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## Assessment and Management of Fall Risk in Primary Care Settings

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Accidental falls; Aged; Wounds and injuries; Primary prevention; Secondary prevention; Risk assessment and management; Preventive health services/organization and administration; Community health services

## INTRODUCTION

### Falls: Definition and Magnitude of the Problem

Falls occur more often with advancing age. Each year, approximately 30% to 40% of people aged 65 years and older who live in the community fall.<sup>1</sup> Roughly half of all falls result in an injury,<sup>2</sup> of which 10% are serious,<sup>3</sup> and injury rates increase with age.<sup>4</sup> The direct medical costs for falls total nearly \$30 billion annually.<sup>5</sup>

Falls in the outpatient setting are usually defined as “coming to rest unintentionally on the ground or lower level, not due to an acute overwhelming event”<sup>6</sup> (eg, stroke, seizure, loss of consciousness) or external event to which any person would be susceptible.

Falls are a major threat to older adults’ quality of life, often causing a decline in self-care ability and participation in physical and social activities. Fear of falling, which develops in 20% to 39% of people who fall, can lead to further limiting activity, independent of injury.<sup>7</sup>

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## Fall Risk Factors

Fall risk factors increase the likelihood that a person will fall. These risk factors can be categorized as extrinsic (external to the individual) and intrinsic (within-person) (Fig. 1). Intrinsic factors include several age-related physiologic changes, as summarized in Table 1.

Many falls result from interactions among multiple risk factors, and the risk of falling increases linearly with the number of risk factors.<sup>1</sup> However, even among community-dwelling people aged 75 years and older without risk factors, approximately 10% fall during any given year.<sup>1</sup> Therefore, all older adults should be recognized as being at some increased risk for falling.

## Falls from Older Adults' Perspective

Older adults frequently think that falls are inevitable with aging<sup>8</sup> but underestimate their personal risk of falling.<sup>9</sup> Environmental and behavioral factors (eg, rushing, being distracted) are most often seen as causing falls; intrinsic (personal/health) factors are rarely recognized. Thus, primary care providers (PCPs) have a crucial role in helping patients understand the importance of intrinsic factors in causing falls.

Few older adults use proven fall prevention strategies such as balance exercises.<sup>10</sup> When asked what they are doing to prevent future falls, people commonly report being more careful.<sup>11</sup> However, there is no evidence that being more careful alone prevents falls.

Less than half of older adults who fall talk with their health care providers about it.<sup>12</sup> Therefore, guidelines specify that providers should ask all their patients aged 65 years and older about falls at least annually.<sup>13</sup> By evaluating patients for fall risk and encouraging them to adopt evidence-based prevention strategies, PCPs can help patients reduce their chances of falling and experiencing functional decline, injury, or death.

## FALL RISK ASSESSMENT

### Clinical Practice Guideline

A 2012 Cochrane Systematic Review reported that clinical assessment by a health care provider combined with individualized treatment of identified risk factors, referral if needed, and follow-up reduced the rate of falls by 24%.<sup>14</sup> Similarly, the US Preventive Services Task Force found that multifactorial clinical assessment and management, combined with follow-up, was effective in reducing falls.<sup>15</sup>

The American Geriatrics Society and British Geriatrics Society (AGS/BGS) have published a clinical practice guideline on fall risk screening, assessment, and management.<sup>13</sup> The AGS/BGS guideline<sup>13</sup> recommends screening all adults aged 65 years and older for fall risk annually. This screening consists of asking patients whether they have fallen 2 or more times in the past year or sought medical attention for a fall, or, if they have not fallen, whether they feel unsteady when walking. Patients who answer positively to any of these questions are at increased risk for falls and should receive further assessment. People who have fallen once without injury should have their balance and gait evaluated; those with gait or balance abnormalities should receive additional assessment. A history of 1 fall without injury and

without gait or balance problems does not warrant further assessment beyond continued annual fall risk screening.<sup>13</sup>

A fall risk assessment is required as part of the Welcome to Medicare examination. PCPs can receive reimbursement for fall risk assessment through the Medicare Annual Wellness visit and incentive payments for assessing and managing fall risk through voluntary participation in the Physician Quality Reporting System.

### Implementing Screening and Assessment

The US Centers for Disease Control and Prevention (CDC) has developed an algorithm that details each step of screening and assessment and guides interventions based on each individual's level of risk (Fig. 2).

This algorithm is part of a tool kit called STEADI (Stopping Elderly Accidents, Deaths, and Injuries).<sup>16</sup> Based on the AGS/BGS guideline<sup>13</sup> with input from practicing clinicians, STEADI was designed to help health care providers integrate falls assessment and management into their practice. The algorithm highlights that even individuals at low risk (no history of falls, no problems with gait or balance) can benefit from a primary prevention approach, namely education about fall risk factors, strength and balance exercises, and vitamin D supplementation.<sup>15</sup> The recommended dose of vitamin D for fall prevention is 1000 IU of cholecalciferol daily.<sup>17</sup>

### Fall Risk Assessment

A risk assessment consists of a falls history, medication review, physical examination, and functional and environmental assessments.

**The falls history**—A falls history should include determining the number of falls in the past year as well as their circumstances, including any premonitory symptoms, location, activity, footwear, use of assistive device (if prescribed), use of glasses (if typically used), ability to get up after the fall, time of day, any injuries sustained, and any medical treatment received. Corroboration by a witness can be helpful in cases of recurrent, unexplained falls, because such falls may be caused by unrecognized syncope.<sup>18</sup> Documenting a falls history is one of the quality indicators for fall prevention and management.<sup>19</sup>

**Medications and falls**—A critical part of risk assessment is a medication review. Several classes of medications increase fall risk (Table 2). Psychoactive medications in particular are independent predictors of falls.<sup>20</sup> These medications tend to be sedating, alter the sensorium, and impair balance and gait. Other medications (eg, antihypertensives, nonsteroidal antiinflammatory drugs, diuretics) are more weakly associated with falls.<sup>21</sup>

A key strategy is to reduce the dose of any indicated medications that contribute to fall risk and to taper and stop any medications that are no longer indicated.<sup>22</sup> Nonpharmacologic approaches (eg, sleep hygiene measures for insomnia) are often a useful alternative.

**Postural hypotension**—Postural hypotension is defined as a reduction in systolic blood pressure of at least 20 mm Hg or in diastolic blood pressure of at least 10 mm Hg within 3

minutes of standing. Postural hypotension affects approximately 30% of community-dwelling older adults<sup>23</sup> and is a fall risk factor. Patients may experience lightheadedness, blurred vision, headache, fatigue, weakness, or syncope within 1 to several minutes of standing up, or they may be asymptomatic. In contrast, patients may experience postural lightheadedness without a measured blood pressure reduction; this should be considered equivalent to postural hypotension for fall risk. Postural hypotension can often be alleviated by reducing the dosage of blood pressure–lowering medications and/or stopping medications that have orthostatic hypotension as a side effect. Use of above-the-knee support hose and sleeping with the head of the bed elevated may also reduce postural reductions in blood pressure.

**Fall-focused physical examination**—The recommended elements of a fall-focused physical examination are shown in Box 1. An essential exam element is assessment of the patient’s gait and balance. Three quick gait, strength, and balance tests are the Timed Up-and-Go (TUG), the 30-Second Chair Stand test, and the 4-Stage Balance test. These tests are described in the STEADI tool kit and shown in online instructional videos at: <http://www.cdc.gov/homeandrecreationalafety/Falls/steady/index.html>.

The TUG, a test of functional mobility, involves timing a person standing up from a chair with armrests (using their assistive device if they normally use one), walking 3 m (10 feet) at their usual pace, turning, returning to the chair, and sitting down. A TUG time greater than or equal to 12 seconds suggests high fall risk.<sup>24</sup>

The 30-Second Chair Stand test assesses lower extremity strength and balance. Being unable to stand up from a chair of knee height without using one’s arms indicates increased fall risk.<sup>20</sup>

The 4-Stage Balance test assesses static balance by having the patient stand in 4 positions, each progressively more challenging. Positions include the parallel, semi-tandem, tandem, and single-leg stand.<sup>25</sup> Inability to perform a tandem stand (ie, heel of one shoe touching toe of the other) for 10 seconds predicts falls, and the inability to stand on 1 leg unassisted for 5 seconds predicts injurious falls.<sup>26</sup>

Cognitive testing is also an important part of the fall-related physical examination and may consist of a brief cognitive screen such as the Mini-Cog.<sup>27</sup> People with moderate to severe cognitive impairment are at high risk of falls.

**Functional assessment**—Assessing a patient’s level of functioning is usually accomplished by asking standardized questions about difficulties with performing activities of daily living and instrumental activities of daily living. The risk of falling and the circumstances and location of falls vary by functional ability.<sup>28</sup> People who are healthier are more likely to fall on stairs, away from home, and during displacing activities (eg, bending over, reaching up), and are more likely to be seriously injured if they fall.<sup>28</sup> By contrast, people with functional limitations are more likely to fall at home during routine activities. Gauging functional ability can help determine the degree of fall and injury risk, indicate risk factors, and suggest interventions.

**Laboratory tests and imaging**—A comprehensive assessment may involve laboratory tests. These tests could include thyroid-stimulating hormone, vitamin B<sub>12</sub> level, complete blood count, 25-hydroxy vitamin D level, and other laboratory tests if clinically indicated.<sup>29</sup>

A dual-energy x-ray absorptiometry scan should be done if bone mineral density has not been assessed. No other radiographic imaging study is routinely necessary. However, based on signs and symptoms, such as evidence of head injury or a new focal neurologic deficit, computed tomography or MRI of the brain may be indicated. An assessment for causes of syncope should be conducted only if there is strong suspicion, as in the case of recurrent, unexplained falls.

**Environmental assessment**—Environmental assessment, which is typically conducted by a trained health professional (eg, occupational therapist [OT]) on referral from the PCP, is intended to identify hazardous conditions within the home, such as obstacles in pathways or on stairs, unsupportive or ill-fitting footwear, unsuitable assistive devices, inadequate lighting, and slippery surfaces. It also identifies hazards outside the home, such as cracked pavement or sloped yards. Identifying and modifying environmental factors is an effective intervention as part of a comprehensive multifactorial approach to preventing falls.<sup>13</sup> It is also effective as a single intervention when delivered by an OT.<sup>14</sup> OTs consider behavioral factors that affect fall risk as well as adaptations that older adults can make to function safely in and around their homes.<sup>30</sup>

## MANAGEMENT OF FALL RISK

### Management Goals for Older Adults at Risk of Falls

Goals for fall risk management include (1) reduce the chances of falling, (2) reduce the risk of injury, (3) maintain the highest possible level of mobility, and (4) ensure ongoing follow-up.

### Clinical Approach to Managing Fall Risk

#### **Collaborate with patients and their caregivers to address fall risk factors**—

Providers should explore older adults' perceptions of the causes of their falls and willingness to make changes to reduce their risk of falling again. Approaches that facilitate behavior change include presenting the information that falls can be prevented, providing choices, personalizing options, and focusing strategies on enhancing quality of life (eg, maintaining independence).<sup>8</sup> The STEADI tool kit<sup>16</sup> includes guidance on talking about fall prevention with patients. There are examples of patients in various stages of readiness to make changes to reduce their fall risk, with possible provider responses for each stage.

**Discuss the importance of strength and balance exercise**—Exercise interventions that focus on improving strength and balance are the most effective single intervention for reducing falls and fall-related injuries.<sup>14</sup> Most older adults do not routinely practice these types of exercises.<sup>31</sup> Other forms of exercise (eg, stretching, walking) have not been shown to reduce falls.<sup>32</sup>

To be effective, exercise must (1) focus on improving balance, (2) be of moderate to high challenge and progress in difficulty, and (3) be practiced a minimum of 50 hours, which equates to 2 hours weekly for 25 weeks.<sup>32</sup> PCPs can educate patients about exercise that prevents falls and refer to appropriate resources (eg, physical therapists [PTs], community fall prevention programs) to initiate it. It is important to emphasize that the effects of exercise will not be apparent for several months, and that practice must be ongoing in order to maintain the benefits.

Evidence-based exercise programs may be either home based (eg, Otago Exercise Program<sup>33</sup>) or group classes offered in community settings (eg, tai chi<sup>34</sup>).

**Prioritize interventions for modifiable risk factors**—Because the risk of falling increases with the number of risk factors, risk can be reduced by modifying even a few contributing factors. Three key risk factors (balance, medications, and home safety) should be addressed in everyone at high risk.<sup>35</sup> In addition, if the PCP suspects that a cataract is affecting vision, it is beneficial to refer the patient for cataract extraction, assuming that the patient is a surgical candidate, because first eye cataract surgery decreases falls.<sup>13,14</sup>

In our experience, most high-risk patients are amenable to decreasing medication dosages and appreciate having their physician reduce the number of prescription medications. Most older adults are willing to consider balance training, especially if the instructions are not complicated and the exercises can be done at home.<sup>36</sup> A referral from a health care provider, particularly a physician, encourages follow-through with environmental assessment and modifications.<sup>8</sup>

**Address fall injury risk**—To reduce the chances of a fall injury, optimize bone health by recommending calcium and vitamin D supplementation and evaluating and treating osteoporosis.<sup>15</sup> Strengthening lower extremity muscles and teaching older adults how to get up from the ground after a fall may prevent a so-called long lie (remaining on the ground involuntarily because of inability to get up without help) with its associated medical complications.<sup>37</sup> High-risk patients should carry a cellular phone or wear a personal medical alert device to reduce the risk of a long lie in the event of a fall.

### **Involve relevant professional disciplines**

**Physical therapists:** PTs assess and treat balance, strength, and gait deficits. Table 3 lists several tests that are typically done by PTs as part of a comprehensive gait and balance assessment.

PTs can design an exercise program to reduce fall risk that takes into consideration an individual's goals and functional abilities. The exercise program should be individually tailored to challenge balance. It may include static and dynamic activities as well as functional balance activities (eg, dual attention tasks, reaching and turning, weight shifting).

PTs work with older adults to improve their balance and mobility to the point where they can safely participate in a home or community exercise program. A PCP should initially refer a patient to a PT for a 3-month period of fall prevention exercise training. However,

continued therapy beyond 3 months is frequently necessary before patients can successfully transition to a community program.<sup>38</sup>

With a referral from the PCP, PTs can determine whether patients require a mobility aid. PTs select and fit an assistive device and teach patients how to use it correctly.

**Occupational therapists:** OTs assess the home environment and evaluate older adults' capacities (eg, vision, cognition) and deficits in relation to functioning safely within their homes. OTs elicit a falls history, individuals' beliefs about causes of falls, their understanding of environmental risks and perceived ability to negotiate those risks, and patterns of home use and community access.<sup>30</sup> OTs help older adults change their behavior to prevent falls; for example, by helping them create new routines during daily activities and identifying adaptive behaviors (eg, scanning ahead for hazards when walking). Like outpatient PT services, outpatient OT services are a covered Medicare Part B benefit. If patients meet Medicare's definition of homebound, they can receive home health services that can include a home safety evaluation by an OT under Medicare Part A.

**Connect patients to evidence-based community fall prevention programs—**Several effective fall prevention programs are becoming available in the community. For example, tai chi has been shown to reduce fall risk by 29%.<sup>14</sup> Some YMCAs are offering the tai chi program, Y-Moving for Better Balance. Stepping On, a 7-week workshop that teaches strength and balance exercises and behavior changes to prevent falls,<sup>39</sup> is also being disseminated (see <https://wihealthyaging.org/stepping-on>). Local public health departments and Area Agencies on Aging typically collaborate in community-level efforts to address falls.

**Considerations for patients with dementia—**Dementia impairs gait, balance, and hazard recognition. About half of community-dwelling older adults with dementia experience a fall every year.<sup>1</sup> Few randomized intervention studies have included people with dementia, and so current evidence is insufficient to recommend for or against a particular fall prevention intervention.<sup>13</sup> However, recent evidence suggests that the mobility and balance deficits seen in dementia may be improved through exercise.<sup>40</sup>

Working with the patient's caregiver becomes important in addressing fall risk in patients with dementia.<sup>41</sup> The caregiver can help by modifying the environment to improve safety and the way in which older adults with dementia perform mobility-related activities (eg, dressing, toileting, housekeeping) in and around the home. In some cases, it may be necessary to provide assistance with activities that the older adult can no longer safely perform. Their caregivers also may help older adults with dementia perform a set of basic exercises<sup>42</sup> or consistently use an assistive device. An evaluation by an OT is critical and should include observing how the patient performs mobility-related tasks in the home.

**Offer ongoing monitoring and follow-up—**Reducing falls using the clinical approach described herein requires ongoing monitoring by the providers.<sup>35</sup> Providers' active involvement can help ensure that patients act on recommendations. Providers can receive reimbursement for providing medically necessary fall-related services by using International

Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) code R29.6 for repeated falls.

For high-risk patients with multiple modifiable risk factors, it may be necessary to address each risk factor individually over time so as not to confuse or overwhelm the patient. These patients typically have multiple health issues and may see several specialists, all of whom make suggestions, adjust medications, and schedule the patient for follow-up visits.

A PCP managing a high-risk patient may complete assessments and recommend interventions over a 3-month period,<sup>19</sup> or longer if intercurrent health problems interfere. In this case, reassess the patient and recommend interventions at 4 to 6 months and as part of routine follow-up visits thereafter. Follow-up by other providers, (eg, nurse, PT, or OT) can augment the PCP's care.

**Resources for clinical practice**—Several resources can facilitate integrating fall prevention into practice (Table 4).

## SUMMARY

Falls and their associated injuries are common and usually result from interactions among multiple fall risk factors, many of which may be modifiable. PCPs play a critical role in reducing fall risk factors among their older patients. Guidelines recommend annual screening to identify patients at increased risk of falling and comprehensive risk assessment and management of modifiable fall risk factors for high-risk patients. Regular exercise that improves strength and balance, along with vitamin D supplementation, can reduce falls and are appropriate prevention strategies even for low-risk patients. Understanding older adults' perspective and how to facilitate their involvement in fall prevention activities is critical to the success of provider efforts in this area.

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**Box 1: Key elements of fall-focused physical examinations**

Examination element

Orthostatic vital signs

Distance visual acuity

Cardiac examination (rate, rhythm, murmurs)

Gait and balance evaluation<sup>a</sup>

Musculoskeletal examination of back and lower extremities

Neurologic examination

    Cognitive screen

    Sensation

    Proprioception

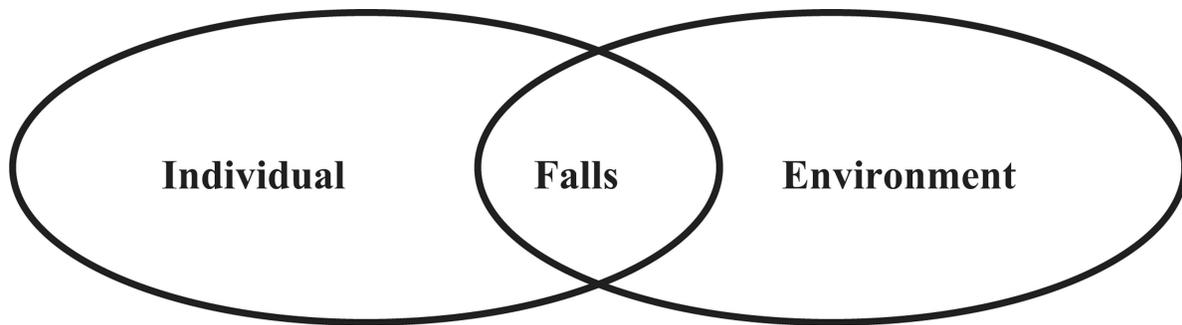
    Muscle bulk, tone, strength, reflexes, and range of motion

    Higher neurologic function (cerebellar, motor cortex, basal ganglia)

<sup>a</sup> Recommended evaluations include the Timed Up-and-Go, 30-Second Chair Stand, and 4-Stage Balance tests.

**KEY POINTS**

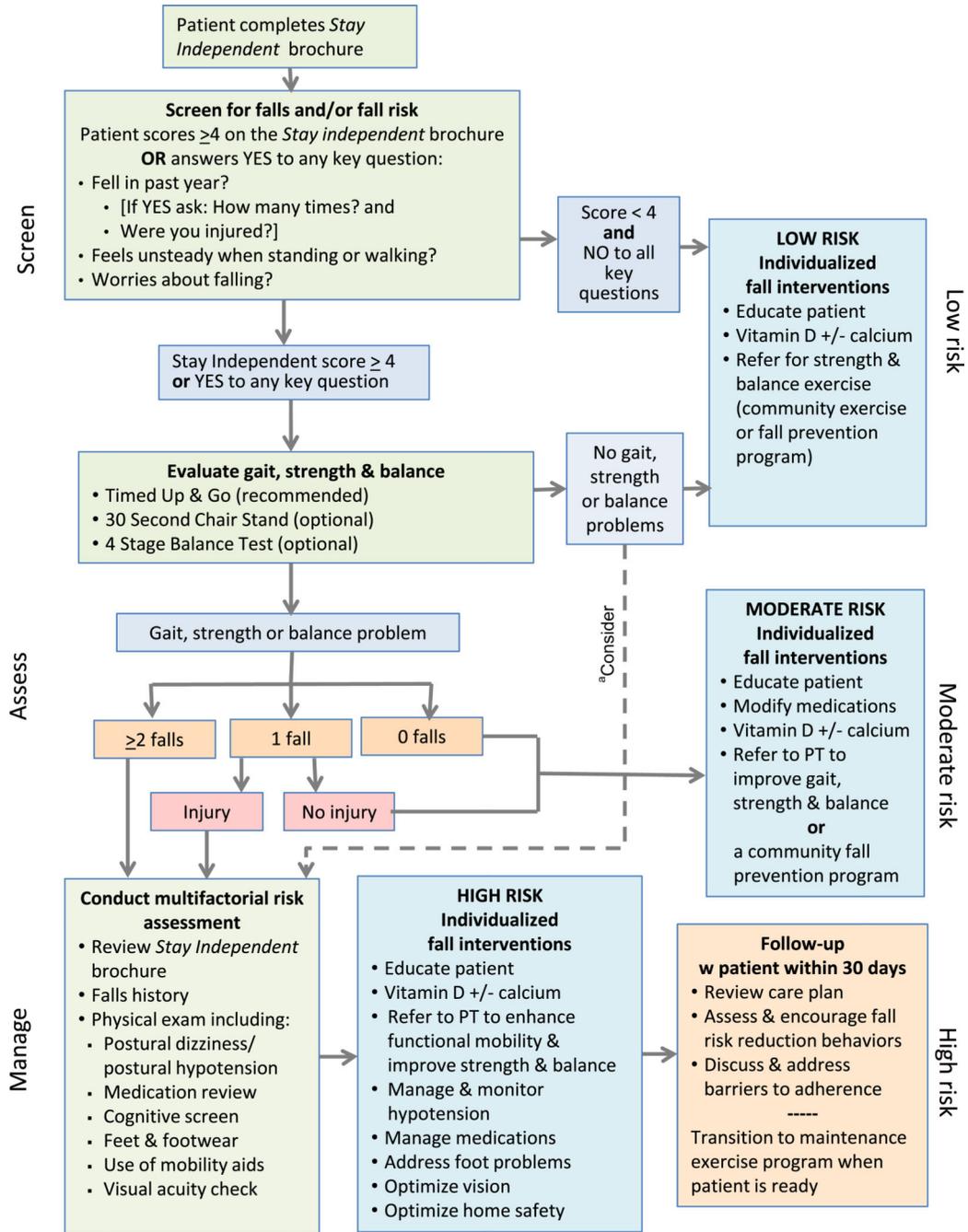
- Falls are common and have adverse consequences, but are often preventable.
- Current guidelines specify that primary care providers should screen older adults for falls and risk for falling at least once a year by asking about falls and unsteadiness when walking.
- Multifactorial interventions that address many predisposing factors are appropriate for people at high risk and can decrease falls by approximately 25%.
- Three key risk factors (balance, medications, and home safety) should be addressed in everyone at high risk.
- Primary care providers should refer patients to clinical and community resources to address modifiable risk factors.



**Age-related changes**  
**Cognitive deficits**  
**Gait, strength, or balance deficits<sup>a</sup>**  
**Sensory deficits<sup>a</sup>**  
**Chronic conditions**  
**Acute illnesses**  
**Behaviors/choices<sup>a</sup>**

**Medications<sup>a</sup>**  
**Footwear<sup>a</sup>**  
**Assistive devices<sup>a</sup>**  
**Home/neighborhood features<sup>a</sup>**  
**Alcohol/drugs<sup>a</sup>**  
**Supports from caregivers<sup>a</sup>**

**Fig. 1.** Falls result from an interaction between factors in the individual (intrinsic) and the environment (extrinsic). <sup>a</sup> Factors that may be modifiable with intervention.



**Fig. 2.** STEADI (Stopping Elderly Accidents, Deaths, and Injuries) algorithm. <sup>a</sup> For patients who screen positive for falls but have no gait, strength, or balance problems, <sup>a</sup> consider additional risk assessment (eg, medication review, cognitive screen, syncope). PT, physical therapist. (From Centers for Disease Control and Prevention. Algorithm for fall risk assessment & interventions. Available at: [http://www.cdc.gov/homeandrecreationalsafety/pdf/steadi/algorithm\\_fall\\_risk\\_assessment.pdf](http://www.cdc.gov/homeandrecreationalsafety/pdf/steadi/algorithm_fall_risk_assessment.pdf). Accessed November 11, 2014.)

**Table 1**

Aging-related physiologic changes in organ systems that affect fall risk

<b>Organ System</b>	<b>Physiologic Change</b>
Muscular system	Decreased muscle strength
Nervous System	
Balance	Increased postural sway Slowed righting reflexes
Gait	Decreased step height Decreased proprioception
Vision	Reduced papillary response to light variation Thickening and loss of elasticity of lens

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**Table 2**

## Medications that increase the risk of falls

Medication Class	Odds Ratio (95% CI)
Psychoactive Medications	
Antidepressants	1.68 (1.47–1.91)
Antipsychotics	1.59 (1.37–1.83)
Sedative hypnotics	1.47 (1.35–1.62)
Benzodiazepines	1.57 (1.43–1.72)
Other Medications	
Antihypertensives	1.24 (1.01–1.50)
Nonsteroidal antiinflammatory drugs	1.21 (1.01–1.44)
Diuretics	1.07 (1.01–1.14)

*Abbreviation:* CI, confidence interval.

*Data from* Woolcott JC, Richardson KJ, Wiens MO, et al. Meta-analysis of the impact of 9 medication classes on falls in elderly persons. *Arch Intern Med* 2009;169:1957.

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**Table 3**

Tests for evaluation of gait and balance in people at risk of falls

Test	Purpose
Dynamic Gait Index <sup>43</sup>	Gait with head turns, speed changes, and pivot turns; stepping over and around obstacles; chair-climbing
TUG Cognitive <sup>24</sup>	Gait with divided attention
Berg Balance Scale <sup>44</sup>	Balance with sitting, standing, transferring, reaching, and turning
Functional Reach <sup>45</sup>	Postural stability
Four Square Step Test <sup>46</sup>	Dynamic balance

*Adapted from Refs. 24,43–46*

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**Table 4**

Resources for health care providers

Source	Item	Location
American Geriatrics Society	Clinical practice guideline on fall prevention	<a href="http://www.americangeriatrics.org/health_care_professionals/clinical_practice_guidelines_recommendations/prevention_of_falls_summary_of_recommendations">http://www.americangeriatrics.org/health_care_professionals/clinical_practice_guidelines_recommendations/prevention_of_falls_summary_of_recommendations</a>
CDC	STEADI tool kit	<a href="http://www.cdc.gov/injury/steadi">www.cdc.gov/injury/steadi</a>
Centers for Medicare and Medicaid Services	Welcome to Medicare (Initial Preventive Physical Examination) visit	<a href="http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/MPS_QRL_IPPE001a.pdf">www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/MPS_QRL_IPPE001a.pdf</a>
Centers for Medicare and Medicaid Services	Annual Wellness visit	<a href="http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/Downloads/AWV_Chart_ICN905706.pdf">www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/Downloads/AWV_Chart_ICN905706.pdf</a>
National Council on Aging	Fact sheets about Medicare coverage for fall-related clinical services	<a href="http://www.ncoa.org/improve-health/falls-prevention">www.ncoa.org/improve-health/falls-prevention</a>
National Institute on Aging	Go4Life exercise DVD and manual	<a href="http://go4life.nia.nih.gov">http://go4life.nia.nih.gov</a>