

# Prevention of Falls in Community-Dwelling Older Adults: U.S. Preventive Services Task Force Recommendation Statement

Virginia A. Moyer, MD, MPH, on behalf of the U.S. Preventive Services Task Force\*

**Description:** Update of the 1996 U.S. Preventive Services Task Force (USPSTF) recommendation statement on counseling to prevent household and recreational injuries, including falls.

**Methods:** The USPSTF reviewed new evidence on the effectiveness and harms of primary care–relevant interventions to prevent falls in community-dwelling older adults. The interventions were grouped into 5 main categories: multifactorial clinical assessment (with or without direct intervention), clinical management (with or without screening), clinical education or behavioral counseling, home hazard modification, and exercise or physical therapy.

**Recommendations:** The USPSTF recommends exercise or physical therapy and vitamin D supplementation to prevent falls in community-dwelling adults aged 65 years or older who are at increased risk for falls. (Grade B recommendation)

The USPSTF does not recommend automatically performing an in-depth multifactorial risk assessment in conjunction with comprehensive management of identified risks to prevent falls in community-dwelling adults aged 65 years or older because the likelihood of benefit is small. In determining whether this service is appropriate in individual cases, patients and clinicians should consider the balance of benefits and harms on the basis of the circumstances of prior falls, comorbid medical conditions, and patient values. (Grade C recommendation)

*Ann Intern Med.* 2012;157.

[www.annals.org](http://www.annals.org)

For author affiliation, see end of text.

\* For a list of the members of the USPSTF, see the **Appendix** (available at [www.annals.org](http://www.annals.org)).

This article was published at [www.annals.org](http://www.annals.org) on 29 May 2012.

**T**he U.S. Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific clinical preventive services for patients without related signs or symptoms.

It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.

## SUMMARY OF RECOMMENDATIONS AND EVIDENCE

The USPSTF recommends exercise or physical therapy and vitamin D supplementation to prevent falls in community-dwelling adults aged 65 years or older who are at increased risk for falls. This is a B recommendation.

No single recommended tool or brief approach can reliably identify older adults at increased risk for falls, but several reasonable and feasible approaches are available for primary care clinicians. See the Clinical Considerations section for additional information on risk assessment.

The USPSTF does not recommend automatically performing an in-depth multifactorial risk assessment in con-

junction with comprehensive management of identified risks to prevent falls in community-dwelling adults aged 65 years or older because the likelihood of benefit is small. In determining whether this service is appropriate in individual cases, patients and clinicians should consider the balance of benefits and harms on the basis of the circumstances of prior falls, comorbid medical conditions, and patient values. This is a C recommendation.

See the Clinical Considerations section for more information about providing this service for individual patients.

See the **Figure** for a summary of the recommendations and suggestions for clinical practice.

**Table 1** describes the USPSTF grades, and **Table 2** describes the USPSTF classification of levels of certainty about net benefit.

See also:

### Print

Summary for Patients . . . . . 2

### Web-Only

CME quiz

Figure. Prevention of Falls in Community-Dwelling Older Adults: Clinical Summary of U.S. Preventive Services Task Force Recommendation

Annals of Internal Medicine



PREVENTION OF FALLS IN COMMUNITY-DWELLING OLDER ADULTS

CLINICAL SUMMARY OF U.S. PREVENTIVE SERVICES TASK FORCE RECOMMENDATION

Population	Community-dwelling adults aged 65 years or older who are at increased risk for falls	Community-dwelling adults aged 65 years or older
Recommendation	Provide intervention consisting of exercise or physical therapy and/or vitamin D supplementation to prevent falls.  Grade: B	Do not automatically perform an in-depth multifactorial risk assessment with comprehensive management of identified risks to prevent falls.  Grade: C
Risk Assessment	Primary care clinicians can consider the following factors to identify older adults at increased risk for falls: a history of falls, a history of mobility problems, and poor performance on the timed Get-Up-and-Go test.	
Interventions	Effective exercise and physical therapy interventions include group classes and at-home physiotherapy strategies and range in intensity from very low (≤9 hours) to high (>75 hours).  Benefit from vitamin D supplementation occurs by 12 months; the efficacy of treatment of shorter duration is unknown. The recommended daily allowance for vitamin D is 600 IU for adults aged 51 to 70 years and 800 IU for adults older than 70 years.  Comprehensive multifactorial assessment and management interventions include assessment of multiple risk factors for falls and providing medical and social care to address factors identified during the assessment. In determining whether this service is appropriate in individual cases, patients and clinicians should consider the balance of benefits and harms on the basis of the circumstances of prior falls, medical comorbid conditions, and patient values.	
Balance of Harms and Benefits	Exercise or physical therapy and vitamin D supplementation have a moderate benefit in preventing falls in older adults.	Multifactorial risk assessment with comprehensive management of identified risks has at least a small benefit in preventing falls in older adults.
Other Relevant USPSTF Recommendations	The USPSTF has made recommendations on screening for osteoporosis. These recommendations are available at <a href="http://www.uspreventiveservicestaskforce.org/">www.uspreventiveservicestaskforce.org/</a> .	

For a summary of the evidence systematically reviewed in making these recommendations, the full recommendation statement, and supporting documents, please go to [www.uspreventiveservicestaskforce.org/](http://www.uspreventiveservicestaskforce.org/).

RATIONALE

Importance

Falls are the leading cause of injury in adults aged 65 years or older. Between 30% and 40% of community-dwelling adults aged 65 years or older fall at least once per year.

Detection

Effective primary care interventions for falls use various approaches to identify persons at increased risk. However, no evidence-based instrument exists that can accurately identify older adults at increased risk for falling. The factor used most often to identify high-risk persons is a history of falls, and most studies use additional risk factors to select patients.

Benefits of Early Intervention

The USPSTF found convincing evidence that exercise or physical therapy has moderate benefit in preventing falls in older adults. Adequate evidence indicates that vitamin D supplementation has moderate benefit in preventing falls

in this population and that interventions identified and categorized as multifactorial risk assessment with comprehensive management of identified risks have at least a small benefit in preventing falls. Comprehensive multifactorial assessment and management interventions include assessment of multiple risk factors for falls and providing medical and social care to address factors identified during the assessment. It is possible that some combination of interventions in a select population could provide important benefits, but given the current evidence, the USPSTF is uncertain what that combination or population would be.

Harms of Early Intervention

The USPSTF found convincing evidence that the harms of vitamin D supplementation are no greater than small. Adequate evidence indicates that the harms of physical therapy or exercise are small. These harms include a paradoxical increase in falls and an increase in physician visits.

**Table 1. What the USPSTF Grades Mean and Suggestions for Practice**

Grade	Definition	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer/provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.	Offer/provide this service.
C	<i>Note: The following statement is undergoing revision.</i> Clinicians may provide this service to selected patients depending on individual circumstances. However, for most individuals without signs or symptoms, there is likely to be only a small benefit from this service.	Offer/provide this service only if other considerations support offering or providing the service in an individual patient.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.	Read the clinical considerations section of the USPSTF Recommendation Statement. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

The USPSTF found convincing evidence that the harms of multifactorial assessment with comprehensive management of identified risks are no greater than small.

#### USPSTF Assessment

The USPSTF concludes with high certainty that exercise or physical therapy has moderate net benefit in preventing falls in older adults.

The USPSTF concludes with moderate certainty that vitamin D supplementation has moderate net benefit in preventing falls in older adults.

The USPSTF concludes with moderate certainty that multifactorial risk assessment with comprehensive management of identified risks has a small net benefit in preventing falls in older adults.

**Table 2. USPSTF Levels of Certainty Regarding Net Benefit**

Level of Certainty*	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by such factors as: the number, size, or quality of individual studies; inconsistency of findings across individual studies; limited generalizability of findings to routine primary care practice; and lack of coherence in the chain of evidence. As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of: the limited number or size of studies; important flaws in study design or methods; inconsistency of findings across individual studies; gaps in the chain of evidence; findings that are not generalizable to routine primary care practice; and a lack of information on important health outcomes. More information may allow an estimation of effects on health outcomes.

\* The USPSTF defines *certainty* as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general primary care population. The USPSTF assigns a certainty level on the basis of the nature of the overall evidence available to assess the net benefit of a preventive service.

## CLINICAL CONSIDERATIONS

### Patient Population Under Consideration

This recommendation applies to interventions that are feasible in primary care for community-dwelling adults aged 65 years or older.

### Brief Assessment of Individual Risk in Primary Care

Primary care clinicians can reasonably consider a small number of factors to identify older persons at increased risk for falls. Age itself is strongly related to risk for falls (1, 2). Several clinical factors, including a history of falls, a history of mobility problems, and poor performance on the timed Get-Up-and-Go test (3, 4), also identify persons at increased risk for falling. A history of falling is most commonly used to identify increased risk for future falling and has generally been considered concurrently or sequentially with other key risk factors, particularly gait and balance. A pragmatic, expert-supported approach to identifying high-risk persons uses a history of falls and mobility problems and the results of a timed Get-Up-and-Go test. The test is performed by observing the time it takes a person to rise from an armchair, walk 3 meters (10 feet), turn, walk back, and sit down again (4). The average healthy adult older than 60 years can perform this task in less than 10 seconds (5). The USPSTF did not find evidence about frequency of a brief falls risk assessment, but other organizations, including the American Geriatric Society (AGS), recommend that clinicians ask their patients yearly about falls and balance or gait problems.

## Interventions

Effective exercise and physical therapy interventions include group classes and at-home physiotherapy strategies. Effective interventions range in intensity from low ( $\leq 9$  hours) to high ( $> 75$  hours). The U.S. Department of Health and Human Services recommends that older adults get at least 150 minutes per week of moderate-intensity or 75 minutes per week of vigorous-intensity aerobic physical activity, as well as muscle-strengthening activities twice per week (6). It also recommends balance training 3 or more days per week for older adults at risk for falling because of a recent fall or difficulty walking (6). The AGS recommends that exercise interventions include balance, gait, and strength training.

The trials studied a wide range of doses and durations for vitamin D supplementation; the median dose was 800 IU daily and the median duration was 12 months. The data suggest that benefit from vitamin D supplementation occurs by 12 months; the efficacy of shorter treatment is unknown. According to the Institute of Medicine, the recommended daily allowance for vitamin D is 600 IU for adults age 51 to 70 years and 800 IU for adults older than 70 years (7). The AGS recommends 800 IU per day for persons at increased risk for falls.

The following interventions lack sufficient evidence for or against use in prevention of falls in community-dwelling older adults: vision correction, medication discontinuation, protein supplementation, education or counseling, and home hazard modification.

## Other Approaches to Prevention

The Centers for Disease Control and Prevention has published details on implementing community-based interventions to prevent falls (8). The USPSTF's recommendation on vitamin D and calcium supplementation to prevent cancer and fractures is being updated and will be available at [www.uspreventiveservicestaskforce.org](http://www.uspreventiveservicestaskforce.org) when complete.

## Useful Resources

The USPSTF recommends screening for osteoporosis in women aged 65 years or older. More information is available at [www.uspreventiveservicestaskforce.org](http://www.uspreventiveservicestaskforce.org).

## OTHER CONSIDERATIONS

### Implementation

Although the evidence does not support routinely performing an in-depth multifactorial risk assessment with management in all older adults, there may be reasons for providing this service to certain individuals. Important items in the patient's medical history could include the circumstances of prior falls and comorbid medical conditions. The AGS recommends multifactorial risk assessment with multicomponent intervention in older adults who have had 2 falls in the past year (1 fall if combined with gait or balance problems), have gait or balance problems,

or present with an acute fall. The most effective components of multifactorial risk assessment with comprehensive management are evaluations of balance and mobility, vision, and orthostatic or postural hypotension, as well as review of medication use and home environment. Follow-up and comprehensive management of identified risk factors are essential to the effectiveness of this strategy.

The burden of falls on patients and the health care system is large. Decreasing the incidence of falls would also improve the socialization and functioning of older adults who have previously fallen and fear falling again. Many other interventions could potentially be useful to prevent falls, but because of the heterogeneity in the target patient population, heterogeneity (that is, multiplicity) of predisposing factors, and additive or synergistic nature, their effectiveness is not known. However, many interventions that have insufficient evidence to support their use in fall prevention have other arguments that do support their use.

For multifactorial risk assessment with comprehensive management and, to a lesser degree, physical therapy, insurance coverage and the cost of services are current barriers to widespread adoption. The often-multifactorial nature of the deficits related to fall risk requires close case management and coordination of services, which are also not uniformly reimbursed.

## Research Needs and Gaps

Studies are needed on the clinical validation of primary care tools to identify older adults at substantial risk for falls. More efficacy trials are needed of the following interventions: vision correction, medication withdrawal, protein supplementation, education or counseling, and home hazard modification.

## DISCUSSION

### Burden of Disease

Falls are the leading cause of injury in adults aged 65 years or older. A total of 30% to 40% of community-dwelling adults older than 65 years falls at least once per year, and 5% to 10% of adults who fall will have a fracture, laceration, or head injury (1, 2).

### Scope of Review

In 1996, the USPSTF reviewed the effectiveness of counseling to prevent household and recreational injuries, including falls, by age group. The 1996 review concentrated on adults aged 65 years or older and included hospital and nursing home patients (9). Since the 1996 recommendation, the USPSTF has developed and adapted its methods, the framework for systematic reviews, and the quality rating system it uses to evaluate evidence.

The current USPSTF review focused on the effectiveness and harms of primary care-relevant interventions to prevent falling in community-dwelling older adults. The interventions are grouped into 5 main categories: multifactorial clinical assessment (with or without direct interven-

tion), clinical management (with or without screening), clinical education or behavioral counseling, home hazard modification, and exercise or physical therapy.

### Brief Risk Assessment

The risk for falling can be assessed in various ways, and the literature contains many disparate assessment tools. Age and history of falls are the 2 risk factors most commonly used to define high risk in fall intervention studies. Other commonly assessed factors to define high-risk status include female sex, impaired balance and gait, visual impairment, and medication use. Studies of risk factor assessment have used a large and varied list of reported risk factors for falls, which makes it difficult to synthesize the literature. One systematic review of risk factor assessments used in effective falls intervention trials analyzed the prognostic value of risk factors and found that 3 risk factors provided independent prognostic value in most studies: history of falls, use of certain medications (for example, psychoactive medications), and gait and balance impairment (10).

Several tools have been developed that use combinations of risk factors to predict falls. None of these tools has been widely validated, and many are not clearly feasible in a primary care setting. Commonly used tools for assessing fall risk include the Falls Risk Assessment Tool, the Performance Oriented Mobility Assessment, the timed Get-Up-and-Go test, the Falls Risk Assessment Score for the Elderly, the Functional Reach Test, and the Berg Balance Scale (1, 11). Only the Get-Up-and-Go test and the Functional Reach Test are feasible for primary care settings.

### Effectiveness of Preventive Measures

The USPSTF reviewed the evidence on the use of in-depth multifactorial clinical assessments, clinical management, clinical education or behavioral counseling, home hazard modification, and exercise or physical therapy to reduce falls and fall-related morbidity and mortality. The USPSTF did consider several systematic reviews that came to different conclusions from those of the USPSTF, including a 2009 Cochrane review (12). These differences in conclusions result from differences in study inclusion and exclusion criteria. The most common reasons for exclusion were study quality, study design (generally comparative effectiveness trials without a control), population (not comparable with primary care), and availability of recent studies published after other systematic reviews (1). The USPSTF reviewed evidence for several outcomes, including falls, fractures, quality of life, and mortality.

Although the evidence was mixed on whether interventions reduced fall-related fractures or improved quality of life, several studies reported a decrease in the number of falls after fall-related interventions. Multifactorial clinical assessment with comprehensive management seems to reduce the risk for falling in older adults by a small amount. The USPSTF reviewed trials on multifactorial clinical assessment with varying levels of intensity of referral and

management of identified fall-related concerns. Combining the results of the 6 studies of multifactorial clinical assessment with comprehensive management resulted in a non-statistically significant reduced risk for falling after 12 months compared with usual care (pooled relative risk [RR], 0.89 [95% CI, 0.76 to 1.0]) (1, 13–18). An intervention was considered to have comprehensive management if it included multifactorial clinical assessment with referral to needed services, plus intervention based on results of the assessment. The heterogeneity of the populations and interventions in the studies led to substantial challenges in synthesizing and interpreting the evidence on multifactorial assessments as a whole. It is possible that some combination of interventions in a select population could provide important benefits, but given the current evidence, the USPSTF is uncertain what that combination or population would be. The largest of the studies on multifactorial clinical assessment was a fair-quality randomized trial of 1559 adults with a mean age of 72.5 years that reported a 25% reduction in risk for falling in the intervention group compared with the control group (RR, 0.75 [CI, 0.64 to 0.88]) (19). A small U.K. study of 200 older adults that was published after the USPSTF systematic review reported a decrease in the number of falls with multifactorial assessment and comprehensive management (20). The addition of this study to the meta-analysis may result in statistical significance, but the magnitude of benefit would continue to be small. Multifactorial clinical assessment with less-than-comprehensive follow-up does not seem to be effective in reducing the risk for falling (pooled RR, 0.994 [CI, 0.917 to 1.076]) (1).

Among the individual clinical management strategies to reduce falls that the USPSTF reviewed, vitamin D supplementation seems to reduce the risk for falling; other clinical management interventions, including vision correction, hip protectors, medication withdrawal, and protein supplementation, do not consistently reduce this risk. The USPSTF reviewed 9 trials of vitamin D supplementation and found an approximate 17% reduction in risk for falling during 6 to 36 months of follow-up and a number needed to treat of 10 (1, 2). Several of the studies targeted older adults who were vitamin D–deficient, and the effect of vitamin D supplementation was greater in these populations. Unlike the 2009 Cochrane review and meta-analyses, the USPSTF found that vitamin D supplementation was consistent with a statistically significant reduction in risk for falling. The USPSTF considered data from 3 additional trials that were not included in the Cochrane review. An Australian trial, which was published after the USPSTF systematic review, studied 2256 older women who received a 1-time high dose of oral vitamin D and reported an increased number of fallers with vitamin D supplementation (21). This was the only study that showed an increased risk for falls after vitamin D supplementation and was thus considered an outlier by the USPSTF; however, an overall benefit of vitamin D in the reduction of

falls continues to be seen even if this study is included in pooled analysis. None of the 4 studies of vision correction reported a reduced risk for falling. Limited evidence from 2 of the vision correction studies indicates that a fear of falling is reduced after vision correction. Evidence on whether hip protectors are beneficial is mixed. Adherence to prescribed hip protector use was poor in the available studies. One large study of 4169 women with an average age of 78 years reported both a reduced risk for falling after 12 months and a reduced fear of falling (22). A smaller study did not find a beneficial effect from hip protectors. The design of trials that included medication discontinuation interventions varied, thus preventing the USPSTF from concluding whether they were beneficial in reducing falls. The evidence on whether protein supplementation improves fall outcomes is limited.

The USPSTF reviewed 18 studies of exercise or physical therapy in community-dwelling older adults and found that there was a statistically significant reduction in risk for falling (pooled RR, 0.87 [CI, 0.81 to 0.94]) (1, 2). The number needed to treat with exercise or physical therapy for a median of approximately 12 weeks to prevent 1 person from falling was 16. The benefit was greater in high-risk populations (pooled RR, 0.84 [CI, 0.78 to 0.91]) than in low-risk populations (1, 2). The studies included approximately 3500 adults who were mostly older than 75 years and primarily non-Hispanic white women. Most studied populations were deemed high-risk on the basis of several factors, including history of falling, gait and balance impairments, chronic disease status, and use of psychotropic medications. Exercise or physical therapy trials included various components that can be summarized into 3 major categories: gait, balance, or functional training (including a study on tai chi); strength or resistance exercise; and general exercise. Treatment intensity (estimated in hours of contact) ranged from 2 to 80 hours.

The evidence on clinical education and behavioral counseling interventions to prevent falls is limited. Only 1 study was found in the USPSTF's review, and it did not report a benefit in reduction of risk for falling. Several studies of multiple interventions included some minimal education, but the heterogeneity in study design prevented the calculation of a confident summary estimate of fall risk. The USPSTF found limited evidence from 3 studies that home hazard modification results in a nonstatistically significant reduction in risk for falling among community-dwelling populations selected on the basis of fall risk factors.

### Potential Harms of Screening or Treatment

Limited evidence indicates that some interventions designed to prevent falls actually increase them. Several studies on physical activity interventions and multifactorial assessment with management interventions reported an increase in falls in the intervention group, but only 1 reported statistically significant results. There does not seem

to be an increase in all-cause mortality or disability or a decrease in self-reported quality of life with fall prevention interventions. The USPSTF found no evidence of serious harms from hip protectors, medication, protein supplementation, vitamin D supplementation, clinical education or counseling, home hazard modification, or exercise or physical therapy. An increase in falls after vision screening in frail older adults has been reported (23). Minor adverse outcomes associated with specific interventions included increased fall-related outpatient visits after falls assessment, self-reported musculoskeletal symptoms after exercise, increased outpatient visits for abnormal heart rhythm after exercise, minor local skin irritation or infection with use of hip protectors, gastrointestinal adverse effects from protein supplementation, and transient or asymptomatic hypercalcemia with vitamin D supplementation. The heterogeneity in study design makes it difficult to synthesize the evidence on vitamin D supplementation and harms. Many of the studies on vitamin D did not report on adverse events, and many included other interventions, such as calcium supplementation, making it difficult to determine the independent effect of vitamin D on harms. The Women's Health Initiative trial (24) reported the results of daily supplementation with 400 IU of vitamin D<sub>3</sub> combined with 1000 mg of calcium in women aged 50 to 79 years and found a small increase in the risk for renal stones (hazard ratio, 1.17 [CI, 1.02 to 1.34]).

### Estimate of Magnitude of Net Benefit

The USPSTF found convincing evidence that exercise or physical therapy reduces the risk for falls by a moderate amount (approximately 13%) (1). Adequate evidence indicates that the harms of physical therapy or exercise, such as a paradoxical increase in falls and an increase in physician visits, are small. The USPSTF concluded with high certainty that exercise or physical therapy confers a moderate benefit in the reduction of falls.

The USPSTF found adequate evidence that vitamin D supplementation reduces the risk for falling by a moderate amount (approximately 17%) (1). Convincing evidence indicates that the harms of vitamin D supplementation are no greater than small. Therefore, the USPSTF concluded with moderate certainty that the net benefit from vitamin D supplementation is moderate.

The USPSTF found that multifactorial clinical assessment with comprehensive management of identified risk factors reduces the risk for falls by a small amount. Among the 15 multifactorial clinical assessment interventions with less-than-comprehensive management, the risk for falling was not reduced (1). The USPSTF found that there were no serious harms associated with multifactorial clinical assessment with comprehensive management. Therefore, the USPSTF concluded with moderate certainty that the overall net benefit of multifactorial clinical assessment with comprehensive management of identified risk factors is small.

### How Does Evidence Fit With Biological Understanding?

Muscle weakness, gait disturbances, and imbalance are important factors that contribute to increased risk for falls in older persons. Vitamin D receptors have been identified in various cell types, including skeletal muscle, and stimulation of these receptors promotes protein synthesis. Vitamin D receptors decline with age. Several studies have demonstrated a beneficial effect of vitamin D or its metabolites on muscle strength and balance (25–27). Exercise and physical therapy probably improve strength and balance and therefore result in fewer falls. The health status of older adults is affected by many interrelated variables, some of which probably have additive effects and may explain why multifactorial risk assessment with comprehensive management is effective in preventing falls.

### Response to Public Comments

A draft version of this recommendation statement was posted for public comment on the USPSTF Web site from 12 January to 9 February 2011. Many comments pointed out a lack of clarity about how to identify adults at increased risk for falls who would qualify for the recommended interventions. Although the evidence is limited on tools to assess risk for falls, the USPSTF provided a pragmatic approach to assessing risk in the Clinical Considerations section. Several comments requested clarification on the difference between assessing an older adult for increased risk (for whom the vitamin D and physical activity interventions should be applied) and the more comprehensive “multifactorial risk assessment,” which is the focus of the C recommendation. The USPSTF provided more information throughout the statement to clarify what is meant by a “brief” risk assessment and “multifactorial risk assessment.” Many respondents commented on the perceived difference between the USPSTF recommendation and the AGS guideline on multifactorial assessments. More information on the AGS guideline was provided in several sections of the statement to clarify the similarities.

### RECOMMENDATIONS OF OTHERS

The Centers for Disease Control and Prevention recommends 3 categories of interventions: exercise-based, home modification for hazard reduction, and multifaceted (including medical screening for visual impairment and medication review) (8). The National Institute on Aging outlines similar interventions for the prevention of falls: exercise for strength and balance, monitoring for environmental hazards, and regular medical care to ensure optimized hearing and vision, as well as medication management (28). According to the AGS, detecting a history of falls is fundamental to a falls reduction program. It recommends that all older Americans be asked once a year about falls (29). It further recommends that older persons who have fallen should have their gait and balance assessed by using one of the available evaluations, and that those who cannot perform or perform poorly on a standardized gait

and balance test should be given a multifactorial fall risk assessment. The multifactorial fall risk assessment should include a focused medical history, physical examination, functional assessments, and an environmental assessment. The AGS recommends the following interventions for falls prevention: adaptation or modification of home environment; withdrawal or minimization of psychoactive or other medications; management of postural hypotension; management of foot problems and footwear; exercise (particularly balance), strength, and gait training; and vitamin D supplementation of at least 800 IU per day for persons who have vitamin D deficiency or are at increased risk for falls. The AGS found insufficient evidence to recommend vision screening as a single intervention for reducing falls.

From the U.S. Preventive Services Task Force, Rockville, Maryland.

**Disclaimer:** Recommendations made by the USPSTF are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

**Financial Support:** The USPSTF is an independent, voluntary body. The U.S. Congress mandates that the Agency for Healthcare Research and Quality support the operations of the USPSTF.

**Potential Conflicts of Interest:** Dr. Moyer: *Support for travel to meetings for the study or other purposes:* AHRQ/USPSTF; *Consultancy:* AAP. Disclosure forms from USPSTF members can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M10-0471](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M10-0471).

**Requests for Single Reprints:** Reprints are available from the USPSTF Web site ([www.uspreventiveservicestaskforce.org](http://www.uspreventiveservicestaskforce.org)).

### References

1. Michael YL, Lin JS, Whitlock EP, Gold R, Fu R, O'Connor EA, et al. Interventions to Prevent Falls in Older Adults: An Updated Systematic Review. Evidence Synthesis no. 80. AHRQ Publication no. 11-05150-EF1. Rockville, MD: Agency for Healthcare Research and Quality; December 2010.
2. Michael YL, Whitlock EP, Lin JS, Fu R, O'Connor EA, Gold R; U.S. Preventive Services Task Force. Primary care–relevant interventions to prevent falling in older adults: a systematic evidence review for the U.S. Preventive Services Task Force. *Ann Intern Med.* 2010;153:815-25. [PMID: 21173416]
3. Mathias S, Nayak US, Isaacs B. Balance in elderly patients: the “get-up and go” test. *Arch Phys Med Rehabil.* 1986;67:387-9. [PMID: 3487300]
4. Podsiadlo D, Richardson S. The timed “Up & Go”: a test of basic functional mobility for frail elderly persons. *J Am Geriatr Soc.* 1991;39:142-8. [PMID: 1991946]
5. Bohannon RW. Reference values for the timed up and go test: a descriptive meta-analysis. *J Geriatr Phys Ther.* 2006;29:64-8. [PMID: 16914068]
6. U.S. Department of Health and Human Services. 2008 Physical Activity Guidelines for Americans. Washington, DC: U.S. Department of Health and Human Services; 2008. Accessed at [www.health.gov/paguidelines/guidelines/default.aspx#toc](http://www.health.gov/paguidelines/guidelines/default.aspx#toc) on 5 April 2012.
7. Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine. Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride. Washington, DC: National Academy Press; 1997. Accessed at [www.nal.usda.gov/fnic/DRI//DRI\\_Calcium/calcium\\_full\\_doc.pdf](http://www.nal.usda.gov/fnic/DRI//DRI_Calcium/calcium_full_doc.pdf) on 5 April 2012.
8. Stevens JA, Sogolow ED. Preventing Falls: What Works. A CDC Compendium of Effective Community-Based Interventions From Around the World. Atlanta, GA: National Center for Injury Prevention and Control, Centers for

- Disease Control and Prevention; 2008. Accessed at [www.cdc.gov/HomeandRecreationalSafety/images/CDCCompendium\\_030508-a.pdf](http://www.cdc.gov/HomeandRecreationalSafety/images/CDCCompendium_030508-a.pdf) on 5 April 2012.
9. **U.S. Preventive Services Task Force.** Counseling to prevent household and recreational injuries. In: *Guide to Clinical Preventive Services*. 2nd ed. Rockville, MD: Agency for Healthcare Research and Quality; 1996.
  10. **Ganz DA, Bao Y, Shekelle PG, Rubenstein LZ.** Will my patient fall? *JAMA*. 2007;297:77-86. [PMID: 17200478]
  11. **Scott V, Votova K, Scanlan A, Close J.** Multifactorial and functional mobility assessment tools for fall risk among older adults in community, home-support, long-term and acute care settings. *Age Ageing*. 2007;36:130-9. [PMID: 17293604]
  12. **Gillespie LD, Robertson MC, Gillespie WJ, Lamb SE, Gates S, Cumming RG, et al.** Interventions for preventing falls in older people living in the community. *Cochrane Database Syst Rev*. 2009;CD007146. [PMID: 19370674]
  13. **Close J, Ellis M, Hooper R, Glucksman E, Jackson S, Swift C.** Prevention of falls in the elderly trial (PROFET): a randomised controlled trial. *Lancet*. 1999;353:93-7. [PMID: 10023893]
  14. **Davison J, Bond J, Dawson P, Steen IN, Kenny RA.** Patients with recurrent falls attending Accident & Emergency benefit from multifactorial intervention—a randomised controlled trial. *Age Ageing*. 2005;34:162-8. [PMID: 15716246]
  15. **Lord SR, Tiedemann A, Chapman K, Munro B, Murray SM, Gerontology M, et al.** The effect of an individualized fall prevention program on fall risk and falls in older people: a randomized, controlled trial. *J Am Geriatr Soc*. 2005;53:1296-304. [PMID: 16078954]
  16. **Spice CL, Morotti W, George S, Dent TH, Rose J, Harris S, et al.** The Winchester falls project: a randomised controlled trial of secondary prevention of falls in older people. *Age Ageing*. 2009;38:33-40. [PMID: 18829689]
  17. **Tinetti ME, Baker DI, McAvay G, Claus EB, Garrett P, Gottschalk M, et al.** A multifactorial intervention to reduce the risk of falling among elderly people living in the community. *N Engl J Med*. 1994;331:821-7. [PMID: 8078528]
  18. **Vind AB, Andersen HE, Pedersen KD, Jørgensen T, Schwarz P.** An outpatient multifactorial falls prevention intervention does not reduce falls in high-risk elderly Danes. *J Am Geriatr Soc*. 2009;57:971-7. [PMID: 19507291]
  19. **Wagner EH, LaCroix AZ, Grothaus L, Leveille SG, Hecht JA, Artz K, et al.** Preventing disability and falls in older adults: a population-based randomized trial. *Am J Public Health*. 1994;84:1800-6. [PMID: 7977921]
  20. **Logan PA, Coupland CA, Gladman JR, Sahota O, Stoner-Hobbs V, Robertson K, et al.** Community falls prevention for people who call an emergency ambulance after a fall: randomised controlled trial. *BMJ*. 2010;340:c2102. [PMID: 20460331]
  21. **Sanders KM, Stuart AL, Williamson EJ, Simpson JA, Kotowicz MA, Young D, et al.** Annual high-dose oral vitamin D and falls and fractures in older women: a randomized controlled trial. *JAMA*. 2010;303:1815-22. [PMID: 20460620]
  22. **Birks YF, Porthouse J, Addie C, Loughney K, Saxon L, Baverstock M, et al; Primary Care Hip Protector Trial Group.** Randomized controlled trial of hip protectors among women living in the community. *Osteoporos Int*. 2004;15:701-6. [PMID: 14997286]
  23. **Cumming RG, Ivers R, Clemson L, Cullen J, Hayes MF, Tanzer M, et al.** Improving vision to prevent falls in frail older people: a randomized trial. *J Am Geriatr Soc*. 2007;55:175-81. [PMID: 17302652]
  24. **Jackson RD, LaCroix AZ, Gass M, Wallace RB, Robbins J, Lewis CE, et al; Women's Health Initiative Investigators.** Calcium plus vitamin D supplementation and the risk of fractures. *N Engl J Med*. 2006;354:669-83. [PMID: 16481635]
  25. **Bischoff-Ferrari HA, Orav EJ, Dawson-Hughes B.** Effect of cholecalciferol plus calcium on falling in ambulatory older men and women: a 3-year randomized controlled trial. *Arch Intern Med*. 2006;166:424-30. [PMID: 16505262]
  26. **Dukas L, Bischoff HA, Lindpaintner LS, Schacht E, Birkner-Binder D, Damm TN, et al.** Alfacalcidol reduces the number of fallers in a community-dwelling elderly population with a minimum calcium intake of more than 500 mg daily. *J Am Geriatr Soc*. 2004;52:230-6. [PMID: 14728632]
  27. **Dhesi JK, Jackson SH, Bearne LM, Moniz C, Hurley MV, Swift CG, et al.** Vitamin D supplementation improves neuromuscular function in older people who fall. *Age Ageing*. 2004;33:589-95. [PMID: 15501836]
  28. **National Institute on Aging.** AgePage: Falls and Fractures. Bethesda, MD: U.S. Department of Health and Human Services; 2009. Accessed at: [www.nia.nih.gov/health/publication/falls-and-fractures](http://www.nia.nih.gov/health/publication/falls-and-fractures) on 5 April 2012.
  29. **American Geriatrics Society, British Geriatrics Society.** 2010 AGS/BGS Clinical Practice Guideline: Prevention of Falls in Older Persons. New York: American Geriatrics Society; 2010. Accessed at [www.americangeriatrics.org/health\\_care\\_professionals/clinical\\_practice/clinical\\_guidelines\\_recommendations/2010/](http://www.americangeriatrics.org/health_care_professionals/clinical_practice/clinical_guidelines_recommendations/2010/) on 5 April 2012.



---

## APPENDIX: U.S. PREVENTIVE SERVICES TASK FORCE

Members of the U.S. Preventive Services Task Force at the time this recommendation was finalized<sup>†</sup> are Virginia A. Moyer, MD, MPH, *Chair* (Baylor College of Medicine, Houston, Texas); Michael L. LeFevre, MD, MSPH, *Co-Vice Chair* (University of Missouri School of Medicine, Columbia, Missouri); Albert L. Siu, MD, MSPH, *Co-Vice Chair* (Mount Sinai School of Medicine, New York, and James J. Peters Veterans Affairs Medical Center, Bronx, New York); Linda Ciofu Baumann, PhD, RN (University of Wisconsin, Madison, Wisconsin); Kirsten Bibbins-Domingo, PhD, MD (University of California, San Francisco, San Francisco, California); Susan J. Curry, PhD (University of Iowa College of Public Health, Iowa City, Iowa); Mark Ebell, MD, MS (University of Georgia, Athens, Georgia); Glenn Flores, MD (University of Texas Southwestern, Dallas, Texas); Adelita Gonzales Cantu, RN, PhD (University of Texas Health Science Center, San Antonio, Texas); David C. Grossman, MD,

MPH (Group Health Cooperative, Seattle, Washington); Jessica Herzstein, MD, MPH (Air Products, Allentown, Pennsylvania); Joy Melnikow, MD, MPH (University of California, Davis, Sacramento, California); Wanda K. Nicholson, MD, MPH, MBA (University of North Carolina School of Medicine, Chapel Hill, North Carolina); Douglas K. Owens, MD, MS (Stanford University, Stanford, California); Carolina Reyes, MD, MPH (Virginia Hospital Center, Arlington, Virginia); and Timothy J. Wilt, MD, MPH (University of Minnesota Department of Medicine and Minneapolis Veterans Affairs Medical Center, Minneapolis, Minnesota). Former USPSTF members who contributed to the development of this recommendation include Ned Calonge, MD, MPH; Rosanne Leipzig, MD, PhD; Judith Ockene, PhD, MEd; and Diana Petitti, MD, MPH.

<sup>†</sup> For a list of current Task Force members, go to [www.uspreventiveservicestaskforce.org/members.htm](http://www.uspreventiveservicestaskforce.org/members.htm).