implementation of fall prevention guidelines 22
  - Guidelines: 27
    - Nurses Improving Care for Health System Elders (NICHE) guideline for falls prevention in acute care unit 27
    - Intervention Protocol Procedures 32

- Fall Prevention Toolkit 10,18,22,33 (*Conflicting Evidence)
  - *The implementation of a falls prevention tool kit, with use of health information technology (HIT) was related to significantly reduced falls and was particularly effective with patients 65 years or older 10
    - No significant effect in fall-related injuries 10
    - Not effective with younger patients 10
  - *A falls toolkit can assist healthcare facilities to create and improve comprehensive falls prevention programs by: 18,33
    - Analyzing data collection from Root Cause Analysis 33
    - Develop best practices, action plans and outcome measures to reduce falls & fall related injuries 18,33

- Person-to-Person Communication 2,18
  - Hourly rounding forms 2
  - *Lightning Rounds* checklist 18
  - Punch List during walking rounds 2
  - Safe Environment Checklist 2
  - SBAR 2
  - Shift handoff checklist 2

- Visual Indicators (visual identification of high risk patients) 2,4,5,7,9,20,28,33,36,38 (*Conflicting Evidence)
  - Colored socks, *wrist bands, blankets, room/door/assignment board signage, reminders of hourly rounding 2,4,5,7,28,36,38
    - Use obvious, unambiguous, and Individualized visual alerts 9
      - Generic signage can be futile if they are everywhere and staff becomes immune to them 9,28
      - “Too much pink” caused a fall prevention program to lose some of its significance 28
    - *Identification bracelet studies failed to show any fall reductions 36
    - *High risk patients with armband identification bracelets had higher fall rates than those without the armband 5

- Models and Frameworks 2,10,27
  - Sentara’s Falls Reduction Conceptual Framework: An Error Management Model 2
  - Falls Predictive Model 10
  - Algorithm for Evaluation and Management of Falls 27
Fall Risk Assessment Scales 2,5-7,9,10,13,15,17,18,20,24,27,28,30,32,35-37,42
• Assessment 2,5,6,9,17,24,37,42
  o A fall risk assessment is insufficient unless fall risk status is communicated to all stakeholders and guides individual plans 9
    ▪ Patients of all ages should be screened using a standardized tool 6
    ▪ Develop a formal, documented, standard policy on risk assessment and falls prevention to reduce risk of falls 24
    ▪ May be more appropriate to assess risk rather than calculating a composite score 42
    ▪ A higher use of risk assessment tools for fallers (94%) compared with non-fallers (74%) 17
  o Use a risk assessment instrument routine to measure the level of mental status deficits as part of the falls risk assessment 37
    ▪ Involve nursing staff and family members in assessing a patient’s mental status 37
  o Increase frequency/intensity of patient observation when initiating drugs that increase fall risk (sedatives, anti-HTN) or risk of fall related injury (anticoagulants) 2
  o Fewer falls during shifts in which risk assessment and toileting interventions used, but compliance difficult to maintain 5
• Reassessment 6,20,24,42
  o All patients who fall should have a comprehensive post-fall assessment 6,20,24
    ▪ High level evidence suggests that in-hospital patients who have already fallen should undergo post-fall assessment of fall risk factors as a key fall prevention strategy 20,24
    ▪ Only 66% of patients experiencing a fall were reassessed 42
• Instruments 5,7,10,15,18,28,32,36,42
  o Fall risk assessment tools are not standardized within hospitals 17
    ▪ Good interrater reliability, but inaccurate 36
    ▪ Tools may not be sensitive in identifying patients most at risk of fall 42
    ▪ Do not measure environmental factors or human and organizational factors (staffing, new staff, patient acuity, census) 36
  o Tools/Instruments: 5,7,10,15,18,28,32,42
    ▪ STRATIFY 5
    ▪ Morse Fall Risk Assessment 5,10,28,32
      ▪ Low specificity and positive predictive value of Morse Fall Scale 28
    ▪ Heinrich Falls Risk Model I & Model II 5
    ▪ Functional Reach Test 5
    ▪ Hospital created untested assessment tools 7,15,18,42
      ▪ Fall Risk Assessment tool 15,18,42
      ▪ Fall Quality Assessment tool 7
    ▪ Nurses clinical judgment 5

Fall Risk Factor Characteristics 4-7,12,17,24,26,27,33,35-38,41,42
• Falls result from myriad of factors that complicate evaluation and management 27
• Some evidence suggests that actively targeting a patient’s most important risk factors for falls helps in reducing the number of falls 24
  o Identify both intrinsic and extrinsic factors that contribute to falling 24
• Extrinsic Risk Factors 4
  o Location of Falls 35-38
    ▪ Near patient’s bed: 50% of falls 35,36
    ▪ Moving from one place to another 35-38
      ▪ Corridor 35,36
A Topic Summary of the Evidence

- **Bathroom**
  - Geriatric unit

- **Environmental**
  - Unfamiliar hospital environment
  - Florescent light
  - High gloss floors/condition of floors

- **Equipment**
  - Inadequate footwear
  - Assistive device
  - Bed Height
  - Bedrail (*Conflicting Evidence*)
    - No evidence that bedrails increase falls from bed
    - For all age-gender groups, the incidence of falls from bed with bedrails elevated was equal to or greater than when bedrails were not elevated
  - Restraints

- **Toileting**
  - Toileting remains a factor in patient's falling
  - Urge incontinence

- **Alcohol (ETOH)**
  - 12.5% who fell from bed had an alcohol related diagnosis, 85% males
  - 70% with alcohol related medical related diagnosis and fell from bed over elevated bedrails
  - 2/3 considered “not rational” at time of fall

- **Time of Fall**
  - Night shift more at risk of patients falling

- **Length of Stay (LOS)**
  - Greater number of falls among patients hospitalized for 2 weeks or longer
  - LOS greater than 14 days = 14 fold increase in fall risk

- **Surgical Procedures**
  - Admission to the surgery, orthopedics, urology, neurosurgery service
  - Neurosurgery = 3 fold increase in fall risk
  - Although neurosurgery, surgery, urology and orthopedics had higher fall rates, patients who underwent a surgical procedure had a significantly lower risk of falling

- **Medications**

- **Intrinsic Risk Factors**
  - Gender
  - Age
  - Elderly

- **Intrinsc Risk Factors**
  - 65 years of age and older
  - For group 65 yrs or >, no association of age with falls
Older hospitalized people, and particularly over 75 to 85 years, are proportionately most vulnerable for falls. Mental Status/Confusion/Cognitive Impairment is most frequently associated factor for total falls was patient’s mental status. Statistically significant proportion of falls for patient 65 years or older occurred in those with mental stats deficits (MSD). Non-elderly, healthy individuals with acute psychiatric problems are at risk for falls. Complex psychotropic medication regimens to manage acute psychosis increases the risk for falls.

Co-Morbidities include Cardiovascular (CHF, vasovagal syncope, arrhythmias, infarction, valvular stenosis), Diabetes, Osteoporosis, Frailty, History of smoking, Arthritis, General medicine disease, Orthostatic hypotension, Cerebrovascular accidents, and Neoplasm. Vitamin D deficiency and Uncorrected Visual Impairment (doubles risk of falls) are also noted. Impaired Functional Status, Gait/Balance/Mobility Impairment, and Fear of Falling are additional factors. More than One Risk Factor is considered.

Multiple Falls vs. First Fall highlights high level evidence suggesting that in-hospital patients who have already fallen should be considered high-risk for future falls. Follow-up monitoring 48 hours after the fall is warranted, with patient/family caregiver education with specific post-hospital discharge instructions for falls prevention. Fall preventive program showed an effect of the intervention protocol in decreasing the number falls after the first fall had occurred. Demonstrated an effect of preventing multiple falls, but not first falls. A first fall is an important marker for subsequent falling. Statistically significant reduction in falls (RR 0.71) by applying a tailored plan of care to adult inpatients deemed at high risk for fall based on having a previous fall. However, there were NO decrease in injuries.

Harm/Injuries from Falls include Risk of Injury from Falls. Screening for injury risk should be performed across all acute care settings. Patients of all ages should be screened and reassessed at regular intervals. Screening via a standardized tool should include injury risk. Most fall risk assessment tools do not assess for injury. Moving beyond traditional measures of fall rates to assessing and measuring patient injury from falls provides more information for a new level of intervention to be applied. Reduce impact of potential trauma via protective equipment (hip protectors, helmets). *Contradictory evidence regarding the efficacy of hip protectors.

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### Injury from Falls Risk Factors

#### Extrinsic Risk Factors
- Equipment
  - Restraints
    - Associated with increased injuries
  - Bedrails
    - No statistically significant relationship found between bedrail position and injury severity in falls from bed or increase fall-related injuries
    - Serious direct injury from bedrails related to use of outmoded designs, incorrect assembly, and incompatible combinations of equipment

#### Toileting
- Mental status deficit fallers had few toileting related fall than those without mental status deficits

#### Surgical Procedures
- Post-surgery, especially lower limb amputation, major abdominal or thoracic
- A multidisciplinary multifactorial intervention of systematic assessment and treatment of fall risk factors, as well as active management of postoperative complications, can reduce the amount of falls in patients with femoral neck fracture following surgery

#### Medications
- Medications factors related to bleeding

#### Intrinsic Risk Factors
- Greater than 85 yrs old or frail
- Confusion
- Mental Status Deficits (MSD)
  - MSD fallers have more severe injuries than those without MSD
  - MSD fallers statistically significantly older than those without MSD (MSD fallers = 75.67 years [SD 14.9, range 20-99, median 80 years])
  - MSD fallers have higher fall chance during 2300 to 0700 hours (n=142, 42.6%)

#### Unsafe Gait

#### History of Falls

#### Co-Morbidities/Health Conditions
- Bone Conditions (osteoporosis, previous fracture, prolonged steroid use, metastatic bone CA)
- Physiologic bleeding disorders related to clinical conditions
- Low BMI
- Vitamin D Deficiency

#### Simple Reminder: ABCs
- A = age or frailty
- B = bones
- C = coagulation
- s = recent surgery
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- **Degree of Harm/Injury Scales**\(^{13,37}\) (Note from Author: Unable to determine the testing and/or validity and reliability of the following scales)
  - **Degree of Harm**\(^{13}\)
    - No Harm
    - Low Harm
    - Moderate Harm
    - Severe Harm
    - Death
  - **Five Point Injury Scale**\(^{13,37}\)
    - 1. No apparent injury
    - 2. Minor injury
    - 3. Moderate injury
    - 4. Major injury
    - 5. Death

- **Documentation**\(^{4-6,9,13,42}\)
  - Patient care plan should include the fall risk status with tailored interventions which needs to be easily accessible to all stakeholders (healthcare team, patients, and family)\(^9\)
    - Stakeholders must use this information plus their own knowledge and skills and patient and hospital resources to carry out the plan\(^9\)
  - Documentation of falls care compliance is problematic\(^{42}\)
    - There is considerable variation in both recording and reporting of falls\(^{13}\)
  - **Electronic Health Record**\(^{4-6,9}\)
    - Most automated risk assessment techniques are electronic versions of existing instruments with limited use of computerized decision support\(^5\)
    - Generic nature of automated care plan creates a “dead document” within a “siloized” patient record\(^9\)
    - Ensure that fall precautions orders in the computer\(^4\)
    - Examine use of computer based guidelines in all settings\(^6\)
    - Methods for computerized screening & follow-up should be explored\(^6\)

- **Data Collection & Analysis**\(^{2,5,11,13,17,20,23,25,29,33}\)
  - Data collection and analysis can cause facilities to modify their fall prevention programs\(^{33}\)
  - **Data Collections Tools**\(^{17,20}\)
    - Develop fall data collection processes\(^20\)
    - Fall Prevention for Older Adults Evidenced-Based Protocol\(^{17}\)
  - **Data Analysis Tools**\(^{2,20,23,25,29,33}\)
    - Develop fall data analysis processes\(^20\)
      - Assess injury or injury from falls via standardized normalized method to quantify injury using the definitions of National Quality Forum\(^{29}\)
    - Run charts\(^2,25\)
    - Root Cause Analysis\(^{33}\)
    - Consistent control chart presentation of fall data\(^{23}\)
  - **Fall Outcome Measures**
    - Use of reported data allows managers and staff to identify fall prevention opportunities\(^{23}\)
    - **Outcome Measures**:\(^{2,17,29,33}\)
      - Rate of falls per 1000 patient days\(^{29}\)
      - Days between falls resulting in moderate or major injury or death\(^{29}\)
      - Analyze fall via accidental fall, anticipated physiologic falls, and unanticipated physiologic falls\(^{33}\)
      - Injury rate per 1000 patient days\(^{29}\)
      - Measure reliability of rounding as a falls prevention intervention (focus on improving reliability with goal of 100%)\(^2\)
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- Continuous evaluation of the outcomes of interventions in relation to certain risk factors
- National Voluntary Consensus Standards for Nursing Sensitive Care: Initial Performance Measure Set

- **Fall/Injury Reduction**
  - Move beyond traditional fall rate measures to assessing and measuring patient injury from falls, as it provides more information for a new level of intervention to be applied

- **Fall Rates**
  - Be cautious in using crude reported fall rates as any indicator of the quality of care, safety or governance in units
  - Units committed to falls prevention maybe more likely to record and report falls, with lower apparent fall rates in less committed hospitals

- **Coding**
  - ICD-9 codes typically used to record a fall in the medical record, but not used consistently for reporting
  - Most institutions rely on incident reports to identify fall events
  - ICD-9-CM: inpatient code of E888 “other and unspecified fall”

- **Usability testing**
  - Usability testing can identify errors and/or problems with a system that negatively impact existing acute care workflow
  - Provides vital information to significantly improve the chances for end user acceptance during the pilot phase

- **Cost/Benefit**
  - The beneficial consequence of fall/fall injury prevention programs has the potential to streamline resource use with the added potential for decreased costs associated with this clinical problem
  - For older patients admitted to hospital, a special care program that includes exercise may slight reduce the cost of care to the health system by $278 per patient hospital stay (2007 dollars)

- **Nursing Care Implications**
  - **Surveillance**
    - Increased nursing observation and vigilance ensures patient safety and decreases fall risk
    - Targeted surveillance and the use of risk assessments should be used as part of falls prevention policies for cognitively impaired older patients during hospital stays
      - Targeted surveillance might include using sitters or adding a fall risk assessment tool to assessments of cognitive impairment
    - Involving family visitors in patient care may provide psychological support, but cannot replace nurses in effectively preventing patient falls
    - When more personnel (RN, NA, and sitter) share the caring for a patient, the negative outcome (i.e., patient falls) can be aggravated
  - **Staff Awareness**
    - A multi-component fall prevention program may increase a nurse’s awareness and appropriateness of the interventions used
      - Maximize the awareness of fall risk among the staff via careful daily assessment and initiation of a reporting tool
    - A randomized control trial demonstrated that, although awareness, documentation, and knowledge improved with fall prevention strategies, it did not prevent harm from falls
      - Harm from falls actually increased despite strategies
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- **Nursing Strategies** 2,5,9,12,14,17-22,25,27,28,30,33,36,37,38,39,42
  - **Nursing Practice** 2,12,17,18,19,25,30,37,39
    - Nurses are integral in developing and implementing evidence based practices to prevent complications and improve the outcomes of patients 19
      - Nurses have a significant role in quality of care via the impact they have on nurse-sensitive quality indicators 25
    - Change the traditional method nurses think about falls 18
      - From traditional method of assessing "all" patients are at risk regardless of age, sex or diagnosis To targeting patients most at risk 18
    - Nurse as a Unit Fall Champion has been identified as a best practice for falls prevention 2,18
    - Nurses should partner with high risk patients to maximize their independence 17
    - Nurses should play a key role in detecting risk factors for falls in patients showing signs of cognitive impairment 37
      - Involve nursing personnel and family members in assessing a patient’s mental status to assist in preventing falls caused by mental status deficits 37
    - As nurses are accountable for both patient and sitter, it is essential they understand the responsibilities between licensed and unlicensed nursing staff 39
    - Bedrails should never be a substitute for adequate levels of care and observation as a stand-alone method of falls prevention 12,30
  - **Nursing Interventions** 17,20,30,36,38
    - Key Caregiver Steps to Prevent Fall/Fall Injuries: 20
      - Establish a trusting relationship with patients and significant others 20
      - Frequently reorient patients to environments 20
      - Remind those at high risk of falls not to get out of bed 20
      - Check on patients frequently 20
      - Keep personal items within reach 20
    - Most Common Nursing Interventions: 17
      - Adaptation and structuring of the environment 17
      - Review and modification of medications 17
      - Regulation of the patients ambulation and toileting rounds 17
    - Increase staff awareness, educate patients and staff, and promote interventions 36
    - Focus on safe patient transfers and movements in the patient room 38
    - Nursing best practice guidelines can be successfully implemented only where there are adequate planning, resources, organizational and administrative support as well as appropriate facilitation 30
  - **Barriers** 5,11,28,39,42
    - The majority of practicing nurses are underprepared to care for the special needs of an increasingly older population experiencing the debilitating effects of chronic disease 21
    - Resistance of nurses and lack of fall intervention compliance may negate the effectiveness of falls prevention strategies 5
      - Failure more likely due to systems issues related to guideline implementation failures 5
    - Nurses may spend more time coordinating care, which can result in fragmented workflow and impact safe hospital stays 39
    - Involve more ward staff so they can take ownership of project and don’t perceive it as being driven by middle management 28,42
  - **Tools/Resources** 9,14,22,27,33,39
    - Experienced clinical staff are needed to adapt basic risk screening tools, as well as test and develop them over time to meet the needs of specific patient populations and reflect clinical practice setting realities 14

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- Practical nursing interventions reduce the risk of falls in the hospital setting and are contained within the NICHE guideline.
  - However, one project demonstrated that changes in fall prevention nursing practice, as well as documentation and evaluation, was not strongly evident after implementation of fall prevention guidelines.
- Visual cues are particularly important to nursing assistants due to absence or delayed patient report.
  - Signs allow staff to immediately align resources with needs, with immediately observable results.
- Tools such as the PAAT may help nurses assess patients’ needs for sitters and better judge whether to request scarce resources for nursing services.

Nursing Research: Present and Future

- Research must be conducted on a larger scale to demonstrate generalizability and to be able to translate the evidence into practice.
- Nursing education and change in practices are vital markers. Further research should identify standard markers and the degree of significance each marker has in preventing falls.
  - Targeting risk factors and actions to change the professional behaviors in the healthcare team.
- Fall incidence and fall prevention should be examined further with the aim of standardizing assessment across the acute care sector.
- Design research studies evaluating fall assessment and prevention processes and programs that target those patients most at risk for falls and fall-related injuries.
- Randomized control trials and other types of research methodologies should be used to explore current approaches to falls prevention that have a limited research base.
  - Sustained surveillance and increased supervision of the group of high fall risk patients in the hospitals.
    - Monitoring.
    - Alarm systems.
    - Impact of bedrails, the development of legal and ethical guidelines to their usage as well as possible alternatives.
  - Multimodal interventions controlling for staffing ratios, skill mix, acuity, comorbidities, and other environmental factors.
  - Supervised exercise in the acute care setting.
  - Understanding mechanisms for differences between genders, falls rates, injuries, timing, and institutions.
  - Hospital level studies involving medical/surgical wards of patients other than geriatric.
    - Fall prevention measures appropriate for younger patients.
- Data Collection and Analysis:
  - Questions on recording and reporting variability bias.
  - Consistency between trials and more effective pooling of data.
- Fall Risk Assessment, Identification, Risk Factors, and Prevention:
  - Automated methods of assessing and communicating fall risk.
  - Relationship between tachycardia caused by agitation & anxiety and/or psychotropic medication regime and fall risk.
  - Identification of prevention measures and tailored interventions for newly identified risk factors, such as Vitamin D deficiency.
  - Link between fall risk assessment and an individualized plan.
  - Overcoming barriers to intervention implementation and guideline adherence.
  - Rate of falls and number of falls to detect a significant effect of their interventions.
  - Use and effectiveness of pictograms specific to patients’ fall prevention plans.
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• **Repeat/Multiple Falls** \(^{13,33}\)
  o Recurrent fallers or for secondary falls prevention vs. single fallers and primary falls prevention \(^{13}\)
  o Effectiveness of team communication, and care planning redesign for patient who experience repeat falls \(^{33}\)

• **Financial Considerations** \(^{3,6,40}\)
  o Economic evaluation of falls prevention interventions should be included \(^{3}\)
  o Cost-effectiveness studies to characterize the impact of fall and injury prevention programs \(^{6}\)
  o Cost-effectiveness of sitter or volunteer components of a fall prevention program \(^{40}\)

• **Toileting** \(^{38,40}\)
  o Design interventions to lead to fewer toileting-related falls and injurious fall during hospital stays \(^{40}\)
  o Clinical trials to test which nursing initiated interventions work on certain types of toileting related inpatient falls \(^{38}\)
  o Investigate differences in prevalence of toileting related falls across different types of hospital and inpatient units \(^{38}\)
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## Search Methodology

**Inclusion criteria:** fall prevention, falls, prevention of harm/injury from falls, acute care setting, hospitalized patient population, adult inpatient

**Exclusion criteria:** evaluation of fall risk assessment tools/instruments; children, pediatric population, acute care nurses experiences, perceived barriers, measuring direct healthcare costs, fracture risk, implementation of clinical guidelines, ambulatory care, community care, home care, skilled nursing facilities, rehabilitation units outside the acute care setting, subacute care units outside the acute care setting, convalescent homes, data sets, DRG weights

### Key Search Terms

**Key Search Terms (Open or 2000 to 2010)**

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<th>Terms singular, mixed, or in combination</th>
<th>AHRQ</th>
<th>Cochrane Library: Cochrane Review</th>
<th>Institute of Healthcare Improvement</th>
<th>Joanna Briggs Institute</th>
<th>KP Clinical Guidelines</th>
<th>Ovid</th>
<th>Proquest (search 1) + Search 2)</th>
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**Search Results (October 18th to November 17th, 2010)**

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<th>Registered Nurses Association of Ontario</th>
<th>Context &amp; Reference Links</th>
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<th>Excluded Articles (did not meet inclusion criteria)</th>
<th>Relevant Selected Articles (duplicates removed)</th>
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**Grand Total of Search Results**

| 131 |

**Relevant Articles for Review**

| 50 |

**Total Articles Excluded After Review:** 8

**Total Relevant Articles Included in Final Review:** 42

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### Ranking and Leveling of the Evidence

#### Canadian Medical Association Evidence Scoring System  
*(Adapted by KP SCAL Regional Nursing Research Program, 2006)*

<table>
<thead>
<tr>
<th>SCORE</th>
<th>LEVELS OF STUDIES</th>
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<th>ARTICLE NUMBER</th>
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<td>9</td>
<td>Large Sample Randomized Controlled Trials</td>
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<td>Small Sample Randomized Controlled Trials</td>
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<td>Non-random, Controlled Prospective Studies</td>
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<td>Non-random, Controlled Retrospective Studies</td>
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<td>5</td>
<td>Cohort Studies</td>
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<td>Case-Controlled Studies</td>
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<tr>
<td>3</td>
<td>Non-Controlled, Clinical, Descriptive Studies</td>
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<td>Case Studies</td>
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<td>2,23</td>
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<td>Expert Consensus, Manufacturers Recommendations (Literature Reviews)</td>
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**Total** 42

#### American Association of Critical Care Nurses (AACN) Evidence Leveling System

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<td>A</td>
<td>Meta-analysis of multiple controlled studies or metasynthesis of qualitative studies with results that consistently support a specific action, intervention, or treatment</td>
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<td>Well-designed controlled studies, both randomized and nonrandomized, with results that consistently support a specific action, intervention, or treatment</td>
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<td>Qualitative studies, descriptive or correlational studies, integrative reviews, systematic reviews, or randomized controlled trials with inconsistent results</td>
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<td>D</td>
<td>Peer-reviewed professional organizational standards, with clinical studies to support recommendations</td>
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<td>Theory-based evidence from expert opinion or multiple case reports</td>
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<td>M</td>
<td>Manufacturer’s recommendations</td>
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</tbody>
</table>

**Total** 42
References


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(29) Quigley P, Hahm B, Gibson W et al. Reducing Serious Injury From Falls in Two Veterans' Hospital Medical-Surgical Units. *Journal of Nursing Care Quality* 2009;24:33-41.


(33) Stalhandske E, Mills P, Quigley P, Neily J, Bagian J. VHA's National Falls Collaborative and Prevention Programs - Collaboratives and Patient Involvement Section in Advances in Patient
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Appendix A
Falls Awareness & Prevention Model:
An Evidence-Based Framework for
Risk Reduction & Management
Purpose/intended Audience

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