Fall assessment in older people

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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 commonly 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 Society 10 and the Australian Commission on Safety and Quality of Health Care.11

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. Other fall risk assessments can be found in the additional tables on bmj.com. 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. 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 the 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

<table>
<thead>
<tr>
<th>Test and criteria</th>
<th>Practical aspects</th>
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<tbody>
<tr>
<td><strong>Screening in the community: timed up and go test</strong>&lt;sup&gt;12&lt;/sup&gt;&lt;sup&gt;13&lt;/sup&gt;</td>
<td><strong>Description</strong> 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. <strong>Criterion</strong> A time of 12 seconds indicates increased risk of falling. <strong>Time to undertake test</strong> 1-2 minutes <strong>Equipment</strong> Chair and stopwatch or minute hand on watch.</td>
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<tr>
<td><strong>Assessment in the community: QuickScreen</strong>&lt;sup&gt;13&lt;/sup&gt;</td>
<td><strong>Description</strong> 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. <strong>Criterion</strong> A score of 4 or more indicates an increased risk of falling. <strong>Time to undertake test</strong> 10 minutes <strong>Equipment</strong> A low contrast eye chart, a filament for measuring touch sensation, and a small step.</td>
</tr>
<tr>
<td><strong>Screening in the emergency department: Prevention of Falls in the Elderly Trial</strong>&lt;sup&gt;11&lt;/sup&gt;</td>
<td><strong>Description</strong> 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? <strong>Criterion</strong> If the patient answers yes to any of the questions further assessment and intervention are needed. <strong>Time to undertake test</strong> 1-2 minutes <strong>Equipment</strong> None.</td>
</tr>
<tr>
<td><strong>Screening in hospital: modified STRATIFY</strong>&lt;sup&gt;14&lt;/sup&gt;</td>
<td><strong>Description</strong> Six item weighted questionnaire with questions relating to falls, cognition, transfer and mobility skills, vision, and toileting practice. <strong>Criterion</strong> A score of &gt;9 identifies high risk fallers. <strong>Time to undertake test</strong> 1-2 minutes <strong>Equipment</strong> None.</td>
</tr>
<tr>
<td><strong>Screening in nursing and residential care: residential aged care falls screen</strong>&lt;sup&gt;15&lt;/sup&gt;</td>
<td><strong>Description</strong> Clinical algorithm based on the person’s ability to stand unaided, previous falls, drug use, and continence status. <strong>Criterion</strong> Depending on risk factors identified, outcome will be either high or low risk of falls. <strong>Time to undertake test</strong> 1-2 minutes <strong>Equipment</strong> Medium density 15 cm thick foam mat.</td>
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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.

### 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)<sup>2</sup> and the modified STRATIFY (table 1).<sup>14</sup> 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 interventions

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Assessment</th>
<th>Intervention</th>
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<tr>
<td>Impaired balance and mobility</td>
<td>QuickScreen, short physical performance battery, physiological profile assessment, Berg balance scale, and performance oriented mobility assessment</td>
<td>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</td>
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<td>Impaired vision</td>
<td>Snellen eye chart; Melbourne edge test; review spectacles; check for evidence of cataracts</td>
<td>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</td>
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<td>Syncope or dizziness</td>
<td>Lying and standing blood pressure measurements; Holter monitoring and carotid sinus massage; Dix-Hallpike test</td>
<td>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</td>
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<tr>
<td>Feet and footwear</td>
<td>Foot pain and deformity</td>
<td>Treat pain and consider referral to podiatrist and provision of ankle strengthening and mobility exercises</td>
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<tr>
<td>Drug use</td>
<td>Drug review</td>
<td>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</td>
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<tr>
<td>Environment</td>
<td>Home assessment by an occupational therapist in people identified at high risk of falls</td>
<td>Modification of the home environment with provision of support and advice on safety within and outside the home</td>
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<tr>
<td>Cognition</td>
<td>Mini mental state examination with additional measures of cognition if indicated</td>
<td>Consider the effect of any cognitive deficits on the ability to engage in an intervention</td>
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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. 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. 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.

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. 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). Other effective interventions deal with fall 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).

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. 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 disease.
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.  

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.

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7 Shumway-Cook A, Brauer S, Woollcott M. Predicting the probability for falls in community-dwelling older adults using the Timed Up & Go Test. Phys Ther 2000;80:896-901.