

## The Strategies to Reduce Injuries and Develop Confidence in Elders Intervention: Falls Risk Factor Assessment and Management, Patient Engagement, and Nurse Co-management

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In response to the epidemic of falls and serious falls-related injuries in older persons, in 2014, the Patient Centered Outcomes Research Institute (PCORI) and the National Institute on Aging funded a pragmatic trial, Strategies to Reduce Injuries and Develop confidence in Elders (STRIDE) to compare the effects of a multifactorial intervention with those of an enhanced usual care intervention. The STRIDE multifactorial intervention consists of five major components that registered nurses deliver in the role of falls care managers, co-managing fall risk in partnership with patients and their primary care providers (PCPs). The components include a standardized assessment of eight modifiable risk factors (medications; postural hypotension; feet and footwear; vision; vitamin D; osteoporosis; home safety; strength, gait, and balance impairment) and the use of protocols and algorithms to generate recommended management of risk factors; explanation of assessment results to the patient (and

caregiver when appropriate) using basic motivational interviewing techniques to elicit patient priorities, preferences, and readiness to participate in treatments; co-creation of individualized falls care plans that patients' PCPs review, modify, and approve; implementation of the falls care plan; and ongoing monitoring of response, regularly scheduled reassessments of fall risk, and revisions of the falls care plan. Custom-designed falls care management software facilitates risk factor assessment, the identification of recommended interventions, clinic note generation, and longitudinal care management. The trial testing the effectiveness of the STRIDE intervention is in progress, with results expected in late 2019. *J Am Geriatr Soc* 65:2733–2739, 2017.

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More than one in four older Americans fall each year, 20% of whom sustain serious injuries (e.g., hip fracture, head trauma),<sup>1</sup> making falls the leading cause of fatal<sup>2</sup> and nonfatal<sup>3</sup> injuries. Despite evidence that falls can be prevented, fewer than half of persons discuss their falls with their primary care providers (PCPs).<sup>4</sup>

Strategies to Reduce Injuries and Develop confidence in Elders (STRIDE) is a multisite cluster-randomized clinical trial comparing the effectiveness of an evidence-based, multifactorial, individualized intervention with enhanced usual care in reducing serious fall injuries in 5,451 at-risk, noninstitutionalized older persons. People eligible to participate were aged 70 and older and screened positive for increased risk of future injurious falls (reported  $\geq 2$  falls or an injurious fall during the past year or a fear of falling

because of balance or gait problems.)<sup>5</sup> We describe the STRIDE intervention. This differs from the STRIDE program of supervised walking for older adults admitted to the hospital with medical illnesses.<sup>6</sup>

## THE STRIDE INTERVENTION

### Overview

The STRIDE intervention consists of specific care processes designed to reduce fall risks, as well as two methods of ensuring that these processes are followed for each at-risk person. The care processes include an assessment of the individual's specific risks of falling, followed by evidence-based<sup>7</sup> interventions steps that are tailored to the person's individual risk factors and preferences. The two methods used to ensure implementation are "practice redesign," based on the Assessing Care of Vulnerable Elders-2 approach,<sup>8</sup> and risk factor assessments and interventions to engage individuals and caregivers, based on the Connecticut Collaboration for Fall Prevention.<sup>9,10</sup>

The STRIDE processes are:

- 1 Risk assessment and generation of recommendations by a falls care manager (FCM) using standardized, structured assessment procedures and algorithms.
- 2 Explanation of identified risks by the FCM to the individual (and caregiver when appropriate) and suggested interventions using motivational interviewing to elicit preferences and readiness to participate in treatments.
- 3 Co-creation (FCM and individual) of an individualized falls care plan that considers risk-specific treatment algorithms, personal preferences, and available resources.
- 4 Implementation of the falls care plan by the individual, FCM, PCP, and other providers.
  - i Interventions within a registered nurse's (RN's) scope of practice (e.g., recommendations for safe footwear and instruction on simple home exercises) are managed by FCMs and individuals.
  - ii Interventions outside a RN's scope of practice (e.g., treatment of osteoporosis) are communicated to relevant providers using the situation, background, assessment and recommendation (SBAR)<sup>11</sup> template.
  - iii Interventions requiring specialized skills or programs are referred (e.g., to outpatient physical therapy or community-based exercise programs).
- 5 Longitudinal follow-up includes in-person visits (at least annually) and telephone calls (at least once during the first year) to reassess the individual's falls risk factors and to evaluate the implementation and effects of the falls care plan. These calls and visits determine whether the individual had difficulty implementing the specific prioritized actions in the care plan and, if so, what assistance could be provided or modifications made. The FCMs also inquired about whether the individual's goals and expectations were met, as outlined in the care plan (e.g., better balance, improved function) but did not obtain the research outcomes, which the Data Coordination Center collected.

A patient and stakeholder council, composed of 21 members, including four patients and one caregiver, as well as community stakeholder representatives, and national fall prevention experts, reviewed and revised procedures, algorithms, and patient education materials and guided intervention development and implementation.

Falls care management software was created to facilitate risk calculation, note generation, tracking of care, and implementation of recommendations.

### FCM Qualifications and Role

FCMs have a Bachelor of Science in Nursing and are RNs who have completed a comprehensive STRIDE training course, which includes 26 on-line modules (with narrated presentations, formative assessments, and written resources) supplemented with a face-to-face group session designed to facilitate simulation and practice delivering all intervention components. Continuing education is offered throughout the study in annual face-to-face group sessions and monthly conference calls.

FCMs practice within a co-management model with PCPs and their healthcare teams. A site clinical director, who is a physician, nurse practitioner, or pharmacist with expertise in falls and knowledge regarding the local healthcare system, supervises FCMs. To ensure cross-site standardization, FCMs participate in weekly conference calls with a nurse scientist who has expertise in advanced practice nursing in gerontology.

### Work Flow for the STRIDE Intervention

Before contacting each high-risk individual, the FCM reviews the individual's electronic medical record for information related to falls risk factors, including prior bone mineral density testing, cognitive function, and medications related to falling and osteoporosis.<sup>12</sup>

In the initial contact with the individual, which occurs over the telephone, the FCM introduces the clinical aspects of the STRIDE intervention and begins to develop a therapeutic relationship. The FCM reviews the circumstances of any falls and data that will be needed to calculate the individual's risk of future fractures (FRAX score).<sup>11</sup> The FCM also informs the individual of documents that will soon arrive by mail (previsit questionnaire, Centers for Disease Control and Prevention Home Safety Checklist, travel safety checklist) and encourages the individual to bring the completed previsit questionnaire and all current medications and to wear usual footwear to the first STRIDE visit.

The FCM's goal for the individual's initial visit is to complete a comprehensive falls risk assessment and to draft with the individual (and caregiver, when appropriate) a falls care plan. The history clarifies or expands on pre-visit questionnaire topics and current medications, and the physical examination includes postural vital signs, a Snellen vision screen (when indicated), a modified short physical performance battery<sup>13</sup> that was modified for this study (<http://www.stride-study.org/clinical-instruments/>) to accommodate the time constraints of clinical practice, cognitive screening using the Mini-Cog,<sup>14</sup> and inspection of the individual's feet and footwear.

The FCM then summarizes the individual’s modifiable risk factors and begins the process of care planning. Techniques of motivational interviewing and self-management<sup>15–19</sup> are used to explore the individual’s perspectives regarding the identified risk factors and which of these are the individual’s priorities for modification. The FCM then describes the evidence-based interventions that could reduce each of these risk factors, including how the individual might help implement them. Based on the individual’s preferences, the FCM drafts an initial falls care plan (Figures 1 and 2) and gives the individual written information about each of his or her prioritized risks (in English or Spanish). Finally, the individual (and the caregiver, when appropriate) is instructed on how to get up from a fall by watching a video or reviewing an illustrated handout.

After the initial visit, the FCM completes a comprehensive note and communicates the initial falls care plan electronically to the PCP and other healthcare team members, including the pharmacist if fall risk-increasing drugs are identified. STRIDE-recommended interventions are communicated using standardized SBAR templates through the electronic health record. Within several days, the PCP sends edits to or approval of the falls care plan to the FCM, and the FCM telephones the

individual to discuss these recommendations and plan appropriate follow-up.

**Risk Factor Assessment and Recommendations**

Through this evaluation and planning process, the FCM addresses eight risk factors for falling, including generating specific recommendations (<http://www.stride-study.org/clinical-protocols/>). An example is provided as Figure 3. Sites have leeway to modify the protocols to fit local cultures as long as the risk assessment and recommendation process lead to the same outcomes of the protocols. For example, one site prefers to have bone mineral testing performed on all participants.

**Medications**

The FCM reviews the individual’s medications to detect:

- Fall risk-increasing drugs—including benzodiazepines, first-generation antihistamines, skeletal muscle relaxants, long acting hypoglycemic agents, and tertiary tricyclic antidepressants
- Drug-related side effects that may increase the risk falling—including feeling unsteady, dizzy, drowsy, foggy, or sleepy

**My Fall Risk Assessment**








Participant Name		Study ID	Date	
Risk Factor	Why Does It Matter?	Is this a risk for me?	Is this a priority for me?	Comments
Changes in leg strength, balance and/or walking 	People with decreased leg strength and changes in balance and/or gait are more likely to trip, slip and fall.			
Medications 	Medications that cause lightheadedness or tiredness (e.g., sleeping pills) can increase the likelihood of falling.			
Postural Hypotension 	Postural hypotension, or a drop in blood pressure when a person changes positions, increases the chances of falling.			
Feet Footwear 	Problems with feet, footwear can make it more difficult to walk.			
Home Environmental hazards 	Objects on the floor, loose throw rugs, low lighting, and not having handrails can increase the likelihood of tripping, slipping, and falling.			
Risk of Osteoporosis 	Osteoporosis, or fragile bones, increases the chances of injury during or after a fall.			
Vitamin D supplements	People who do not take Vitamin D supplements are more likely to fall and have an injury.			
Vision problems 	Problems with vision can lead to missteps.			

Figure 1. Falls care plan, Page 1: Summary of risk assessment.

**Priority: Changes in leg strength, balance and/or walking**

**My Goal for the next month is:**

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**Why it matters to me (e.g., increased balance will.....)**

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**How will I do this?**

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**When will I do this?**

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**The things that could make it difficult to do this are:**

**My plan for overcoming these difficulties includes:**

**Support/Resources my Falls Care Manager will assist me with in order to achieve these goals include:**

**How will I monitor progress?**

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**Figure 2.** Falls care plan, Pages 2–7: Example template: Risk factor–specific goals and plans. A separate page is completed for each risk factor that the individual prioritizes.

- Medications without a clear indication
- Medication adherence problems
- Increased fall risk due to the individual's use of alcohol

If any are present, the FCM reports concerns to the site pharmacist or the site clinical director, who then communicates any recommendations to the PCP, who in turn communicates any medication changes back to the FCM.

### Strength, Gait, and Balance impairment

Based on the individual's modified short physical performance battery results, cognitive function, pain level, and preferences, the FCM recommends a course of evidence-based exercise:<sup>20</sup> outpatient or home health physical therapy, community-based exercise programs, or home-exercises based on the Otago exercise program.<sup>21</sup>

### Postural Hypotension

Any of the following abnormalities associated with changing from a lying to a standing position indicate a need for further investigation and treatment:

- 1 A drop in systolic blood pressure of more than 20 mmHg
- 2 A systolic blood pressure of less than 90 mmHg when standing
- 3 No compensatory rise in heart rate when blood pressure drops 20 mmHg or more
- 4 Symptoms of lightheadedness or dizziness

### Feet and Footwear

Foot-related risk factors include foot pain; lack of range of motion; numbness; weakness of toes or ankles; and deformities such as bunions, hammertoes, and long toenails. Footwear-related risks include walking barefoot, in slippers, or in shoes that have inadequate fixation, high or

narrow heels, or smooth, thick, or soft soles. The FCM may initiate referrals to podiatry for nail and foot care and to other specialists for shoe and orthotic interventions.

### Home Safety

Based on the completed previsit questionnaire and home safety checklist, the FCM evaluates the need for and makes a referral to, when appropriate, an occupational therapist for a home safety assessment or recommends home safety modifications, such as nightlights or bathroom grab bars.

### Osteoporosis and Vitamin D

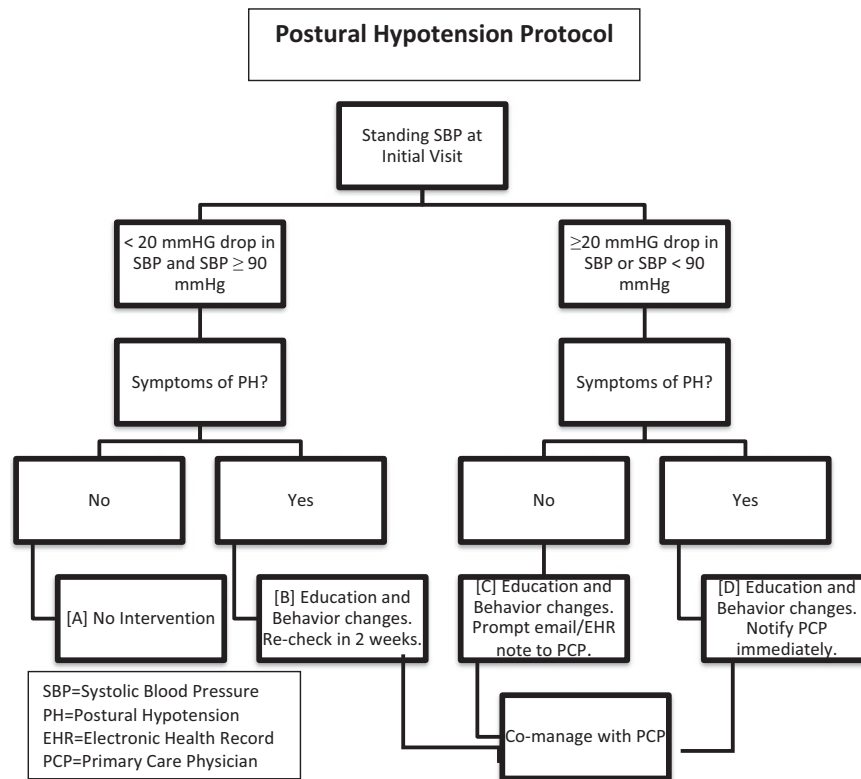
The assessment determines whether individuals are currently receiving treatment for osteoporosis and, if so, for how long. Consistent with the National Osteoporosis Foundation guidelines,<sup>22</sup> if the individual is not receiving treatment, the FCM determines whether he or she has osteoporosis as determined by a bone mineral density (BMD) test or a history of a "minimal trauma" fracture. If the individual has osteopenia or there are no BMD test results, the FRAX risk calculator<sup>6</sup> is used to determine recommendations for treatment.<sup>22</sup> Supplementation with calcium and vitamin D is recommended for all people according to Institute of Medicine recommendations.<sup>23</sup>

### Visual Impairment

The FCM reviews the individual's history to identify any history of cataracts, macular degeneration, glaucoma, or visual loss and to determine whether a visit with an eye doctor has occurred during in the past year. Recommendations are made accordingly.

### Fidelity

Standardized training, implementation, and monitoring ensure that the STRIDE intervention is delivered



Triggers for Communications with PCP

- A. The patient’s SBP does not drop more than 20 mmHg, and the SBP remains > 90 mmHG and is asymptomatic. No templated communication but will be recorded in Falls Care Manager’s note.
- B. The patient’s SBP does not drop more than 20mmHg, and the SBP > 90 mmHg but is symptomatic triggers communication template B.
- C. The patient has a drop of ≥ 20 mmHg or SBP < 90 when standing but is asymptomatic triggers communication template C.
- D. The patient has a drop of ≥ 20 mmHg or SBP < 90 when standing and is symptomatic triggers communication template D.

Education

FCM discusses with patient:

What causes postural hypotension?

- Dehydration
- Medications for depression, sleep, heart problems and blood pressure (e.g. “water pills”)
- Taking a larger number of medications
- How does postural hypotension cause falls?
- What symptoms have you experienced?

**Figure 3.** Protocol for one fall risk factor addressed in Strategies to Reduce Injuries and Develop Confidence in Elders: Postural hypotension.

consistently at all sites. Each FCM has been observed performing individual assessments and their clinical notes have been reviewed periodically for accuracy and comprehensiveness. Each FCM was also monitored making follow-up calls (enacted by a member of the study’s Patient and Stakeholder Council) and received standardized feedback on her motivational interviewing techniques. FCMs from all sites participate in weekly conference calls to discuss

protocol or implementation concerns. All FCMs use the same software for recording fall risks, recommendations, and interventions, further ensuring that the STRIDE protocols are implemented consistently. Similarly, on-site training was provided to the physical therapists and community partners who provide exercise interventions at each practice site, and community-based exercise programs were examined to ensure that they provide evidence-based care.

## Follow-Up and Study Outcomes

Follow-up is conducted according to individualized care plans but at a minimum includes formal visits 6 months after the initial assessment and then annually. The 6-month follow-up visit focuses on care plan evaluation during a scheduled telephone visit unless the individual has had challenges implementing his or her care plan; a fall; or changes in his or her medical, functional, or mobility status. Annual visits also include re-assessments of all fall risks and care plan evaluations and revisions, as needed. Collection of study outcomes is not part of the STRIDE intervention. The primary study outcome is time to first serious fall-related injury, defined as a fall leading to medical attention, including nonvertebral fractures, joint dislocation, head injury, lacerations, and other major sequelae (e.g., rhabdomyolysis, internal injury, hypothermia). Secondary outcomes include all fall injuries and all falls, defined as an event in which a person unintentionally comes to rest on the ground or other lower level not as a result of a major intrinsic event or an overwhelming external hazard.

## DISCUSSION

Despite the importance of preventing falls in older adults and evidence to support the efficacy of interventions to reduce the risk of falling,<sup>6</sup> efforts to integrate fall-prevention interventions into the routine care of older adults have lagged.<sup>24</sup> National strategies, such as the Centers for Disease Control and Prevention Stopping Elderly Accidents, Deaths and Injuries initiative,<sup>25</sup> have assembled educational materials for individuals and healthcare providers, but their integration into practice on a system level has been inconsistent. The STRIDE intervention, embedded in the context of a pragmatic trial, is an attempt to engage healthcare systems in evaluating and modifying risk factors for serious falls-related injuries by changing the care of older persons who are at risk of these injuries. It uses principles of co-management, in this instance by RNs and PCPs, that have been demonstrated to be effective in improving the quality of care and the clinical outcomes of chronic conditions.<sup>7,26–28</sup> STRIDE also partners with community-based fall prevention programs that have been found to reduce falls. Moreover, the intervention actively engages individuals in their care through motivational interviewing and attention to risk factors that are their initial and subsequent highest priorities.

Most trials of multifactorial interventions to reduce serious falls-related injuries (the focus of STRIDE) have been conducted in settings where research staff have administered the interventions without integrating them into individuals' routine clinical care.<sup>29</sup> In contrast, the STRIDE intervention is embedded in clinical practice, including PCPs and other clinical professionals (e.g., pharmacists, physical therapists). All STRIDE components are standard components of clinical care that have been protocolized to provide guidance for the FCMs and to ensure that the intervention is delivered uniformly across clinical sites. The intervention also requires the training and supervision of FCMs. For the purposes of this trial, supervision has been provided nationally, as well as locally, but this

supervision has been designed so that it can be provided at local sites. The STRIDE intervention is also consistent with recommendations for optimizing the role of RNs as partners in primary care.<sup>30</sup>

Whether the STRIDE intervention will reduce serious-falls related injuries remains to be determined. The STRIDE pragmatic trial began enrolling individuals in July 2015 and completed enrollment in March 2017. Although the results of the study will not be available until late 2019, the design and implementation of a standardized intervention that systematically assesses and modifies eight major risk factors for falling suggests that the intervention is feasible in health systems serving diverse populations.

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## SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

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