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Fall assessment in older people

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Cite this as: *BMJ* 2011;343:d5153
doi: 10.1136/bmj.d5153

This is the third in a series of four articles about assessing older people

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- ▶ Cognitive assessment of older people (*BMJ* 2011;343:d5042)
- ▶ Functional assessment in older people (*BMJ* 2011;343:d4681)

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- ▶ How to do a fall assessment



Falls are common in older people and are the leading cause of injury related admissions to hospital in people of 65 years and over, accounting for about 14% of emergency admissions and 4% of all hospital admissions in this age group.¹ A fall may result from acute disease (for example, chest infection), chronic underlying pathology (for example, Parkinson's disease), or the interaction of a person with their surroundings (for example, tripping on a pavement). Evidence indicates that many falls could be prevented through appropriate assessment and intervention.²⁻⁴ The terms "fall risk screening" and "fall risk assessment" are sometimes used interchangeably. Screening is a process that primarily aims to identify people at increased risk of falls, whereas assessment aims to identify factors that increase the risk of a fall that can be dealt with by subsequent intervention. In the community setting, a fall risk screen can be used at a population level to identify older people who need a more detailed fall risk assessment and intervention or onward referral (see box 1).

How best to assess risk of falling?

Many tools for screening and assessing fall risk have been developed for use in older people in community, hospital, and nursing and residential care settings. However, only some have been evaluated for reliability and predictive validity in prospective studies and have reasonable sensitivity and specificity—that is, they have acceptably high accuracy in predicting those who will or will not fall.

Screening and assessment of older people in the community

UK national and international guidelines recommend that the general practitioner or other community based health professional asks all older people (or their carers) about any falls and undertakes a brief mobility screen on an annual basis.⁵⁻⁶ The "timed up and go test" is one of the more com-

SOURCES AND SELECTION CRITERIA

As well as using our personal reference collections, we used the most up to date Cochrane reviews as well as national and international guidelines, including those from the National Institute for Health and Clinical Excellence, the American and British Geriatric Society falls prevention guidelines, and the Australian national falls prevention guidelines for communities, hospitals, and residential age care facilities.

monly used screening tests and gives a global indication of postural stability. Although results from studies vary, a time of 12 or more seconds to complete the test (for people who live in the community) is an indicator of impaired functioning and increased risk of falls.⁷⁻⁸ Other community based screening tools can be found on bmj.com.

The emergency department provides a useful opportunity to screen older people for their risk of falling and to refer for assessment. However, when using screening tools that involve physical tests in this setting, interpret the results with caution because an acute injury from a fall may affect the person's ability to perform these tests. A screening tool based on questions alone may be a useful alternative (table 1).⁹

A history of two or more falls in the previous year negates the need for screening in the community and should trigger a detailed assessment (see box 2). This is consistent with the suggested algorithm in the recently published guidelines from the American Geriatric Society and British Geriatric Society⁵ and the Australian Commission on Safety and Quality of Health Care.³

Offer further assessment to community dwelling older people who have been identified by screening as at risk of falls and to those who report two or more falls in the past year. General practitioners or other health professionals may assess fall risk using a multifactorial assessment tool that covers a range of risk factors or functional mobility assessments that focus on the physiological and functional

SUMMARY POINTS

- Fall risk screening identifies people at increased risk of falls who need detailed fall risk assessment and intervention, which can in turn prevent falls and fall related injury
- Quick validated fall risk screening tools for older people are available for community, hospital, and nursing and residential care settings
- Screen older people living in the community for fall risk every 12 months and assess for risk factors after a fall
- Fall risk in hospital inpatients is changeable because physical and cognitive abilities may alter during a hospital stay
- Although all older people in nursing and residential care are at high risk of falls, a screening tool that includes their ability to stand unaided and risk factors such as cognitive impairment, incontinence, and drug use can provide extra information about fall risk

Box 1 | Case scenario

Mrs F, aged 82, has been brought to the emergency department by ambulance after tripping on a pavement while out shopping.

Outcome 1 (community screening and assessment):

She is assessed in the emergency department as not having a serious injury and is discharged home, advised to take simple analgesia for any pain resulting from the fall, and to consult her GP about future fall prevention.

Outcome 2 (hospital and residential aged care screening and assessment):

She is diagnosed with a fractured neck of femur and admitted to the hospital under the care of the orthopaedic surgeons where she undergoes surgery.

domains of postural stability, including vision, strength, coordination, balance, and gait. Many disease processes that increase fall risk do so by impairing postural stability; examples include impaired vision from cataracts, impaired balance and proprioception from diabetic peripheral neuropathy, and reduced proximal muscle strength and reaction time because of vitamin D deficiency.

Table 1 provides example of validated assessment tools.¹⁰⁻¹⁵ Other fall risk assessments can be found in the additional tables on bmj.com.¹⁶⁻²² Most validated risk assessment tools focus on postural stability, gait, and balance. The short physical performance battery is a widely used tool for assessing the ability to rise from a chair, standing, and gait, and it has been validated against self reported disability, need for nursing home care, and mortality.²³ Assessment tools like QuickScreen assess postural stability and include additional items that may guide intervention, such as visual assessment and documentation of drug use (see box 3). The results of the assessment may show the need for direct intervention—such as reduction in dose or discontinuation of a drug that is causing postural hypotension—or onward referral for further assessment and intervention—such as referral to an ophthalmologist for cataract extraction.

Table 1 | Examples of validated tests and tools available for screening and assessment of fall risk

Test and criteria	Practical aspects
Screening in the community: timed up and go test¹⁰⁻¹²	
Description	This test measures the time taken for a person to rise from a chair, walk 3 m at normal pace with their usual assistive device, turn, return to the chair, and sit down
Criterion	A time of ≥ 12 seconds indicates increased risk of falling
Time to undertake test	1-2 minutes
Equipment	Chair and stopwatch or minute hand on watch
Assessment in the community: QuickScreen¹³	
Description	QuickScreen is a risk assessment tool designed for use by practice and rural nurses, allied health workers, and general practitioners. It allows the clinician to estimate the level of increased fall risk and determine which sensorimotor systems are impaired. The test measures previous falls, drug use, vision, peripheral sensation, lower limb strength, balance, and coordination
Criterion	A score of 4 or more indicates an increased risk of falling
Time to undertake test	10 minutes
Equipment	A low contrast eye chart, a filament for measuring touch sensation, and a small step
Screening in the emergency department: Prevention of Falls in the Elderly Trial⁹	
Description	Used in people presenting to the emergency department after a fall. Three simple questions identify people at increased risk of further falls: (1) Have you had any other falls over the past 12 months? (2) Have you fallen indoors? (3) Have you been unable to get up after a fall?
Criterion	If the patient answers yes to any of the questions further assessment and intervention are needed
Time to undertake test	1-2 minutes
Equipment	None
Screening in hospital: modified STRATIFY¹⁴	
Description	Six item weighted questionnaire with questions relating to falls, cognition, transfer and mobility skills, vision, and toileting practice
Criterion	A score of ≥ 9 identifies high risk fallers
Time to undertake test	1-2 minutes
Equipment	None
Screening in nursing and residential care: residential aged care falls screen¹⁵	
Description	Clinical algorithm based on the person's ability to stand unaided, previous falls, drug use, and continence status
Criterion	Depending on risk factors identified, outcome will be either high or low risk of falls
Time to undertake test	1-2 minutes
Equipment	Medium density 15 cm thick foam mat

STRATIFY=St Thomas' risk assessment tool.

Box 2 | Case scenario (outcome 1): assessment in the community

Mrs F was discharged home from the emergency department and when she next visited her general practitioner she mentioned that she had fallen and was taken to the local emergency department by ambulance. Because this was her second fall in a year, the general practitioner undertook a more detailed fall risk assessment.

Box 3 | Case scenario (outcome 1): QuickScreen

Mrs F was assessed by the general practitioner using the QuickScreen assessment tool (table 1)¹³ and several fall risk factors were identified—poor strength and balance because of a sedentary lifestyle, probable vitamin D deficiency from limited sunlight exposure, and the use of bifocal glasses. As a result of the assessment it was agreed that Mrs F needed to do specific exercises to improve balance and strength and to continue these exercises long term. She was started on vitamin D supplements and told that bifocal glasses pose a fall risk when worn outdoors, with the recommendation that she wear single lens glasses when away from home. Mrs F adopted the interventions, and at a follow-up fall risk assessment with her general practitioner 12 months later, she reported improved balance, increased confidence, and no further falls.

Table 2 highlights risk factors that may be identified during an assessment and links them to suggested interventions. Most of these suggested interventions reflect evidence generated through randomised controlled clinical trials.²

Screening and assessment in hospitals

An acute admission to hospital for an older person is often associated with a change in physical or cognitive status (or both), which when combined with exposure to an unfamiliar environment presents a concomitant increase in risk of falls. Falls are one of the most common adverse events experienced in hospitals and can lead to injury, prolonged hospital stay, and death. Validated screening tools are available to identify those who are most likely to fall during an inpatient stay. The two most commonly used tools are the St Thomas' risk assessment tool (STRATIFY)¹⁹ and the modified STRATIFY (table 1).¹⁴ Patients identified as being at increased risk of falls require further assessment to determine the nature of the increased risk so that interventions can be individually tailored. Fall risk assessment should be viewed as a dynamic process, given that a patient's physical and cognitive abilities may alter while in hospital (see box 4). It is crucial to assess cognition because strategies that require the patient's understanding and cooperation may not be feasible in people with delirium or cognitive impairment (for example, pushing the call bell for help in getting to the toilet). In patients with delirium or cognitive impairment, changes in staff practice and environmental modifications are needed.

Screening and assessment in nursing and residential care facilities for older people

Falls are more common in older people who are in nursing and residential care facilities than in those who live in the community, and it has been argued that screening is not needed in this population because all residents are

Table 2 | Examples of linking assessment to evidence based interventions²

Risk factor	Assessment	Intervention
Impaired balance and mobility	QuickScreen, short physical performance battery, physiological profile assessment, Berg balance scale, and performance oriented mobility assessment	Consider home or group based strength and balance training programme; ensure that any underlying cause for impaired balance and mobility, such as vitamin D deficiency, vitamin B-12 deficiency, use of central nervous system drugs, and pain, is dealt with if possible
Impaired vision	Snellen eye chart; Melbourne edge test; review spectacles; check for evidence of cataracts	If cataracts are impairing vision, refer for extraction; if the patient is using bifocal or multifocal glasses, recommend a separate pair of single lens glasses for use outdoors
Syncope or dizziness	Lying and standing blood pressure measurements; Holter monitoring and carotid sinus massage; Dix-Hallpike test	Review any drugs that might contribute to orthostatic hypotension; consider insertion of a pacemaker for prolonged periods of asystole; consider Epley manoeuvre if dizziness is thought to be related to benign paroxysmal positional vertigo
Feet and footwear	Foot pain and deformity	Treat pain and consider referral to podiatrist and provision of ankle strengthening and mobility exercises
Drug use	Drug review	Stop any drugs that affect the central nervous system unless there is an ongoing clinical indication; ensure calcium and vitamin D intake are sufficient and if not consider supplementation
Environment	Home assessment by an occupational therapist in people identified at high risk of falls	Modification of the home environment with provision of support and advice on safety within and outside the home
Cognition	Mini mental state examination with additional measures of cognition if indicated	Consider the effect of any cognitive deficits on the ability to engage in an intervention

Box 4 | Case scenario (outcome 2): assessment in hospital

On admission to the orthopaedic ward, Mrs F was assessed for risk of falls. At this point she was unable to transfer or mobilise and was not confused. The modified STRATIFY indicated that she was not at high risk of falls.¹⁴ However, after her surgery she developed a hyperactive delirium, became impulsive and tried to get out of her bed and chair. Given the change in her clinical status, her fall risk was reassessed using the modified STRATIFY. This indicated that she was now at high risk because of her change in cognitive status and a poor performance in the mobility component. The staff moved her to an area where she could be closely observed, reviewed her pain control, and developed a plan for regular toileting. In addition, they lowered her bed to its minimum height and fitted a bed alarm to alert staff if she attempted to get up unsupervised. Finally, they asked her daughter if it would be possible for her to sit with Mrs F during the day and arrange for additional staff observation overnight until Mrs F was no longer delirious and impulsive. With these interventions in place, Mrs F did not fall during her hospital stay.

Box 5 | Case scenario (outcome 2): assessment in residential care

Unfortunately Mrs F did not recover sufficient function to return home after her hip fracture. At discharge she could walk short distances with a frame and the supervision of one person. On arrival in the nursing care facility she was screened using the residential aged care falls screen and identified as being at high risk.¹⁵ A combined risk assessment undertaken by the staff and the general practitioner identified several modifiable risk factors. The vitamin D supplementation that was started in hospital was continued, and after discussion with her general practitioner, she was prescribed a bisphosphonate for fracture prevention. The staff developed a toileting plan with Mrs F and placed her in a room close to the toilet. She was also encouraged to participate in the ongoing exercise programme run in the home.

at increased risk. However, one simple validated screen looks at residents' ability to stand unaided in association with risk factors such as cognitive impairment, incontinence, and drug use and can provide additional information about fall risk in this group (table 1).¹⁵ The screen identifies different risk factors for those who can and cannot stand unaided and draws attention to the non-linear association between fall risk and physical function—fall rates are low in those with very poor functioning (as well as those with good functioning) because of reduced exposure to risk as a result of being bed bound or wheelchair bound.²⁴

As in the community setting, assessment should be linked to intervention, and several approaches have been shown to be effective in nursing and residential care facilities for older people.^{3 4} Vitamin D supplementation is a simple intervention with evidence of benefit in fall prevention in older people living in nursing and residential care facilities (see box 5), particularly those with low vitamin D values (<50 nmol/L).⁴ Other effective interventions deal with risk factors identified by a multifaceted assessment—factors specific to the individual (cognition, physical function, drug use, and hydration) and to the environment (such as distance to toilet or dining area and lighting at night).⁴

What are the challenges?

Despite the evidence supporting fall risk factor assessment and intervention, fall risk assessment is still not routinely undertaken, and many people who could benefit from falls and fracture interventions are not receiving guideline care.²⁵ This may be due, in part, to some healthcare professionals being unaware of effective approaches to intervention.

The multifactorial nature of falls and the need to assess multiple domains and involve several healthcare professionals can seem overwhelming for the patient and the clinician undertaking the initial screen or assessment. Fortunately, clearer approaches based on systematic evidence for fall prevention in different settings are now available. Time pressures are a reality in practice, and it may be necessary—as well as more appropriate for the older person—to look at one risk factor at a time and review progress in subsequent consultations. Individual perception of fall risk is also important, and many older people—as well as some healthcare professionals—describe falling as an inevitable consequence of ageing. It can be difficult to motivate older people to undertake exercise that targets balance and strength, particularly when the potential benefits are accrued over months rather than days and lost when the exercise is stopped. It is important for practitioners to prescribe exercise as an ongoing activity. Fall and fracture prevention may be less effective if not incorporated into the management of coexisting chronic conditions, such as diabetes, osteoporosis, and chronic obstructive pulmonary disease. This may be particularly relevant when exercise plans need to be modified to deal with a person's deficits.

Finally, evidence of the effectiveness of fall prevention initiatives is still limited in some high risk populations, including older people with dementia, Parkinson's

IMPROVING PRACTICE

Resources for healthcare professionals

American Geriatric Society/British Geriatric Society. Clinical practice guidelines for falls prevention in older people. 2010. www.americangeriatrics.org/health_care_professionals/clinical_practice/clinical_guidelines_recommendations/2010/

Prevention of Falls Network Earth (<http://profane.co/>)—Interactive and up to date website combining latest evidence and practical examples of activities in falls assessment and prevention; UK focus

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* 2008;2:CD007146

Cameron ID, Murray GR, Gillespie LD, Robertson MC, Hill KD, Cumming RG, et al. Interventions for preventing falls in older people in nursing care facilities and hospitals. *Cochrane Database Syst Rev* 2010;1:CD005465

BMJ Group resources

BMJ Learning module. Discharge planning: a guide: <http://learning.bmj.com/learning/search-result.html?moduleId=10017723>

Best Practice. Assessment of falls in the elderly: <http://bestpractice.bmj.com/best-practice/monograph/880.html>

Resources for older people

Aged UK. Falls awareness week. www.ageuk.org.uk/health-wellbeing/national-falls-awareness-week/

Aged UK. Information leaflet: Staying steady—improving your strength and balance. www.ageuk.org.uk/Global/Age-Cymru/Information-and-Advice/AGEUKIG14%20Staying%20Steady%20A52032pp_inf.pdf

disease, depression, and a previous stroke. Further research is needed to determine optimal interventions for these groups. In the interim, “standard” fall prevention strategies should be implemented.³

Conclusion

Validated fall risk screens and assessments are now available for older people in community, hospital, and nursing and residential care settings, and randomised controlled trials provide good evidence that falls can be prevented by tackling identified risk factors. A fall assessment should therefore be a key part of guideline care of older people.

Contributors: Both authors helped plan, draft, and revise the article and are guarantors.

Competing interests: Both authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; JCTC had no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; SRL declares that the FallScreen and QuickScreen fall risk assessment tools are commercially available through Neuroscience Research Australia (NeuRA); any profits from sales of the assessments are shared between the inventors (which include SRL), the falls and balance research group at NeuRA, and the NeuRA central fund; with regard to QuickScreen, SRL's share and a matching NeuRA central fund share are transferred to the falls and balance research group for research purposes; no other relationships or activities that could appear to have influenced the submitted work.

Provenance and peer review: Commissioned; externally peer reviewed.

Patient consent not required (patient anonymised, dead, or hypothetical).

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