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# Falls prevention in continuing care

## A Bruyère Rapid Review

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# Key messages

Falls prevention has been identified as a high priority at Bruyère Continuing Care. Many falls occur as a result of interactions of multiple risk factors at the individual and setting level.
Based on our assessment of the evidence, we recommend three strategies to reduce fall rates in Bruyère Continuing Care settings:

- Implement a comprehensive risk assessment tool, tailored for the clinical setting, for use at admission to design individualized, multifactorial falls prevention plans
- Implement post-fall huddles to foster ongoing team learning and continuously improve the comprehensive risk assessment process.
- Engage staff and clients in implementing falls prevention, fostering a culture of ongoing learning and continuous monitoring and improvement of individual falls prevention plans.

Tools for implementing falls prevention strategies and a review of risk assessment tools is covered in the companion Bruyère Evidence Review.

# Executive summary

Falls prevention has been identified as a high priority at Bruyère Continuing Care. Many falls occur as a result of interactions of multiple risk factors at the individual and setting level.

The objective of this review was to assess the effectiveness of falls prevention interventions in four settings in continuing care:

1) subacute care;
2) palliative care;
3) rehabilitation and geriatric day unit settings; and
4) long term care.

We identified 5 systematic reviews and 4 clinical practice guidelines which assessed effectiveness of falls prevention in one or more of these settings. The full report outlines findings in each of these settings and the quality of the evidence.

Based on our assessment of the evidence, we recommend three strategies to reduce fall rates in Bruyère Continuing Care settings:

- Implement a comprehensive risk assessment tool, tailored for the clinical setting, for use at admission to design individualized, multifactorial falls prevention plans
- Implement post-fall huddles to foster ongoing team learning and continuously improve the comprehensive risk assessment process.
- Engage staff and clients in implementing falls prevention, fostering a culture of ongoing learning and continuous monitoring and improvement of individual falls prevention plans.

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# Background: context and risk factors

## Context

The Senior Quality Committee of Bruyère Continuing Care requested a review of evidence regarding falls prevention in the Bruyère continuing care settings:

1) rehabilitation (stroke and geriatric care);
2) palliative care;
3) subacute care; and
4) long term care.

Preventing falls was identified by a recent Accreditation Canada report as a high priority(1).

This review of falls prevention interventions will consider the context of each of these different settings with a focus on feasibility and relevance to the setting. Different risk factors are more prevalent in different settings. For example, a study at Bruyere Continuing Care has shown that the risk factors for falls in adults with advanced cancer in the palliative care setting are different from other settings, and include a primary brain tumour, a fall in the previous 3 months, severity of depression, benzodiazepine use(2). These differences may require a tailored approach to falls prevention.

Falls are a major public health problem and the leading cause of injury-related hospitalizations among seniors (aged 65 and older) in Canada; 20 to 30% will experience a fall each year(3) and 85% of all fall-related hospitalizations are due to falls in seniors(1). Half of people aged 85 and older will fall each year and 12% to 42% who fall will have a fall-related injury (4). There are more fall-related hospitalizations associated with serious injuries such as hip fractures in seniors living in long-term residential care (59%) than in the community (32%)(3). The direct health care costs for fall-related injuries in Canada are estimated at $2 billion annually(1, 3).

## Risk factors for falls

Falling is associated with a variety of risk factors including biological, behavioural, environmental and socioeconomic risk factors(3). Many falls occur as a result of interactions of multiple risk factors(3). The most powerful predictor of a fall is a history of falling (1). Falls can occur in the home or in various hospital settings including continuing care and acute care. Continuing care involves two types of care – residential-based care and hospital-based care(1). Risk factors and associated odds of falling for community-dwelling, hospitalized and residential or nursing home

# Evidence review

We searched for relevant systematic reviews and guidelines published between January 2007 and June 2015 in Medline, the Cochrane Library (DARE and HTA) and Trip Database (Appendix 1). The search results and potentially eligible articles were screened and reviewed in duplicate. The quality of eligible guidelines and systematic reviews was assessed using the AGREE score and AMSTAR checklist respectively (Appendix 2).

## Evidence review: Risk factors for falls

Based on a 2013 updated assessment of risk by the American College of Physicians, the most important predictors of risk of falling in hospitalized patients were a history of a previous fall (3 times higher risk), ambulatory aids (3 times higher risk), vision impairment (2 times higher risk), cognitive impairment (3-6 times higher risk) and the presence of poly-pharmacy or benzodiazepines (2-7 times higher risk). Other risk factors for falls in hospitalized patients are shown in Table 1.

Some risk factors may be more common in some settings e.g. ambulatory aids in rehabilitation care(6); cognitive impairment in palliative care(7). For subacute care, balance and cerebrovascular disorders are more common in the stroke unit(8); polypharmacy and psychotropic drug use are more common in geriatric care(9). History of previous fall is the best predictor of subsequent falls in long-term care (LTC)(10, 11).

# Evidence review

## Evidence review: Systematic reviews of falls prevention

We identified 5 systematic reviews of falls prevention (12-16). Two reviews were focused on subacute care (geriatric care, rehabilitation)(12, 13); one review on stroke patients in rehabilitation care(16); and two included diverse hospital settings (14, 15). We summarize the evidence on effectiveness below in a single table, with a description about setting-specific findings below. Their quality varied from 2-11/11 on the AMSTAR score.

**SUBACUTE CARE SETTINGS**

In subacute settings, two reviews concluded that unifactorial falls prevention interventions were ineffective (i.e. bracelets to identify those at high risk, low-low beds, staff education, carpet vs vinyl floor), possibly due to short stays with inadequate time to reap the benefits of interventions(13, 15). However, risk assessment followed by targeted multifactorial interventions including exercise, medication review, environmental review, vision correction, education were effective based on high quality evidence from randomized trials.

**REHABILITATION SETTING**

Similar to subacute settings, unifactorial falls prevention interventions have not shown evidence of benefit in high quality studies. However, risk assessment followed by targeted interventions to address identified risks was effective at preventing falls. Also, vitamin D was effective for those who were vitamin D deficient, and had duration of stay of >12 weeks.

**PALLIATIVE CARE SETTING**

We found one systematic review of risk factors for inpatient oncology patients falling (mainly in palliative care settings)(17). This review included six studies of the inpatient setting, including a prospective study conducted in Bruyère Continuing Care(2). Almost half of patients admitted to palliative care experience a fall, and the following risk factors were identified: previous fall (odds ratio 9.5), cognitive impairment (odds ratio 10.5), delirium (odds ratio 2.2), depression (odds ratio 2.8), brain metastases (odds ratio 7.5), physical performance measures (e.g. gait) (odds ratio 11.6), gender (women were more likely to fall than men), age. The number of medications taken was not associated with falling, but use certain medications was associated with increased risk of falling including antipsychotics, odds ratio 4.9; corticosteroids, odds ratio 2.8; and benzodiazepines (odds ratio 2.15).

We did not find evidence on falls prevention interventions in palliative care settings.

**LONG TERM CARE SETTING**

Interventions which were shown to prevent five or more falls per 100 people per year were:

- Client education
- Strength and balance training
- Medication review and discontinuation, where appropriate
- Multifactorial interventions
- Wireless position monitoring
- Vitamin D supplementation
- Staff education on patient safety

**Summary Table: Synthesis of falls prevention intervention in hospital settings**

| Interventions | Long term care | Stroke & rehabilitation | Subacute | Palliative |
|---|---|---|---|---|
| | #falls/100 people/year | | | |
| Strength and balance training, | ✓ 11 falls | ↔No effect | ✓ 8 falls | |
| Vitamin D supplementation for those who are vitamin D deficient, | ✓ 7 falls | ✓if stay >12 weeks | ↔No effect | |
| Multifactorial interventions | ✓ 8 falls | | ✓ 6 falls | |
| Client education, | ✓ 14 falls | | | |
| Medication review /pharmacist outreach, | ✓ 8 falls | | | |
| Fluid for dehydration and management of urinary incontinence | ✓ 8 falls | | No data | |
| Staff education on patient safety | ✓ 7 falls | | ↔No effect | |
| Fall risk assessment at admission and post fall + targeted multifactorial intervention[1] | risk assessment alone ineffective | ✓ 11 falls | ✓ 11 falls | |
| Wireless position monitoring vs usual care for those at high risk | ✓ 7 falls | | ? conflicting evidence of benefit | |
| Pressure-sensitive mats or bed/chair alarms | ↔No effect | | ↔No effect | |
| Bracelets to identify high risk patients | No data | ↔No effect | ↔No effect | |
| Carpet vs vinyl flooring, | No data | | ✗ increases falls | |
| Low-low beds, | ? | | ↔No effect | |
| Exercise programs | ✗ increased risk of falls [2] | ✗ increased risk of falls[3] | ✗ increased risk of falls [4] | |

[1] targeted multifactorial intervention includes falls risk assessment, exercise, medication review, vision correction, education, environmental review, medical examination (Healey)

[2]Exercise program involved brisk walking

[3]Exercise program involved post-stroke patients walking on a treadmill

[4] Exercise program involved seated leg strengthening exercises

✓ favourable effect; ↔No effect; ? conflicting evidence; ✗ unfavourable effect

## Clinical practice guidelines for falls prevention

We identified four guidelines for falls prevention in hospital-based continuing care setting(11, 18-20). We excluded guidelines on acute care settings only because we expect differences in the patients and settings may lead to different drivers of falls than the continuing care settings

Recommended interventions in guidelines were in agreement with findings in the systematic reviews.

- Comprehensive falls risk on admission (Silver )
  [see below for components]
- Tailored, multifactorial interventions (based on comprehensive risk assessment) (Silver )
- Exercise as part of multifactorial program (Silver )
- Client engagement and education (Bronze )
- Staff education and engagement (Bronze )
- Post-fall assessment and problem solving (Silver )
- Environmental modifications (Silver )
- Psychotropic medication review and discontinuation (Silver )
- Least restraint (Silver )

**Controversy in the guidelines regarding:**

- Hip protectors for those who tolerate wearing them (Silver )
- Surveillance using wireless positioning or remote sensors (Silver )
- Bone check and osteoporosis treatment, if indicated (Silver )
- Vitamin D supplementation (Silver )

Comprehensive falls risk includes assessing falls history, gait, balance and mobility, and muscle weakness, osteoporosis risk, older person's perceived functional ability and fear relating to falling, visual impairment, cognitive impairment and neurological examination, urinary incontinence, assessment of environmental hazards, cardiovascular examination and medication review, and may include other components dependent on the setting. Validated tools for this are reviewed in the companion Bruyère Best Evidence Review.

Multifactorial interventions include strength and balance training, home hazard assessment and intervention, vision assessment and referral, medication review with modification/withdrawal, post-fall assessment and conferences, client and staff education(20).

## Client/patient views and acceptability

NICE conducted a separate review on perspectives of patients and clients about falls prevention which included 24 studies. This review identified multiple barriers to adhering to falls prevention including fear of falling, low self-efficacy, low perceived need (underestimating personal risk of falling), embarrassment, inconvenience and alienation because of imposed strategies rather than mutually agreed strategies. Facilitators included information promoting the positive aspects of falls prevention (e.g. social aspects, maintaining independence), partnering with a peer and being responsive to individual preferences for strategies. NICE recommended that falls prevention programs be designed to accommodate participants' needs and preferences.

# Discussion of evidence review: strengths and limitations

One limitation of these recommendations is that there is uncertainty about the components of multifactorial interventions as they are not assessed individually. For example, multifactorial risk assessment could include identification of falls history; assessment of gait, balance and mobility, and muscle weakness; assessment of osteoporosis risk; assessment of the older person's perceived functional ability and fear relating to falling; assessment of visual impairment; assessment of cognitive impairment and neurological examination; assessment of urinary incontinence; assessment of environmental hazards; cardiovascular examination, medication review, exercise, client education, hip protector, physical restraint, in different combinations. However, evidence regarding the use of multifactorial rather than unifactorial interventions is supported by two moderate quality systematic reviews which compared the effects across this dimension(13, 15).]

There are a small number of studies, and studies are not available in all settings, thus requiring judgments about whether results from one setting can be transferred to a different setting.

Regarding vitamin D, although there is evidence of benefit from randomized trials, there is controversy as to what dose of vitamin D should be given to prevent falls in older peopleThe RNAO guidelines recommend vitamin D supplementation for residents since people in Canada have a risk for vitamin D insufficiency or deficiency because the production of vitamin D in the skin falls to near zero for four to five months of the year in Canada.

# Implementation of falls prevention interventions

Comprehensive falls risk assessment is an integral part of an effective multifactorial fall prevention program as targeted interventions to address a patient's identified risk factors are implemented. All three guidelines describe a comprehensive risk assessment to include:

- identification of falls history,
- cognitive impairment,
- continence problems,
- footwear that is unsuitable or missing
- health problems that may increase their risk of falling (such as osteoporosis)
- medication review
- postural instability, mobility problems and/or balance problems
- syncope syndrome
- visual impairment
- neurological examination
- environmental hazards

This assessment should be done by a multidisciplinary team if possible or by a healthcare professional with appropriate skills and experience.

A post-fall risk assessment helps identify the reasons for the fall and guide actions taken to prevent future falls. A comprehensive post-fall assessment involves interdisciplinary communication, consultation and analysis of the circumstances surrounding the fall, physical examination of the patient, medication review, assessment of existing interventions to prevent falls and their implementation, and a falls risk assessment to identify new modifiable risk factors. The post-fall risk assessment should be iterative as injury may not be apparent until even weeks after the fall. It should be followed up with a new individualized care plan to reduce falls. The post-fall staff huddles process has been used with success in the long term care setting to identify required changes to the care plan(21).

The staff should be encouraged to share risk information with clients/patients/residents and their family, discuss risk reduction strategies that the individual can take to prevent falls, and implement interventions that are compatible with the patient's risk factors and preferences.

The NICE and Australian guidelines are designed for use in any hospital setting while the RNAO guidelines are designed for acute care and long term care. However, they all suggest that the guidelines be applied based on the specific needs of the organization or practice setting/environment, such as available resources local services, policies and protocols in place, available personnel and devices, clinical experience of the practitioner, knowledge of more recent research findings as well as the needs and wishes of the client. Due to the scarcity of evidence of effectiveness of fall prevention interventions in some settings such as palliative care we suggest the applicability of evidence from other hospital-based settings, and modifying based on the patient population, setting characteristics and clinical expertise.

# Recommendations

Based on our review, we suggest the following:

1. A multifactorial risk assessment should be done for each patient on admission accompanied by implementation of multifactorial interventions tailored to meet needs identified following falls risk assessment. In case of long-stay, this process should be repeated after a change in the patient's status is recognized or at an interval of 6-12 months. Tools for falls risk assessment have been discussed in the accompanying report. Their choice should be guided by the patient population, the setting and feasibility of implementation.
2. A post-fall risk assessment and team conference should be done for each patient who falls followed by the creation and implementation of a new individualized care plan to prevent future falls. This needs to be conducted in a "no-blame" culture that fosters a shared vision for falls prevention.
3. Engage staff and clients in implementing individualized falls prevention tailored to needs and preferences, fostering a culture of ongoing learning and continuous monitoring.

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