

# Rapid Synthesis

## Examining the Impact of Interprofessional Training and Patient Engagement on Falls Prevention

30 April 2017



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**Rapid Synthesis:**  
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#### McMaster Health Forum

For concerned citizens and influential thinkers and doers, the McMaster Health Forum strives to be a leading hub for improving health outcomes through collective problem-solving. Operating at regional/provincial levels and at national levels, the Forum harnesses information, convenes stakeholders, and prepares action-oriented leaders to meet pressing health issues creatively. The Forum acts as an agent of change by empowering stakeholders to set agendas, take well-considered actions, and communicate the rationale for actions effectively.

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#### Timeline

Rapid syntheses can be requested in a three-, 10- or 30-business day timeframe. This synthesis was prepared over a 30-business day timeframe. An overview of what can be provided and what cannot be provided in each of the different timelines is provided on McMaster Health Forum's Rapid Response program webpage.

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#### Conflict of interest

The authors declare that they have no professional or commercial interests relevant to the rapid synthesis. The funder played no role in the identification, selection, assessment, synthesis or presentation of the research evidence profiled in the rapid synthesis.

#### Merit review

The rapid synthesis was reviewed by a small number of policymakers, stakeholders and researchers in order to ensure its scientific rigour and system relevance.

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## KEY MESSAGES

### Questions

- What is the impact of interprofessional training on falls prevention in community and hospital settings?
- What is the impact of patient and family engagement on falls prevention in community and hospital settings?

### Why the issue is important

- More than a third of those over the age of 65 fall each year, which can lead to devastating physical and mental health consequences including functional decline, decline in independence and self-efficacy, morbidity, quality of life and risk of prolonged hospitalization.
- In Canada, direct costs associated with falls for those over the age of 65 are estimated at \$2 billion annually.
- As the number of older adults in communities across Ontario and the country continues to rise, there is a growing need to better understand how to make communities safer for older adults and to effectively prevent falls.
- In Ontario, collaboration among health providers in the province continues to grow and has for the most part demonstrated improved patient outcomes and, among certain conditions and populations, improvements in patient satisfaction.
- This shift in how health professionals practise combined with the need to improve falls prevention efforts makes it timely to identify the impact of delivering falls prevention interventions by interprofessional teams.

### What we found

- We identified a total of 23 relevant documents addressing the question, including seven systematic reviews, six economic evaluations, and nine single studies.
- In general, the delivery of falls-prevention interventions by interprofessional teams has resulted in significant reductions in the risk and rate of falls.
- In terms of interprofessional training, programs were found to be effective for both staff and patient outcomes, however mixed evidence was found for the cost-effectiveness of these training programs with studies suggesting that it may largely depend on the rates of falls in individual communities and nursing homes.
- Mixed evidence was found for the effectiveness of interventions that directly engage the patient, including exercise and education.
- In terms of engaging patients in the process of developing and delivering care, one recent medium-quality review found that patient engagement in falls-prevention interventions were dependent on overcoming barriers related to:
  - practical considerations, such as affordability and time;
  - adaptability to the community, including ensuring the intervention is socially and culturally appropriate; and
  - psychosocial barriers, including feelings of loss of independence and quality of life.
- The same review also identified success factors such as shared-decision making and redefining the 'expert' in the professional-patient relationship as being predictors of sustained engagement.

## **QUESTIONS**

- What is the impact of interprofessional training on falls prevention in community and hospital settings?
- What is the impact of patient and family engagement on falls prevention in community and hospital settings?

## **WHY THE ISSUE IS IMPORTANT**

More than a third of those over the age of 65 fall each year, which can lead to devastating physical and mental health consequences including functional decline, decline in independence and self-efficacy, morbidity, quality of life and risk of prolonged hospitalization.(1) In Canada, falls are the number one cause of injury among older adults, and when proper supports are not in place, falls contribute a significant burden on the health system. In Canada, direct costs associated with falls for those over the age of 65 are estimated at \$2 billion annually.(1)

As the number of older adults in communities across Ontario and the country continues to rise, there is a growing need to better understand how to make communities safer for older adults and to effectively prevent falls. A significant amount of synthesized research exists that identifies the efficacy of falls-prevention interventions, with most of it being supportive of the use of multi-factorial risk assessments followed by interventions that are tailored to an individual's specific risk factors.(2; 3)

However, there is a need to also identify literature that evaluates which professionals and healthcare workers should be delivering these services. In recent years, a shift has been seen in the province whereby health providers are increasingly collaborating as interprofessional teams to deliver care. These new models have, for the most part, demonstrated improved patient outcomes and, among certain conditions and populations, improvements in patient satisfaction.(4) This shift in how health professionals practise combined with the need to improve falls-prevention efforts makes it timely to identify the impact of delivering falls-prevention interventions by interprofessional teams.

In this rapid synthesis requested by Hamilton Health Sciences, we sought to identify research evidence to identify the impact of interprofessional training and patient engagement in falls-prevention services.

## **WHAT WE FOUND**

We identified a total of 23 relevant documents addressing the question, including seven systematic reviews, six economic evaluations, and nine single studies. We provide more details about each systematic review and the single studies in Appendix 1 and 2, respectively.

### **Box 1: Background to the rapid synthesis**

This rapid synthesis mobilizes both global and local research evidence about a question submitted to the McMaster Health Forum's Rapid Response program. Whenever possible, the rapid synthesis summarizes research evidence drawn from systematic reviews of the research literature and occasionally from single research studies. A systematic review is a summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select and appraise research studies, and to synthesize data from the included studies. The rapid synthesis does not contain recommendations, which would have required the authors to make judgments based on their personal values and preferences.

Rapid syntheses can be requested in a three-, 10- or 30-business day timeframe. An overview of what can be provided and what cannot be provided in each of these timelines is provided on the McMaster Health Forum's Rapid Response program webpage (<http://www.mcmasterhealthforum.org/policymakers/rapid-response-program>).

This rapid synthesis was prepared over a 30-business day timeframe and involved four steps:

- 1) submission of a question from a health-system policymaker or stakeholder (in this case, Hamilton Health Sciences);
- 2) identifying, selecting, appraising and synthesizing relevant research evidence about the question;
- 3) drafting the rapid synthesis in such a way as to present concisely and in accessible language the research evidence; and
- 4) finalizing the rapid synthesis based on the input of at least two merit reviewers.

**Question 1: What is the impact of interprofessional training on falls prevention in community and hospital settings?**

We identified one systematic review,(5) five economic evaluations,(6-10) and five single studies (11-14) that were relevant to this question. In general, the delivery of falls-prevention interventions by interprofessional teams has resulted in significant reductions in the risk and rate of falls.

For example, one older medium-quality review and one recent economic evaluation found that the delivery of a falls-prevention program by an interprofessional team resulted in a significant reduction in the number of falls and the fall rate.(5; 6) The evaluations also reported a reduction in the fear of falling and increased self-efficacy among community-dwelling older adults.(6)

We identified mixed evidence for the cost-effectiveness of these interventions, with two economic evaluations having found a significant reduction in resource use from fracture-prevention programs provided by multidisciplinary teams.(7; 10) However, one older economic evaluation of a hospital-based falls-prevention program in the Netherlands found no significant difference in the number of falls or patient outcomes between the intervention and usual care.(9)

In terms of interprofessional training, programs were generally found to be effective for both staff and patient outcomes.(6; 8; 11; 14) Mixed evidence was also found for the cost-effectiveness of these training programs with studies suggesting that it may depend on the rates of falls in individual communities and nursing homes.(8) The training programs included in this synthesis differed significantly in terms of the delivery setting (e.g., hospitals, nursing homes, post-secondary institutions) and duration of training, which ranged from a 90-minute peer-delivered workshop to graduate courses for nurses, social workers and recreation workers.(14) Further, the interventions differed in which professionals were included as part of the interprofessional team, including physicians,(11) long-term care nurses,(11) nursing-home staff,(8) home-health nurses (11) and other home-care providers,(15) pharmacists,(11) social workers (11) and students.(12-13). The evidence for these interventions is presented below and organized from least to most intensive.

Three recent studies evaluated workshops for interprofessional team training, ranging from 90-minutes to four hours.(11; 14) In all three studies, the workshops resulted in increased knowledge and confidence among providers.(11; 14) One of the studies focused on supporting providers to use practice guidelines, which included developing team strategies to optimize fall risk-reduction strategies across settings of care.(11) Results from a baseline survey of health professionals and structured interviews following the intervention revealed an increased commitment to practice change, and a perceived ability to tailor prevention efforts to their community's needs.(11) The second study included a large-group discussion followed by individual-team coaching delivered by an interprofessional teaching team.(11) The third study consisted of clinical-skills

**Box 2: Identification, selection and synthesis of research evidence**

We identified research evidence (systematic reviews and primary studies) by searching (in February 2017) Health Systems Evidence ([www.healthsystemsevidence.org](http://www.healthsystemsevidence.org)), the Cochrane library, and PubMed.

For Health Systems Evidence we searched for: 1) (skill-mix – multidisciplinary teams OR consumer and stakeholder engagement) AND (fall prevention OR falls prevention). This search was filtered by document type to include overviews of systematic reviews systematic reviews of effects, systematic reviews addressing other types of questions, and economic evaluations or costing studies.

In PubMed we searched for: 1) interprofessional education AND (fall prevention or falls prevention); and 2) (patient engagement or family engagement) AND (fall prevention or falls prevention). These searches were limited to articles published in the last 10 years.

The results from the searches were assessed by one reviewer for inclusion. A document was included if it fit within the scope of the questions posed for the rapid synthesis.

For the primary research, we documented the focus of the study, methods used, a description of the sample, the jurisdiction(s) studied, key features of the intervention, and key findings. We then used this extracted information to develop a synthesis of the key findings from the included reviews and primary studies.

sessions, whereby pre-licensure students rotated in small groups learning how to approach falls prevention in each of a medical, physiotherapy and occupational therapy setting.(14) In a series of likert scales and qualitative free-text comments, students identified the multidisciplinary nature, content and practical approach to the workshop as strengths, and helped the providers to see the session as being relevant and enjoyable.(14)

One older study evaluated one-day training sessions for case managers and all members of an interdisciplinary team, which focused on teaching proven falls-prevention strategies as well as strategies for addressing barriers to preventing falls.(15) Training was provided for all team members as a method of encouraging behaviour change, and the training sessions were supplemented by additional sessions over the course of the six-month trial.(15) The intervention resulted in a reduction in the total number of combined falls in the experimental and control groups, but there was no difference in the mean number of falls between the study groups.(15) A sub-analysis found the intervention was more effective than usual home care in reducing the number of falls in 75-84-year-old males with a fear of or history of falls in the past six months.(15)

One recent study assessed a multidisciplinary falls-prevention training program, and in examining patient data and fall incident report data the study found a significant reduction in the number of falls among hospital inpatients.(6) Professionals were trained to deliver screening, strategies for high-risk patients, and on-going interventions such as progress reviews.(6)

Another study examined the impact of a training program in nursing homes and was comprised of both education about best practices in falls prevention, and a module on implementing new knowledge.(8) The intervention also included training for municipal surveyors who are responsible for conducting assessments of local grounds, to begin considering the risk of falls when assessing the building and property of local nursing homes.(8) Across 45 nursing homes, using patient data and the minimum data set, the study found a significant reduction of between five and 12 resident falls annually, as well as an improvement in levels of negative affect among nursing-home residents.(8) Training surveyors with the same modules as nursing-home staff was found not to be a critical component in the success of the intervention.(8)

Finally, two studies assessed pre-licensure, elective graduate and undergraduate courses for health providers (i.e., nurses, physical therapists, pharmacists and physician assistants), as well as for individuals seeking careers in social work and recreation. A pre- and post-intervention knowledge test and qualitative observations following the two courses found that students had improved pre- and post-falls knowledge, had a better understanding of strategies for increasing physical exercise, and had more favourable attitudes towards working as a team.(12; 13)

## **Question 2: What is the impact of patient and family engagement on falls prevention in the community and hospital settings?**

Evidence from six systematic reviews,(11; 16-20) one economic evaluation (21) and four single studies (22-25) provided insights on patient and family engagement on falls prevention. For the purpose of this synthesis, we considered patient and family engagement to include any program or service where patients are active participants (e.g., through education or changes to exercise routines), as well as the processes and predictors of patient and family engagement in the development and delivery of care. Generally, engaging patients and their family members in falls-prevention interventions has been found to empower patients to take an active role in their own safety and to create valuable partnerships with health providers.(26-28)

Five reviews and one economic evaluation provided mixed evidence on the impact of exercise interventions among older adults, with two medium-quality reviews finding no significant difference in rates of falling or number of people who fall when engaged in exercise routines.(16; 17) In contrast, the remaining reviews provide findings that support approaches for patients to engage in specific exercise activities or as part as tailored multifaceted interventions.(18; 19; 29) The economic evaluation found a reduction in costs associated



with reduced resource use for treating femoral fractures, but it also found a slight increased cost due to the implementation of exercise and education interventions.(21)

We also found mixed evidence from the included literature about education, but it is critical to note that in all studies and reviews education was implemented alongside additional interventions, which may significantly affect the outcomes of the intervention. One medium-quality review found little evidence to support the use of education or multifactorial interventions to reduce the rates of falls in nursing homes.(11) However, a number of included studies found positive results, including one recent randomized controlled trial which provided patients aged 60 years and older with a tailored education package consisting of multimedia information packages and trained health professional follow-up.(24) This educational intervention resulted in increased engagement in falls-prevention strategies following hospital admission, including a significant increase in individuals planning for how to restart functional activities, as well as an increase in their likelihood to complete their own home exercise program as compared to usual care.(24) Similarly, another study using the Plan-Do-Study-Act model, engaged in one-on-one education sessions about falls prevention between patients and health professionals on a neurological ward and found the intervention significantly reduced the number of falls during the four-month follow-up period.(22)

In terms of engaging patients in the process of developing and delivering care, one recent medium-quality review found that patient engagement in falls-prevention interventions were dependent on overcoming barriers related to:

- practical considerations, such as affordability and time;
- adaptability to the community, including ensuring interventions are socially and culturally appropriate; and
- psychosocial barriers, including feelings of loss of independence and quality of life.(20)

The review also identified success factors including shared-decision making and redefining the ‘expert’ in the professional-patient relationship as being predictors of sustained engagement.(20) In addition to these, one recent observational study found that other predictors of continued engagement in falls-prevention interventions included:

- high-level of perceived risk of physical injury;
- exercise or other intervention being continuously recommended by health providers; and
- currently living with a partner.(25)

Finally, one recent study which assessed the use of patient-centric evaluation tools identified the importance of using a patient-centred perspective, rather than clinician-focused perspective, when engaging individuals in their care.(23) Importantly, the study points out the need to shift from using clinical-focused risk assessments to patient-centred risk assessments which focus more on the subjective experience of patients rather than the objective supports (e.g., hand rails, footwear).(23)

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## APPENDICES

The following tables provide detailed information about the systematic reviews and primary studies identified in the rapid synthesis. The ensuing information was extracted from the following sources:

- systematic reviews - the focus of the review, key findings, last year the literature was searched and the proportion of studies conducted in Canada; and
- primary studies - the focus of the study, methods used, study sample, jurisdiction studied, key features of the intervention and the study findings (based on the outcomes reported in the study).

For the appendix table providing details about the systematic reviews, the fourth column presents a rating of the overall quality of each review. The quality of each review has been assessed using AMSTAR (A MeaSurement Tool to Assess Reviews), which rates overall quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. It is important to note that the AMSTAR tool was developed to assess reviews focused on clinical interventions, so not all criteria apply to systematic reviews pertaining to delivery, financial or governance arrangements within health systems. Where the denominator is not 11, an aspect of the tool was considered not relevant by the raters. In comparing ratings, it is therefore important to keep both parts of the score (i.e., the numerator and denominator) in mind. For example, a review that scores 8/8 is generally of comparable quality to a review scoring 11/11; both ratings are considered “high scores.” A high score signals that readers of the review can have a high level of confidence in its findings. A low score, on the other hand, does not mean that the review should be discarded, merely that less confidence can be placed in its findings and that the review needs to be examined closely to identify its limitations. (Lewin S, Oxman AD, Lavis JN, Fretheim A. SUPPORT Tools for evidence-informed health Policymaking (STP): 8. Deciding how much confidence to place in a systematic review. *Health Research Policy and Systems* 2009; 7 (Suppl1):S8).

All of the information provided in the appendix tables was taken into account by the authors in describing the findings in the rapid synthesis.

## Appendix 1: Summary of findings from systematic reviews related to interprofessional training and patient engagement for falls prevention

Question addressed	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
What is the impact of interprofessional training on falls prevention in community and hospital settings?	Effectiveness of falls-prevention programs for older adults (5)	<p>The review included 17 studies that reported the effectiveness of falls-prevention programs for older adults. Each individual study usually included several types of intervention strategies with a common goal of preventing falls. Multifactorial intervention programs included a comprehensive medical exam, occupational therapy assessment, activities of daily living, home environmental and behavioural assessment, cognition assessment, gait stability, medication review, staff training, and education for residents. The multifactorial team approaches included more than one staff member, including physicians, nurses, physical therapists, occupational therapists, social workers, and/or other trained healthcare professionals.</p> <p>Overall, a significant 14% fall reduction was found on the number of falls and fall rate during the follow-up. An even larger reduction of 17% was observed for the fall rate along with an even more significant reduction in multifactorial intervention studies and nursing homes.</p>	2009	5/11 (AMSTAR rating from McMaster Health Forum)	Not reported in detail
What is the impact of patient and family engagement on falls prevention in community and hospital settings?	Effectiveness of falls-prevention programs on reducing falls in adult stroke patients (16)	The review included 13 studies that evaluated interventions aimed at fall prevention in adult stroke patients. The interventions which actively involved patients included physical-activity interventions such as balance training, exercise and strength training, modifying the environment or improving knowledge, models of stroke care, and medication for improving bone density. The review found a significant reduction in fall rate and proportion of fallers among recent female stroke survivors actively taking vitamin D compared to those using a placebo. The review, however, found no significant differences with exercise or medication use on the rates of falling and number of individuals who fall.	2009	7/11 (AMSTAR rating from McMaster Health Forum)	1/13
	Effectiveness of hospital falls-prevention programs (17)	<p>The review included eight studies that were conducted mostly in long-stay and rehabilitation units within the hospital setting. The intervention programs were characterized as unifactorial and multifactorial, based on the fall risk factors that were addressed. The unifactorial interventions included vitamin D supplements, identity bracelets, exercise or physiotherapy, carpet versus vinyl flooring, or bed alarms. The multifactorial interventions all included a risk assessment with a targeted intervention, followed by education, exercise or physiotherapy, along with two to four of the following: fall alert cards with brochures, hip protectors, identity bracelets, medication review, environmental review, medical examination, eyesight correction, and nurse assistance with daily living activities.</p> <p>The authors did not undertake assessments for single interventions. In general, they found no significant differences with the unifactorial and multifactorial interventions on either fall rates or number of fallers.</p>	2006	5/11 (AMSTAR rating from McMaster Health Forum)	1/8

Question addressed	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
	Effectiveness of interventions designed to reduce falls by older people in care facilities and hospitals (18)	<p>The review included 60 studies of interventions that attempted to reduce falls in older people in residential, nursing-care facilities or hospitals.</p> <p>For care facilities, there were 13 studies testing exercise interventions, but no differences in the rate of falls or risk of falling was found. A sub-group analysis however, found that those with greater levels of disability are less likely to benefit from engaging in exercise. A sub-group analysis on types of exercise found that tested balance training significantly reduced the rate of falling but not the risk of falling. The functional walking program was found to increase the rate of falling but not the risk.</p> <p>Conflicting results were found for the impact of medication review by a pharmacist on risk and rate of falls.</p> <p>Vitamin-D supplementation in five studies showed a significant reduction in the rate of falls but not in the risk of falling.</p> <p>Staff training was not found to reduce the risk of rate of falling.</p> <p>There were suggested benefits for multifactorial interventions, but the evidence was not conclusive.</p> <p>For hospitals, multifactorial interventions reduced the rate of falls and risk of falling, but the evidence for the latter was inconclusive. One study found that multidisciplinary care in the geriatric ward after hip-fracture surgery significantly reduced rates of fall and risk of falling. Knowledge interventions including targeted education were found to reduce risk and rate of falling, however, videos and materials alone were not found to have an impact on the rate or risk of falling.</p>	2012	10/10 (AMSTAR rating from McMaster Health Forum)	2/60
	Effectiveness of multifactorial assessment and intervention programs to prevent falls among older adults in primary care, community, or emergency care settings (19)	<p>The review included 19 studies that evaluated interventions to prevent falls based in emergency department, primary care or community settings. The interventions varied between studies, but included drugs, environment or assistive technologies, education, supervised/unsupervised exercise, and referrals. The outcomes were number of fallers, fall-related injuries, fall rate, death, admission to hospital, contacts with health services, move to institutional care, physical activity and quality of life.</p> <p>The combined results from 18 studies found a reduction in the number of fallers, and combined results from eight studies found a similar reduction in fall-related injuries. However, ultimately there was little evidence to support the effectiveness of multifactorial interventions to prevent falls and injuries in older people in the community and in emergency care settings.</p> <p>There were no differences in admissions to hospital, emergency department attendance,</p>	2007	7/11 (AMSTAR from McMaster Health Forum)	2/19

Question addressed	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		death or move to institutional care. No studies assessed quality of life, physical activity, different settings or the presence of a multi-disciplinary team. Interventions that provide treatment rather than knowledge and referral were found to be more effective.			
	Effectiveness of interventions aimed at reducing falls in elderly residents in long-term care facilities (29)	<p>The review included 20 studies that examined interventions aimed at reducing falls in elderly residents in long-term care facilities.</p> <p>The programs that generally had positive benefits were: a comprehensive structured individual assessment with specific safety recommendations; a multidisciplinary program including general strategies tailored to the setting and strategies tailored specifically to residents; a multifaceted intervention including education, environmental adaptation, balance, resistance training, and hip protector; calcium plus vitamin D supplementation; vitamin D supplementation; a clinical medication review; and a multifactorial intervention (fall risk evaluation, specific and general interventions). However, the authors express caution, stating programs may be ineffective or have adverse effects because the programs may not be feasible or stimulating for the specific setting in which they are implemented.</p>	2009	3/10 (AMSTAR rating from McMaster Health Forum)	0/20
	Barriers and facilitators to the successful implementation of falls-prevention programs (20)	<p>The review included 19 studies that revealed information about the mechanisms through which barriers to implementation of falls-prevention interventions had been overcome. There were 3 concepts: 1) practical considerations; 2) adapting for community; and 3) psychosocial.</p> <p>In terms of practical considerations, three need to be addressed: economic factors (e.g., affordability); access to the intervention (e.g., transportation); and time (e.g., coinciding with daily routines). The review highlighted that individuals may face financial costs associated with the purchase of assistive technologies. At the organizational level there is a lack of reimbursement for falls-prevention assessments and the associated paperwork, as well as limited staff training to undertake these assessments. Further, a perceived lack of time remains a significant factor for all staff working within healthcare organizations.</p> <p>With regards to adapting for the community, there was an emphasis on socially and culturally appropriate interventions for assistive devices, types of exercises and attitudes in different communities. In particular there is a need for the care being delivered to patients to take these aspects into consideration. need for care being delivered to patients to take these aspects into consideration.</p> <p>In terms of the psychosocial concepts, the review focused on patients' transforming identity as they age (e.g., loss of independence, confidence and quality of life for patients who felt stigma being labelled "at risk of falling") and defining the expert (e.g., shared decision-making in professional-patient relationship).</p>	2012	6/9 (AMSTAR rating from McMaster Health Forum)	2/19



Question addressed	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		The successful implementation of these programs requires individuals, professionals and organizations to modify existing behaviours, thoughts and practices. The type and delivery of an exercise program needs to be tailored to fit individual preferences, and support from family, friends, peers and healthcare professionals helps promote and maintain engagement. Furthermore, healthcare professionals need to better practise shared decision-making to make older adults aware of the risk of falling.			
	Benefits and harms of falls-prevention programs for inpatients in the acute care setting (17)	<p>The review included 21 studies with at least 1,000 older adult participants, and that assessed multiple component falls-prevention interventions in acute care hospitals. These interventions consisted of either a Falls-Prevention Tool Kit, comprising information technology-based risk assessment, tailored signage, patient education, and a plan of care, or an assessment tool that matched high-risk patients to appropriate interventions, alongside patient education.</p> <p>Overall, it was found that these interventions were effective in reducing falls. Eleven studies reported the factors that affected implementation, which were summarized as leadership support, engagement of frontline clinical staff, use of multidisciplinary committees to oversee interventions, pilot testing of the intervention, use of information systems on falls data, attitude change away from the inevitability of falls, and education or training for patients and providers to promote adherence to implementation.</p>	2012	5/10 (AMSTAR rating from McMaster Health)	0/21

## Appendix 2: Summary of economic evaluations and single studies related to interprofessional training and patient engagement for falls prevention

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
What is the impact of interprofessional training on falls prevention in community and hospital settings?	Multidisciplinary falls-prevention program on number of falls and fall-related injuries in orthopedic hospital (6)	<p><i>Publication date:</i> 2011</p> <p><i>Jurisdiction studied:</i> United States</p> <p><i>Methods used:</i> A cost-effective analysis was conducted on patient data and fall incident report data</p>	There were 3,675 patients the year before the intervention, and 3,364 patients the year after the intervention. There was an approximately equal split between males and females.	The multidisciplinary falls-prevention program involved staff training, specific interventions affecting all admitted patients (e.g., screening using FRASE tool, auxiliary nursing station at night, ward modifications, information leaflets), interventions for high-risk patients (e.g., designated beds, risk alert signs, ambulating assistance, physiotherapist training sessions, education on falls prevention for patients and families), and ongoing interventions (e.g., meeting of task force to review progress, additional training).	The prevention program led to significant reduction in the number of falls. As well, a detailed cost analysis found that the program resulted in large cost savings for the hospital in the short term. The majority of cost savings was related to preventing resource use for the treatment of hip fractures.
	Cost-effectiveness of multidisciplinary falls-prevention program in Dutch healthcare (9)	<p><i>Publication date:</i> 2008</p> <p><i>Jurisdiction studied:</i> Netherlands</p> <p><i>Methods used:</i> The cost-effective and cost-utility analysis was based on a single randomized control trial over the course of 12 months</p>	The study included 166 participants with a 74% response rate. The participants were recruited at the accident and emergency department and general practitioner cooperative at the Maastricht University Hospital. The participants were 65 years or older and had visited the hospital due to a fall.	The falls-prevention program was multidisciplinary-focused, and consisted of a medical and occupational therapy assessment (comprised of geriatrician, geriatric nurse, occupational therapist and rehabilitation physician) in the hospital setting. The program was aimed at addressing risk factors for falls. The intervention period lasted for approximately 3.5 months.	The differences in clinical measures and benefits were not significant between the intervention and control groups. There were no decreases in the percentage of persons sustaining a fall, and no significant decrease in cost per patient. The authors concluded that multidisciplinary intervention programs to prevent falls in community-dwelling elderly was not cost-effective in the Dutch setting.
	Effectiveness and cost-effectiveness of evidence-based education programs in reducing falls in nursing-home residents (8)	<p><i>Publication date:</i> 2013</p> <p><i>Jurisdiction studied:</i> United States</p> <p><i>Methods used:</i> The cost-effectiveness analysis was based on a quasi-experimental design as a variant of a cluster randomized trial</p>	There were 45 nursing homes sampled, yielding 7,361 individuals. In the study itself, 38 nursing homes participated.	<p>The intervention included evidence-based education and best-practice programs in nursing homes. These comprised standard training, training and implementation modules provided to facility staff, and staff training and implementation modules augmented by surveyor training. The surveyors were responsible for ensuring the long-term care institutions met all required safety regulations and provision of services, and received the same training materials and forms as the facility staff.</p> <p>There were two training programs implemented. One focused on vision awareness and targeted all residents to increase staff knowledge of visual impairments. The other focused on person-</p>	<p>The study found a significant reduction of falls in a typical nursing home. While both intervention groups resulted in fall reduction, the larger and significant reduction occurred in the group without surveyor training. A significant reduction in negative affect associated with training staff and surveyors was observed.</p> <p>In terms of costs, the intervention itself was relatively low cost. As well, there was an estimated overall net cost savings from falls prevention.</p>

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
				centred bathing of individuals with dementia.	
	Effectiveness of interprofessional falls-prevention program for older adults (30)	<p><i>Publication date:</i> 2008</p> <p><i>Jurisdiction studied:</i> Canada</p> <p><i>Methods used:</i> Statistical analysis using the Berg Balance Scale, the Timed Up and Go Test, the Falls Efficacy Scale, and the Morse Fall Risk Scale</p>	The participants were seniors (over the age of 65) living in the community or retirement homes and had at least one fall in the past 12 months.	The interprofessional falls prevention program was aimed at improving physical function and balance, and reducing fear of falling among seniors with a history of falls. This program included a falls assessment followed by a 12-week program of once-weekly group education and exercise sessions, three- and six-month follow-up visits, and individual counselling. The interprofessional team consisted of physicians, nurses, physiotherapists, occupational therapists, pharmacists, dietitians, social workers and secretarial support.	The program demonstrated positive patient outcomes, and its implementation supported the hospital's priority to improve patient safety. There were direct improvements in physical function and balance, reduced fear of falling and increased self-efficacy in community-dwelling seniors. The actual number of falls was not examined.
	Cost-effectiveness of multifactorial falls-prevention programs in nursing home residents (21)	<p><i>Publication date:</i> 2013</p> <p><i>Jurisdiction studied:</i> Germany</p> <p><i>Methods used:</i> The cost-effective analysis was part of a prospective, unblinded, clustered, non-randomized controlled trial</p>	The sample included 33,152 nursing-home residents aged 65 years or older, who either had a considerable need of care, severe need of care, or extreme need of care based on their level in the long-term care insurance plan in Germany.	<p>The intervention was a modified version of a previously successful falls-prevention program comprising a reduction of risk factors (e.g., exercise programs) and hazard compensation components (e.g., environmental modifications).</p> <p>The program also trained change agents and exercise instructors, who in turn disseminated knowledge on fall and fracture prevention in nursing homes to nursing staff, therapists and general physicians. Eligible residents were offered participation in an exercise program, which consisted of progressive strength and balance training.</p>	<p>The study found a reduction in femoral fractures, which were more prominent among women.</p> <p>In terms of costs, there was a saving in fracture-related costs. However, there were slight incremental costs when also considering the implementation of the intervention. Potential factors leading to this increased cost may be due to the process of education or the way the program was implemented.</p>
	Effectiveness of using evidence-based falls-prevention workshop to train interprofessional teams to decrease risk of falls among older adults (11)	<p><i>Publication date:</i> 2016</p> <p><i>Jurisdiction studied:</i> United States</p> <p><i>Methods used:</i> Recruited professionals to train in a falls-prevention workshop, and fill out a survey to report outcomes</p>	Participants within the interprofessional practice teams were from the fields of medicine, nursing, pharmacy and social work.	The interprofessional teaching team supports other teams through a workshop to reduce falls among older adults via implementation of evidence-based practice guidelines. The goals of the training were to 1) have increased knowledge of effective falls-prevention strategies, 2) have increased confidence in ability to assess patients for risk of falls and implement a risk-reduction plan, and 3) develop a team strategy to optimize falls risk-reduction efforts specific to respective populations and settings.	The study found that across professions and settings, the interprofessional team members who trained in evidence-based falls-prevention strategies reported increased knowledge and confidence, as well as a commitment to practise change tailored to their community's needs.
	Changes in students' attitudes about interprofessional education during a community falls-	<p><i>Publication date:</i> 2015</p> <p><i>Jurisdiction studied:</i> United States</p>	There were 36 students (16 pharmacy, 17 physical therapy, 12 nursing, and 18 physician assistant) who participated in the fall	The interprofessional education intervention occurred with students from four health science programs (pharmacy, nursing, physician assistant and physical therapy) to come together and learn about what enables effective collaboration and	The study found an initial favourable attitude toward the education program. Overall, physical therapy students had the most significant changes in attitudes towards team work and

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
	prevention event (13)	<i>Methods used:</i> Changes in attitude were compared using statistical analysis	prevention event.	improves health outcomes. More specifically, there was a focus on falls prevention in older adults.	accommodating roles of other professions. The post-event findings revealed a statistically significant change among pharmacy students (compared with pre-event findings) in their level of discomfort if another healthcare professional knew more about a specific topic. However, collectively, the discomfort level was reduced.
	Using interprofessional falls-prevention workshop to improve medical students' ability to improve fall outcomes in older adults (14)	<i>Publication date:</i> 2010 <i>Jurisdiction studied:</i> London <i>Methods used:</i> Outcomes were measured using a survey and likert scale	There were 176 students who attended the session and 144 who completed the evaluation. These were second-year medical students at a London medical school.	The prevention workshop consisted of an interprofessional team that conducted a 90-minute clinical-skills session, and students rotated through medical, occupational therapy and physiotherapy areas. They worked in small groups, using brainstorming, discussion and practical exercises to learn about multiple risk factors contributing to falls, and how professionals work together in the management of patients at risk of falling.	The session was positively evaluated by students and peer tutors. The authors reported that the study fulfilled their aim of encouraging students to consider multiple risk factors for falls, and how to work within a multidisciplinary team to tackle these. The multidisciplinary approach, content and practical nature were identified as strengths, with encouraging accompanying comments, showing that students found the session to be relevant and enjoyable. Students also stated that their knowledge and understanding had improved as a result.
	Effectiveness of an interprofessional evidence-based falls-management course for university students to improve outcomes in community-dwelling older adults (12)	<i>Publication date:</i> 2015 <i>Jurisdiction studied:</i> United States <i>Methods used:</i> Observational study with a survey used to measure outcomes.	There were 16 undergraduate and graduate students who enrolled and completed the course. The students were studying social work, nursing, recreation or health administration as their major. There were 62 older adults enrolled in the program.	The undergraduate and graduate elective course is designed to support students with the ability to assess risk factors related to falls, and skills to prevent falls while working in the "Matter of Balance Program" which targets older adults' fear of falling using a series of cognitive-behavioural techniques.	The study found that students and older adults seem to benefit from the interprofessional course within the Matter of Balance Program. The students from all disciplines had improved pre- and post-falls knowledge and better understanding of the strategies for increasing physical exercise. For the older adults, there were significant improvements in falls efficacy, control, management and overall mobility.
What is the impact of patient and family engagement on falls prevention in	Cost-effectiveness of multifactorial fracture-prevention programs provided by multidisciplinary	<i>Publication date:</i> 2014 <i>Jurisdiction studied:</i> Germany	The population was based off a simulation model that consisted of residents aged 80 years or older who were newly admitted to nursing	The intervention was a multifactorial fracture-prevention program provided by a multidisciplinary team. The program included patient education, group exercises, a hip protector and assessment of personal	The results of this analysis may suggest that intervention programs to prevent fractures in nursing-home residents is a cost-effective approach. However, the clinical evidence used for this

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
community and hospital settings?	teams (31)	<i>Methods used:</i> Performed a cost-utility analysis on a simulated cohort of individuals	homes.	surroundings in the nursing home.	evaluation was based on the assumption of a strong relationship between the rate of falls and the number of fractures.
	Cost-effectiveness of day-hospital programs for screening and preventing falls in community-dwelling older people (10)	<i>Publication date:</i> 2010 <i>Jurisdiction studied:</i> United Kingdom <i>Methods used:</i> The cost-effective analysis was based on a pragmatic randomized controlled trial.	The sample consisted of community-dwelling people aged 70 or older. There were 172 patients analyzed with the intervention and 171 for the control. These participants were screened on the basis of being at high risk of falls.	The intervention consisted of either an information document combined with a day-hospital falls-prevention program or the information document by itself. The information document related to educating patients on avoiding slips, trips and broken hips. The program included physiotherapy, occupational therapy, nurse and medical reviews, and referral to other specialists. The program was tailored to individual needs, incorporating a medical assessment, strength and balance training, a home-hazard assessment and referral to other specialists as necessary.	The study found that fall rates were lower with the falls-prevention program being implemented, however there was an incremental increase in cost. However, neither the incremental cost nor the differences in effectiveness were significant. The authors concluded that there was a lack of evidence to suggest that targeting screened community-dwelling older adults with a day-hospital falls-prevention program was a cost-effective approach.
	Hospital-based falls-prevention interventions that attempt to prevent falls in hospitals (32)	<i>Publication date:</i> 2013 <i>Jurisdiction studied:</i> Australia <i>Methods used:</i> The cost-effective analysis was conducted alongside a multicentre randomized controlled trial. The cost was calculated based on individual patient data.	The study included 1,206 cognitively intact hospital inpatients aged 60 years or older. These patients were a part of acute (orthopedic, respiratory medicine, general medicine) wards and sub-acute (geriatric assessment and rehabilitation, neurological rehabilitation) wards in two hospitals in Australia.	The intervention included intensive multimedia patient educational material delivered with trained health professional follow-up.	The cost per patient varied based on the type of statistical analysis. The authors concluded that if the percentage of cognitively intact patients who had a fall on a ward under usual care conditions was 4% or higher, then their multimedia program was likely to both prevent falls and reduce costs.
	Outcomes of adding patient and family-engagement education to falls-prevention bundled interventions (33)	<i>Publication date:</i> 2016 <i>Jurisdiction studied:</i> United States <i>Methods used:</i> Quasi-experimental study with data collected at a Midwest suburban hospital, in which the patient's fall risk assessment was based on the Morse Fall Scale	Not reported in detail	The educational video included falls-prevention components, such as sample room signage, demonstration on patient call light usage, and demonstration of the correct method for nurses to assist a patient to the bathroom, with emphasis on always toileting with a nurse present.	The study found that the video educational component for patients and their families in addition to the nursing staff appears to have decreased falls, particularly in the orthopedic unit.

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
	Educators' perspectives about how older hospital patients can engage in a falls-prevention education program (34)	<p><i>Publication date:</i> 2015</p> <p><i>Jurisdiction studied:</i> Australia</p> <p><i>Methods used:</i> A qualitative exploratory study which was part of a sequential mixed methods study, in which the qualitative approach used a focus group and interview, participant (educator) notes written at the end of the study, and reflective researcher field notes based on interactions with the educators over a 12-month period</p>	The patients eligible for the program were 60 years or older without moderate or severe cognitive impairment.	The Safe Recovery Program was an in-hospital falls-prevention education intervention, which included individualized education delivered directly to patients and staff. The individualized education consisted of providing patients with a multimedia package, followed by a session with a physiotherapist. This was also provided to multidisciplinary staff to facilitate their support of the program.	<p>The study found that the individualized falls-prevention education provided patients with capability to undertake behavioural strategies to reduce their falls. However, this was dependent on the support by staff and hospital ward environment.</p> <p>In these programs, the educators (i.e., physiotherapists) emphasized the importance of building engagement between themselves, patients and staff for the facilitated uptake of key educational messages.</p>
	Fall rates in hospital rehabilitation units after individualized patient and staff education program (35)	<p><i>Publication date:</i> 2015</p> <p><i>Jurisdiction studied:</i> Australia</p> <p><i>Methods used:</i> Randomized control trial over a 50-week period</p>	There were 914 patients included, who were 60 years and older had a projected length of stay of at least three days, had basic cognitive functioning, were judged by the treating clinical team judged to have a high enough level of cognition to benefit from the education.	The Safe Recovery program consisted of an individualized patient falls-prevention education program that focused on changing health behaviour. It aimed to alert patients to their personal risk of falls, raise knowledge about falls epidemiology and prevention, and motivate them to engage in appropriate strategies. The program was provided by physiotherapist educators.	The study found fewer number of falls and patients who were fallers after the intervention program. The number of falls was reduced in the whole group, including patients who had cognitive impairment, although, as expected, the program had the largest effect in those patients with better cognition who directly received individualized education. There were no differences in length of stay.
	Effectiveness of tailored falls-prevention education in hospitals for older patients (24)	<p><i>Publication date:</i> 2013</p> <p><i>Jurisdiction studied:</i> Australia</p> <p><i>Methods used:</i> Randomized control trial</p>	The study included 50 hospital inpatients aged 60 years or older, and eventually discharged to the community.	<p>The falls-prevention program included a tailored education package that consisted of multimedia falls-prevention information with trained health professional follow-up.</p> <p>The information emphasized developing personalized behavioural strategies to maintain safety, while regaining function after hospitalization. The key messages focused on seeking assistance and gradually resuming functional activities, and planning for participation in an exercise program.</p>	The study found a reduction in the number of falls after the education program. In addition, the participants who received the tailored education had positive reactions, and developed the capability and motivation to engage in falls-prevention behaviours. As well, more participants engaged in seeking required assistance for activities of daily living, exercising and planning to return to usual functional activities. The authors recommend evaluating the effects of this program in a larger trial to further assess effects on falls and

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
					falls-related injuries.
	Factors associated with older patient's engagement with exercise after hospital discharge following a fall (25)	<p><i>Publication date:</i> 2011</p> <p><i>Jurisdiction studied:</i> Australia</p> <p><i>Methods used:</i> Prospective observational study using qualitative and quantitative evaluation</p>	The study included 305 participants for the final survey. These participants were aged 60 years or older and had been discharged from general medical, surgical, stroke or rehabilitation wards of a hospital.	The intervention group received inpatient falls-prevention education in addition to their usual care. The education aimed to empower these patients to reduce their hospital fall risk (e.g., ringing the patient call bell for assistance, being aware of hazards in the hospital environment). There was no exercise program as part of the intervention, although hospital rehabilitation programs were encouraged.	The study found that older patients have low levels of engagement in exercise after discharge from the hospital. Moreover, this is possibly a result of the self-perceived risk of injury from a fall in addition to other social and emotional factors. The most frequent barriers were low self-efficacy (i.e., believing the exercise was not necessary) and medical barriers (e.g., experiencing pain).
	Engaging patients and family with falls-prevention education (22)	<p><i>Publication date:</i> 2008</p> <p><i>Jurisdiction studied:</i> United States</p> <p><i>Methods used:</i> Evaluation of the project completed using a Plan-Do-Study-Act analysis</p>	The project included 67 participants whose age ranged from 25 to 94 years, with the majority older than 65 years. The participants were determined to be high risk if they had five or higher on their fall risk score on the Hendrich II Falls Risk Assessment Tool.	The individual education program consisted of one-to-one education sessions for a six-week period with a nurse for all patients who were at high risk for falls. There was also an information pamphlet provided. The content of these sessions and the pamphlet included fall risk factors, location of frequent falls, possible outcomes from falls, how to prevent falls during hospitalization, what to do after a fall, and tips for families and visitors to prevent falls.	<p>The authors reported no falls among the patients who received patient and family education as part of the falls-prevention program; however, they also stated that this was not a research study and cannot conclude the teaching sessions were responsible for the reduced fall rate.</p> <p>The authors reported challenges with implementing and maintaining a multifactorial falls-prevention program (e.g., disseminating evidence-based interventions). However, the project found that pamphlets and education by nursing staff alleviated these difficulties.</p>



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