

# *Falls in Older Adults:*

*Evaluation and Management in Primary Practice*

*3<sup>rd</sup> Edition*

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Tool Kit 4

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**The Practicing Physician Education Project**

**Tools for the Evaluation and Management of Geriatric Patients  
in Primary Practice**

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Supported by the Merck Institute of Aging and Health

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# The Practicing Physician Education in Geriatrics Project

## ***Project Background***

This tool kit is one of a series initially developed under the project *Enhancing Geriatric Care through Practicing Physician Education*, which was funded in 1998 by the John A. Hartford Foundation and administered by the American Geriatrics Society. The project's goal was to improve the quality of geriatric care provided by community-based primary care physicians through the development, dissemination, and evaluation of ongoing professional development programs in geriatrics. Since 2002, the Practicing Physician Education in Geriatrics (PPE) project has continued with the generous support of the Merck Institute of Aging and Health.

## ***The Tool Kits: An Organized, Collaborative Approach to Managing Chronic Conditions in Older Adults***

The PPE program uses a case-based, evidence-based clinical approach to the evaluation and management of common geriatric conditions. The topics for the tool kits were identified through a 1998 needs assessment of American Academy of Family Physicians and American College of Physicians members.<sup>1</sup> Tool kits are available for Depression, Falls, Heart Failure, Memory Loss, Persistent Pain, Prevention, and Urinary Incontinence.

The clinical approach, which is based on current best practice in the management of chronic illness, emphasizes the importance of a collaborative relationship between health care providers and patients, their families, and other caregivers.<sup>2</sup> When patients are engaged in learning about their illness, they are generally more motivated and prepared to participate in day-to-day self-care. The patient becomes a partner with the health care provider as they pursue the common goal of better health.

The tool kits are designed to help busy practitioners provide quality, comprehensive care in an increasingly demanding health care environment. This is accomplished by taking practitioners systematically through the clinical approach. At each stage, assessment instruments and chart-recording forms for health care providers are linked to educational materials for patients.

Each tool kit contains:

- Tools for patients to collect and record relevant information prior to a visit
- Tools for office personnel to assist in assessment and management
- Patient information handouts that can shorten the time needed for explanations during visits
- Educational materials that help the patient and family implement and monitor self-care and make decisions at follow-up visits
- A list of additional resources and organizations that provide information and support services needed for effective self-care
- Chart and office forms to record information needed in a Medicare fee-for-service environment to obtain reimbursement for the time spent with the patient and family

Health care providers are encouraged to select the most relevant tools for their practice and to modify them to fit their own office procedures and the needs of their patients. The basic clinical approach presented in the tool kits can be adapted to the evaluation and management of any chronic condition.

Since 1998, specially trained peer facilitators have led small group, interactive educational sessions on the use of the tool kits in clinical practice. Over 180 facilitators have trained more than 4,000 primary care providers in this collaborative approach to managing chronic disease. These programs continue to be sponsored by the American College of Physicians and other interested organizations.

The tool kits were rated so highly by health care providers participating in these sessions that the tool kits are now being disseminated on CD-ROM and through the Internet. The complete tool kits are available at [www.gericareonline.net](http://www.gericareonline.net), and many of the tools are on the American Geriatric Society Web site at [www.americangeriatrics.org](http://www.americangeriatrics.org).

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2. Von Korff, M, Gruman J, Schaefer J, et al. Collaborative management of chronic illness. *Ann Intern Med*, 1997; 127:1097-110.

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## **Learning Objectives**

At the completion of this educational session you will have...

- Increased confidence in your evaluation of seniors with falls and gait problems
- Become familiar with tools designed to streamline the evaluation and treatment of patients with falls
- Developed an organized approach for evaluating and educating patients with falls

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# The Clinical Problem: The Prevention of Falls in Older Persons

## **Introduction**

This Section contains two documents:

- 1. The Clinical Guidelines: The Prevention of Falls in Older Persons,** a joint guideline of the American Geriatrics Society, British Geriatrics Society, and American Academy of Orthopedic Surgeons Panel on Falls Prevention.

This guideline, published in 2001, provides a review of the literature regarding falls prevention and attempts to organize recommendations according to strength of evidence criteria. The guideline was used to develop the approach found in this tool kit. It provides excellent background reading for understanding the problem of falls and falls prevention in older adults.

The joint Panel on Falls Prevention is currently updating the guideline. Publication is expected in the fall of 2006 (visit the American Geriatrics Society at [www.americangeriatrics.org](http://www.americangeriatrics.org) for updates).

- 2. Update on the Evidence Base in Falls Epidemiology and Prevention**

Since the publication of the AGS/BGS/AAOS Falls Prevention guideline in 2001, many researchers have risen to the challenge of unanswered questions. The epidemiology of falls has changed slightly with the changing demographics and new risk factors have been identified with older risk factors reevaluated. Additionally, we now have new evidence for multifactorial and single interventions in various aged populations. In reading through the guideline, refer to this update of the literature, to be used in conjunction with the guideline.

# The Clinical Guidelines: The Prevention of Falls in Older Persons

## **Background and Significance**

Falls are among the most common and serious problems facing elderly persons. Falling is associated with considerable mortality, morbidity, reduced functioning, and premature nursing home admissions.<sup>1-5</sup> Falls generally result from an interaction of multiple and diverse risk factors and situations, many of which can be corrected. This interaction is modified by age, disease, and the presence of hazards in the environment.<sup>6</sup> Frequently, older people do not appreciate the seriousness of or report these problems to their physicians and, thus, the problems remain undetected until preventable injury and disability occur.<sup>7-9</sup>

Both the incidence of falls and the severity of fall-related complications rise steadily after about age 60. In the age 65-and-over population as a whole, approximately 35% to 40% of community dwelling, generally healthy elderly persons fall annually. After age 75, the rates are higher.<sup>10,11</sup>

Incidence rates of falls in nursing homes and hospitals are almost three times the rates for community-dwelling persons  $\geq 65$  (1.5 falls per bed annually). Complication rates are also considerably higher, with 10% to 25% of institutional falls resulting in fracture, laceration, or the need for hospital care.<sup>12</sup> Fall-related injuries recently accounted for 6% of all medical expenditures for persons age 65 and older in the U.S.<sup>12,13</sup>

A key concern is not simply the high incidence of falls in elderly persons (young children and athletes have an even higher incidence of falls) but rather the combination of high incidence and a high susceptibility to injury. This propensity for fall-related injury in elderly persons stems from a high prevalence of co-morbid diseases (e.g., osteoporosis) and age-related physiological decline (e.g., slower reflexes) that make even a relatively mild fall particularly dangerous. Approximately 5% of elderly people who fall require hospitalization.

**Background and  
Significance,  
continued**

Accidents are the fifth leading cause of death in older adults (after cardiovascular, neoplastic, cerebrovascular, and pulmonary causes) and falls constitute two-thirds of these accidental deaths. More pointedly, 75% of deaths due to falls in the United States occur in the 13% of the population age 65 and over.<sup>14</sup> In addition to physical injury, falls can also have psychological and social consequences. Recurrent falls are a common reason for admission of previously independent elderly persons to long-term care institutions.<sup>15,16</sup> One study found that falls were a major reason for 40% of nursing home admissions.<sup>17</sup> Fear of falling and the post-fall anxiety syndrome are also well recognized as negative consequences of falls. The loss of self-confidence to ambulate safely can result in self-imposed functional limitations.<sup>1,18</sup>

**Risk Factors for  
Falling**

A number of studies have identified risk factors for falling. These can be classified as either intrinsic (e.g., lower extremity weakness, poor grip strength, balance disorders, functional and cognitive impairment, visual deficits) or extrinsic [e.g., polypharmacy (i.e., five or more prescription medications) and environmental factors such as poor lighting, loose carpets, lack of bathroom safety equipment]. Although investigators have not used a consistent taxonomy, a recent review of fall risk factor studies ranked the risk factors and summarized the relative risk of falls for persons with each risk factor (Table 1).<sup>11</sup> In addition, a meta-analysis that studied the relationship of falls and medications, which included studies that examined both multiple and single risk factors, found a significantly increased risk from psychotropic medication (OR 1.7), Class 1a anti-arrhythmic medications (OR 1.6), Digoxin (OR 1.2), and diuretics (OR 1.1).<sup>32</sup>

Perhaps as important as identifying risk factors is appreciating the interaction and probable synergism between multiple risk factors. Several studies have shown that the risk of falling increases dramatically as the number of risk factors increases. Tinetti et al. surveyed community-dwelling elderly persons and reported that the percentage of persons falling increased from 27% for those with no or one risk factor to 78% for those with four or more risk factors.<sup>30</sup> Similar results were found among an institutionalized population.<sup>5</sup> In another study, Nevitt et al. reported that the percentage of community-living persons with recurrent falls increased from 10% to 69% as the number of risk factors increased from one to four or more.<sup>27</sup>

**Risk Factors for  
Falling, continued**

Robbins et al. used multivariate analysis to simplify risk factors so that maximum predictive accuracy could be obtained by using only three risk factors (i.e., hip weakness, unstable balance, taking  $\geq 4$  medications) in an algorithm format. With this model, the predicted 1-year risk of falling ranged from 12% for persons with none of the three risk factors to 100% for persons with all three.<sup>3</sup>

There is emerging evidence of an overlap between the symptoms of falls and syncope in some older adults. This is due either to amnesia for loss of consciousness or to hypotension-induced imbalance in patients with existing gait and balance instability. To date, the overlap has been reported in selected populations with bradycardiac disorders such as carotid sinus syndrome. The prevalence of cardiovascular causes of falls in the wider population is as yet unknown.

**Guidelines  
Development  
Process and  
Methods**

The aim of the guidelines is to assist healthcare professionals in their assessment of fall risk and in their management of elderly patients both at risk of falling and those who have fallen. The Panel on Falls Prevention assumes that healthcare professionals will use general clinical knowledge and judgment in applying the general principles and specific recommendations of this document to the assessment and management of individual patients. Decisions to adopt any particular recommendation must be made by the practitioner in light of available evidence and resources.

The literature search attempted to locate systematic reviews and meta-analyses, randomized trials, controlled before-and-after studies, and cohort studies using a combination of subject heading and free text searches. We made extensive use of high-quality recent review articles and bibliographies, as well as contact with subject area experts. New searches were concentrated in areas of importance to the guidelines development process, for which existing systematic reviews were unable to provide valid or up-to-date answers. The expert knowledge and experience of group members also backed up the search strategy.

**Guidelines  
Development  
Process and  
Methods,  
continued**

A literature search conducted by the RAND Corporation for the purpose of identifying quality of care indicators for falls and mobility problems for two ongoing national projects provided the initial set of articles reviewed for the guideline. "Included" articles were meta-analyses and systematic literature reviews, randomized controlled trials, non-randomized clinical trials, case control studies, and cohort studies in which outcomes involved data related to fall risk or fall prevention as well as articles that provided epidemiological or other background information. For each "included" article, data were extracted. Reference lists of included articles were scanned for any additional relevant studies and further relevant articles were identified.

The Panel identified and synthesized relevant published evidence to allow recommendations to be evidence-based whenever possible using the grading criteria shown in Table 2. The guidelines distinguish between category of evidence and strength of the associated recommendation. It was possible to have methodologically sound (Class I) evidence about an area of practice that was clinically irrelevant or had such a small effect that it was of little practical importance and would, therefore, attract a lower strength of recommendation. More commonly, a statement of evidence would only cover one part of an area in which a recommendation had to be made or would cover it in a way that conflicted with other evidence. Therefore, to produce comprehensive recommendations, the Panel had to extrapolate from the available evidence. This may lead to weaker levels of recommendation (B, C, or D) based on evidence Class I statements.<sup>33</sup> This is inevitably a subjective process.

It was accepted that there would be areas without evidence where recommendations could be made and that consensus would be required to deal with such areas. For a number of the interventions, there was not sufficient evidence to make recommendations and "Comment" sections are written. Throughout the guidelines development process, the Panel identified important unanswered research questions that are listed in the "Research Agenda" section at the end of these guidelines.

## Assessment of Persons Who Have Fallen or Are at Risk of Falling

**General Principles** It is a fundamental tenet of these guidelines, based on a number of controlled studies, that detecting a history and performing a falls-related assessment when coupled with intervention (see Interventions to Prevent Falls, p. 7). Because of this dependence of the assessment on subsequent intervention for effectiveness, it was more difficult to ascribe strength of recommendation to assessment recommendations alone. Therefore, specific recommendations for assessment have been left ungraded. Likewise, prior to any intervention, assessment of an individual's risks and deficits is required to determine specific needs and, if necessary, to deliver targeted interventions.

The recommendations for assessment came from epidemiological studies demonstrating an association between risk factors and falls (see Background and Significance) and from experimental studies in which assessment followed by intervention demonstrated benefit (see Interventions to Prevent Falls, p. 7). Thus, the suggested assessment describes what needs to be done to understand an individual's risk factors and apply an effective intervention(s). An algorithm summarizing the assessment and management of falls is shown in Figure 1.

The intensity of assessment varies by target population. For example, fall risk assessment as part of routine primary healthcare visits with relatively low-risk senior populations would involve a brief assessment. In contrast, high-risk groups — such as persons with recurrent falls, those living in a nursing home, persons with injurious falls, or persons presenting after a fall — would require a more comprehensive and detailed assessment. The essential elements of any fall-related assessment include details about the circumstances of the fall (including a witness account), identification of the subject's risk factors for falls, any medical co-morbidity, functional status, and environmental risks. A comprehensive assessment may necessitate referral to a specialist service.

**General Principles,  
continued**

Unfortunately, the epidemiology of falls is largely based on North American data and there is little data to inform the appropriate configuration of services within the UK National Health Service. In particular, the balance between the benefits of assessment and intervention, set against the workload and cost implications of a potential increase in referral for specialist assessment, is unclear and would need to be planned carefully when implementing these guidelines within any local setting.

The risk factors identified in the assessment may be modifiable (such as muscle weakness, medication side effect, or hypotension) or non-modifiable (such as hemiplegia or blindness). However, knowledge of all risk factors is important for treatment planning. Essential components of the fall-related patient assessment were identified whenever possible from successful controlled trials of fall prevention interventions. The case for assessment to identify a specific risk factor is strongest when successful treatment or other risk reduction strategies have been explicitly based on this specific risk factor. In some cases, the link between identified risk factors and the content of interventions is not clear. When conclusive data on the importance of specific aspects of the assessment (either to prediction of falls or to responsiveness of these risk factors to the intervention) were not available, consensus from the Panel was sought.

**Specific  
Recommendation:  
Assessment**

Approach to older persons as part of routine care (not presenting after a fall).

- I. All older persons (or their caregivers) who are under the care of a health professional should be asked yearly about falls.
- II. All older persons who report a single fall should be observed as they stand up from a chair without using their arms, walk several paces, and return (i.e., the "Get Up and Go Test").<sup>34,35</sup> Those demonstrating no difficulty or unsteadiness need no further assessment.
- III. Persons who have difficulty or demonstrate unsteadiness performing this test require further assessment.

**Specific  
Recommendation:  
Assessment,  
continued**

Approach to people presenting with one or more falls or, have abnormalities of gait and/or balance, or who report recurrent falls.

- I. Persons who present for medical attention because of a fall; report recurrent falls in the past year; or demonstrate abnormalities of gait and/or balance should have a fall evaluation performed. This evaluation should be performed by a clinician with appropriate skills and experience, which may necessitate referral to a specialist service.
- II. A fall evaluation is defined as an assessment that includes the following: a history of fall circumstances, medications, acute or chronic medical problems, and mobility levels; an examination of vision, gait and balance, and lower extremity joint function; an examination of basic neurological function, including mental status, muscle strength, lower extremity peripheral nerves, proprioception, reflexes; tests of cortical, extrapyramidal, and cerebellar function; and assessment of basic cardiovascular status including heart rate and rhythm, postural pulse and blood pressure and, if appropriate, heart rate and blood pressure responses to carotid sinus stimulation.

## **Interventions to Prevent Falls**

**General Principles** The literature identified for this part of the guidelines was heterogeneous across most dimensions. This heterogeneity precluded the use of meta-analytic techniques and dictated the use of narrative summary. Again, the Panel identified and synthesized relevant published evidence according to the grading criteria shown in Table 2.

The study populations included in the studies varied from fit elders who had not fallen, those at risk for falls, and those experiencing single or frequent falls. The cognitive status of the study population was not reported consistently. Study environments included community settings (the majority), long-term care facilities, and acute hospital units. The method of reporting the effect of interventions on falls also varied across studies.

**General Principles,  
continued**

The system most commonly used reported the total number of falls during a given interval following randomization. Other methods included reporting the number of fallers or the time to the first fall event. Evidence for compliance with the intervention(s) was not always reported. Methods for documenting fall outcomes also varied. The most frequently used method was calendar/diary cards. Other methods included telephone or personal interviews.

Most studies evaluating multifactorial intervention were conducted in community settings. The individual elements of the interventions were described inconsistently and, as a consequence of the study designs, it was not possible to determine which components were effective. However, by looking at the components of studies with and without an overall positive effect, it was possible to identify specific interventions that were used more commonly in positive studies. The multifactorial intervention studies were considered for the different settings in which participants resided: community-based, long-term care, and in-hospital studies.

The intervention strategies evaluated for their effectiveness in preventing falls were classified as single or multifactorial strategies and as generic or individually tailored. The recommendations are presented for multifactorial interventions followed by single interventions because this sequence reflects the underlying evidence.

**Specific  
Recommendations:  
Multifactorial  
Interventions**

1. Among community-dwelling older persons (i.e., those living in their own homes), multifactorial interventions should include: gait training and advice on the appropriate use of assistive devices (B); review and modification of medication, especially psychotropic medication (B); exercise programs, with balance training as one of the components (B); treatment of postural hypotension (B); modification of environmental hazards (C); treatment of cardiovascular disorders including cardiac arrhythmias (D).

**Specific  
Recommendations:  
Multifactorial  
Interventions,  
continued**

II. In long-term care and assisted living settings, multifactorial interventions should include: staff education programs (B); gait training and advice on the appropriate use of assistive devices (B); and review and modification of medications, especially psychotropic medications (B).

III. The evidence is insufficient to make recommendations for or against multifactorial interventions in acute hospital settings.

**Community-Based  
Studies**

There were eleven randomized controlled studies of community-dwelling older adults.<sup>36-46</sup> The elements of the multifactorial interventions included education programs, self-management programs, home environment modifications, advice about medication use (with or without subsequent modification of medications), exercise, medical assessment, and management of cardiovascular disorders (such as postural hypotension and carotid sinus syndrome).

Reductions in the number and dosages of prescribed medications were associated with benefit in all three studies that included this intervention (I).<sup>36,37,43</sup> However, medication review without subsequent direct efforts to modify medications was of no benefit in three<sup>38,39,45</sup> of four<sup>46</sup> studies (I). Exercise programs were associated with benefit in all three studies that included this intervention (I).<sup>36,41,43</sup>

Medical assessment followed by tailored interventions for any medical problems that were identified (including cardiovascular disorders and visual problems) was beneficial in one study (I).<sup>37</sup> Referral for medical assessment was of benefit in two<sup>37,46</sup> of three<sup>45</sup> studies (I). In addition the management of postural hypotension was part of the effective intervention in two studies (I).<sup>37,44</sup> Evidence of benefit from modification of home environmental hazards was equivocal in one<sup>43</sup> study and of no benefit in a second<sup>45</sup> (I).

Staff education programs were not effective in reducing falls (I).<sup>38</sup> Self-management programs were not beneficial in the five studies in which they were reported (I).<sup>38-41,45</sup>

- Community-Based Studies, continued** Advice alone about fall risk factor modification (without measures to implement recommended changes) was of equivocal benefit in three<sup>37,41,46</sup> and of no benefit in two<sup>39,40</sup> studies (I).
- Long-Term Care-Based Studies** There were two randomized controlled studies in long-term care settings.<sup>47,48</sup> Both showed overall benefit from multifactorial interventions, although only one<sup>47</sup> study documented significant reductions in subsequent falls (I). The effective components appeared to be comprehensive assessment, staff education (in contrast to community settings), assistive devices, and reduction of medications.
- In-Hospital-Based Studies** Although the strategy is widely implemented, there are no adequate randomized controlled trials of multifactorial intervention studies to reduce falls in hospital in-patients.<sup>49</sup>

### **Specific Recommendations: Single Intervention**

#### **Exercise**

- I. Although exercise has many proven benefits, the optimal type, duration and intensity of exercise for falls prevention remains unclear (B).
- II. Older people who have had recurrent falls should be offered long-term exercise and balance training (B).
- III. Tai Chi C'uan is a promising type of balance exercise, although it requires further evaluation before it can be recommended as the preferred balance training (C).

The Panel made a number of general observations about exercise. There is good evidence of benefit from exercise in fall prevention. However, the Panel was unable to determine which configuration of exercise program to recommend. The Panel identified a number of key findings: the evidence is strongest for balance training; there is less evidence for resistance and aerobic training; there is little data regarding the intensity or type of exercise. Successful programs have consistently been over 10 weeks duration. Exercise needs to be sustained for sustained benefit. There is only preliminary evidence to support the use of Tai Chi C'uan. There is a dearth of studies involving men. In long-term care settings, there is no evidence of benefit for exercise alone.

**Exercise,  
continued**

Among relatively healthy, community-dwelling older people, a program of very intensive strength and endurance training reduced the risk of subsequent falls and the proportion of fallers (I).<sup>50</sup> In another study involving community-dwelling women there was no evidence that a generic exercise program reduced falls (I).<sup>51</sup> In young elderly, community-dwelling women, frequent low-impact weight-bearing exercises and calcium supplementation over a two-year period did not significantly reduce falls (I).<sup>52</sup> In community-dwelling older women, individually tailored exercise programs in the home that incorporated strength and balance training reduced both falls and injuries; for those who continued to exercise, the benefits were evident after a two-year period (I).<sup>53</sup> In the FICSIT meta-analysis of seven studies that featured exercise as a prominent part of multifactorial interventions, there was an overall significant reduction in falls among intervention subjects, although only three of the seven individual trials showed significant reductions (I).<sup>54</sup> In a randomized trial of a group exercise program held thrice weekly for fall-prone elderly men, there was improvement in strength, endurance, gait, and function as well as reduced fall rates adjusted for increased levels of activity (I).<sup>55</sup>

In community-dwelling women at moderate risk of falls, Tai Chi C'uan reduced the rate of falls during a short follow-up period of four months (I).<sup>56</sup> In the same population, a computerized balance training program did not reduce falls (I).<sup>56</sup>

Among older women who had recurrent falls, a course of physical therapy targeting strength and balance was effective in reducing falls,<sup>57</sup> while a community-based generic exercise program in elderly men was of no benefit in fall reduction (I).<sup>55,58</sup> An individually tailored exercise program for moderately demented nursing home patients did not reduce falls (I).<sup>59</sup>

**Environmental  
Modification**

- I. When older patients at increased risk of falls are discharged from the hospital, a facilitated environmental home assessment should be considered (B).

In a subgroup of older patients, a facilitated home modification program after hospital discharge was effective in reducing falls (I).<sup>60</sup> Otherwise, modification of home environment without other components of multifactorial intervention was not beneficial (I).<sup>61-65</sup>

## **Medications**

- I. Patients who have fallen should have their medications reviewed and altered or stopped as appropriate in light of their future fall risk. Particular attention to medication reduction should be given to older persons taking four or more medications and to those taking psychotropic medications. (C)

For all settings (i.e., community, long-term care, hospital, and rehabilitation), there is a consistent association between psychotropic medication use (i.e., neuroleptics, benzodiazepines, and antidepressants) and falls. Although there are no randomized, controlled studies of manipulation of medication as a sole intervention, reduction of medications was a prominent component of effective fall-reducing interventions in community-based and long-term care multifactorial studies (I).<sup>36,37,43,46,47</sup> Multifactorial studies suggest that a reduction in the number of medications in patients who are taking more than four preparations is beneficial. There is no clear difference in the risk for falls between long- and short-acting benzodiazepines (II).<sup>32</sup> Compliance with intervention needs to be sustained to be effective.

## **Assistive Devices**

Assistive devices include bed alarms, canes, walkers (Zimmer frames), and hip protectors.

- I. Studies of multi-factorial interventions that have included assistive devices have demonstrated benefit. However, there is no direct evidence that the use of assistive devices alone will prevent falls. Therefore, while assistive devices may be an effective element of a multifactorial intervention program, their isolated use without attention to other risk factors cannot be recommended (C).

There are few studies evaluating the effect of assistive devices (such as canes and walkers) as an intervention for preventing falls (IV).<sup>66</sup> Among hospitalized patients there is insufficient evidence for or against the use of bed alarms (I).<sup>67</sup>

Hip protectors do not appear to affect the risk of falling (I).<sup>68</sup> However, there are a number of studies, including three randomized trials, that strongly support the use of hip protectors for prevention of hip fractures in high risk individuals. The panel refers the reader to the published guidelines on the treatment and prevention of osteoporosis.<sup>69,70</sup>

**Behavioral and Educational Programs**

- I. Although studies of multi-factorial interventions that have included behavioral and educational programs have demonstrated benefit, when used as an isolated intervention, health or behavioral education does not reduce falls and should not be done in isolation (B).

A structured group educational program among community-dwelling elderly people did not reduce the number of falls but did achieve short-term benefits in attitudes and self-efficacy (I).<sup>71</sup> Practice guidelines in the emergency department did not alter documentation of falls risk factors, causes of falls, consequences of falls, or the implementation of practice guidelines (I).<sup>72,73</sup>

**Comments on Other Potential Interventions**

**Bone Strengthening Medications**

A number of medications, widely used to prevent or treat osteoporosis (e.g., hormone replacement therapy (HRT), calcium, vitamin D, anti-resorptive agents) reduce fracture rates. However, these agents do not reduce rates of falls per se. Given the wealth of information concerning HRT and vitamin D in osteoporotic fractures, including ample prior analyses and practice guidelines, the Panel refers the reader to published guidelines on HRT for osteoporosis.<sup>69,70,74</sup>

**Cardiovascular Intervention**

There is emerging evidence that some falls have a cardiovascular cause that may be amenable to intervention strategies often directed to syncope, such as medication change or cardiac pacing. The role of these cardiac investigations and treatments is not yet clear.

Case series report an overlap of symptoms of falls and syncope and a causal association between some cardiovascular disorders and falls, particularly orthostatic hypotension, carotid sinus syndrome, and vasovagal syndrome.<sup>75-80</sup>

In particular, up to 30% of older patients with carotid sinus syndrome present with falls, and have amnesia for loss of consciousness when bradyarrhythmia is induced experimentally.<sup>81,82</sup> Preliminary studies suggest that patients with recurrent unexplained falls and a bradycardiac response to carotid sinus stimulation experience fewer falls after implantation of a permanent cardiac pacemaker. However, pending the results of an ongoing randomized trial, pacemaker therapy for the treatment of recurrent falls cannot be recommended at this time.

**Visual Intervention**

Patients should be asked about their vision and if they report problems, their vision should be assessed formally and any remediable visual abnormalities should be treated.

There are no randomized, controlled studies of interventions for individual visual problems despite a significant relationship between falls, fractures, and visual acuity.<sup>83</sup> Fall-related hip fractures were higher in patients with visual impairment.<sup>84</sup> Visual factors associated with two or more falls included poor visual acuity, reduced contrast sensitivity, decreased visual field, posterior subcapsular cataract, and non-mitotic glaucoma medication.<sup>83-85</sup>

**Footwear Interventions**

Because there are no experimental studies of footwear examining falls as an outcome, the Panel is not able to recommend specific footwear changes to reduce falls. However, some trials report improvement in intermediate outcomes, such as balance and sway from specific footwear intervention. In women, results of functional reach and timed mobility "Get Up and Go" tests were better when subjects wore walking shoes than when they were barefoot.<sup>86</sup> Static and dynamic balance were better in low-heeled rather than high-heeled shoes or than the patient's own footwear.<sup>87</sup> In men, foot position awareness and stability were best with high mid-sole hardness and low mid-sole thickness.<sup>88</sup> Static balance was best in hard-soled (low resistance) shoes.<sup>89</sup>

**Restraints**

The Panel found no evidence to support restraint use for fall prevention. Restraints have been used traditionally as a fall prevention approach. However, they have major, serious drawbacks and can contribute to serious injuries. There is no experimental evidence that widespread use of restraints or, conversely, the removal of restraints, will reduce falls.<sup>90-93</sup>

## Research Agenda

In the process of developing these guidelines, the Panel identified a number of issues related to fall prevention that it believes should be given high priority for future research and analysis. The Panel believes that further research will be necessary to gather sufficient evidence that will lead to meaningful conclusions about the following concerns:

1. What is the cost effectiveness of recommended strategies?
2. Can falls-prone individuals be risk stratified in terms of who will most benefit from assessment and interventions?
3. What are the effective elements for fall prevention among hospital inpatients?
4. How can falls best be prevented in patients with cognitive impairment and dementia?
5. What are the effective elements of exercise programs (such as type, duration, intensity, and frequency)?
6. What are the effective elements of cardiovascular programs for fall prevention?
7. For whom and when is home assessment by an occupational therapist or other home care specialist effective?
8. What is the effectiveness of assistive devices (e.g., canes and walkers/Zimmer frames) used alone as a strategy for preventing falls?
9. What is the effect of restraint removal, coupled with other tailored interventions, on falls and serious injuries?
10. Does treatment of visual problems prevent falls?
11. What is the safest footwear for people who have fallen or are at risk of falling?
12. What is the role of hip protectors in persons who have fallen or are at risk of falling and what are the most effective designs?

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**Table 1. Results of Univariate Analysis\* of Most Common Risk Factors for Falls Identified in 16 Studies\* That Examined Multiple Risk Factors.**

<b>Risk Factor</b>	<b>Significant/Total<sup>†</sup></b>	<b>Mean RR-OR<sup>‡</sup></b>	<b>Range</b>
Muscle weakness	10/11	4.4	1.5-10.3
History of falls	12/13	3.0	1.7-7.0
Gait deficit	10/12	2.9	1.3-5.6
Balance deficit	8/11	2.9	1.6-5.4
Use assistive device	8/8	2.6	1.2-4.6
Visual deficit	6/12	2.5	1.6-3.5
Arthritis	3/7	2.4	1.9-2.9
Impaired ADL	8/9	2.3	1.5-3.1
Depression	3/6	2.2	1.7-2.5
Cognitive impairment	4/11	1.8	1.0-2.3
Age > 80 years	5/8	1.7	1.1-2.5

\* References: 3, 5, 19-31

+ Number of studies with significant odds ratio or relative risk ratio in univariate analysis/total number of studies that included each factor.

‡ Relative risk ratios (RR) calculated for prospective studies. Odds ratios (OR) calculated for retrospective studies.

**Table 2. Categories of Evidence and Strength of Recommendation.**

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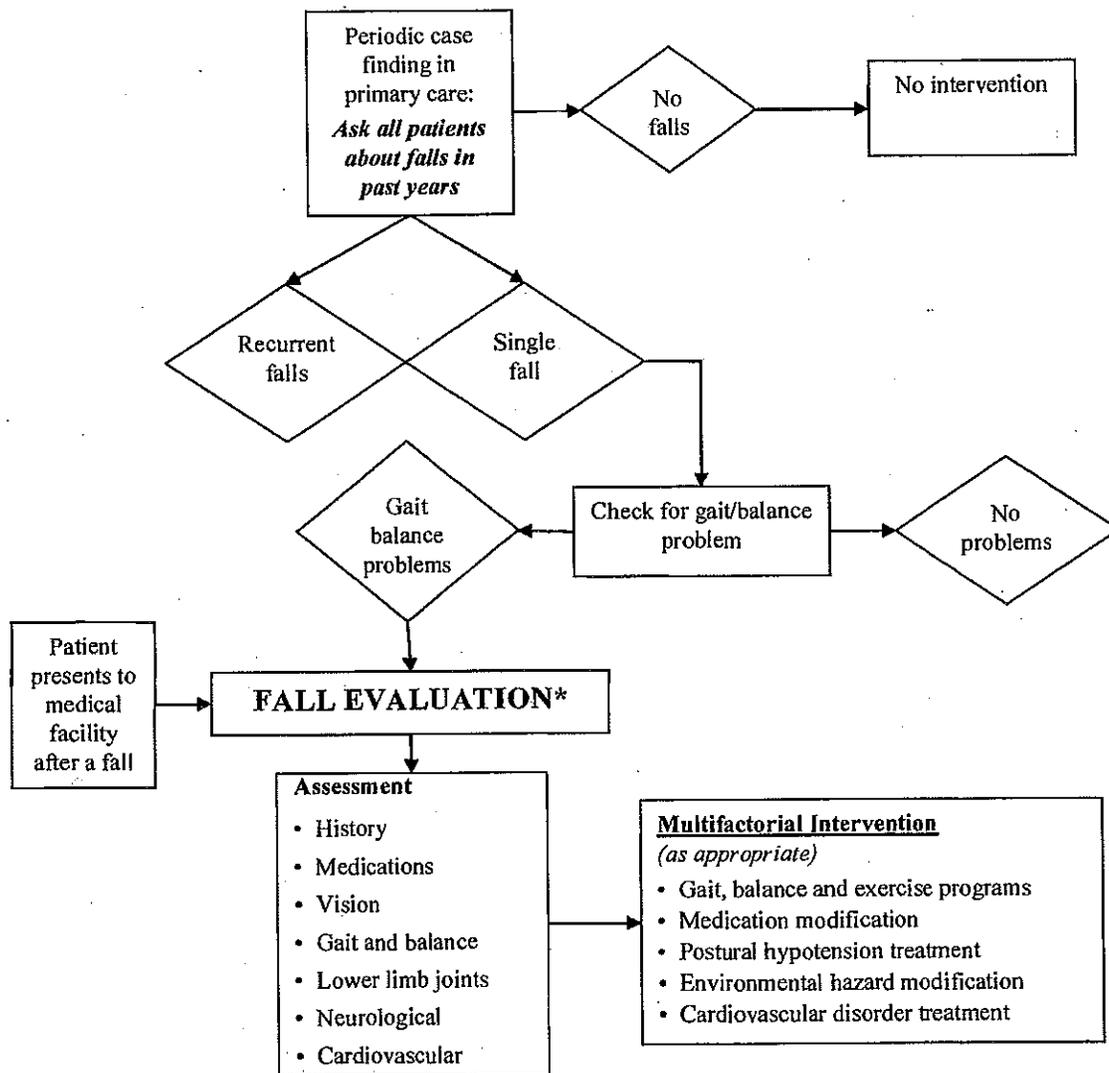
<b>Categories of Evidence</b>	
Class I:	Evidence from at least one randomized controlled trial or a meta-analysis of randomized controlled trials.
Class II:	Evidence from at least one controlled study without randomization or evidence from at least one other type of quasi-experimental study.
Class III:	Evidence from non-experimental studies, such as comparative studies, correlation studies, and case-control studies.
Class IV:	Evidence from expert committee reports or opinions and/or clinical experience of respected authorities.

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<b>Strength of Recommendation</b>	
A:	Directly based on Class I evidence.
B:	Directly based on Class II evidence or extrapolated recommendation from Class I evidence.
C:	Directly based on Class III evidence or extrapolated recommendation from Class I or II evidence.
D:	Directly based on Class IV evidence or extrapolated recommendation from Class I, II, or III evidence.

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**Figure 1. Assessment and Management of Falls**



# Update on the Evidence Base in Falls Epidemiology and Prevention

## **Introduction**

Since the introduction of the AGS/BGS/AAOS Falls Prevention guidelines in 2001, many researchers have risen to the challenge of unanswered questions. The epidemiology of falls has changed slightly with the changing demographics and new risk factors have been identified with older risk factors reevaluated. Additionally, we now have new evidence for multifactorial and single interventions in various aged populations. In reading through the guidelines keep in mind the following updates to be used in conjunction with the guidelines.

## **Epidemiology (USA)**

- Fear of falling incidence averaged 22.5% in one prospective study of community elders(1)
- More than 1.8 million elderly were treated in emergency departments for fall-related injuries and more than 421,000 were hospitalized in 2003 (2)
- 20% to 30% of fallers suffer moderate to severe injuries that reduce mobility and independence (3)
- 360,000 to 480,000 fall-related fractures each year given estimates of 3-5% of falls leading to fracture and 2000 census data (4)
- 9th leading cause of injury deaths in elderly (5)
- In 2002, 12,837 people  $\geq 65$  died from fall-related injuries (5)
- Crude rates of fall-related deaths in 2002 rise from 7.92 for elders 65-69 years to 131.06 for elders  $> 85$  years old (5)
- White men have the highest fall-related death rates, followed by white women, black men, and black women (5)
- 9% community dwelling US elderly in 1997 reported medical conditions related to falls with medical costs of \$6-8 billion per year (6)
- Total cost of fall-related injuries in 1994 for people  $\geq 65$  was \$27.3 billion, and by 2020 it is expected to reach \$43.8 billion (7)

**Risk factors (Newly Described)**

- GFR<65:
  - In community dwelling elders GFR<65 is an independent risk factor for falls during 36 week observation. Significantly higher incidence of number of fallers (25/70 vs 21/116; OR=4.01; 95% CI, 1.48-10.98; p=0.006), and a significantly higher incidence of falls (28/70 vs 23/116; OR=3.68; 95% CI, 1.38-9.82; p=0.009) (8)
- Vitamin D deficiency/PTH (previously noted as an association (9-11)):
  - Frail elders: “Vitamin D deficiency, defined as a serum 25OHD level below 39 nmol/liter was present in 73.6%. Baseline serum 25OHD and PTH were significantly associated with falls in univariate analyses. In multivariate analyses that also corrected for balance and health status, PTH remained a significant predictor of falls independent of 25OHD. Serum PTH is a predictor of time to first fall in the frail elderly independent of vitamin D status and measures of general health” (12)
  - Institutionalized female elders: The adjusted hazards ratio for time to first fall with 25-OH Vitamin D was 0.74 (95% confidence interval=0.59-0.94; P=.01), implying a 20% reduction in the risk of falling with a doubling of the vitamin D level. (13)
- Insomnia
  - In 34, 163 nursing home residents (76% women, mean age ± standard deviation 84 ± 8), hypnotic use did not predict falls (adjusted odds ratio (AOR) = 1.13, 95% confidence interval (CI) = 0.98, 1.30). In contrast, insomnia did predict future falls (AOR = 1.52, 95% CI= 1.38, 1.66)” (14)
- Fear of falling
  - Fear of falling is an independent predictor of falling at 20 months (OR = 1.79, P < .0005) (15)

**Interventions**

Data since the publication of the guidelines continues to demonstrate a need to target appropriate groups for intervention as single interventions in the general elderly population have not been as effective.

**Interventions,  
continued**

Successful interventions for fall risk reduction (Class 1 evidence)

- Tai Chi C'uan in untargeted community dwelling elders but not in frail or transitionally frail elders (16)
- Individually tailored strengthening, balance retraining by professionals (PT/OT) in individuals found to have a deficit on risk assessment (17, 18) with multiple interventions (balance, weight, resistance training) more likely to be effective than single interventions (resistance training) (17)
- Yaktrax Walker footwear during the winter months when used appropriately by known fallers (19)
- Home hazard modification in fallers (17)
- Psychotropic medication removal (20)
- Cardiac pacing in patients with cardioinhibitory carotid sinus hypersensitivity (21)
- Cataract removal (22)
- Multidisciplinary, multifactorial, risk factor screening and intervention in addition to population based public health efforts in the community dwelling elderly (17, 23-26)

Interventions that have been shown to have no significant effect (Class 1 evidence)

- Exercise interventions in untargeted community dwelling elders or institutionalized elders (17, 27)
- Cognitive behavioral interventions alone in any elder population (17)
- Home hazard modification in elders without a previous fall (28)
- Multifactorial assessment and intervention in cognitively impaired fallers (29)

**Interventions,  
continued**

- Multidisciplinary, multifactorial, risk factor screening and intervention in addition to population based public health efforts in institutionalized elders (17, 30, 31) except for one trial in Germany (32)

**Value of Vitamin D**

The value of vitamin D supplementation for fall risk reduction in either community dwelling or institutionalized elders remains unanswered. Key unanswered questions are the value above and beyond calcium supplementation, value in vitamin D deficient elders vs. replete elders, the most effective type of vitamin D supplement, and efficacy in men.

- The two most recent meta-analyses result in different outcomes largely based on including studies with/without baseline calcium supplementation:
  - Bischoff-Ferrari, et al extracted data from 5 RCTs involving 1237 participants showing vitamin D reduced the corrected OR of falling by 22% (corrected OR, 0.78; 95% CI, 0.64-0.92) compared with patients receiving calcium or placebo. The inclusion of 5 additional studies, involving 10 001 participants, in a sensitivity analysis resulted in a smaller but still significant effect size (corrected RR, 0.87; 95% CI, 0.80-0.96) (33).
  - Gillespie, et al pooled data from 3 studies of 461 subjects who all received calcium in addition to vitamin D and showed no benefit from vitamin d supplementation amongst falling elders (RR 0.87, 95% CI 0.7-1.08) (17).
- Recent RCTs not included in above meta-analyses
  - Community dwelling:
    - Randomized, double-blind, placebo-controlled intervention trial of alfacalcidol on fall risk in non-vitamin D deficient community-dwelling elderly men and women in Switzerland. Participants were randomly assigned to receive 1 microgram of alfacalcidol or matched placebo daily for 36 weeks and dietary calcium intake was assessed at baseline using a food frequency questionnaire. Alfacalcidol treatment was associated with fewer fallers (OR=0.69, 95% CI=0.41-1.16) than placebo.

**Value of Vitamin D,  
continued**

- In a post hoc subgroups analysis by medians of total calcium intake, this reduction reached significance in alfacalcidol-treated subjects with a total calcium intake of more than 512 mg/d (OR=0.45, 95% CI=0.21-0.97, P=.042) but not in those who consumed less than 512 mg/d (OR=1.00, 95% CI= 0.47-2.11, P=.998) (34).
- Pragmatic open randomized controlled trial of daily oral supplementation using 1000 mg calcium with 800 IU cholecalciferol and information leaflet on dietary calcium intake and prevention of falls, or leaflet only (control group) on risk of fracture in women with one or more risk factors for fracture of the hip with secondary outcome number of falls. 69% of the women who completed the follow-up questionnaire at 24 months were still taking supplements (55% with inclusion of randomized participants known to be alive). After a median follow-up of 25 months (range 18 to 42 months), clinical fracture rates were lower than expected in both groups but did not significantly differ for all clinical fractures. The odds of a woman having a fall at six and 12 months was 0.99 and 0.98, respectively (35).

**Single  
Interventions**

Key fall reduction interventions in randomized controlled trials (RCTs) or meta-analysis (Class 1 evidence) published since the AGS/BGS/AAOSFP Guidelines Community:

- **Untargeted (general risk population):**
  - Exercise: No evidence to support non-individually targeted exercise programs to reduce falls in the general elderly population with the exception of Tai Chi
  - In the 2005 Cochrane Database of Systematic Reviews “Interventions for preventing falls for elderly people” analysis of pooled data of nine RCTs of general exercise interventions in older community-dwelling people showed no significant risk reduction based on number of fallers (pooled RR 0.89, 95%CI 0.78 to 1.01)” (17).

**Single  
Interventions,  
continued**

- Tai Chi C'uan (initially shown to be effective in FICSIT trial (36) but inconsistently reproduced)
  - Physically inactive, community dwelling adults: This RCT involved a sample of 256 adults aged 70 to 92 randomized to participate in a 3x/week Tai Chi group or to a stretching control group for 6 months. At the end of the 6-month intervention, significantly fewer falls (n=38 vs. 73; p=.007), lower proportions of fallers (28% vs. 46%; p=.01), and fewer injurious falls (7% vs. 18%; p=.03) were observed in the Tai Chi group compared with the stretching control group. After adjusting for baseline covariates, the risk for multiple falls in the Tai Chi group was 55% lower than that of the stretching control group (RR 0.45; 95% CI, 0.30 to 0.70) (16)
  - Transitionally frail adults: RCT of 48 weeks duration of 291 women and 20 men aged 70 to 97 recruited from congregate living facilities to compare an intense tai chi (TC) exercise program with a wellness education (WE) program. The risk ratio of falling was not statistically different in the TC group and the WE group (RR=0.75, 95% CI=0.52-1.08; p=.13) (37).
- Psychotropic medication withdrawal: Community dwelling New Zealand women and men  $\geq 65$  taking psychotropic medication (n = 93) who had gradual withdrawal of psychotropic medication versus continuing to take psychotropic medication (double blind placebo controlled) had a relative hazard for falls of 0.34 (95% CI 0.16-.74) after 44 weeks (20).
- Targeted (higher risk population):
  - Footwear: This prospective, randomized, interventional trial of Yaktrax Walker (YW), a nonmedical gait-stabilizing device, in ambulatory, community-dwelling, fall-prone people aged 65 and older demonstrated relative risk (RR) of outdoor slip for YW was 0.50 (P<.04). The RR of outdoor fall for YW was 0.42 (P<.03) when only days walked on snow and ice was the exposure variable. RR of injurious falls per day walked on snow and ice for YW was 0.13 (P<.02). The tendency for both groups to slip/fall indoors was comparable. The number needed to treat for the YW to prevent one nonserious injurious fall in one winter was six. (19)

**Single  
Interventions,  
continued**

- Exercise: Individually prescribed exercise programs including balance training are effective in reducing falls in the high-risk, non-frail, community dwelling elderly population
  - Pooled data from three studies with individually tailored programs of progressive muscle strengthening, balance retraining exercises and walking plans showed significant reduction in the number of individuals sustaining a fall over a one year period (pooled RR 0.80, 95% CI 0.66 to 0.98) (17)
  - Rehab exercise program in fallers: This RCT with repeated measures was performed at an outpatient rehabilitation center. Elderly, ambulatory, community-dwelling volunteers underwent 6 weeks of supervised stretching, balance, endurance, coordination, and strengthening exercises. Controls attended seminars. Of baseline fallers in the intervention group, 87% (compared with 34.5% for the controls) reported no falls in the subsequent 6 months (18).
  - In frail elders: Multicenter, RCT with a factorial design of 10 weeks of high-intensity home-based quadriceps resistance exercise or frequency-matched visits in 243 frail older people after discharge from hospital. There was no effect of intervention on falls, but patients in the exercise group were at increased risk of musculoskeletal injury (RR 3.6, 95% CI 1.5-8.0) (38).
- Vision improvement:
  - 306 women aged >70, with cataract, were randomized to expedited (approximately 4 weeks) or routine (12 months wait) surgery. Falls were ascertained by diary, with follow up every 3 months. Visual function improved in the operated group. Over 12 months of follow up, rate of falling was reduced by 34% in the operated group (RR 0.66, 95% CI 0.45 to 0.96,  $p = 0.03$ ). Number of subjects who fell at least once was not significantly different. (22)
- Home safety modification:
  - RCT amongst fallers there was a significant 34% reduction in subjects sustaining two or more falls during the study period (17)

**Single  
Interventions,  
continued**

- RCT amongst elders without a history of falls in the previous year there was no significant reduction. Additionally, questions were raised about the specificity of the effect since the rate of falls was the same out of the home as in the home. (28)
- Cardiac pacing in older adults with cardioinhibitory carotid sinus hypersensitivity (CSH): RCT of consecutive older patients (>50 years) attending an accident and emergency facility because of a non-accidental fall who were randomized to dual-chamber pacemaker implant (paced patients) or standard treatment (controls). Paced patients were significantly less likely to fall (OR 0.42; 95% CI 0.23-0.75); controls (N=88) reported 669 falls (mean 9.3; range 0 to 89), and paced patients (N=87) 216 falls (mean 4.1; range 0 to 29) (21).

**Institution:**

- **Untargeted**
  - Exercise: There continues to be no substantial effect of exercise, balance training, or strengthening interventions in reducing falls among institutionalized elders despite improvements in overall mobility (17, 27)
  - In-patient rehab center: Of fifty-four consecutive patients referred for rehabilitation, there were 10 falls on carpet, and only a single fall on vinyl floor covering (relative risk 8.3, 95% confidence interval 0.95-73,  $p = 0.05$ ) (39). Although not a RCT it does seem to support vinyl flooring for exercise/rehab rooms.
- **Targeted**
  - Individual supervision (These are not RCTs but are worth mentioning for future evaluation)
    - High frequency fallers with dementia: Eight dementia unit residents identified as high risk who continued to have falls despite multiple previous interventions received consistent supervision by selected CNAs. A comparison of four months of intervention with the four months prior to the intervention revealed a significant ( $p = 0.024$ ) fall reduction during the intervention months. Individually, seven of the eight participants had reduced falls during the intervention period (40).

**Single  
Interventions,  
continued**

- High frequency fallers in "acute aged care ward": Patients assessed at high falls risk were accommodated in a room staffed by volunteer companion-observers. The volunteers engaged them in conversation, played cards, opened meals and used the call bell to summon nurses if patients attempted to move from the bed or chair without assistance. The falls rate decreased by 44 percent ( $p < 0.000$ ) despite the fact that volunteers were not always present. No patients fell in the observation room when volunteers were present (41).

**Multifactorial  
Interventions**

Community:

- Untargeted
  - Pooled data from 4 trials (17) with 1651 participants show relative risk reduction of 27% (95% CI 15%-37%) in multidisciplinary, multifactorial, health/environmental risk factor screening and intervention studies.
  - RCT of an individualized falls prevention program comprising exercise, visual, and counseling interventions in 620 people aged 75 and older recruited from a health insurance company membership database. The individualized intervention program reduced some falls risk factors but did not prevent falls during the 12 month follow-up (42).
  - RCT with a full factorial design testing efficacy and interactions between three interventions (group based exercise, home hazard management, and vision improvement) to prevent falls among older people. Time to first fall as measured by an 18 month falls calendar in 1090 community dwelling elders aged  $\geq 70$  years was significantly lower in exercise group. Neither home hazard management nor treatment of poor vision alone showed significant reductions in falls. The strongest effect was seen in combining all three interventions with an estimated 14.0% reduction in the annual fall rate (24).

**Multifactorial  
Interventions,  
continued**

- Targeted
  - Fallers:
    - Pooled data from 5 trials (17) with 1176 participants show relative risk reduction of 24% (95% CI 2%-24%) in multidisciplinary, multifactorial, health/environmental risk factor screening and intervention studies.
    - RCT of multifactorial (medical, physiotherapy and occupational therapy) post-fall assessment and intervention compared with conventional care in 313 cognitively intact men and women > 65 years old presenting to emergency care with a fall or fall-related injury and at least one additional fall in the preceding year. Intervention group had 36% fewer falls (RR 0.64, 95% CI 0.46-0.90). The proportion of subjects continuing to fall was not different between groups (25).
  - 310 community residents aged  $\geq 70$  who had had a fall in the previous 12 months or were concerned about falling were randomized to Stepping On or no intervention and were followed for 14 months. Stepping On is a multifaceted community-based program using a small-group learning environment to improve lower-limb balance and strength, improve home and community environmental and behavioral safety, encourage regular visual screening, make adaptations to low vision, and encourage medication review. Two-hour sessions were conducted weekly for 7 weeks, with a follow-up occupational therapy home visit. The intervention group experienced a 31% reduction in falls (RR=0.69, 95% CI 0.50-0.96; P=.025). Secondary analysis of subgroups showed that it was particularly effective for men (n=80; RR=0.32, 95% CI=0.17-0.59). (26)
  - 274 cognitively impaired subjects aged  $\geq 65$  presenting to the accident and emergency department after a fall randomized to assessment and intervention were equally likely to fall again compared to the control group who were assessed but had no intervention (RR 0.92, 95% CI 0.81 to 1.05) (29).

**Multifactorial  
Interventions,  
continued**

Institution:

• Untargeted

- In the 2005 Cochrane Database of Systematic Reviews “Interventions for preventing falls for elderly people”, which included RCTs of multifactorial, multidisciplinary interventions through 2003, Gillespie et al concluded that there was no clear evidence to suggest risk reduction within facilities (17)
- In cluster RCT of a multifactorial falls prevention program including 3 months gait and balance training, medication review, podiatry and optometry in 20 residential care homes were randomly allocated to intervention and control arms there was a mean of 2.2 falls per resident per year in the intervention group compared with 4.0 in the control group; this failed to reach statistical significance ( $P = 0.2$ ) (30).
- Prospective, cluster-randomized, controlled 12-month trial in community nursing homes in Germany of the benefit of generalized staff and resident education on fall prevention, advice on environmental adaptations, progressive balance and resistance training, and hip protectors. The incidence density rate of falls per 1,000 resident years (RY) was 2,558 for the control group (CG) and 1,399 for the intervention group (IG) (RR 0.55, 95% CI 0.41-0.73). The proportion of fallers was significantly reduced (RR 0.75, 95% CI 0.57-0.98). The incidence density rate of frequent fallers (>2/year) was 115 (24.4%) for the CG and 66 (13.0%) for the IG (RR = 0.56, 95% CI = 0.35-0.89) (32).

• Targeted

- Cluster RCT of 14 randomly selected residential care homes in New Zealand where residential care staff implemented systematic individualized fall-risk management for all residents using a fall-risk assessment tool, high-risk logo, and strategies to address identified risks. During 12 months of follow-up, 103 (43%) residents in the control group and 173 (56%) residents in the intervention group fell ( $P < .018$ ). There was a significantly higher incidence rate of falls in intervention homes than in control homes (incident rate ratio=1.34, 95% confidence interval=1.06-1.72) during the intervention period after adjusting for dependency level (type of home), baseline fall rate, and clustering. Low-intensity intervention may be worse than usual care (31).

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# The Clinical Process: Managing Falls in Primary Practice

Process	Purpose	Strategies	Professional Tools	Educational Materials
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## Identify



Detect "fallers" and identify those who need evaluation.

Enhance staff awareness.

Get Up and Go Test

Falls: General Information

Query patients during routine visits.

Train staff to perform the "Get Up and Go Test" at check-in, and query those with gait or balance problem for falls.

Clinical Problem: The Clinical Guidelines

Medical Evaluation of Falls

Clinical Problem: Update on the Evidence Base In Falls Epidemiology and Prevention

Home Safety Questionnaire

## Prepare



Use the questionnaire to gather information useful to differential diagnosis.

Give patients and families information about the purpose and structure of the visit and on background of decisions they may face during the evaluation process.

Story of Your Falls

Medical History

Get Up and Go Test

**Evaluate** Document a falls evaluation efficiently and with high enough quality for identification of appropriate targets for fall prevention.

Use the forms provided to prompt for and record the necessary evaluation.

Provide further information to patients and families about the management choices they are likely to face.

Falls Evaluation: Initial Visit CDC Home Safety Check



**Follow-up** Counsel patient and family on appropriate targets for reducing fall/injury risk.

Provide additional materials for patients and families regarding treatments selected to improve understanding and compliance.

Provide specific recommendations for medical treatments and referrals.

Use other professionals, when indicated.

Falls Evaluation: Initial Visit

What Is a Physical Therapist?

What Is an Occupational Therapist?

Choosing and Using a Cane

Choosing and Using a Walker

Choosing and Starting an Exercise Program

Improve Your Balance in 10 Minutes a Day

Decrease Your Risk of Falling



**Follow-up**

continued

Put Your Best Foot  
Foreword: Shoes and Falling

Osteoporosis: The Brittle  
Truth

Can You Get Help?

After the Fall: A Guide for  
Patients and Families

Avoiding Falls: Tips for  
Patients with Low Vision

Tai Chi

Steady As You Go: Low  
Blood Pressure

Canes and Walkers

# Case Study

Mrs. H is an 86-year-old, widowed, retired English teacher, who lives alone in her own home. The office nurse fields a call from Mrs. H's daughter who is concerned about a fall.

The nurse calls Mrs. H, who reports that three days earlier she fell on the front porch of her home and sustained multiple bruises to her left side. The nurse asks about other falls and learns that two other falls have occurred in the past two months.

Mrs. H agrees to come in for evaluation. The nurse mails the evaluation questionnaires to her. Her daughter is called and informed of the appointments. She agrees to come with her and to help complete the forms.

# Get Up and Go Test

The “Get Up and Go Test” is an assessment that should be conducted as part of a routine evaluation when dealing with older persons. Its purpose is to detect “fallers” and to identify those who need evaluation.

The staff should be trained to perform the “Get Up and Go Test” at check-in and query those with gait or balance problems for falls.

## **INITIAL CHECK**

All older persons who report a single fall should be observed as they:

- From a sitting position, stand without using their arms for support.
- Walk several paces, turn, and return to the chair.
- Sit back in the chair without using their arms for support.

Individuals who have difficulty or demonstrate unsteadiness performing this test require further assessment.

## **FOLLOW-UP ASSESSMENT**

In the follow-up assessment, ask the person to:

- Sit.
- Stand without using their arms for support.
- Close their eyes for a few seconds, while standing in place.
- Stand with eyes closed, while you push gently on his or her sternum.
- Walk a short distance and come to a complete stop.
- Turn around and return to the chair.
- Sit in the chair without using their arms for support.

While conducting the test, pay attention to any abnormal movements. As you observe, answer the questions below. Record your assessment in the Yes or No boxes provided and/or on the "Falls Evaluation: Initial Visit" form.

### Follow-Up Assessment Observations

- Is the person steady and balanced when sitting upright? Yes  No
- Is the person able to stand with the arms folded? Yes  No
- When standing, is the person steady in narrow stance? Yes  No
- With eyes closed, does the person remain steady? Yes  No
- When nudged, does the person recover without difficulty? Yes  No
- Does person start walking without hesitancy? Yes  No
- When walking, does each foot clear the floor well? Yes  No
- Is there step symmetry, with the steps equal length and regular? Yes  No
- Does the person take continuous, regular steps? Yes  No
- Does the person walk straight without a walking aid? Yes  No
- Does the person stand with heels close together? Yes  No
- Is the person able to sit safely and judge distance correctly? Yes  No

### Additional Observations

*Unsteady with eyes closed. Narrow stance, slow, irregular steps.*

*Turns slowly with multiple steps.*

# Falls Evaluation: Initial Visit

Mrs. H

Name

Date: 4/4/01

Age: 88

**Home Safety Ques.**  
(0=rare, no problem  
3=Frequent/serious)

Trips	2
Handholds	1
Light	2
Footwear	0
Toilet	2
Bath	1
Stairs	0
Reach	1
Outside	1
Help	1

**Past Med Hx**  
(check positives)

Syncope	<input type="checkbox"/>
Heart disease	<input checked="" type="checkbox"/>
Arrhythmia	<input checked="" type="checkbox"/>
Seizures	<input type="checkbox"/>
Renal Insufficiency	<input type="checkbox"/>
Lung disease	<input type="checkbox"/>
Alcoholism	<input type="checkbox"/>
Neuropathy	<input checked="" type="checkbox"/>
Stroke	<input type="checkbox"/>
Vertigo	<input type="checkbox"/>
Hearing loss	<input type="checkbox"/>
Vision problems	<input checked="" type="checkbox"/>
Arthritis	<input type="checkbox"/>
Joint surgery	<input type="checkbox"/>
Incontinence	<input type="checkbox"/>
Depression	<input type="checkbox"/>
Fractures	<input checked="" type="checkbox"/>
Osteoporosis	<input type="checkbox"/>
Vitamin D deficiency	<input type="checkbox"/>
Parkinson's	<input type="checkbox"/>

**Family History**

Arthritis	<input type="checkbox"/>
Parkinson's	<input type="checkbox"/>
Alzheimer's	<input type="checkbox"/>
Heart	<input type="checkbox"/>
Diabetes	<input type="checkbox"/>
Depression	<input type="checkbox"/>

**Story of the Falls**

3 falls past 2 months. Increasing unsteadiness over same period. Falls on level ground inside home and on front porch - felt dizzy and unsteady just prior to fall 3 days ago. Struck left chest wall on porch rail. No syncope, vertigo, vision change. Adequate lighting, wearing shoes during fall.

**Current Medical History/Treatments**

12 year history of diabetes with retinopathy, neuropathy, and chronic leg pain. Chronic stable angina. Macular degeneration.

**Medical and Psychiatric History**

CAD - stents 1996  
left wrist fracture 1988

**Medications**

≤see list

Glipizide 10mg daily,  
Nitropatch 0.4mg/hr  
NTG prn

**Positives (FHx, occup., habits, function)**

Mother diabetic

**ROS**

(circle positives)

- acute illness
- memory loss
- ◊ dizziness
- incontinence
- ◊ headache
- chest pain
- ◊ palpitations
- joint pain
- ◊ joint instability
- foot problems
- edema
- weakness
- weight loss
- fatigue
- cane/walker
- help dress/bathe
- stairs
- walk block
- depressed
- fear of falling
- insomnia

**Drugs Causing Falls**

- Psychotropic medications
- Diuretics
- Antiarrhythmics
- Hypoglycemics
- Antihypertensives

**Health Habits:**

**Tobacco**  
0 /pk-yrs.

**Alcohol**  
1 /day

**Lives Alone** Y N

<b>Vital Signs</b> BP sit <u>110/70</u> standing <u>100/70</u> P <u>84</u>		P Standing <u>80</u> T <u>98</u> Wt. <u>170</u> lb		Ht. <u>64</u> in	
<b>Eyes</b>	<input checked="" type="checkbox"/> nl conjunctiva & lids	<b>Feet</b>	<input checked="" type="checkbox"/> no deformity, lesions, tenderness		
<b>Pupils</b>	<input checked="" type="checkbox"/> pupils symmetrical, reactive	<b>Nails</b>	<input type="checkbox"/> no clubbing, cyanosis <i>onychomycosis</i>		
<b>Fundus</b>	<input type="checkbox"/> nl discs & pos elements <i>Cataracts bilat</i>	<b>Footwear</b>	<input checked="" type="checkbox"/> supportive, safe, well-fitting		
<b>Vision</b>	<input type="checkbox"/> acuity and gross fields intact <i>acuity ~ 20/200 (200)</i>				
<b>ENT-External</b>	<input checked="" type="checkbox"/> no scars, lesions, masses	<b>Neurologic</b>			
<b>Otoscopic</b>	<input checked="" type="checkbox"/> nl canals & tympanic membranes	<b>Check nl, circ abn</b>	<b>ROM</b>	<b>Strength</b>	<b>Tones</b>
<b>Hearing</b>	<input checked="" type="checkbox"/> nl to <i>conversation, finger rub</i>	Upper extrem	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>Intranasal</b>	<input checked="" type="checkbox"/> nl mucosa, septum, turbinate	Lower extrem	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Ant. Oral</b>	<input checked="" type="checkbox"/> nl lips, teeth, gums			<i>4/5 distal LE bilat.</i>	
<b>Oropharynx</b>	<input checked="" type="checkbox"/> nl tongue, palate, pharynx				
<b>Neck palp.</b>	<input checked="" type="checkbox"/> symmetrical without masses	<b>Mental status</b>	<input type="checkbox"/> nl alertness, attentive		
<b>Thyroid</b>	<input checked="" type="checkbox"/> no enlargement or tenderness	<b>Cranial nerves</b>	<input type="checkbox"/> w/o gross deficit		
<b>Resp. effort</b>	<input checked="" type="checkbox"/> nl without retractions	<b>Coordination</b>	<input type="checkbox"/> nl rapid alternating movement		
<b>Chest percuss.</b>	<input checked="" type="checkbox"/> no dullness or hyperresonance	<b>DTRs</b>	<input type="checkbox"/> symmetrical, __ (scale: 0-4+) <i>decreased ankle jerks</i>		
<b>Chest palp.</b>	<input checked="" type="checkbox"/> no fremitus	<b>Sensation</b>	<input type="checkbox"/> nl touch, proprioception <i>decreased proprioception, light touch</i>		
<b>Auscultation</b>	<input checked="" type="checkbox"/> nl bilateral breath sounds w/o rales	<b>Orientation</b>	<input type="checkbox"/> nl to m/d/day/yr, time		
		<b>Tandem walk</b>	<input type="checkbox"/> able, steady		
		<b>One leg balance</b>	<input type="checkbox"/> 30 sec eyes open		
		<b>Psychiatric</b>			
		<b>Mood</b>	<input type="checkbox"/> nl good eye contact, appropriate		
		<b>Memory</b>	<input type="checkbox"/> nl short term and long term memory		
		<b>Thought process</b>	<input type="checkbox"/> nl no delusions, phobias, hallucinations		
<b>Heart palp.</b>	<input type="checkbox"/> nl location, size	<b>Get up and Go Test</b> (circle abnormal, check normal)			
<b>Cardiac ausc</b>	<input type="checkbox"/> no murmur, gallop, or rub <i>sys. flow murmur</i>	<b>Sitting balance</b>	<input type="checkbox"/> steady, safe when upright		
<b>Carotids</b>	<input type="checkbox"/> nl intensity w/o bruit <i>decreased</i>	<b>Arise w/larms folded</b>	<input type="checkbox"/> able		
<b>Pedal pulses</b>	<input type="checkbox"/> nl posterior tibial & dorsalis pedis	<b>Standing balance</b>	<input type="checkbox"/> steady in narrow stance		
<b>Abdomen</b>	<input checked="" type="checkbox"/> no masses or tenderness	<b>Eyes closed</b>	<input type="checkbox"/> remains steady		
<b>L/S</b>	<input checked="" type="checkbox"/> no liver/spleen	<b>Nudge</b>	<input type="checkbox"/> recovers w/o difficulty		
<b>Hernia</b>	<input checked="" type="checkbox"/> no hernia identified	<b>Gait initiation</b>	<input type="checkbox"/> no hesitancy		
<b>Anus/rectal</b>	<input checked="" type="checkbox"/> no abnormality or masses	<b>Step length/ht</b>	<input type="checkbox"/> each foot passes stance, clears floor well		
<b>Breasts</b>	<input type="checkbox"/> nl inspection & palpation	<b>Step symmetry</b>	<input type="checkbox"/> step lengths equal, regular		
<b>Comments:</b>		<b>Pattern</b>	<input type="checkbox"/> continuous, regular steps		
<i>Diminished/absent pulses both feet</i>		<b>Path</b>	<input type="checkbox"/> straight w/o walking aide		
<i>///V systolic ejection murmur</i>		<b>Stance</b>	<input type="checkbox"/> steps with heels together		
		<b>Sitting</b>	<input type="checkbox"/> safe, smooth, judges distance correctly		
		<b>Speed</b>	<input type="checkbox"/> 10 feet in less than 10 seconds		
		<b>Gait Description</b>			
		<b>Carotid sinus stimulation (if indicated)</b>			
		Recumbent PreBP ___ P ___ PostBP ___ P ___			

**Assessment**

- ① Low vision - cataracts, macular degeneration
- ② Peripheral neuropathy
- ③ Unsteady gait due to #1 and #2
- ④ Borderline low blood pressure - R/O orthostatic hypotension? Autonomic neuropathy
- ⑤ Chronic stable angina, on nitrates
- ⑥ History of wrist fracture, R/O osteoporosis
- ⑦ Diabetes mellitus
- ⑧ Physical deconditioning

**Recommendations**

Decrease nitrodur to 0.2 ug/hr. patch  
Lying and standing blood pressure after breakfast/lunch. Daughter will do.

**Environmental changes:**

**Assistive device**

- Straight cane
- Quad cane
- Hemi-walker
- Standard Walker
- Rolling walker
- Three-wheel walker
- Other: *Lighting, Toilet grab bar*

**Exercise program**

*Balance training, strengthening*

**Referrals**

- Physical therapist
- Podiatry
- Ophthalmology
- Bone density
- Emergency response
- VNA home safety evaluation

**Educational Materials**

- Falls: General Information
- Medical Evaluation of Falls
- Choosing and Using a Cane
- Choosing and Using a Walker
- What is a Physical Therapist?
- Improve Your Balance in 10 Minutes a Day
- What is an Occupational Therapist?
- Choosing and Starting an Exercise Program
- Tai Chi
- Can You Get Help?
- After the Fall: A Guide for Patients and Families
- Steady As You Go: Low Blood Pressure
- Decrease Your Risk of Falling
- Avoiding Falls: Tips for Patients with Low Vision
- Put Your Best Foot Forward: Shoes and Falling
- Osteoporosis: The Brittle Truth
- Canes and Walkers

# Home Safety Questionnaire

Patient Name Mrs. H

Date 06/04/01

When you are prone to falling, your home can either support you or become a reason for your falls. The following is a list of common things that make a difference in a falling problem.

Look around you and answer the questions truthfully about how well your home is helping you avoid falling. Then think about how you can change things to make it less likely that you will fall. **Bring this form with you for your evaluation.**

**Please choose the best response to each of the questions below.**

- As I move from room to room in my house, I slip or stumble from clutter of electrical cords, low furniture, or other things in my path. (Trips)  
Never      Rarely      **Once a week**      More than once a week
- As I move from room to room in my house there are sturdy things I can grab to steady myself if I feel unsteady. (Handholds)  
Everywhere      **Most places**      Sometimes      Few things to steady me
- I have good light when I walk in my house, (include nighttime trips to the toilet). (Light)  
Always      Almost always      **Sometimes**      Often dark
- While inside my home I walk in shoes, not barefoot or in slippers. (Footwear)  
**Often**      Usually      Sometimes      Mostly barefoot
- I slip or have difficulty getting on and off the toilet. (Toilet)  
Never      Rarely      **Sometimes**      Often
- I slip or have difficulty getting in and out of the bath or shower. (Bath)  
Never      **Rarely**      Sometimes      Often

7. I slip or have difficulty with steps or stairs in my house. (Stairs)

**Never**      **Rarely**      **Sometimes**      **Often**

8. I stand on my toes to get things out of reach in my kitchen or closets. (Reach)

**Never**      **Rarely**      **Sometimes**      **Often**

9. In the places I walk outside, there are uneven surfaces, cracked sidewalks, slippery steps, or other problems that make me trip or stumble. (Outside)

**Never**      **Rarely**      **Sometimes**      **Often**

10. If I were to fall, hurt myself, and were unable to get up, I would be able to get help quickly. (Help)

**Always**      **Usually**      **Sometimes**      **No – Usually Alone**

# Home Safety Questionnaire: Scoring Instructions

**Scoring  
Instructions**

- Extreme left items score 0, with sequential left to right scores of 1, 2, 3. For example, Item 10:  
Always = 0, Usually = 1, Sometimes = 2, No – Usually Alone = 3.
- The higher the score, the more concern regarding the safety issue.
- The score for each item should be copied into the same numbered and titled block on the Falls Evaluation: Initial Visit form.

# Medical History

**Instructions**

To determine the cause of your falls, the doctor needs details about your history, including current and past medical problems, medications, health habits, and family history. The information may be gathered from both you and your family members.

**My name is:**

*Mrs. H*

---

**My telephone is:**

*(802) 918-4161*

---

**Past Medical History**

Have you been affected by any of the following problems or conditions? If so, when was it first found?

Condition	When?	Yes	No
Fainting or passing out		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Heart attack, heart trouble	<i>3 years</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Heart rhythm problem		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Seizure		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Asthma or emphysema		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Excessive alcohol use		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Nerve damage or neuropathy	<i>2 years</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Stroke or TIA's		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Dizziness or vertigo		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Hearing loss		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Vision problems	<i>10 months</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Arthritis		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Joint surgery		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Trouble holding your urine		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Depression		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Fractures		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Osteoporosis	<i>1 year</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Parkinson's disease		<input type="checkbox"/>	<input checked="" type="checkbox"/>



**Family History**

Please indicate which family members have had any of the following medical conditions (give the relationship to you, not the relative's name).

<b>Condition</b>	<b>Family Member(s)</b>
Arthritis	_____
Parkinson's disease	_____
Alzheimer's disease	_____
Heart disease	_____
Diabetes	<i>Mother</i>
Depression	_____
	_____
	_____

**Health Habits**

If you ever smoked, how many packs per day and for how many years? *None*

If you no longer smoke, when did you quit?

Do you drink alcoholic beverages on most days?

\_\_\_\_\_ No  Yes

If yes, how many drinks per day, usually?

(1 drink is 1 beer, 6 oz of wine, or 2 oz of hard liquor)

*half a glass of wine*

Do you live alone?

\_\_\_\_\_ No  Yes

**Medication  
History**

Please list all **prescription** medicines that you are currently taking.

<b>Name of Medication</b>	<b>Strength and Times per Day</b>
<i>Glipizide</i>	<i>10mg everyday</i>
<i>Nitrostat</i>	<i>.4mg for chest pain</i>
<i>Nitropatch</i>	<i>.4mg during the day</i>

Please list all **over-the-counter** medicines that you are currently taking at least once a week.

<b>Name of Medication</b>	<b>Strength and Times per Day</b>
<i>Tylenol</i>	<i>500mg for pain in back</i>

**Review of  
Systems**

Have you been bothered by any of the following problems in the past few months?

Please describe any problems briefly, with approximate dates. If you need more room, write on the back of the sheet. Leave the line empty if the problem has not occurred.

<b>Problem</b>	<b>Description, Dates(s)</b>
Recent acute illness	
Memory loss	
Dizziness	<i>when I move too fast</i>
Urinary incontinence	
Headache	<i>once a month</i>
Chest pain	
Palpitations	
Joint pain	
Joints give way	<i>my knees are weak</i>
Foot problems	
Edema	<i>at night</i>
Weakness	
Weight loss	
Fatigue or tiredness	
Use a cane or walker	
Unable to dress or bathe	
Unable to climb stairs	<i>for years</i>
Unable to walk a block	<i>since my angina</i>
Sad or depressed	

# Story of Your Falls

## **Description of the Fall**

We need to hear the details of your falls so we can understand what is causing them. Think about a recent fall and answer the following questions.

When was this fall?

Date (approximate) 3 days ago Time of Day 12 noon

Where were you when you fell? On my front porch

Think about all of the items listed below. Then in the box below write down everything you can remember about the fall.

- What were you doing before you fell?
- How did you feel just before?
- How did you feel going down?
- What part of your body hit?
- What did it strike in the room?
- What was injured?
- How did you recover?
- Anything else you recall?
- Do you think you passed out?

*I was walking out the door to go to the mailbox, and I felt a little dizzy. I fell sideways on the porch rail, and bruised the left side of my chest.*

*I was able to let myself to the ground. I felt better in a couple of minutes, and got up to go inside.*

**Questionnaire**

Now answer the following questions about how you felt before this fall:

	<b>Yes</b>	<b>No</b>
Were you dizzy?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Did the room spin around?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Did your vision blur?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Did your heart skip?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Did you feel weak?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Did you pass out?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Did you feel like you might pass out?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were you wearing shoes?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Was it dark where you fell?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If you have had other falls different from this fall, describe those too. Use the back of the paper if you need to.

*I had two other falls. One while I was walking from my bedroom to my kitchen, and the other walking from my bedroom to the bathroom at night.*

# Resources

## **Audiovisual Resources**

### ***Exercise: A Guide and Video from the National Institute on Aging***

The NIA offers an exercise book and video for older adults. See the "Healthy Aging" section of the NIA Web publications listing at:  
<http://www.nia.nih.gov/HealthInformation/Publications/>

The exercise guide is also available in .pdf format at:  
<http://www.niapublications.org/exercisebook/ExerciseGuideComplete.pdf>

### ***Sit and be Fit Balance and Fall Prevention Workout***

Available in VHS and DVD, provides a full-body workout designed to improve balance and strengthen legs to help prevent falls. Fall prevention tips are included as well. The video can be ordered on the website or over the phone.

Phone: (509) 448-9438

Web site: <http://www.sitandbenefit.org>

*Continued*

**Organizations  
and Agencies**

**Agency for Healthcare Research and Quality (AHRQ)**

Publications Clearinghouse  
P.O. Box 8547  
Silver Springs, MD 20907-8547

Phone: (800) 358-9295

Web sites: (general) <http://www.ahrq.gov/>  
(for guidelines) <http://www.guideline.gov/>  
E-mail: <mailto:info@ahrq.gov>

AHRQ, a part of the U.S. Department of Health and Human Services, is the lead agency charged with supporting research designed to improve the quality of healthcare, reduce costs of care, and broaden access to essential services. AHRQ's broad programs of research bring practical, science-based information to medical practitioners and consumers. The National Guideline Clearinghouse can be contacted to obtain copies of evidence-based clinical practice guidelines including those for depression.

The AHRQ was formerly the AHCPR (Agency for Healthcare Policy and Research).

**American Academy of Orthopedic Surgeons (AAOS)**

See the section on "Injury Prevention" for a number of public information items on falls prevention and balance.

Web site: <http://orthoinfo.aaos.org/main.cfm>

**The American Association for Marriage and Family Therapy**

1133 15<sup>th</sup> St., NW, Suite 300  
Washington, D.C. 20005-2710

Phone: (202) 452-0109

Web site: <http://www.aamft.org/>

Web site includes several resources for clinicians and the general public.

**Organizations  
and Agencies,  
continued**

**American Geriatrics Society (AGS)**

**Guideline for the Prevention of Falls in Older Persons**

American Geriatrics Society, British Geriatrics Society, and American Academy of Orthopedic Surgeons Panel on Falls Prevention.

Web site: <http://www.americangeriatrics.org/products/positionpapers/Falls.pdf>

**Falls Intervention Evidence Tables**

[http://www.americangeriatrics.org/news/pdf/Intervention\\_fall\\_table.pdf](http://www.americangeriatrics.org/news/pdf/Intervention_fall_table.pdf)

**Geriatrics At Your Fingertips, 2006-2007 Edition / Falls Chapter**

<http://www.geriatricsatyourfingertips.org>

**American Geriatrics Society Foundation for Health in Aging (FHA)**

This site includes an extensive public education section, *Aging in the Know*, that covers a wide range of health topics, including falls.

Web site: <http://www.healthinaging.org/agingintheknow/>

Additional resources from the American Geriatrics Society (<http://www.americangeriatrics.org>) include:

**Patient Education Forum on Falls Prevention**

<http://www.americangeriatrics.org/education/forum/falling.shtml>

**Public Education Brochure on Falls Prevention**

[http://www.americangeriatrics.org/news/pdf/consumer\\_pamphlet.pdf](http://www.americangeriatrics.org/news/pdf/consumer_pamphlet.pdf)

**American Society on Aging (ASA)**

**Live Well, Live Long** (a health promotion, disease prevention project developed in conjunction with the Centers for Disease Control and Prevention) includes a module on:

**Exercise for Life! Physical Activity for Older Adults**

<http://www.asaging.org/cdc/module6/home.cfm>

**Organizations  
and Agencies,  
continued**

**Centers for Disease Control and Prevention (CDC) Falls  
Prevention Tool Kit**

The CDC Tool Kit to Prevent Senior Falls has current technical information and materials about falls and fall-related injuries that can be used on an individual basis or incorporated into health promotion activities aimed at reducing falls among older adults.

Web site: <http://www.cdc.gov/ncipc/pub-res/toolkit/toolkit.htm>

**Connecticut Collaboration for Fall Prevention**

Materials for clinicians include a quick screen to identify older adults who are likely to benefit from fall prevention treatments, and assessment tools and management strategies for reducing the risk factors for falling. Public information addresses why older adults fall and what can be done to decrease the chance of falling or getting hurt.

Web site: <http://www.fallprevention.org/index.htm>

**Fall Prevention Center of Excellence**

The Fall Prevention Center of Excellence's mission is to identify best practices in fall prevention and to help communities offer fall prevention programs to older people. This site contains information for individuals and families, as well as healthcare providers, researchers, and educators.

Web site: <http://www.stopfalls.org>

**Mayo Clinic Foundation for Medical Education and Research**

This Mayo Clinic public education site includes a host of topics on senior health, including "Falls Prevention: 6 Ways to Reduce Your Falling Risk."

Web site: <http://www.mayoclinic.com/health/fall-prevention/HQ00657>

**Organizations  
and Agencies,  
continued**

**National Council on Aging (NCOA) Center for Healthy Aging**

Under the Health Topics section of this NCOA site is a comprehensive list of resources on fall prevention

Web site: <http://www.healthyagingprograms.com/>

**National Institute on Aging (NIA)**

The National Institute on Aging office of public information provides a series of publications called *Age Pages*, including this one on falls and fractures.

Web site: <http://www.niapublications.org/agepages/falls.asp>

**National Library of Medicine (NLM)**

The NLM, part of the National Institutes of Health, has an extensive public information site called MedlinePlus. Under its alphabetical section of "Health Topics" are links to numerous information sources on falls prevention, home safety, and exercise to help reduce the risk of falling in older adults.

Web site: <http://www.nlm.nih.gov/medlineplus/falls.html>

**Publications**

Reuben DB, Herr KA, Pacala JT, et al. *Geriatrics At Your Fingertips™* 2006-2007, 8<sup>th</sup> Edition. American Geriatrics Society; 2006. New York, NY. Copyright ©2006 by the American Geriatrics Society.

American Geriatrics Society, British Geriatrics Society, and American Academy of Orthopedic Surgeons Panel on Falls Prevention: Guidelines for the Prevention of Falls in Older Persons. *J Amer Geriatr Soc.*2001;49(5):666.

## **Web Sites**

<http://www.geriatricspt.org/>

This site contains a search feature to locate a certified geriatric Physical Therapist Specialist. Also includes lots of patient and provider information.

<http://www.apta.org/consumer/ptandyourbody>

This site contains disease and joint specific advice about methods and benefits of physical therapy.

<http://www.aarp.org/confacts/money/modhome.html>

This site contains information about home modifications for disabilities.

<http://www.nih.gov/nia/health/>

This site contains the new resource directory for older people, along with links to hundreds of disease specific sites and publications.

<http://www.nia.nih.gov/health/pubs/nasa-exercise/>

This link has information about the video "Exercise: A Video from the National Institute on Aging."

<http://www.mayoclinic.com/home>

This is the link to the Mayo Clinic.com site. The Healthy Aging section includes lots of educational materials and updates on current advances. There is also a section on falls and tips to avoid them.

[http://www.americangeriatrics.org/news/pdf/consumer\\_pamphlet.pdf](http://www.americangeriatrics.org/news/pdf/consumer_pamphlet.pdf)

The consumer pamphlet accompanying the AGS Falls Prevention Guidelines.

<http://www.healthinaging.org/>

The link to the Foundation of the American Geriatrics Society. This site offers a variety of consumer information and links.

<http://www.arthritis.org/conditions/default.asp>

This link to the Arthritis Foundation site has a good section on tips for living with arthritis and helpful adaptive equipment. It also has articles on Tai Chi. There is also a search feature where you can search for disease, condition, or treatment.