Preventing Falls and Harm From Falls in Older People

Best Practice Guidelines
for Australian Hospitals
2009

AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

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ACSQHC was established in January 2006 by the Australian health ministers to lead and coordinate improvements in safety and quality in Australian health care.

Copies of this document and further information on the work of ACSQHC can be found at http://www.safetyandquality.gov.au or obtained from the Office of the Australian Commission on Safety and Quality in Health Care: +61 2 9263 3633 mail@safetyandquality.gov.au.

Other resources available from http://www.safetyandquality.gov.au:

- *Preventing Falls and Harm From Falls in Older People: Best Practice Guidelines for Australian Community Care 2009*
- *Guidebook for Preventing Falls and Harm From Falls in Older People: Australian Community Care 2009*
- *Guidebook for Preventing Falls and Harm From Falls in Older People: Australian Hospitals 2009*
- *Preventing Falls and Harm From Falls in Older People: Best Practice Guidelines for Australian Residential Aged Care Facilities 2009*
- *Guidebook for Preventing Falls and Harm From Falls in Older People: Australian Residential Aged Care Facilities 2009*
- *Implementation Guide for Preventing Falls and Harm From Falls in Older People: Best Practice Guidelines for Australian Hospitals and Residential Aged Care Facilities 2009*
- Fact sheets
  - Falls facts for patients and carers
  - Falls facts for doctors
  - Falls facts for nurses
  - Falls facts for allied health professionals
  - Falls facts for support staff (cleaners, food services and transport staff)
  - Falls facts for health managers

Statement from the chief executive

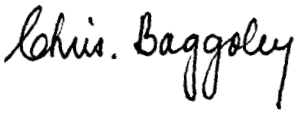
Australians today enjoy a longer life expectancy than previous generations, but for some this is disrupted by falls. As we age, our sure-footedness declines and, at the same time, our bones become increasingly brittle. The comment that 'he fell and broke his hip' is heard all too often — in fact, almost one in three older Australians will suffer a fall each year. Such falls can have extremely serious consequences, including significant disability and even death.

Falls are one of the largest causes of harm in care. Preventing falls and minimising their harmful effects are critical. During care episodes, older people are usually going through a period of intercurrent illness, with the resultant frailty and the uncertainty that brings. They are at their most vulnerable, often in unfamiliar settings, and accordingly attention has been paid to acquiring evidence about what can be done to minimise the occurrence of falls and their harmful effects, and to use these data in the national Falls Guidelines.

These new guidelines consider the evidence and recommend actions in the three main care settings: the community, hospitals and residential aged care facilities. Each of three separate volumes addresses one of these care settings, providing guidance on managing the various risk factors that make older Australians in care vulnerable to falling.

The Australian Commission on Safety and Quality in Health Care is charged with leading and coordinating improvements in the safety and quality of health care for all Australians. These new guidelines are an important part of that work.

The ongoing commitment of staff in community, hospital and residential aged care settings is critical in falls prevention. I commend these guidelines to you.



Professor Chris Baggoley
Chief Executive
Australian Commission on
Safety and Quality in Health Care
August 2009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Acronyms and abbreviations

AMTS	Abbreviated Mental Test Score
AST	Alternate Step Test
BPPV	benign paroxysmal positional vertigo
CAM	Confusion Assessment Method
DXA	dual energy X-ray absorptiometry
FESI	Falls Efficacy Scale International
FR	functional reach
FRAT	Falls Risk Assessment Tool
FRHOP	Falls Risk for Hospitalised Older People
ICER	incremental cost-effectiveness ratio
JBI-PACES	Joanna Briggs Institute Practical Application of Clinical Evidence System
LYS	life years saved
MET	Melbourne Edge Test
MMSE	Mini Mental State Examination
NARI	National Ageing Research Institute
NHMRC	National Health and Medical Research Council
OAB	overactive bladder
PBS	Pharmaceutical Benefits Scheme
PEDro	Physiotherapy Evidence Database
PJC-FRAT	Peter James Centre Fall Risk Assessment Tool
POMA	Performance-Oriented Mobility Assessment Tool
PPA	Physiological Profile Assessment
ProFaNE	Prevention of Falls Network Europe
PROFET	Prevention of Falls in the Elderly Trial
PSA	Pharmaceutical Society of Australia
QALY	quality-adjusted life years
RACF	residential aged care facility
RCT	randomised controlled trial
RDI	recommended daily intake
RUDAS	Rowland Universal Dementia Scale

SERM	selective oestrogen receptor modulator
SHPA	Society for Hospital Pharmacists
SMW	Six-Metre Walk Test
STRATIFY	St Thomas Risk Assessment Tool in Falling Elderly In-patients
STS	Sit-to-Stand Test
TBI	traumatic brain injury
TUG	Timed Up-and-Go Test
VA	visual acuity
VR	vestibular rehabilitation

Preface

Falls are a significant cause of harm to older people. The rate, intensity and cost of falls identify them as a national safety and quality issue. The Australian Commission on Safety and Quality in Health Care (ACSQHC) is charged with leading and coordinating improvements in the safety and quality of health care nationally, and has consequently produced these guidelines on preventing falls and harm from falls in older people.

Health care services are provided in a range of settings. Therefore, ACSQHC has developed three separate falls prevention guidelines that address the three main care settings: the community, hospitals and residential aged care facilities. Although there are common elements across the three guidelines, some information and recommendations are specific to each setting. Collectively, the guidelines are referred to as the Falls Guidelines.

This document, *Preventing Falls and Harm From Falls in Older People: Best Practice Guidelines for Australian Hospitals 2009*, aims to reduce the number of falls and the harm caused by falls experienced by older people in hospital care.

The guidelines and support materials are suitable for hospitals that:

- do not have a falls prevention program or plan in place
- have recently initiated a falls prevention program or plan
- have a successful falls prevention program or plan in place.

Older people themselves are at the centre of the guidelines. Their participation, to the full extent of their desire and ability, encourages shared responsibility in health care, promotes quality care, and focuses on accountability.

The guidelines are written to promote patient-centred independence and rehabilitation. Hospital care in any form involves some risk for many older people. The guidelines do not promote an entirely risk-averse approach to the health care of older people. Some falls are preventable; some are not preventable. However, an excessively custodial and risk-averse approach designed to avoid complaints or litigation from older people and their carers may infringe on a person's autonomy and limit rehabilitation.

Wherever possible, these guidelines are based on research evidence and are written to supplement the clinical knowledge, competence and experience applied by health professionals. However, as with all guidelines and the principles of evidence-based practice, their application is intended to be in the context of the professional judgment, clinical knowledge, competence and experience of health professionals. The guidelines also acknowledge that the clinical judgment of informed professionals is best practice in the absence of good-quality published evidence. Some flexibility may therefore be required to adapt these guidelines to specific settings, to local circumstances, and to older people's needs, circumstances and wishes.

The following additional materials have been prepared to accompany the guidelines:

- *Guidebook for Preventing Falls and Harm From Falls in Older People: Australian Hospitals 2009*
- Falls Guidelines — fact sheets
- Falls Guidelines — poster.

These guidelines are the result of a review and rewrite of the first edition of the guidelines, *Preventing Falls and Harm from Falls in Older People – Best Practice Guidelines for Australian Hospitals and Residential Aged Care Facilities 2005*,[1] which were developed by the former Australian Council for Safety and Quality in Health Care.

Key messages of the guidelines

- Many falls can be prevented.
- Fall and injury prevention need to be addressed at both point of care and from a multidisciplinary perspective.
- Managing many of the risk factors for falls (eg delirium or balance problems) will have wider benefits beyond falls prevention.
- Engaging older people is an integral part of preventing falls and minimising harm from falls.
- Best practice in fall and injury prevention includes implementing standard falls prevention strategies, identifying fall risk and implementing targeted individualised strategies that are resourced adequately, and monitored and reviewed regularly.
- The consequences of falls resulting in minor or no injury are often neglected, but factors such as fear of falling and reduced activity level can profoundly affect function and quality of life, and increase the risk of seriously harmful falls.
- The most effective approach to falls prevention is likely to be one that includes all staff in health care facilities engaged in a multifactorial falls prevention program.
- At a strategic level, there will be a time lag between investment in a falls prevention program and improvements in outcome measures.

Acknowledgments

The Australian Commission on Safety and Quality in Health Care (ACSQHC) acknowledges the authors, reviewers and editors who undertook the work of reviewing, restructuring and writing the guidelines.

ACSQHC acknowledges the significant contribution of the Falls Guidelines Review Expert Advisory Group for their time and expertise in the development of the Falls Guidelines.

ACSQHC also acknowledges the contribution of many health professionals who participated in focus groups, and provided comment and other support to the project. In particular, the National Injury Prevention Working Group, a network of jurisdictional policy staff, played a significant role in communicating the review to their networks and providing advice.

The guidelines build on earlier work by the former Australian Council for Safety and Quality in Health Care and by Queensland Health.

The contributions of the national and international external quality reviewers and the Office of the Australian Commission on Safety and Quality in Health Care are also acknowledged.

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A full list of authors, reviewers and contributors is provided in Appendix 1.

ACSQHC gratefully acknowledges the kind permission of St Vincent's and Mater Health Sydney to reproduce many of the images in the guidelines.

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Summary of recommendations and good practice points

This section contains a summary of the guidelines' recommendations and good practice points. These are also presented at the start of each chapter, with accompanying references and explanations.

Part B Standard falls prevention strategies

Chapter 4 Falls prevention interventions

Recommendations

Intervention

- A multifactorial approach to preventing falls should be part of routine care for all older people in hospitals. (Level I)[31,36]
- Develop and implement a targeted and individualised falls prevention plan of care based on the findings of a falls screen or assessment. (Level II)[37-39]
- As part of discharge planning, organise an occupational therapy home visit for people with a history of falls, to establish safety at home. (Level II)[40]
- Patients considered to be at higher risk of falling should be referred to an occupational therapist and physiotherapist for needs and training specific to the home environment and equipment, to maximise safety and continuity from hospital to home. (Level I)[41]

Good practice points

- Interventions should systematically address the risk factors identified, either during the admission or, if this is not possible, through discharge planning and referral to community services.
- Screen patients for falls risk and functional ability, and ensure that referrals for follow-up falls prevention interventions are in place.
- Managing many of the risk factors for falls (eg delirium or balance problems) will have wider benefits beyond falls prevention.

Chapter 5 Falls risk screening and assessment

Recommendations

Screening and assessment

- Document the patient's history of recent falls, or use a validated screening tool to identify people with risk factors for falls in hospital.
- Use falls risk screening and assessment tools that have good predictive accuracy, and have been evaluated and validated across different hospital settings.
- As part of a multifactorial program for patients with increased falls risk in hospital, conduct a systematic and comprehensive multidisciplinary falls risk assessment to inform the development of an individualised plan of care to prevent falls.
- When falls risk screens and assessments are introduced, they need to be supported by education for staff and intermittent reviews to ensure appropriate and consistent use.

Good practice points

Falls risk screening

- Screening tools are particularly beneficial because they can form part of routine clinical management and inform further assessment and care for all patients — even though clinical judgment is as effective as using a screening tool in acute care.
- All older people who are admitted to hospital should be screened for their falls risk, and this screening should be done as soon as practicable after they are admitted.
- The emergency department represents a good opportunity to screen patients for their falls risk.
- A falls risk screen should be undertaken when a change in health or functional status is evident, or when the patient's environment changes.

Falls risk assessment

- A falls risk assessment should be done for those patients who exceed the threshold of the falls risk screen tool, who are admitted for falls, or who are from a setting in which most people are considered to have a high risk of falls (eg a stroke rehabilitation unit).
- For patients who have fallen more than once, undertake a full falls risk assessment for each fall (approximately 50% of falls are in patients who have already fallen).
- Interventions delivered as a result of the assessment provide benefit, rather than the assessment itself; therefore, it is essential that interventions systematically address the risk factors identified.

Part C Management strategies for common falls risk factors

Chapter 6 Balance and mobility limitations

Recommendation

Intervention

- Use a multifactorial falls prevention program that includes exercise and assessment of the need for walking aids to prevent falls in subacute hospital settings. (Level II)[39]

Good practice points

- Refer patients with ongoing balance and mobility problems to a post-hospital falls prevention exercise program when they leave hospital. This should include liaison with the patient's general practitioner.
- To assess balance, mobility and strength, use an assessment tool to:
  - quantify the extent of balance and mobility limitations and muscle weaknesses
  - guide exercise prescription
  - measure improvements in balance, mobility and strength
  - assess whether patients have a high risk of falling.

Chapter 7 Cognitive impairment

Recommendations

Assessment

- Older people with cognitive impairment should have their risk factors for falls assessed.

Intervention

- Identified falls risk factors should be addressed as part of a multifactorial falls prevention program, and injury minimisation strategies (such as using hip protectors or vitamin D and calcium supplementation) should be considered. (Level II)[37-39]

Good practice points

- Patients presenting to a hospital with an acute change in cognitive function should be assessed for delirium and the underlying cause of this change.
- Patients with gradual onset, progressive cognitive impairment should undergo detailed assessment to determine diagnosis and, where possible, reversible causes of the cognitive decline.
- Patients with delirium should receive evidence based interventions to manage the delirium (eg follow the Australian guidelines, *Clinical Practice Guidelines for the Management of Delirium in Older People*).[†]
- If a patient with cognitive impairment does fall, reassess their cognitive status, including presence of delirium (eg using the Confusion Assessment Method tool).
- Where possible and appropriate, involve family and carers in decisions about which implementations to use, and how to use them, for patients with cognitive impairment. (Family and carers know the patient and may be able to suggest ways to support them.)
- Interventions shown to work in cognitively intact populations should not be withheld from cognitively impaired populations; however, interventions for people with cognitive impairment may need to be modified and supervised, as appropriate.

Chapter 8 Continence

Recommendations

Intervention

- ~~Ward urinalysis should form part of a routine assessment for older people with a risk of falling. (Level II)[37]~~
- As part of multifactorial intervention, toileting protocols and practices should be in place for patients at risk of falling. (Level III-2)[43,133]
- Managing problems with urinary tract function is effective as part of a multifactorial approach to care. (Level II)[37]

Good practice point

- Incontinence can be screened in hospital as part of a validated falls risk screen assessment, such as the St Thomas Risk Assessment Tool in Falling Elderly In-patients (STRATIFY) or the Peter James Centre Fall Risk Assessment Tool (PJC-FRAT).

[†] http://www.health.vic.gov.au/acute-agedcare/delirium-cpg.pdf

Chapter 9 Feet and footwear

Recommendations

Assessment

- In addition to using standard falls risk assessments, screen patients for ill-fitting or inappropriate footwear upon admission to hospital.

Intervention

- Include an assessment of footwear and foot problems as part of an individualised, multifactorial intervention for preventing falls in older people in hospital. (Level II)[37]
- Hospital staff should educate patients and provide information about footwear features that may reduce the risk of falls. (Level II)[37]

Good practice points

- Safe footwear characteristics include:
  - *soles:* shoes with thinner, firmer soles appear to improve foot position sense; a tread sole may further prevent slips on slippery surfaces
  - *heels:* a low, square heel improves stability
  - *collar:* shoes with a supporting collar improve stability.
- As part of discharge planning, refer patients to a podiatrist, if needed.

Chapter 10 Syncope

Recommendations

Assessment

- Patients who report unexplained falls or episodes of collapse should be assessed for the underlying cause.

Intervention

- Patients with unexplained falls or episodes of collapse who are diagnosed with the cardioinhibitory form of carotid sinus hypersensitivity should be treated by inserting a dual-chamber cardiac pacemaker. (Level II)[189]
- Assessment and management of postural hypotension and review of medications, including medications associated with presyncope and syncope, should form part of a multifactorial assessment and management plan for falls prevention in hospitalised older people (this can also be part of discharge planning). (Level I)[31]

Chapter 11 Dizziness and vertigo

Recommendations

Assessment

- Vestibular dysfunction as a cause of dizziness, vertigo and imbalance needs to be identified in the hospital setting. A history of vertigo or a sensation of spinning is highly characteristic of vestibular pathology.
- Use the Dix-Hallpike test to diagnose benign paroxysmal positional vertigo, which is the most common cause of vertigo in older people and can be identified in the hospital setting. This is the only cause of vertigo that can be treated easily.

Note: there is no evidence from randomised controlled trials that treating vestibular disorders will reduce the rate of falls.

Good practice points

- Use the Epley manoeuvre to manage benign paroxysmal positional vertigo.
- Use vestibular rehabilitation to treat dizziness and balance problems, where indicated.
- Screen patients complaining of dizziness for gait and balance problems, as well as for postural hypotension. (Patients who complain of 'dizziness' may have presyncope, postural dysequilibrium, or gait or balance disorders.)
- All manoeuvres should only be done by an experienced person.

Chapter 12 Medications

Recommendations

Intervention

- Older people admitted to hospital should have their medications (prescribed and nonprescribed) reviewed and modified appropriately (and particularly in cases of multiple drug use) as a component of a multifactorial approach to reducing the risk of falls in a hospital setting. (Level I)[31]
- As part of a multifactorial intervention, patients on psychoactive medication should have their medication reviewed and, where possible, discontinued gradually to minimise side effects and to reduce their risk of falling. (Level II-*)[37,235]

Recommendations

Assessment

- Use hospitalisation as an opportunity to screen systematically for visual problems that can have an effect both in the hospital setting and after discharge.
- For a rough estimate of the patient's visual function, assess their ability to read a standard eye chart (eg a Snellen chart) or to recognise an everyday object (eg pen, key, watch) from a distance of two metres.

Intervention

- As part of a multidisciplinary intervention for reducing falls in hospitals, provide adequate lighting, contrast and other environmental factors to help maximise visual clues; for example, prevent falls by using luminous commode seats, luminous toilet signs and night sensor lights. (Level III-3)[43]
- Where a previously undiagnosed visual problem is identified, refer the patient to an optometrist, orthoptist or ophthalmologist for further evaluation (this also forms part of discharge planning). (Level II)[37]
- When correcting other visual impairment (eg prescription of new glasses), explain to the patient and their carers that extra care is needed while the patient becomes used to the new visual information. (Level II-*)[249]
- Advise patients with a history of falls or an increased risk of falls to avoid bifocals or multifocals and to use single-lens distance glasses when walking — especially when negotiating steps or walking in unfamiliar surroundings. (Level III-2-*)[250]
- As part of good discharge planning, make sure that older people with cataracts have cataract surgery as soon as practicable. (Level II-*)[251,252]

Note: there have not been enough studies to form strong, evidence based recommendations about correcting visual impairment to prevent falls in any setting (community, hospital, residential aged care facility), particularly when used as single interventions. However, considerable research has linked falls with visual impairment in the community setting, and these results may also apply to the hospital setting.

Good practice points

- If a patient uses spectacles, make sure that they wear them, and that they are clean (use a soft, clean cloth), unscratched and fitted correctly. If the patient has a pair of glasses for reading and a pair for distance, make sure they are labelled accordingly, and that they wear distance glasses when mobilising.
- Encourage patients with impaired vision to seek help when moving away from their immediate bed surrounds.

Chapter 14 Environmental considerations

Recommendations

Assessment

- Regular environmental reviews are advisable; procedures should be in place to document environmental causes of falls; and staff should be educated in environmental risk factors for falls in hospitals.

Intervention

- Environmental modifications should be included as part of a multifactorial intervention. (Level II)[37,38]
- As part of a multifactorial intervention, falls can be reduced by using luminous toilet signs and night sensor lights. (Level III-3)[43]

Good practice points

- Make sure that the patient's personal belongings and equipment are easy and safe for them to access.
- Check all aspects of the environment and modify as necessary to reduce the risk of falls (eg furniture, lighting, floor surfaces, clutter and spills, and mobilisation aids).
- Conduct environmental reviews regularly (consider combining them with occupational health and safety reviews).

Chapter 15 Individual surveillance and observation

Recommendations

Intervention

- Include individual observation and surveillance as components of a multifactorial falls prevention program, but take care not to infringe on people's privacy. (Level III-2)[43]
- Falls risk alert cards and symbols can be used to flag high-risk patients as part of a multifactorial falls prevention program, as long as they are followed up with appropriate interventions. (Level II)[39]
- Consider using a volunteer sitter program for patients who have a high risk of falling, and define the volunteer roles clearly. (Level IV)[42,64]

Good practice points

- Most falls in hospitals are unwitnessed. Therefore, the key to reducing falls is to raise awareness among staff of the patient's individual risk factors, and reasons why improved surveillance may reduce the risk of falling.
- If appropriate, hospital staff should discuss with carers, family or friends the patient's risk of falling and their need for close monitoring.
- Family members or carers can be given an information brochure to use in discussions with the patient about falls in hospitals.
- Encourage family members or carers to spend time sitting with the patient, particularly in waking hours, and encourage them to notify staff if the patient requires assistance.
- A range of alarm systems and alert devices are available, including motion sensors, video surveillance and pressure sensors. They should be tested for suitability before purchase, and appropriate training and response mechanisms should be offered to staff. Alternatively, find another hospital that already has an effective alarm system, see what their program includes, and try their system.
- Patients who have a high risk of falling should be checked regularly.
- A staff member should stay with patients with cognitive impairment and a high risk of falls while the patient is in the bathroom.

Recommendations

Assessment

- Causes of agitation, wandering and other behaviours should be investigated, and reversible causes of these behaviours (eg delirium) should be treated, before restraint use is considered.

Note: there is no evidence that physical restraints reduce the incidence of falls or serious injuries in older people.[290-293] However, there is evidence that they can cause death, injury or infringement of autonomy.[294,295] Therefore, restraints should be considered the last option for patients who are at risk of falling.[296]

Good practice points

- The focus of caring for patients with behavioural issues should be on responding to the patient's behaviour and understanding its cause, rather than attempting to control it.
- All alternatives to restraint should be considered and trialled for patients with cognitive impairment, including delirium.
- If all alternatives are exhausted, the rationale for using restraints must be documented and an anticipated duration agreed on by the health care team.
- If drugs are used specifically to restrain a patient, the minimal dose should be used and the patient should be reviewed and monitored to ensure their safety. Importantly, chemical restraint must not be a substitute for quality care.
- Follow hospital protocol if physical restraints must be used.
- Any restraint use should not only be agreed on by the health team, but also discussed with family or carers.

Part D Minimising injuries from falls

Chapter 17 Hip protectors

Recommendations

Assessment

- When assessing a patient's need for hip protectors in hospital, staff should consider the patient's recent falls history, age, mobility and steadiness of gait, disability status, and whether they have osteoporosis or a low body mass index.
- Assessing the patient's cognition and independence in daily living skills (eg dexterity in dressing) may also help determine whether the patient will be able to use hip protectors.

Intervention

- Hip protectors must be worn correctly for any protective effect, and the hospital should introduce education and training for staff in the correct application of hip protectors. (Level II-*)[302]
- When using hip protectors as part of a falls prevention strategy, hospital staff should check regularly that the patient is wearing their protectors, and ensure that the hip protectors are comfortable and the patient can put them on easily. (Level I-*)[303]

Good practice points

- Although there is no evidence of the effectiveness of hip protectors in the hospital setting, their use can be considered in individual cases where the patient is able to tolerate wearing them, and has a high risk of injurious falls.
- If hip protectors are to be used, they must be fitted correctly and worn at all times.
- The use of hip protectors in hospitals is challenging but feasible in subacute wards. In hospital wards where patients are acutely ill (acute wards), effective use of hip protectors has not been shown to be possible.
- Hip protectors are a personal garment and should not be shared between patients.

Chapter 18 Vitamin D and calcium supplementation

Recommendations

Assessment

- To screen for possible vitamin D deficiency, dieticians, nutritionists or health professionals can collect information on the patient's eating habits, food preferences, meal patterns, food intake and sunlight exposure. Alternatively, a blood sample can be taken.

Intervention

- Vitamin D and calcium supplementation should be recommended as an intervention strategy to prevent falls in older people. Benefits from supplementation are most likely to be seen in patients who have vitamin D insufficiency (25(OH)D of <50 nmol/L) or deficiency (25(OH)D of <25 nmol/L), comply with the medication, and respond biochemically to supplementation. (Level I-*)[31]

Note: it is unlikely that benefits from vitamin D and calcium supplementation will be seen in hospital (particularly in acute care or short stays), but there is evidence both from the community and residential aged care settings to support dietary supplementation, particularly in people who are deficient in vitamin D.

Good practice points

- Hospitalisation of an older person provides an opportunity for comprehensive health care assessment and intervention. There is no direct evidence to suggest that calcium and vitamin D supplementation will prevent falls in hospital; however, because most older people will return home or to their residential aged care facility, hospitalisation should be viewed as an opportunity to identify and address falls risk factors, including adequacy of calcium and vitamin D. This information should be included in discharge recommendations.
- As part of discharge planning, any introduction of vitamin D and calcium supplementation should be conveyed to the person's general practitioner or health practitioner.

Recommendations

Assessment

- Patients with a history of recurrent falls should be considered for a bone health check. Also, patients who sustain a minimal-trauma fracture should be assessed for their risk of falls.

Intervention

- People with diagnosed osteoporosis or a history of low-trauma fracture should be offered treatment for which there is evidence of benefit. (Level I)[283]
- Hospitals should establish protocols to increase the rate of osteoporosis treatment in patients who have sustained their first osteoporotic fracture. (Level IV)[340]

Good practice points

- The health care team should consider strategies for minimising unnecessary bedrest (to maintain bone mineral density), protecting bones, improving environmental safety and vitamin D prescription, and this information should be included in discharge recommendations.
- When using osteoporosis treatments, patients should be co-prescribed vitamin D with calcium.

Part E Responding to falls

Chapter 20 Post-fall management

Good practice points

- Hospital staff should report and document all falls.
- It is advisable to ask a patient whether they remember the sensation of falling or whether they think that they blacked out, because many patients who have syncope are unsure whether they blacked out.
- Staff should follow the hospital protocol or guidelines for managing patients immediately after a fall.
- After the immediate follow-up of a fall, determine how and why a fall may have occurred, and implement actions to reduce the risk of another fall.
- Analysing falls is one of the key ways to prevent future falls. Organisational learning from this analysis can be used to inform practice and policies, and to prevent future falls. A post-fall analysis should lead to an interdisciplinary care plan to reduce the risk of future falls and injuries, and address any identified comorbidities or falls risk factors.
- An in-depth analysis of the fall (eg a root-cause analysis) is required if there has been a serious injury following a fall, or if a death has resulted from a fall.


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Part A
Introduction

1 Background

1.1 About the guidelines

These guidelines aim to improve the safety and quality of care for older people. They are designed for health professionals providing care in Australian hospital settings and offer a nationally consistent approach to preventing falls based on best practice recommendations. The development of these guidelines was funded and managed by the Australian Commission on Safety and Quality in Health Care (ACSQHC).

The guidelines advocate autonomy, independence, enablement and rehabilitation in the context of acceptable risk of falling. A degree of risk is inevitable in promoting autonomy in older people.

Any fall needs to be considered in the context of the care provided relative to best practice for the individual within the specific environment. Some falls may continue to occur even when best practice is followed. In such cases, there remains a need for vigilant monitoring, review of the care plan, and implementation of actions to minimise injury risk.

1.2 Scope of the guidelines

1.2.1 Targeting older Australians

Falls can occur at all ages, but the frequency and severity of falls-related injury increases with age.[2] These guidelines have been developed with older people — defined as people aged 65 years and over — in mind. When considering Indigenous Australians, *older people* commonly refers to people aged over 50 years.[3] These guidelines may also apply to younger people at increased risk of falling, such as those with a history of falls, neurological conditions, cognitive problems, depression, visual impairment or other medical conditions leading to an alteration in functional ability.[4]

1.2.2 Specific to Australian hospitals

These guidelines have been developed for Australian hospitals, including emergency departments, the acute and subacute care settings, and specialised units. Separate guidelines have been developed for the community and residential aged care settings.

1.2.3 Relevant to all hospital staff

All hospital staff have a role to play in preventing falls in older people. These guidelines have been developed for all those who either deliver or are responsible for the care of older people. This includes support services as well as clinical, management and corporate staff.

1.3 Terminology

1.3.1 Definition of a fall

For a nationally consistent approach to falls prevention within Australian facilities, it is important that a standard definition of a fall be used. For the purpose of these guidelines, the following definition applies:

> A fall is an event which results in a person coming to rest inadvertently on the ground or floor or other lower level.[5]

To date, no national data definition for a fall exists in the National Health Data Dictionary (run by the Australian Government's Australian Institute of Health and Welfare).†

1.3.2 Definition of an injurious fall

These guidelines use the Prevention of Falls Network Europe (ProFaNE) definition of an *injurious fall*. The ProFaNE definition considers that the only injuries that could be confirmed accurately using existing data sources are peripheral fractures – defined as any fracture of the limb girdles or of the limbs. Head, maxillo-facial, abdominal, soft tissue and other injuries are not included in the recommendation for a core dataset.‡

However, other definitions of an injurious fall include traumatic brain injuries (TBIs) as a falls-related injury, particularly as falls are the leading cause of TBIs in Australia (representing 42% of TBI-related hospitalisations in 2004-05).[6]

1.3.3 Definition of assessment and risk assessment

In these guidelines, *assessment* is defined as an objective evaluation of the older person's functional level by their ability to perform certain tasks and activities of daily living (eg dressing, feeding, grooming, mobilising).

Falls risk assessment is a detailed and systematic process used to identify a person's risk factors of falling. It is used to help identify which interventions to implement. Falls risk assessment tools should be validated prospectively in more than one group or study (see Chapter 5 for more detail).

† http://meteor.aihw.gov.au/content/index.phtml/itemId/367274

‡ http://www.profane.eu.org

1.3.4 Definition of interventions

An *intervention* is a therapeutic procedure or treatment strategy designed to cure, alleviate or improve a certain condition. Interventions can be in the form of medication, surgery, early detection (screening), dietary supplements, education, or minimisation of risk factors.

In falls prevention, interventions can be:

- targeted at single risk factors — *single interventions*
- targeted at multiple risk factors
  - *multiple interventions* — where everyone receives the same, fixed combination of interventions
  - *multifactorial interventions* — where people receive multiple interventions, but the combination of these interventions is tailored to the individual, based on an individual assessment.

This classification of interventions targeting multiple risk factors is based on the classification of interventions used by the Cochrane Collaboration (which is based on the ProFaNE classification†).

In general, trials have shown that interventions that target multiple risk factors (that is, both multiple and multifactorial interventions) are more effective than single interventions for preventing falls and associated injuries for older people who are in hospital for relatively long periods.[7] The effectiveness of single interventions in this setting is not known. Similarly, it is not known whether interventions are effective for people with relatively short (ie fewer than 14 days) hospital stays.[7] Part C contains more information about the types of interventions that are available in the hospital setting.

1.3.5 Definition of evidence

These guidelines use a definition of *evidence* based on Health-evidence.ca — a Canadian online resource funded by the Canadian Institutes of Health Research and run by McMaster University. It defines evidence as:

> Knowledge from a variety of sources, including qualitative and quantitative research, program evaluations, client values and preferences, and professional experience.‡

Furthermore, these guidelines were developed using the principles of *evidence based practice*, which is the process of integrating clinical expertise, and patient preferences and values, with the results from clinical trials and systematic reviews of the medical literature. This approach also involves avoiding interventions that are shown to be less effective or harmful.

See Section 1.4 for more details on the development of the guidelines using an evidence based approach.

† http://www.profane.eu.org

‡ http://health-evidence.ca/

1.4 Development of the guidelines

1.4.1 Expert advisory group

To guide and provide advice to the project, a multidisciplinary expert panel (the Falls Guidelines Review Expert Advisory Group) was established in 2008. The panel included specialists in the areas of falls prevention research, measurement and monitoring, quality improvement, change management and policy, as well as health care professions from fields including geriatric medicine, allied health and nursing. Whenever necessary, the expert panel accessed resources outside its membership. An additional external quality reviewer was appointed to review the guidelines from an Australian perspective.

Furthermore, an internationally renowned, independent quality reviewer (with expertise in the hospital setting) reviewed these guidelines.

1.4.2 Review methods

The guidelines were developed drawing on the following sources:

- the previous version of the guidelines
- a search of the most recent literature for each risk factor or intervention
- the most recent Cochrane review of falls prevention interventions in the hospital setting
- feedback from health professionals and policy staff implementing the previous guidelines
- clinical advice from the expert advisory group
- guidance from external expert reviewers
- guidance from international external expert reviewers
- guidance from specialist groups (such as the Royal Australian College of General Practitioners, Australian Association of Gerontology, and Continence Foundation Australia).

The review methods used were nonsystematic, because a systematic review of each aspect of falls prevention, for each setting (community, hospital and residential aged care facility) was beyond the capacity and timeframe of this update of the guidelines.

Due to these constraints, it was not possible to follow the National Health and Medical Research Council's (NHMRC's) detailed requirements for developing and grading clinical practice guidelines.[8] In particular, search terms and details of study inclusion and exclusion criteria were not recorded; data extraction tables were not compiled for included studies; quality appraisal criteria were not systematically applied; and the body of evidence was not graded in the way set out by the NHMRC.

However, the expert group was mindful of the need for a thorough review of the evidence supporting each recommendation. The methods used to review assessment and intervention recommendations are described briefly below.

Assessment

Assessment recommendations were based on information supplied by the clinical experts, supplemented by general literature reviews, where relevant. The text of each section describes the supporting information and provides a rationale for each recommendation. As NHMRC methods for reviewing diagnostic questions have not been followed, no attempt has been made to apply levels of evidence or to grade these recommendations.

Interventions

Rapid literature searches were carried out with the aim of identifying the highest quality information for each intervention (systematic reviews — particularly Cochrane reviews as well as, meta-analyses, and randomised controlled trials). This is in line with recommended methods for evidence based practice, where answers are needed quickly to clinical questions based on rapid identification of the best quality literature.[9] The information retrieved in this way was checked and supplemented by information from the extensive personal research databases of the clinical experts. Each chapter was reviewed by an external expert reviewer, before whole-of-guidelines review by an expert for each setting.

Economic evaluation

A systematic review of published economic evaluations was undertaken. Literature searches were carried out in Medline (1950 to end July 2008), CINAHL (1982 to end July 2008), and EMBASE (1980 to end July 2008). MeSH terms (Economics/; or Economics, Medical/; or Economics, Hospital/; or Technology Assessment, Biomedical/; or Models, economic/) and text words for economic evaluations (cost-effectiveness, cost utility, cost benefit, economic evaluation) were combined with MeSH and text words relating to falls or to hip protectors. Reference lists of relevant studies and reviews were also searched, and Australian researchers were contacted.

The search identified 388 abstracts. All abstracts were reviewed, and excluded if they did not appear to be economic evaluations of either falls prevention interventions or hip protectors. Studies that included relevant data or information were retrieved, and their full-text versions were analysed and examined for study eligibility. Across all interventions, a total of 27 papers were identified that considered the costs or economic benefits of falls prevention interventions or hip protectors. The methods, results and limitations of these papers are discussed in the relevant intervention sections.

1.4.3 Levels of evidence

The NHMRC's six-point rating system for intervention research was used to classify each paper according to the strength of evidence that can be derived given the specific methods used in the paper. Table 1.1 lists the six levels of evidence.

Table 1.1 National Health and Medical Research Council levels of evidence

Level	Description
I	Evidence obtained from a systematic review of all relevant randomised controlled trials
II	Evidence obtained from at least one properly designed randomised controlled trial
III-1	Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method)
III-2	Evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case-control studies, or interrupted time series with a control group
III-3	Evidence obtained from comparative studies with historical control, two or more single-arm studies, or interrupted time series without a parallel control group
IV	Evidence obtained from case series, either post-test, or pretest and post-test

NHMRC = National Health and Medical Research Council
Source: NHMRC[10]

It is possible to have methodologically sound (Level I) evidence about an area of practice that is clinically irrelevant or has such a small effect that it is of little practical importance. These issues were not formally reviewed during this update of the guidelines (see above), but relevant issues are described in the text of each section and were taken into account by the expert group in developing the recommendations.

A particular problem in assessing evidence for falls prevention is that research studies of an intervention have often been carried out in a different setting (eg in a residential aged care setting but not in a hospital setting). In these guidelines, the highest level of evidence for an intervention is reported regardless of the setting; however, when the research setting is not a hospital, an * is added to the level (eg Level I-*). This shows that caution is needed when applying economic implications for that recommendation to the hospital setting.

The guidelines will be reviewed in 2014.

1.5 Consultation

The consultation process involved a call for submissions, an online survey, multiple nationwide workshops (in all state and territory capitals and a number of regional centres), teleconferences, and targeted interviews with key stakeholders. An extensive range of useful, high-quality responses to these processes assisted in the development of the guidelines (and subsequent implementation process), as well as to identify other areas of action.

In addition, specialist groups provided invaluable feedback on previous guidelines and draft versions of these guidelines. They included the National Injury Prevention Working Group, the Australian Association of Gerontology, the Royal Australian College of General Practitioners and the Continence Foundation of Australia.

Development of the 2005 guidelines was underpinned by an extensive consultative process, from which these guidelines benefit.

1.6 Governance of the Australian falls prevention project for hospitals and residential aged care facilities

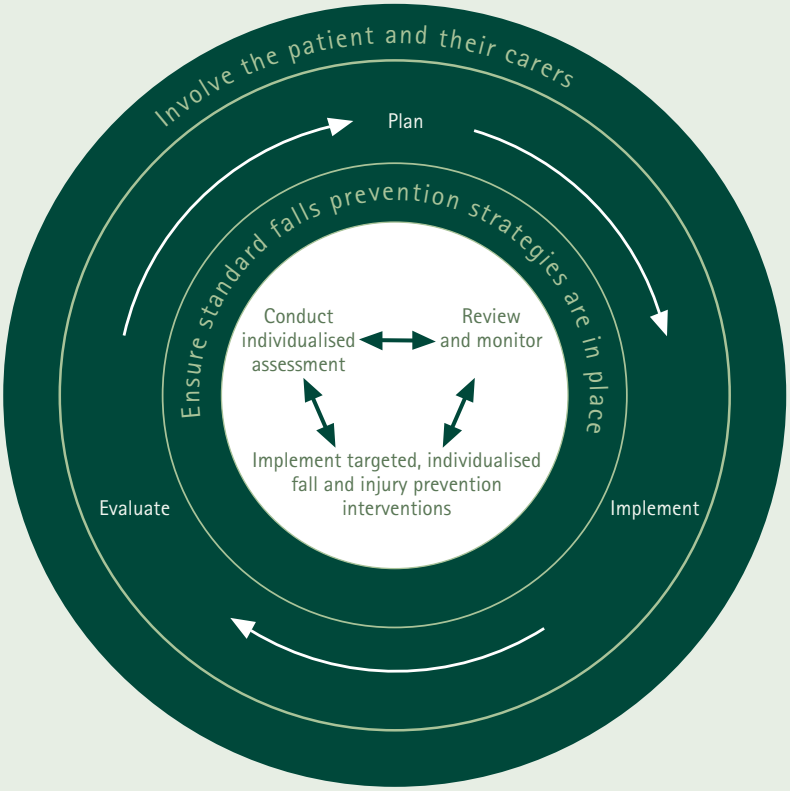
The Falls Guidelines development project was directed by ACSQHC in conjunction with its Inter-Jurisdictional, Private Hospital Sector and Primary Care Committees. It was managed by the Office of the Australian Commission on Safety and Quality in Health Care on the advice of the Falls Guidelines Review Expert Advisory Group, which recommended the final guidelines for endorsement to ACSQHC.

1.7 How to use the guidelines

1.7.1 Overview

Figure 1.1 provides a step-by-step overview of how to use the guidelines to prevent falls and falls injuries in older people in Australian hospitals, in the context of consumer involvement. It is split into two linked sections:

- The bold arrows in the outer circle represent the strategic level. This is a 15-step approach in three sections
  - plan a falls and falls injury prevention program
  - implement a falls and falls injuries prevention program
  - evaluate a falls and falls injuries prevention program.
- The inner circle represents interventions that can be applied at the point of care (that is, the site of patient care). A best practice approach of individualised assessment followed by targeted, individualised interventions is presented in Parts B to D of the guidelines *(Standard falls prevention strategies, Management strategies for common falls risk factors* and *Minimising injuries from falls)*.



Plan

Plan for implementation

Step 1: Identify teams
Step 2: Identify, consult, analyse and engage key stakeholders
Step 3: Assess organisational readiness
Step 4: Analyse falls

Plan for evaluation

Step 5: Establish a baseline

Plan for quality improvement

Step 6: Review current clinical practice

Implement

Step 7: Decide on implementation approaches
Step 8: Determine process for implementation
Step 9: Conduct trial
Step 10: Learn from trial
Step 11: Proceed to widespread implementation for improvement
Step 12: Sustain implementation

Evaluate

Step 13: Measure process
Step 14: Measure outcomes
Step 15: Report and respond to results

Figure 1.1 Using the guidelines to prevent falls in Australia

1.7.2 How the guidelines are presented

The guidelines are presented in five parts:

- Part A — *Introduction*
- Part B — *Standard falls prevention strategies*
  - single and multiple falls prevention interventions
  - falls risk screening and assessment
- Part C — *Management strategies for common falls risk factors*
  - strategies for managing common risk factors
  - 11 specific assessments and interventions
- Part D — *Minimising injuries from falls*
  - hip protectors
  - vitamin D and calcium supplementation
  - osteoporosis management
- Part E — *Responding to falls.*

For ease of reference, Parts C and D consider each falls risk factor and assessment or intervention in separate chapters. However, these interventions are generally most successful when used in combination. Interventions and assessments to minimise falls risk factors are discussed first (Part C), followed by interventions to minimise harm from falls (Part D). This does not imply importance of one chapter over another.

Health care professionals and carers should consider the advantages and risks of using injury-prevention strategies, as outlined in Part D, to give older people in the hospital setting extra protection from falls and related injury. These strategies can be used after a fall or applied systematically to the population at risk.

Chapters on intrinsic and extrinsic risk factors in Parts C and D begin with a set of evidence based recommendations (assessment or intervention, or both, as appropriate). The supporting information for these recommendations is presented in the remainder of the chapter, which is organised into:

- background information — contains an overview of the risk factor or intervention, and a summary of the relevant literature on clinical trials
- principles of care — explains how to implement the intervention of interest
- special considerations — provides information relevant to specific groups (eg Indigenous and culturally and linguistically diverse groups, rural and remote populations, people with cognitive impairment)
- economic evaluation — summarises the relevant literature on health economics.

The guidelines contain text boxes for important information, as outlined below.

Evidence based recommendations

- Evidence based recommendations are presented in boxes at the start of each section, accompanied by references. They were selected based on the best evidence and accepted by the project's expert advisory group and external quality reviewers.
- Where possible, separate recommendations for assessment and interventions are given. Assessment recommendations have been developed by the expert group based on current practice and a review of the literature discussed in the text of each section.
- Intervention recommendations are based on a review of the research on the use of the intervention. Each recommendation is accompanied by a reference to the highest quality study upon which it is based, as well as a level of evidence (see Section 1.4.3 for an explanation of levels of evidence).

Recommendations based on evidence nearer the I end of the scale should be implemented, whereas recommendations based on evidence nearer the IV end of the scale should be considered for implementation on a case-by-case basis, taking into account the individual circumstances of the patient.

Good practice points

Good practice points have been developed for practice where there have not been any studies; for example, where there are no studies assessing a particular intervention, or where there are no studies specific to a particular setting. In these cases, good practice is based on clinical experience or expert consensus.

Point of interest

These boxes indicate points of interest. Most points of interest were revealed by the Australia-wide consultation process or from grey literature (conference proceedings, etc).

Case study

These boxes indicate case studies. The case studies provide information on likely scenarios, which are used as illustrative examples.

Boxes containing additional information, such as useful websites, organisations or resources, are also provided. References are listed at the end of the guidelines.

2 Falls and falls injuries in Australia

The following is a brief summary of the background information derived from the literature in relation to falls in hospitals. Specific literature related to risk factors for falling is outlined in the relevant sections.

2.1 Incidence of falls

Falls-related injury is one of the leading causes of morbidity and mortality in older Australians, with more than 80% of injury-related hospital admissions in people aged 65 years and over due to falls and falls-related injuries.[11] Fall rates are greater for older people.[11] Fall rates of 4–12 per 1000 bed days have been described in this age group.[12] Incident rates vary between wards and departments in hospitals. In the subacute or rehabilitation hospital setting, more than 40% of patients with specific clinical problems, such as stroke, experience one or more falls during their admission.[2] Injuries result from approximately 30% of such falls in hospital.[13]

Australian data on falls in hospitals do not distinguish between injuries that occur before and after admission. If a patient is admitted to hospital for one reason and falls while in hospital care, it is not recorded as a separate event.[14]

2.2 Fall rates in older people

Injuries requiring hospitalisation increase with age (beginning at 65 years old), and falls are the biggest reason for these injuries.[14] Falls are the single biggest reason for injury-related admission to hospital and presentations to the emergency department in people over 65 years.[14] Every year, approximately 30% of Australians over 65 years old fall, with 10% of these falls leading to injury.[15] Approximately 8% of falls-related overnight admissions do not go home, as opposed to 4.5% of other admissions.[16]

An increase in falling as people age is associated with decreased muscle tone, strength and fitness as a result of physical inactivity. Certain medications can contribute to an increased risk of falling. Alcohol consumption can also lead to more falls, particularly if the alcohol interacts with certain medications.[14] Impaired vision also contributes to falls.[14]

Falls are also associated with an increased incidence of death in older people, particularly people older than 80 years. In 2002, the death rate from falls ranged from 18 deaths per 100 000 people (aged 65–84 years) to 81 deaths per 100 000 people (aged 85 years and older, in all settings — not specific to the hospital setting).[17] Age-standardised fall injury cases (leading to hospitalisation) increased to 2415 injuries per 100 000 people (in 2005–06) from 2295 injuries per 100 000 people (in 2003–04).[18]

The potential for falls increases once older people enter health care facilities. Even with high rates of falls, there may still be under-reporting of events.[19]

2.3 Impact of falls

The hip and thigh are the most commonly injured areas requiring hospitalisation in both men and women sustaining falls.[18] Femur fractures from falls have decreased since 1999–2000[18] by 1.3% per year for men and 2.2% for women. Head injuries are also common, more so for men, and indicate that injury prevention mechanisms for the head should be considered, as well as for hips and thighs.[18]

Hip fractures are one of the most common reasons for hospital admission (in relation to injury), and most (91%) hip fractures are caused by falls.[14] Hip fractures impose heavily on the Australian community due to increased death and morbidity, decreased independence, increased burden on family members and carers, increased costs due to rehabilitation, and increased admission into residential aged care facilities.[14]

Falls also result in wrist fractures; when people fall, they put their arms out to break the fall.[14]

Falls may lead to complications, including a fear of falling or a loss of confidence in walking, a longer stay in hospital or other facility, additional diagnostic procedures or surgery, and potential litigation.[2] Additionally, falls may result in caregiver stress, and fear of litigation for clinical and administrative staff.[2]

2.4 Cost of falls

In addition to injuries, falls are costly to the individual — in terms of function and quality of life[2] — and also to the community. Research across all settings shows that, in the face of an ageing population, if nothing more is done to prevent falls by 2051:[20]

- the total estimated health cost attributable to falls-related injury will increase almost threefold from A$498.2 million per year in 2001 to A$1375 million per year in 2051
- in hospitals, 886 000 additional bed days per year, or the equivalent of 2500 additional beds, will be permanently allocated to treating falls-related injuries.

To maintain the current health costs, there will need to be a 66% reduction in the incidence of falls-related hospitalisations by 2051.[20]

2.5 Economic considerations in falls prevention programs

In health care, resources are limited — there are insufficient resources to provide all programs to all people. Therefore, health care providers and funders need to choose programs to ensure they are getting good value for money. This means that it is no longer enough to demonstrate that an intervention is effective — it should also be a good use of scarce health care resources. Individual and organisational components of programs for preventing falls should be selected by weighing up the costs and the benefits (health outcomes). Health care providers must decide how they can facilitate improvements in health outcomes with finite resources, choosing the most effective intervention they can afford.

Economic evaluation of falls prevention programs is an important element of the overall decision-making process when comparing different options for falls prevention. An economic evaluation (often called a cost-effectiveness analysis) compares both costs and health outcomes of alternative health care programs. Health outcomes from a falls prevention intervention can be counted in 'natural units', such as falls prevented, fractures prevented, deaths prevented, and survival — often expressed as 'life years saved' (LYS) or as multidimensional health outcomes, which include both survival and quality of life in a single composite measure (such as a 'quality-adjusted life years' — QALYs).

The cost effectiveness of a new program is assessed by comparing the costs and health outcomes of the new program with the costs and health outcomes of an alternative program (often current clinical practice or usual care) by calculating an 'incremental cost-effectiveness ratio' (ICER). The ICER represents the extra cost for each additional unit of health outcome, and is a measure of value for money. Programs with lower ICERs offer better value for money (they are more cost effective) than programs with higher ICERs.

2.6 Characteristics of falls

The literature contains numerous studies reporting on the epidemiology of falls. These include the characteristics and circumstances of older people who fall, such as the time and place of the fall and resultant injury.[18,21]

Falls are associated with a number of factors, such as environmental obstacles, dementia, delirium, incontinence and medications. Although not proven through controlled trials, the relationship between time of fall and level of staffing suggests that most falls in hospitals occur in daylight hours when staffing levels are at their highest but when there is the greatest level of concurrent work demands.[22]

A snapshot of studies that have reported fall data[22-24] has revealed the following consistent information: the bedside is the most common place for falls to occur, and the bathroom is frequently mentioned; a high percentage of falls are associated with elimination and toileting; falls occur across all age groups, but there is an increasing prevalence of falls in older people; and a high percentage of falls are unwitnessed.[25-27]

The pattern of falls depends on setting and case mix. More mobile patients (for instance, in rehabilitation or mental health settings) are more likely to fall when walking than from a bed or chair. This may, in turn, influence the emphasis of interventions.

2.7 Risk factors for falling

There are a number of risk factors for falling among older people in hospital settings, and a person's risk of falling increases as their number of risk factors accumulates.[28]

Risk factors may be divided into intrinsic risk factors (factors that relate to a person's behaviour or condition) and extrinsic risk factors (factors that relate to a person's environment or their interaction with the environment). Table 2.1 summarises the intrinsic and extrinsic risk factors for falling in hospital.

Table 2.1 Risk factors for falling — hospitals[2]

Intrinsic risk factors	Extrinsic risk factors
Previous fall	Hospitalisation for 19 days or more
Postural instability, muscle weakness	Environmental risk factors (most falls in hospital occur around the bedside and in the bedroom)
Cognitive impairment, delirium, disturbed behaviour	Time of day (falls occur most commonly at times when observational capacity is low — ie shower and meal times, and outside visiting hours)
Urinary frequency, incontinence	
Postural hypotension	
Medications (eg psychoactive medications)	
Visual impairment	

Some risk factors (eg confusion, unsafe gait and antidepressant medications) are associated with an increased risk of multiple falls in the hospital setting.[2,29] Patients whose medical condition impacts directly on one or more falls risk factors, such as stroke, have high fall rates in the hospital setting.[2,30]

A best practice approach for preventing falls in hospitals includes four key components: first, the implementation of standard falls prevention strategies; second, the identification of falls risk; third, the implementation of interventions targeting these risks to prevent falls; and finally, the prevention of injury to those people who do fall. Previous programs in the hospital setting have only been successful in reducing falls when multiple interventions are included. Implementation of one part does not seem enough to improve outcomes. To be most effective, falls prevention should be targeted at both point of care and strategic levels.

While the body of knowledge regarding the risks of falls and how to reduce these risks is continually growing, one key message prevails: multifactorial, multidisciplinary approaches are best in the hospital setting.[31] Implicit in this multifactorial approach is the engagement of the patient and their carer(s) (where appropriate) as the centre of any falls prevention program.

Falls after hospital discharge have been reported as occurring in 15% of older people within a month of discharge, with 11% of these resulting in serious injury.[32] Although the scope of these guidelines is specifically the prevention of falls in hospitals, best practice would also ensure that falls prevention strategies continue after discharge. By working in an integrated manner, the needs of the patient across the broader spectrum of service delivery is more likely to be achieved. This may be demonstrated by reduced levels of readmission, improved quality of life and levels of functional independence, and enhanced population health outcomes; however, comprehensive studies of post-discharge intervention evaluating quality of life and population outcomes are lacking.

3 Involving older people in falls prevention

Consumer participation in health is central to high-quality and accountable health services. It also encourages shared responsibility in health care. Consumers can help facilitate change in health care practices.

Health care professionals should consider the following things to encourage patients to participate in falls prevention:

- Make sure the falls prevention message is presented within the context of people staying independent for longer.[33]
- Be aware that the term 'falls prevention' could be unfamiliar and the concept difficult to understand for many patients in this older age group.[33]
- Provide relevant and usable information to allow patients and their carers to take part in discussions and decisions about preventing falls[34] (see the fact sheets on preventing falls).
- Find out what changes a patient is willing to make to prevent falls, so that appropriate and acceptable recommendations can be made.[34]
- Offer information in languages other than English, where appropriate;[34] however, do not assume literacy in the patient's native language.
- Explore the potential barriers that prevent patients from taking action to prevent falls (such as low self-efficacy and fear of falling) and support patients to overcome these barriers.[34]
- Develop falls prevention programs that are flexible enough to accommodate the patient's needs, circumstances and interests.[34]
- Place falls prevention posters in the ward in common areas used by patients and family members.
- Ask family members to assist in falls prevention strategies.
- Ensure that strategies to promote the continued involvement of patients are included in discharge planning (also called 'post-hospital care planning') and recommendations.
- Trial a range of interventions with the patient.[35]

Part B
Standard falls prevention strategies

4 Falls prevention interventions

Recommendations

Intervention

- A multifactorial approach to preventing falls should be part of routine care for all older people in hospitals. (Level I)[31,36]
- Develop and implement a targeted and individualised falls prevention plan of care based on the findings of a falls screen or assessment. (Level II)[37-39]
- As part of discharge planning, organise an occupational therapy home visit for people with a history of falls, to establish safety at home. (Level II)[40]
- Patients considered to be at higher risk of falling should be referred to an occupational therapist and physiotherapist for needs and training specific to the home environment and equipment, to maximise safety and continuity from hospital to home. (Level I)[41]

Good practice points

- Interventions should systematically address the risk factors identified, either during the admission or, if this is not possible, through discharge planning and referral to community services.
- Screen patients for falls risk and functional ability, and ensure that referrals for follow-up falls prevention interventions are in place.
- Managing many of the risk factors for falls (eg delirium or balance problems) will have wider benefits beyond falls prevention.

4.1 Background and evidence

In these guidelines, the term *standard falls prevention interventions* refers to routine care. This section outlines evidence, recommended actions and resources to address specific falls risk factors and interventions. These interventions have been components of multifactorial programs that have proven successful in the hospital setting. Because falls are multifactorial and complex in nature, interventions should be implemented in combination rather than in isolation.[7] Evidence from hospitals, residential aged care facilities and community settings has indicated the clear benefit of multifactorial approaches to falls prevention.[2]

Where possible, these guidelines suggest how strategies could be implemented, by whom and at what point in time. However, given the unique features of each hospital, and of wards and units within hospitals, the health care team will need to make local decisions on how to best integrate falls prevention actions into a patient's plan for daily care. Each patient has a unique set of falls risk factors and personal preferences, and requires an individualised plan of action to minimise falls and harm from falls.

To prevent falls, a range of standard precautionary strategies should be put into place for all older people in hospitals. This approach is based on good aged care practice and the assumption that all older people in hospitals are at risk of falling, with their level of risk requiring further assessment.

After standard falls prevention strategies are in place and after the assessment process is undertaken, those factors identified as contributing to a patient's risk of falling can be addressed in an individualised plan for daily care focused on preventing falls. Patients with multiple risk factors have a higher rate of falls than those with fewer falls risk factors.[4] See Chapter 5 for information on risk screening and assessment.

4.1.1 Evidence from trials

A Cochrane review showed that trials in hospitals targeting multiple risk factors appeared to be effective in reducing the risk of falls for patients with long lengths of stay.[31] The multifactorial interventions included different combinations of supervised exercise and balance training, education, medication review, vitamin D with calcium supplementation, environmental review, walking aids and hip protectors.

Another randomised controlled trial used a screening tool in each patient's notes to prompt recommendations for four basic interventions by referring to allied health staff.[39] This multifactorial intervention, which was done in an Australian population, reduced the incidence of falls in the subacute hospital setting.

A third randomised controlled trial successfully incorporated staff education; multidisciplinary care planning; investigation, screening and treatment of delirium and pain; and other interventions in a systemised way to prevent inpatient falls and injuries in patients admitted for femoral neck fractures.[38]

A meta-analysis of interventions supports a multifactorial approach for reducing falls in hospitals.[36] The studies included in this meta-analysis were successful in reducing falls, and all had mean hospital stays ranging from 18 to 38 days.

However, since this meta-analysis, a study of acute wards (median length of stay of seven days) applied interventions similar to those in other randomised controlled trials using dedicated multidisciplinary research staff over a three-month period.[42] It was the largest study to date, and was done on an Australian population. The rates of falls in this study were not reduced. This may have been because:[42]

- the intervention was too short or not sufficiently intense
- the use of external staff meant that regular hospital staff did not change their practice to maintain the interventions out of hours
- some interventions (eg exercise programs) most likely required longer than a seven-day period to improve outcomes
- the population of an acute care ward may differ significantly from the rehabilitation wards in the prevalence of cognitively impaired or acutely unwell patients who may require additional interventions and supervision.

The success of falls prevention interventions may be affected by what interventions are already in place, by the level of organisational reinforcement or support, and by the duration of the intervention (interventions that last for only a few months may not be long enough to change the organisational culture).

Many multifactorial programs to prevent falls in acute hospital wards have been evaluated in before-after studies. Most, but not all, of these studies found that falls were reduced in the intervention period.[36] Although the design of before-after studies is not as rigorous as randomised controlled trials (particularly because before-after studies cannot control for changes that may have occurred over time, unrelated to the interventions), they can provide complementary information about effective approaches to falls prevention. For example, an Australian study used a before-after design to evaluate a multifactorial falls prevention approach phased in over three months.[43] This intervention involved data gathering, risk screening with appropriate interventions, work practice changes, environmental and equipment changes, and staff education. Over a two-year period, the number of falls decreased by 19% per 1000 occupied bed days ($P = 0.001$), and the number of falls resulting in serious injuries decreased by 77% per 1000 occupied bed days ($P < 0.001$). Staff adherence to completing the falls risk assessment tool increased from 42% to 70%, and 60% of staff indicated they had changed their work practices to prevent falls.

Overall, these findings indicate that a multidisciplinary, multifactorial approach to falls prevention can be successful in hospital settings; however, in more acute wards, there is perhaps a necessity for more intensive long-term interventions, with an increased focus on cognitive impairment and a whole-system approach to ward-based falls prevention (with associated work practice change) led by ward staff.[43]

4.2 Choosing falls prevention interventions

As mentioned above, successful interventions in hospitals use a combination of falls prevention interventions that should be delivered together as part of a multifactorial program. Using any one intervention on its own is unlikely to reduce the number of falls.

All staff members (including support, clinical, administrative and managerial staff), as well as the patient and their carers (where appropriate), have a role to play in falls prevention, as outlined below.

The following standard falls prevention interventions have been used as interventions in successful in-hospital trials and should be included in routine practice:

- Screen or assess all older people in hospitals for risk of falling, using a validated tool.[39]
- Identify high-risk patients by using falls risk alert cards above beds.[39]
- Ensure that patients have their usual spectacles and visual aids to hand. Refer the patient to an optician, orthoptist or ophthalmologist for undiagnosed visual problems.[37]
- Review medications. In particular, identify high-risk medications, such as sedatives, antidepressants, antipsychotics and centrally acting pain relief, and ask the medical team or pharmacists to review the need for these medications.[37]
- Measure postural blood pressure as part of a medical review to identify patients with a significant drop in blood pressure. Investigate the cause, and provide slow and careful transfers with assistance for these people.[37]
- ~~Organise routine screening urinalysis to identify urinary tract infections, with medical review if positive.~~[37,38]
- Organise routine physiotherapy review for patients with mobility difficulties, including transfers[37-39]
  - communicate to staff and the patient the limits of the patient's mobility status[4] using written, verbal and visual communication
  - put walking aids on the side of the bed that the patient prefers to get up from[44] and, where possible, assign a bed that allows them to get up from their preferred side
  - supervise or help the patient if required[45,46]
  - make sure that, while mobilising, the patient wears fitted, nonslip footwear[45,46] (discourage the patient from moving about in socks, surgical stockings or slippers)
  - encourage the patient to participate in functional activities and exercise (minimise prolonged bedrest and encourage incidental activity)[46,47]
  - in rehabilitation settings, organise physiotherapist-led exercise sessions to improve balance (eg tai chi and functional activities that are progressive and tailored to individual needs).[39]

- Educate and discuss (with regular review) falls risks and falls prevention strategies with all staff, patients and their carers.[38,39,46,48]
- Record falls prevention education of staff, patients and their carers.[48] Document screening, assessment and interventions.
- Establish a plan of care to maintain bowel and bladder function.[46]
- Instruct patients who are being discharged or transferring between facilities about their medication time and dose; side effects; and interactions with food, other medications and supplements.[46] Make sure that unnecessary medications are not prescribed and that information about medications is shared accurately with all relevant medical practitioners.
- Make the environment safe[37] by ensuring that
  - the bed is at the appropriate height for the patient (in most cases, it should be at a height that allows the patient's feet to be flat on the floor, with their hips, knees and ankles at 90-degree angles when sitting on the bed), and the wheels or brakes are locked when the bed is not being moved[45,46,48]
  - the room is kept free from clutter or spills[48]
  - adequate lighting is supplied, based on the patient's needs (particularly at night)[46,48]
  - the patient knows where their personal possessions are and that they can access them safely (including telephone, call light, bedside table, water, eyeglasses, mobility aid, urinal)[4,45,46,48]
  - floor surfaces are clean and dry, and 'wet floor' signs are used when appropriate.[46]
- Orientate the patient to the bed area, room, ward or unit facilities and tell them how they can obtain help when they need it.[4,46,48] Some patients need repeated orientation because of cognitive impairment; they also might need appropriate signage in suitable script and language to reinforce messages.
- Instruct and check that patients understand how to use assistive devices (eg walking frames) before they are prescribed.[46]
- Have a policy in place to minimise the use of restraints and bedside rails,[37,46] or to ensure that they are used appropriately and only when alternatives have been exhausted, and where their use is likely to prevent injury. In addition, the policy for restraint use should ensure that the risk of injury and falls is balanced against the potential problems of using restraints.[49]
- Consider vitamin D supplementation with calcium as a routine management strategy in older patients who are able to walk, or if a patient lives in a residential aged care facility. If a patient has a low-trauma fracture, consider osteoporosis management.[38]
- Place high-risk patients within view of, and close to, the nursing station.[37]
- Consider hip protectors[39] and alarm devices (eg bed or chair alarms) for patients at high risk of falling (see Chapter 15 on individual surveillance and observation for more information).

4.3 Discharge planning

Interventions to reduce the risk of falls and harm from falls should be included in discharge planning (also called 'post-hospital care planning') for those patients who have been identified as having an increased risk of falls and fall injury during the hospital admission.

Patients may present to acute services with a range of risk factors, and may leave with some or all of these risk factors (eg poor vision). Other risk factors may be acquired as part of the events of the admission; for example, gait changes or dizziness. Falls risk is increased for one month after discharge from hospital.

Some risk factors for falls (eg certain medications) can be managed during an admission. However, some falls risk factors (eg muscle weakness) require longer term interventions. An exercise program can be started during admission, but needs to continue for some weeks after discharge to achieve optimal muscle strength.

Discharge planning should therefore start early during admission (or during pre-admission, if admission is planned). It should involve appropriate members of the multidisciplinary care team, and include referral to appropriate primary health provider(s) and community services. Communication with the individual and carer(s) will help to ensure that the benefits and rationale of discharge planning are understood, and that plans are followed.

4.3.1 Discharge planning from the emergency department

Identifying falls and risk factors for falls injuries is crucial while the patient is in the emergency department. The emergency department also provides an ideal opportunity for developing plans to minimise these risk factors through discharge planning processes.[50,51]

Approximately 43% of older people presenting to an emergency department after a fall are not admitted to hospital.[52] An observational study from the United Kingdom found that older people have an increased risk of subsequent hospitalisation and even death,[53] and 6% will return to the emergency department after another fall within 24 hours.[54] One-fifth of the older people who present with minor injuries and who are not admitted to hospital are at risk of ongoing functional decline for up to three months after discharge.[55] There is evidence that an older person will have an elevated risk of further falls if they have experienced a fall and were unable to get up independently, and have a history of previous falls.[56] In addition, older people presenting to the emergency department with other issues may also be unsteady and at risk of future falls and fall injury.

A randomised controlled trial from the United Kingdom investigated a structured, interdisciplinary falls assessment for emergency department patients. The assessment (which included a medical and occupational therapy assessment, and referral to appropriate services) was associated with a significant reduction in risk of further falls in the intervention group compared with usual care.[57] Table 5.2 (in Section 5.2.1) lists the details of the PROFET — the assessment tool recommended in this study. A study of a similar intervention demonstrated a 36% reduction in falls during follow-up.[58]

Position Statement 14 — *The Management of Older Patients in the Emergency Department* — of the Australian and New Zealand Society for Geriatric Medicine[59] encourages the completion of a validated screening tool to reduce re-presentation to the emergency department, or poor outcomes after discharge. The position statement recommends the emergency department as an appropriate place to screen and initiate referrals for ongoing management.[59] A useful falls-specific screening tool for this setting is the FROP-Com screen (for details, see Table 5.2 in Section 5.2.1).[60]

In its work with the Falls Risk for Hospitalised Older People (FRHOP), the National Ageing Research Institute (NARI) developed the following five key recommendations for preventing falls in the emergency department setting:[54]

- All emergency departments should have a policy that outlines procedures for screening, management and referral of older people presenting to the emergency department as a result of a fall.
- All emergency department staff should have an opportunity for orientation training and ongoing education that includes falls prevention policy and procedures, and research evidence to support these.
- An evidence based screening procedure that identifies older people who present to the emergency department and have a risk of future falls should be implemented independently, or within an overall falls risk screen.
- All older people with an elevated falls risk should have modifiable falls risk factors addressed.
- All older people with a high falls risk identified during screening should have a comprehensive falls risk assessment conducted by a trained practitioner using a validated tool.

NARI also identified the following four best practice points for falls prevention in the emergency department:[61]

- The patient's primary health provider should be informed of the risk screening result and subsequent referrals.
- The emergency department should identify a clear referral pathway for patients who have a high risk of falls or have modifiable falls risk factors.
- Emergency department staff should communicate clearly to patients and their carer(s) about the potential benefit and rationale for referrals and interventions for reducing falls risk.
- Emergency departments should review the completion of falls risk screening and referral as part of their routine audit of medical records.

4.3.2 Falls clinics

Falls clinics are conducted by a multidisciplinary team with skills in falls assessment and management for patients who have fallen.[62] Limited numbers of falls clinics are available, and a referral is usually required. Falls clinics are usually conducted as a part of an outpatient service. The team usually develops an intervention strategy for the patient, as well as advice, education and training for the patient, their carer and other members of the health care team. Falls clinics can also refer the patient to mainstream services for ongoing management.

Falls clinics should not be the first intervention for a patient who has fallen, or who is at risk of falling.

Multifactorial case study — decreasing the number of risk factors can reduce the risk of falling[4]

Mrs R is a 79-year-old woman who was transferred by ambulance to hospital from her residential aged care facility (RACF) after fracturing her left inferior pubic ramus (pelvis). This injury was the result of a fall onto the floor while she was rushing to the toilet.

The orthopaedic team admitted Mrs R from the emergency department. Because the fracture was stable, they decided that she would be allowed to walk and weight bear as pain permitted. From the outset, nursing staff implemented standard strategies for falls prevention and, because Mrs R was admitted as the result of a fall, staff completed a falls risk assessment rather than a less detailed falls risk screen.

Information from the falls risk assessment and the accompanying transfer letter from Mrs R's RACF revealed that she had multiple risk factors for falling, including that she:

- was older than 65 years
- had fallen three times in the previous year
- was taking five different medications, including a sleeping tablet and diuretic
- on last attempt (a month ago), was only able to complete the Timed Up and Go test (TUG) in 19 seconds with her wheelie walker; the mean time for healthy 71–79-year-olds is 15 seconds[63]
- was frequently incontinent of urine at night and regularly rushed to the toilet
- had a Mini Mental State Examination (MMSE) score of 22/30 before falling and was frequently agitated (a score of less than 24 indicates cognitive impairment)
- had left foot pain as the result of severe hallux valgus
- wore bifocal glasses for all activities, despite having a second pair of distance glasses for walking
- did not like to venture outdoors and received no direct sunlight.

In addition to the standard strategies and in response to the risk assessment, the hospital staff implemented targeted, individualised interventions to reduce Mrs R's risk of falling. These interventions included a medication review and advice on the importance of getting enough sunlight for vitamin D by the medical officer; advice from the occupational therapist about wearing well-fitting shoes with nonslip soles; and some simple exercises for strengthening core body muscles for better balance, demonstrated by the physiotherapist. As a result of these multifactorial interventions:

- the possibility of medication interactions and adverse medicine events was minimised
- Mrs R had a more restful sleep due to physical exertion throughout the day
- Mrs R's urinary incontinence was better managed
- Mrs R experienced fewer episodes of agitation
- Mrs R had less pain in her left foot from her bunion
- Mrs R was able to clearly see the floor in front of her while walking
- the condition of Mrs R's muscles and bones was optimised.

The health care teams at both the hospital and the RACF were all made aware of changes to Mrs R's care through chart entries, case conferences and appropriate discharge correspondence. Mrs R and her family were made aware of the changes to her care through a scheduled meeting with the health care team.

4.4 Special considerations

4.4.1 Cognitive impairment

The national consultation process that informed the first edition of these guidelines indicated that falls and cognitive impairment are key concerns of patients and health care workers alike. Consequently, cognitive impairment continues to have a dedicated chapter (Chapter 7), as well as being included as a special consideration within each section.

Cognitive impairment (including agitation, delirium and dementia) is a major risk factor for falls; however, patients who have cognitive impairment can benefit from falls interventions.

For older patients suffering from delirium or cognitive impairment, where it is unsafe for them to mobilise or transfer without help, individual observation and surveillance must be increased, and help with transfers must be provided as required. Ideally, one-on-one supervision should be applied for those patients with a mobility impairment for which they lack insight (eg cognitive impairment), and who impulsively attempt to exit their bed or chair without assistance. There is evidence for the benefits of this approach from nonrandomised controlled trials.[64]

Bed exit alarms have not been assessed adequately in appropriate trials, but they are increasingly being used for similar patients, to alert nursing staff when a high-risk patient attempts to leave their bed or chair. More research is required to see whether these devices are effective in reducing falls rates in hospitals.

4.4.2 Rural and remote settings

A common problem in rural and remote settings is a shortage of some health professionals. Where this is the case, options to support available expertise include telephoning and videoconferencing with experts or facilities with advanced programs in other areas or regions. In instances where this approach is used, local staff should:

- ensure they have standard strategies in place before calling for support from external specialist staff
- carry out necessary screening, assessments and identification of appropriate interventions so that the basic assessments and interventions are in place by the time they are linked with the external support.

4.4.3 Indigenous and culturally and linguistically diverse groups

The risk of falls may be greater if people from Indigenous and culturally and linguistically diverse groups cannot read signs or understand information given by staff[2] or be assessed adequately due to language difficulties.

There is some evidence that falls prevention strategies may work differently among culturally and linguistically diverse groups (eg due to cultural differences in exercise preferences and dietary intake of calcium from dairy products).[65]

General points to consider when conveying falls prevention messages to Indigenous and culturally and linguistically diverse groups include:

- the importance of interpreters
- the use of communication and translation boards
- seeking and using written information in the appropriate language and cultural context
- learning some basic words from the person's first language.

4.5 Economic evaluation

An economic evaluation compares the costs and health outcomes of a falls prevention program with the costs and health outcomes of an alternative (often current clinical practice or usual care). Results of economic evaluations of specific falls prevention interventions are presented in the relevant intervention chapters.


Bed
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5 Falls risk screening and assessment

Recommendations

Screening and assessment

- Document the patient's history of recent falls or use a validated screening tool to identify people with risk factors for falls in hospital.
- Use falls risk screening and assessment tools that have good predictive accuracy, and have been evaluated and validated across different hospital settings.
- As part of a multifactorial program for patients with increased falls risk in hospital, conduct a systematic and comprehensive multidisciplinary falls risk assessment to inform the development of an individualised plan of care to prevent falls.
- When falls risk screens and assessments are introduced, they need to be supported with education for staff and intermittent reviews to ensure appropriate and consistent use.

Good practice points

Falls risk screening

- Screening tools are particularly beneficial because they can form part of routine clinical management and inform further assessment and care for all patients — even though clinical judgment is as effective as using a screening tool in acute care.
- All older people who are admitted to hospital should be screened for their falls risk, and this screening should be done as soon as practicable after they are admitted.
- The emergency department represents a good opportunity to screen patients for their falls risk.
- A falls risk screen should be undertaken when a change in health or functional status is evident, or when the patient's environment changes.

Falls risk assessment

- A falls risk assessment should be done for those patients who exceed the threshold of the falls risk screen tool, who are admitted for falls, or who are from a setting in which most people are considered to have a high risk of falls (eg a stroke rehabilitation unit).
- For patients who have fallen more than once, undertake a full falls risk assessment for each fall (approximately 50% of falls are in patients who have already fallen).
- Interventions delivered as a result of the assessment provide benefit, rather than the assessment itself; therefore, it is essential that interventions systematically address the risk factors identified.

5.1 Background and evidence

The terms *falls risk screening* and *falls risk assessment* are sometimes used interchangeably, but there are some clear differences and, in these guidelines, they are considered separate but related processes. Screening is a process that primarily aims to identify people at increased risk. In the hospital setting, a falls risk screen can be used to identify patients who require a high level of supervision and more detailed falls risk assessment.[66] Falls risk assessments aim to identify factors that increase falls risk, and that may be amenable to intervention. Even where risk factors for falling cannot be reversed, there are usually other things that can be done to minimise the risk of falling or to prevent injury if an increased risk is identified.

Many falls risk screening and assessment tools have been developed for use in hospitals. However, only some of these have been evaluated for reliability and predictive validity in prospective studies and have a reasonable sensitivity and specificity. That is, they have acceptably high accuracy in predicting fallers who do fall in the follow-up period, and high accuracy for predicting nonfallers who do not fall in the follow-up period. Most have also only been validated in one hospital — usually the hospital where the tool was developed. While this provides some useful information, risk screening and assessment tools have reduced validity (eg predictive accuracy of fallers and nonfallers) when used outside the original research setting.[67] From a research perspective, further testing is needed of risk assessment tools in a variety of clinical settings to establish their validity and reliability for general use.[68]

Screening and assessment are not stand-alone actions in falls prevention. They need to be linked to an action plan to address any modifiable falls risk factors they identify. Even where risk factors for falling cannot be reversed, alternative strategies can be implemented to minimise the risk of falling or to prevent injury.

5.1.1 Falls risk screening

Falls risk screening is a brief process of estimating a person's risk of falling, classifying people as being at either low risk or increased risk. Falls risk screening usually involves reviewing only a few items. Although it is not designed as a comprehensive assessment, positive screening on certain screen items can also provide information about intervention strategies.

The purpose of screening is to identify those patients with increased falls risk who need to have increased supervision or a detailed falls risk assessment. In some hospital settings, such as a geriatric assessment unit in an acute hospital, or a stroke rehabilitation unit in a subacute hospital, most patients would be considered to have an increased risk of falling. Therefore, the falls risk screening process may be of limited value. In these high-risk areas, it may be beneficial to skip the screening process and implement a full falls risk assessment on all patients.

A number of falls risk screening tools are reported in the literature. One of the most researched tools is the **S**t **T**homas **R**isk **A**ssessment **T**ool **i**n **F**alling **E**lderl**y** In-patients (STRATIFY). The original study reporting the tool showed that it had good accuracy for classifying falls risk in the acute and subacute rehabilitation settings.[69] The tool contains five clinical factors associated with falling, and uses a simple scoring system (see Table 5.1 and Appendix A2.1).

More recent studies evaluating the STRATIFY tool in other hospitals have reported lower prediction accuracy.[67,68,70-73] One cohort study modified the original STRATIFY tool by constructing a weighted risk score based on the components of the STRATIFY tool (see Table 5.1 and Appendix A2.2).[74] The screening accuracy of the modified STRATIFY tool for falls risk showed 91% sensitivity and 60% specificity.[74] A systematic review of eight studies investigating the STRATIFY tool (four of these studies were included in a meta-analysis) concluded that its prediction accuracy — in particular, the sensitivity and negative predictive values — limits the utility of this tool.[75] Nonetheless, the STRATIFY tool remains the most widely researched and widely used falls risk screening tool for the hospital setting.

A systematic review and meta-analysis that assessed falls risk screening tools showed that using clinical judgment to classify a patient as high risk for falls is at least as good as using a screening tool in acute care.[70,76] One potential benefit of a screening tool, if used appropriately, is that it will form part of routine clinical management, which should inform further assessment and care for all patients. This is in contrast to clinical judgment, which depends on an individual nurse's consideration of falls risk in the context of a range of other medical problems, rather than an assessment of the falls risk in isolation. Documenting a history of recent falls is also a good screening question for identifying people at higher risk of falls during their stay in the hospital.[67,71] When a falls risk screen is introduced, it needs to be supported with education for staff and intermittent reviews to ensure that it is used appropriately and consistently.

Many hospitals use nonvalidated tools that they have developed themselves. Using such tools may be detrimental (eg by wasting staff time to complete a tool that does not work).

5.1.2 Falls risk assessment

Falls risk assessment is a more detailed process than screening and is used to identify underlying risk factors for falling. Some falls risk assessments also classify people into low and high falls risk groups. Four randomised trials included specific falls risk assessments as part a multifactorial falls prevention intervention in the hospital setting. Falls were reduced in three of these trials,[37-39] and were unchanged in one.[42]

Falls risk assessment tools vary in the number of risk factors they include, and how each risk factor is assessed. Many assessment tools use a dichotomous classification (present or absent) for each risk factor; for example, the Prevention of Falls in the Elderly Trial (PROFET) tool, which contains screening and assessment components (see Table 5.2 and Appendix A2.8). Others include a graded categorisation (nil, mild, moderate, high risk) for each risk factor; for example, the Falls Risk for Hospitalised Older People tool (FRHOP; see Table 5.3 and Appendix A2.5.).[77] Other tools use a detailed assessment tool for each risk factor; for example, the Peninsula Health Falls Risk Assessment Tool (FRAT) (cognitive status) uses the Hodkinson Abbreviated Mental Test Score (AMTS).

One systematic review identified the following risk factors as the most important among hospital patients:[71]

- gait instability
- lower-limb weakness
- urinary incontinence or frequency, or need for assisted toileting
- previous falls
- agitation, confusion or impaired judgment
- prescription of 'culprit' drugs (particularly centrally acting sedative hypnotics).

Factors such as low bone mineral density, low body mass index and fragile skin also increase the risk of injury if a fall occurs.

The authors of the systematic review concluded that none of the existing falls assessment tools could be recommended for implementation across all hospital settings. Instead, they suggest that better, validated falls risk assessment tools are needed in hospital settings, or a different approach is needed for identifying common, modifiable risk factors in all patients and ensuring an appropriate post-fall assessment for people who do fall in hospital.[71]

5.2 Principles of care

5.2.1 Falls risk screening

Falls risk screening can be done by a member of the multidisciplinary health care team who understands the process, and can administer the tool, interpret the results, and make referrals where indicated. Falls risk screening should occur as soon as practicable after every older person is admitted to hospital. A person's risk of falling can change quickly; therefore, screening for falls risk should be done when changes are noted in a person's health or functional status, and also when their environment changes.

Table 5.1 summarises validated falls risk screening tools for the hospital setting. Where publicly available, copies of the screening tools reported here are provided in Appendix 2. Other validated screening tools for the hospital setting are the Downton index and Morse scale.[78,79]

Table 5.1 Screening tools

St Thomas Risk Assessment Tool in Falling Elderly In-patients (STRATIFY)[69]	
Description	The tool contains five clinical factors associated with falling, and a simple scoring system.
Time needed	1–2 minutes
Criterion	Positive score on ≥2 out of 5 items indicates increased risk of falls and need for a detailed risk assessment.
Ontario Modified STRATIFY[74]	
Description	The tool contains six clinical factors associated with falling (falls history, mental status, vision, toileting, transfer between chair and bed, and mobility score). Management strategies are provided, according to the participant's overall score.
Time needed	1–2 minutes
Criterion	A score of 0–5 = low risk A score of 6–16 = medium risk A score of 17–30 = high risk

The screen should be used to guide more detailed assessment and subsequent targeted interventions. The outcomes of the screen should be documented, reported to other health care staff, and discussed with the patient and their carer(s) (where appropriate). When the threshold score of a screening tool is:

- *exceeded*, a falls risk assessment should be done as soon as practicable
- *not exceeded*, the patient is considered to be at low risk of falling, and standard falls prevention strategies apply.

If any item on a multiple risk factor screen is identified as being 'at risk', interventions should be considered for that risk factor — even if the patient has a low falls risk score overall. For example, if a patient has an overall score of 1 on the STRATIFY tool (consisting of a score of 1 for transfer limitations and 0 for other screening items), an intervention to address their mobility impairment should be considered.

Screening risk in the emergency department

The emergency department provides a useful opportunity to screen older people for their risk of falling, and to refer them for assessment. Risk screening tools have been devised for use in the emergency department for measuring falls risk factors and identifying older people at increased risk of falling after they return home. Two are recommended in Table 5.2. See also Section 4.3 for more information on assessing falls risk in the emergency department.

Table 5.2 Risk screening tools for the emergency department setting

FROP-Com screening tool[60]	
Description	A three-item screening tool, developed based on research using the FROP-Com assessment tool in a sample of older people presenting to an emergency department after a fall. The three items are steadiness during walking and turning, history of falls in the past 12 months, and the need for assistance with activities of daily living before the presenting fall.
Time needed	1–2 minutes
Criterion	A score of 4 or more indicates high risk.
Prevention of Falls in the Elderly Trial (PROFET)[56]	
Description	The first four questions of the PROFET trial include falls history, medical history, social circumstances and a physical examination.
Time needed	1–2 minutes
Criterion	No criterion for high falls risk. Individual risk factors identified are addressed according to guidelines.

5.2.2 Falls risk assessment

To develop an individualised plan for daily care focused on preventing falls, the factors contributing to a patient's increased risk of falling need to be identified systematically and comprehensively.[37,38]

A falls risk assessment should be done for those patients who exceed the threshold of the falls risk screen tool, who are admitted for falls, or who are from a setting in which most people are considered to have a high risk of falls (eg a stroke rehabilitation unit).

A falls risk assessment should be done as soon as possible after the patient is admitted into a high-risk setting, or as soon as possible if a falls risk screen exceeds the threshold. Additionally, a falls risk assessment may need to be repeated:

- when the patient's environment is changed
- when the patient's health or functional status changes
- after a fall
- when the patient is to be discharged.

When a falls risk assessment is introduced, it needs to be supported by education for staff and intermittent reviews to ensure it is used appropriately and consistently. Where publicly available, copies of assessment tools are provided in Appendix 2.

Due to the multifactorial nature of falls, it is preferable that different members of the multidisciplinary health care team (rather than a single member) assess the falls risk. However, if the multidisciplinary health care team is involved in the assessment process, responsibility for ensuring its timely completion should be allocated to one staff member. If a multidisciplinary approach is not possible, nursing staff may be primarily responsible, bringing in medical and other health care professionals where needed.
For example, in acute hospitals, a multidisciplinary assessment is unlikely to be the best choice, because not all patients are seen (or could be seen) for an assessment by an allied health professional within one to two days of admission.

Point of interest

In its work with the Falls Risk for Hospitalised Older People (FRHOP), the National Ageing Research Institute (NARI) found a number of limitations when different health care professionals are performing elements of an assessment, compared with a single-discipline assessment.[66] These limitations include:

- delays in filling in parts of the assessment
- confusion over who is coordinating the assessment
- confusion over who is ensuring the interventions are implemented.

Establishing clear protocols for using falls risk assessment tools (ie which staff member(s) completes them, when they are completed, and how referrals and management options are initiated); a clear process for integrating components of the risk assessment; and effective communication strategies to all staff about the process, level of risk and interventions being recommended for each patient are needed to overcome these limitations.[66]

Several falls risk assessment tools have been developed for use in the hospital setting. Given that a number of falls risk assessment tools have been validated for use in this setting, it is preferable that a validated tool be used, rather than developing a new tool. However, the health care team should be careful when adapting existing tools to their particular location, because this limits the applicability of any previous validation studies.

In any falls risk assessment, both intrinsic and extrinsic risk factors related to a person's health, functional status and environment need to be considered. Most tools focus on intrinsic falls risk factors only, so a separate environmental assessment may be indicated to identify extrinsic falls risk factors (see Chapter 14). The recommended risk assessment tools that are included as appendices in these guidelines were chosen based on their applicability to Australian hospitals (see Table 5.3).

Table 5.3 Risk assessment tools

In the acute hospital setting	
Care plan assessment items[37]	
Description	Twelve items are incorporated into the daily care plan, including intrinsic risk factors (medications, vision, blood pressure, mobility, etc), as well as environmental risk factors (safe environment, appropriate bed height, nurse call bell accessible, etc).
Time needed	Approximately 5–10 minutes
Criterion	No criterion for high falls risk. Individual risk factors identified are addressed according to guidelines.

In the subacute or rehabilitation setting	
Peninsula Health Falls Risk Assessment Tool (FRAT)[80]	
Description	The FRAT has three sections: Part 1 — falls risk status, Part 2 — risk factor checklist, and Part 3 — action plan. The complete tool (including the instructions for use) is a full falls risk assessment tool. However, Part 1 can be used as a falls risk screen.
Time needed	Approximately 15–20 minutes
Criterion	A score of ≥12 indicates an increased risk of falls.

In the subacute or rehabilitation setting	
Falls Risk for Hospitalised Older People (FRHOP)[77]	
Description	The FRHOP is a comprehensive risk assessment tool that includes a broad range of falls risk factors, most of which are graded from nil (0) to high (3) risk. The tool has accompanying strategies that can be used to develop an action list. It also has additional actions for minimising overall risk.
Time needed	Approximately 20 minutes
Criterion	An overall score of 23 or more, or more than four items rated as high risk, indicates an increased risk of falls.
Peter James Centre Fall Risk Assessment Tool (PJC-FRAT)[76]	
Description	The PJC-FRAT is a multidisciplinary falls risk assessment tool (medical, nursing, physiotherapy and occupational therapy staff assessment components), which was used as the basis for developing intervention programs in a randomised controlled trial in the subacute hospital setting that successfully reduced patient or resident falls. Four main interventions are linked to the assessment: falls risk alert card, additional exercise, falls prevention education, and hip protectors.
Time needed	Approximately 15 minutes
Criterion	No criterion for high falls risk. Individual risk factors identified are addressed according to guidelines.

So far, there is no consensus on which falls risk factors should be included in a falls risk assessment tool. Three reviews have been published on falls risk assessment, which identified several risk factors as being more prevalent in fallers than in nonfallers.[71,81,82] Therefore, more specific assessments may be indicated for some risk factors (see Table 5.4). A description of the appropriate assessment tools can be found in the respective chapters, as indicated in the table.

Table 5.4 Specific risk factor assessments

Characteristic or feature	Functional measure	Assessment	Description
Impaired balance or mobility	Impaired balance Reduced mobility Muscle weakness	Functional reach Mobility interaction fall chart, Six-Metre Walk Test, Timed Up and Go Test Sit-to-Stand Test	Chapter 6
Cognitive impairment	Dementia or delirium	Folstein Mini Mental State Examination (MMSE), Rowland Universal Dementia Scale (RUDAS), Confusion Assessment Method (CAM)	Chapter 7
Incontinence	Urinary and fecal	Questionnaires, assessment, physical examination	Chapter 8
Feet and footwear	Footwear analysis Foot problems (ie bunions, corns) and deformities	Safe shoe checklist Podiatrist assessment	Chapter 9 and Appendix 3

Characteristic or feature	Functional measure	Assessment	Description
Syncope	Postural hypotension	Lying and standing blood pressure measurements	Chapter 10
	Carotid sinus hypersensitivity	Carotid sinus massage by a medical specialist	
Dizziness	Benign paroxysmal positional vertigo	Dix-Hallpike test	Chapter 11
Medications	Benzodiazepines	Medication review	Chapter 12
	Selective serotonin reuptake inhibitors and tricyclic antidepressants	Medication review	
	Antiepileptic drugs and drugs that lower blood pressure	Medication review	
	Some cardiovascular medications	Medication review	
Vision	Visual acuity	Snellen eye chart	Chapter 13
Environment	Impaired mobility, visual impairment	General environmental checklist	Chapter 14 and Appendix 4
Individual surveillance and observation	Impaired mobility, high falls risk	Flagging, sitter programs, response systems, review and monitoring	Chapter 15
Restraints	Delirium, short-term elevated falls risk	Restraint policy	Chapter 16

Effective falls prevention programs have combined risk assessment with interventions. Interventions delivered as a result of the assessment, rather than the assessment itself, provide benefit; therefore, it is essential that interventions to address the identified risks are applied systematically.

The outcomes of the falls risk assessment, together with the recommended strategies to address identified risk factors, need to be documented, reported to other health care staff, and discussed with the patient and, where applicable, with their carer(s).

Case study

Mrs S presented to her local hospital after a fall with substantial bruising and a possible broken hip. X-ray revealed no fracture; however, she was admitted because severe pain limited her walking so that she could take only a few hobbling steps. Falls risk screening using the St Thomas Risk Assessment Tool in Falling Elderly In-patients (STRATIFY) indicated a high risk of falling, with a score of four. (Mrs S had had three falls in the past 12 months, and had impaired vision, nocturia and urinary frequency, and difficulty with transfers and mobility.) Once Mrs S was given pain relief, her pain settled, and her mobility improved over three days. The nurse performed a detailed falls risk assessment using the Falls Risk for Hospitalised Older People (FRHOP), and a referral and management program was implemented (mostly linked to Mrs S's discharge planning, because she was discharged home two days later). This included an assessment by the ward physiotherapist, who gave Mrs S a balance and strengthening exercise program to do at home. Mrs S was also referred to:

- a community physiotherapist for ongoing management of her resolving hip pain and balance problems
- an ophthalmologist, who identified cataracts and booked Mrs S into cataract surgery
- an occupational therapist, who ran a home environment assessment and recommended multiple home modifications
- a continence specialist to manage her continence problems.

Six months later, Mrs S's family was pleased to note that Mrs S had resumed all her previous activities, and had experienced no further falls.

5.3 Special considerations

5.3.1 Cognitive impairment

Identifying the presence of cognitive impairment should form part of the falls risk assessment process. However, the falls prevention interventions that are chosen, based on the assessment, may need to be modified to make sure they are suitable for the individual, and often the carer or family members will also play an important role in implementing falls prevention actions,[83] particularly in preparation for discharge and after return home.

Two hospital-based randomised controlled trials that evaluated screening or assessment as part of a multifactorial falls prevention program included participants with cognitive impairment, as well as those without.[37,39] The trials found that the intervention reduced falls across the full sample.

Another randomised controlled trial assessed a multifactorial falls prevention program in people after surgery for hip fracture.[38] The trial found a significant reduction in falls in a subgroup analysis of those participants with dementia.

5.3.2 Rural and remote settings

Falls risk factor assessments can usually be performed by any trained member of the health care team. With medical, nursing and health professional shortages in some rural and remote settings, flexibility and up-skilling of team members may be required for successful assessment and interventions to be implemented.

5.3.3 Indigenous and culturally and linguistically diverse groups

To adequately assess the falls risk of patients from Indigenous and culturally and linguistically diverse groups, the health care team should consider assessing the patient in their primary language and in a culturally appropriate manner. This may require using a translation and interpretation service.

Part C
Management strategies for common falls risk factors

6 Balance and mobility limitations

Recommendation

Intervention

- Use a multifactorial falls prevention program that includes exercise and assessment of the need for walking aids to prevent falls in subacute hospital settings. (Level II)[39]

Good practice points

- Refer patients with ongoing balance and mobility problems to a post-hospital falls prevention exercise program when they leave hospital. This should include liaison with the patient's general practitioner.
- To assess balance, mobility and strength, use an assessment tool to:
  - quantify the extent of balance and mobility limitations and muscle weaknesses
  - guide exercise prescription
  - measure improvements in balance, mobility and strength
  - assess whether patients have a high risk of falling.

6.1 Background and evidence

Balance is a highly complex skill in which the body's centre of mass is controlled within the limits of stability. This requires integration of accurate sensory information (such as vision and proprioception) and a well-functioning musculoskeletal system (not affected adversely by muscle weakness, pain or contracture) to execute appropriate movements. Different combinations of muscle actions are required to maintain balance (ie prevent falling) during the wide range of everyday mobility tasks (eg standing, reaching, walking, climbing stairs). Increasing age, inactivity, disease processes and muscle weakness can impair balance.[84]

Many patients receive exercise and other rehabilitation strategies as part of usual in-hospital care. Therefore, the effect of in-hospital interventions to address balance and mobility impairments is difficult to measure.

People who have been in hospital often have a particularly high risk of falling once they return home. For example, studies have found that one in seven patients fell within one month of returning home[85] and that three in four patients with stroke fell within six months of leaving hospital.[30] This shows the importance of discharge planning (also known as post-hospital care).

6.1.1 Identifying the risk factors for falls

Balance and mobility are often poorer when a person is in hospital, compared with their usual level of mobility. This may be due to the effects of medications (including anaesthetics), acute events (eg stroke or a hip fracture) and acute illnesses (eg infections). Balance and mobility may further deteriorate during a hospital stay if the patient is less active than usual due to their medical condition, or due to the hospital environment, which discourages mobility. Therefore, as part of a mobility assessment, it is important to establish whether a patient's level of mobility in hospital is usual for them.

Assessment of balance or mobility as a single factor appears not to be the best way to predict falls in hospital patients, even in inpatient rehabilitation settings.[86] Rather, multiple risk factors for falls in hospitals have been identified. The most common of these are cognitive impairment or agitation, use of psychoactive medications, gait instability, urinary incontinence or frequency, and falls history.[71]

6.1.2 Exercise as part of a multifactorial intervention

Mobility in hospital patients with particular conditions can be improved with exercise programs delivered as part of usual rehabilitation care. Systematic reviews have found better outcomes in patients with stroke[87] or hip fracture[88] who undergo inpatient rehabilitation.

The effects on fall rates of in-hospital interventions that involve exercise alone are not known.[31] There have been two trials of additional exercise as a single intervention with falls as an outcome.[89,90] These trials gave some indication that additional exercise could reduce falls in rehabilitation settings; however, the trials were too small for firm conclusions to be drawn.[31]

Subacute hospital settings

In subacute hospital settings with lengths of stay of at least three weeks, three randomised controlled trials showed that intervention programs that include interventions to improve balance and mobility can prevent falls. The pooled results from these three trials indicated a 36% reduction in the number of falls (rate ratio=0.64, 95%CI 0.51 to 0.81) and a reduction in fallers of similar size that was not statistically significant (risk ratio=0.61, 95%CI 0.33 to 1.13). This pooled result should be viewed with caution due to the differences between study settings and populations. The details of the three studies are as follows:

- Exercise, education, falls risk alert cards and hip protectors in addition to usual care
  - This combination of interventions reduced fall rates by 30% (rate ratio=0.70, 95%CI 0.55 to 0.90). The risk of being a faller was reduced by 22%, but this was not statistically significant (relative risk=0.78, 95%CI 0.56 to 1.06). Effects were more evident after 45 days of intervention.[39]
- Rehabilitation wards instead of orthopaedic wards for care after a hip fracture
  - A 62% lower fall rate (incident rate ratio=0.38, 95%CI 0.20 to 0.76) was found in patients who were cared for in a rehabilitation ward rather than an orthopaedic ward after a hip fracture.[38] The rehabilitation ward used a team approach that included a greater focus on systematic assessment and intervention to prevent falls and other postoperative complications, more occupational therapy staff, and a greater focus on functional daily task training with ward staff. The ratio of physiotherapy staff to patients was similar in the two wards.
- A risk factor assessment and referral by nursing staff as part of usual care
  - A 30% greater reduction in falls (rate ratio=0.79, 95%CI 0.65 to 0.95) was found in an intervention ward where a multifactorial intervention was conducted by nursing staff. Patients who had difficulties with mobility were referred to a physiotherapist.[37]

Systematic reviews have also found that rehabilitation programs that include exercise can improve mobility, which is likely to decrease the risk of future falls in patients who have had a stroke[87] or a hip fracture.[88]

Acute aged care and short-stay subacute settings

Acute aged care and short-stay subacute settings have an average stay of one week. Systematic reviews have shown that, among older medical inpatients, extra exercise programs can lead to an average one-day reduction in length of hospital stay, a greater chance of returning home,[91] and better functional outcomes.[92]

However, a more recent cluster randomised trial (not included in the two systematic reviews above) found that, when delivered in addition to usual care, multifactorial programs that include exercise did not prevent falls (incidence rate ratio=0.96, 95%CI 0.72 to 1.28[42]). This was despite providing an additional 25 hours a week of nursing and physiotherapist time.

There are many challenges to conducting randomised trials of hospital falls prevention programs in short-stay wards. The need to randomise by cluster means that many participants are required for such trials. Widespread adoption of falls prevention programs is also needed, which would make it difficult to have control wards.[13]

6.1.3 Discharge planning and exercise

A systematic review showed that well-designed exercise programs can prevent falls in older people who live in the community.[93] Therefore, it makes sense that when people leave hospital, referrals should be made for ongoing exercise programs. However, no trials have directly evaluated the effect on falls of such a strategy.

6.2 Principles of care

6.2.1 Assessing balance, mobility and strength

A number of different approaches can be used to assess balance, mobility and strength in older hospital patients. Some of the clinical assessments that may be of use are outlined in Table 6.1. The choice of tool will depend on the time and equipment available.

There is an expanding field of research devoted to evaluating different properties of tools for measuring balance, mobility and strength. These tools are evaluated according to their reliability (whether the tool is consistent when used by different people at different times), validity (whether the tool measures what it aims to measure) and responsiveness to change (how much change is required before it is certain that the change reflects improved performance rather than measurement variability, and how well the tool can detect meaningful changes). Several studies have evaluated these aspects of tools for use in the older population and rehabilitation[94] and in older medical inpatients.[95] Some preliminary work has developed methods for evaluating balance assessment tools in falls prevention programs.[96]

Table 6.1 Clinical assessments for measuring balance, mobility and strength

Balance	
Postural sway and leaning balance tests[97]	
Description	As part of the Physiological Profile Assessment (PPA), sway is measured using a swaymeter that measures displacements of the body at waist level. During standing balance tests, the person has to stand as still as possible for 30 seconds, with the eyes open and closed, once on the floor and once on a piece of medium-density foam rubber (15 cm thick). During leaning balance tests, the person has to lean forward and backward as far as possible, or follow a track.
Time needed	5-10 minutes
Criterion	Computer software program compares individual's performance to normative database compiled from population studies.
Rating	75% accuracy for predicting falls over a 12–month period in community and institutional settings; reliability within clinically expected range (R = 0.5–0.7).[97]
Functional reach (FR)[98]	
Description	FR is a measure of balance and is the difference between a person's arm length and maximal forward reach, using a fixed base of support. FR is a simple and easy-to-use clinical measure that has predictive validity in identifying recurrent falls.
Time needed	1–2 minutes
Criterion	≤6 inches: fourfold risk ≤10 inches: twofold risk
Rating	76% sensitivity; 34% specificity[91]
Alternate Step Test (AST)[99]	
Description	The AST is a measure of lateral stability. It involves the time taken to complete eight steps, alternating between left and right foot, as fast as possible, onto a step 19 cm high and 40 cm deep.
Time needed	1–2 minutes
Criterion	10 seconds
Rating	69% sensitivity; 56% specificity

Mobility	
Six-Metre Walk Test (SMW)[100]	
Description	The SMW measures a person's gait speed in seconds along a corridor (over a distance of six metres) at their normal walking speed.
Time needed	1–2 minutes
Criterion	6 seconds
Rating	50% sensitivity; 68% specificity[100]
Timed Up and Go Test (TUG)[100]	
Description	The TUG measures the time taken for a person to rise from a chair, walk three metres at normal pace and with their usual assistive device, turn, return to the chair and sit down.
Time needed	1–2 minutes[86]
Criterion	15 seconds
Rating	76% sensitivity; 34% specificity[63]
Strength	
Sit-to-Stand Test (STS)[86,99]	
Description	The STS is a measure of lower limb strength and is the time needed to perform five consecutive chair stands from a seated position.
Time needed	1–2 minutes
Criterion	12 seconds
Rating	66% sensitivity; 55% specificity[100]
Spring balance[97]	
Description	As part of the PPA, the strength of three leg muscle groups (knee flexors and extensors and ankle dorsiflexors) is measured while participants are seated. In each test, there are three trials, and the greatest force is recorded.
Time needed	5 minutes
Criterion	Computer software program compares individual's performance to normative database compiled from population studies.
Rating	75% accuracy for predicting falls over a 12-month period in community and institutional settings; reliability coefficients within expected range (0.5–0.7).[97]

Composite scales	
Berg Balance Scale[101]	
Description	The Berg Balance Scale is a 14-item scale designed to measure balance of the older person in a clinical setting, with a maximum total score of 56 points.†
Time needed	15–20 minutes
Criterion	≤20 = high risk of falls ≤40 = moderate risk of falls (potential ceiling effect with less frail people)
Rating	High test-retest reliability (R = 0.97); low sensitivity — an 8-point change is needed to reveal genuine changes in function.
Tinetti Performance-Oriented Mobility Assessment Tool (POMA)[102]	
Description	The POMA measures a person's gait and balance. The POMA-T (total) score consists of two subscales: POMA-G (gait) and POMA-B (balance). It is scored on the person's ability to perform specific tasks, with a maximum total score of 28 points.
Time needed	10–15 minutes
Criterion	A score of <19 = high risk of falls A score of <24 = moderate risk of falls
Rating	High test-retest reliability for POMA-T and POMA-B (R = 0.74–0.93); lower test-retest reliability for POMA-G (R = 0.72–0.89). POMA-T sensitivity (62.%) and specificity (66.1%) indicate poor accuracy in falls prediction.
Confidence and falls efficacy scale	
Falls Efficacy Scale International (FESI)[103]	
Description	The FESI provides information on level of concern on a four-point scale (1 = not at all concerned to 4 = very concerned) across 16 activities of daily living (eg cleaning the house, simple shopping, walking on uneven surfaces).
Time needed	5 minutes
Criterion	A score of ≤22 = low to moderate level of concern A score of ≥23 = high level of concern
Rating	High test-retest reliability (R = 0.96)[103]

In addition to structured training programs, hospital staff should provide the patient with opportunities to be as active as possible throughout the day. For example, the patient's bedrest should be minimised during the day, and the patient should be encouraged to be mobile by increasing the amount of incidental activity (eg walking to the toilet with appropriate supervision).[30,104]

Case study

Mrs B is 83 years old and was admitted to hospital with a urinary tract infection. She was confused and unable to walk on her own as she normally did. Nursing staff ensured that Mrs B did not walk unsupervised, that frequently used items were within easy reach, and that family members visited to provide additional supervision. As part of a multifactorial falls prevention program, the physiotherapist assessed Mrs B and provided daily balance and mobility training, which improved her function and mobility so that she was independent with a walking stick before she was discharged. The physiotherapist also referred Mrs B to a community-based balance and strength program after she left hospital.

† http://www.chcr.brown.edu/geriatric_assessment_tool_kit.pdf

6.3 Special considerations

6.3.1 Cognitive impairment

Risk factors for falls (eg gait and balance problems) are more prevalent in older people with cognitive impairment than in people without cognitive impairment.[105] People with cognitive impairment should therefore have their falls risk investigated as comprehensively as those without cognitive impairment.

Interventions shown to work in cognitively intact populations should not be withheld from cognitively impaired populations, unless there is a problem with ability to follow or comply with instructions (see Chapter 7 on cognitive impairment). Simplifying instructions, and using picture boards and demonstrations, are strategies that may improve the quality of exercise for patients with cognitive impairment. Family members, carers and other volunteers may be able to help in supervising and motivating patients who are following exercise programs.

6.3.2 Rural and remote settings

Ideally, exercise interventions for older people in hospitals would be prescribed by a physiotherapist after individualised assessment. However, in rural and remote settings, this may need to be done by other staff, with appropriate guidance from a physiotherapist to ensure that programs are challenging, yet safe.

6.3.3 Indigenous and culturally and linguistically diverse groups

When developing exercise programs for Indigenous and culturally and linguistically diverse groups, hospital staff should ensure they are informed about requirements specific to that cultural group that may affect the intervention. For example, some cultural groups require single-sex exercise classes. Staff should consider using interpreters and other communication strategies, as necessary.

6.4 Economic evaluation

No economic evaluations were identified that specifically considered interventions based on exercise or physical activity in the hospital setting. Some community interventions have been found to be effective and cost effective; however, it is unclear whether the results are applicable to the hospital setting given that these interventions are mainly home-based exercise programs (see Chapter 6 in the community guidelines for more information).

Additional information

The Physiotherapy Evidence Database (PEDro) provides information from randomised controlled trials, systematic reviews and evidence based guidelines in physiotherapy: http://www.pedro.org.au

The following organisations, manuals, exercise programs and resources are available:

- Otago Exercise Programme. This program is aimed at preventing falls in older people who live in the community, but it is also relevant for the aged care setting. The manual can be purchased online: http://www.acc.co.nz/preventing-injuries/at-home/older-people/information-for-older-people/PI00030
- Hill KD, Miller K, Denisenko S, Clements T and Batchelor F (2005). *Manual for Clinical Outcome Measurement in Adult Neurological Physiotherapy*, 3rd edition, APA Neurology Special Group (Vic). Available from the Australian Physiotherapy Association for A$30 for students, A$60 for group members and A$75 for others: http://www.physiotherapy.asn.au
- Chartered Society of Physiotherapy (United Kingdom) outcome measures online database: http://www.csp.org.uk/


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7 Cognitive impairment

Recommendations

Assessment

- Older people with cognitive impairment should have their risk factors for falls assessed.

Intervention

- Identified falls risk factors should be addressed as part of a multifactorial falls prevention program, and injury minimisation strategies (such as using hip protectors or vitamin D and calcium supplementation) should be considered. (Level II)[37-39]

Good practice points

- Patients presenting to a hospital with an acute change in cognitive function should be assessed for delirium and the underlying cause of this change.
- Patients with gradual onset, progressive cognitive impairment should undergo detailed assessment to determine diagnosis and, where possible, reversible causes of the cognitive decline.
- Patients with delirium should receive evidence based interventions to manage the delirium (eg follow the Australian guidelines, *Clinical Practice Guidelines for the Management of Delirium in Older People*).†
- If a patient with cognitive impairment does fall, reassess their cognitive status, including presence of delirium (eg using the Confusion Assessment Method tool).
- Where possible and appropriate, involve family and carers in decisions about which implementations to use, and how to use them, for patients with cognitive impairment. (Family and carers know the patient and may be able to suggest ways to support them.)
- Interventions shown to work in cognitively intact populations should not be withheld from cognitively impaired populations; however, interventions for people with cognitive impairment may need to be modified and supervised, as appropriate.

† http://www.health.vic.gov.au/acute-agedcare/delirium-cpg.pdf

7.1 Background and evidence

Cognitive impairment is common among hospital patients. Although cognitive impairment is most commonly associated with increasing age, it is a complex problem that may exist in all age groups due to acquired brain injury, mental health conditions and other pre-existing conditions. Cognitive impairment implies a deficit in one or more cognitive domains, such as memory, visuospatial skills or executive function.

Dementia and delirium are the two most common forms of cognitive impairment in older people:

- *Dementia* is a syndrome of progressive decline in more than one cognitive domain; it affects the person's ability to function. Dementia has a gradual onset, usually involves a progressive decline in a range of cognitive abilities (such as memory, orientation, learning, judgment and comprehension), and is often accompanied by changes in personality and behaviour.[106]
- *Delirium* is a syndrome characterised by the rapid onset of variable and fluctuating changes in mental status. Delirium is common in hospitalised patients; most estimates of prevalence of delirium range from 15% to 56% of older inpatients.[107] The risk of developing delirium associated with certain kinds of surgery is especially high (eg 43%-61% of people having orthopaedic surgery for hip fractures[108] and approximately 30% of people who have had heart surgery[109]). Delirium usually develops over hours or days and has a fluctuating course that can involve changes in a range of cognitive abilities, such as attention and concentration, orientation, mood, perceptions, psychomotor activity and the sleep-wake cycle.[107]

Distinguishing between dementia and delirium can be difficult, and they can coexist in many older people. Older people with existing cognitive impairment are more likely to develop a delirium from an acute event.[107] Informants are often used to gain an insight into timing, chronicity and severity to differentiate dementia and delirium.

7.1.1 Cognitive impairment associated with increased falls risk

Older people with cognitive impairment have an increased risk of falls.[110] The presence of confusion or disorientation has been independently associated with falls[110-114] and fracture[115] in hospital patients. Dementia has also been associated with falls in hospitals.

Risk factors for falls are more prevalent in older people with cognitive impairment than in cognitively intact people. For example, impairments of gait and balance are more severe,[105] psychoactive medications are more commonly prescribed,[116,117] and orthostatic hypotension is more prevalent.[118]

Cognitive impairment may increase risk of falling by directly influencing the patient's ability to understand and manage environmental hazards, through a tendency to increased wandering,[119] and through altered gait patterns and impaired postural stability.[120] Examples of the different behaviours that contribute to increased falls risk in people with cognitive impairment include agitation, wandering, reduced awareness of environmental hazards, impaired ability to solve problems and impulsiveness.[121,122] Any changes in the environment can increase confusion and agitation, and may also increase risk of falls — for example, transfers between home and hospital, or between hospital and home or a residential aged care facility, or even just transfers within or between rooms within a hospital.

Some types of cognitive impairment are associated more strongly with falls than others. For example:

- delirium is associated with acute medical illness, metabolic disturbance, drugs and sepsis,[107] which may lead to poor balance, postural hypotension and muscle weakness
- some forms of dementia (eg Lewy body disease or vascular dementia) may be associated with gait instability and a higher incidence of orthostatic hypotension.[123]

7.1.2 Cognitive impairment and falls prevention

Three successful hospital-based randomised controlled trials (RCTs) to prevent falls have included people with cognitive impairment. Although there is limited evidence to support any specific strategy to prevent falls in cognitively impaired older people, older people with cognitive impairment and dementia can comply with falls prevention programs.[37-39]

Delirium is almost always due to a treatable underlying cause and should be addressed as soon as possible. Patients with pre-existing dementia are more susceptible to delirium from events such as constipation, urinary tract infections, chest infections and pain.[107] Patients are also more likely to develop delirium if they have visual or auditory impairment, are older, are malnourished, are physically restrained, have a urinary catheter in place or take more than three medications.[107]

7.2 Principles of care

7.2.1 Assessing cognitive impairment

Although there is no specific evidence for falls prevention interventions for older people with cognitive impairment, the following strategies reflect best practice:

- Repeatedly and regularly check for the presence of delirium, and treat medical conditions that may contribute to an alteration in cognitive status. Rapid diagnosis and treatment of a delirium and its underlying cause (eg infection, dehydration, constipation, pain) are crucial.[124]
- Older patients with a progressive decline in cognition should undergo detailed assessment to determine diagnosis and, where possible, treat reversible causes of the cognitive decline.[106]
- Older patients with cognitive impairment should have falls risk factors assessed, as discussed in other chapters, and should be offered interventions to modify risk.[36] Some interventions need the patient to be able to follow instructions or comply with a program (eg exercise). Where there is doubt about a person's ability to follow instructions safely, the health care team should conduct an individualised assessment and develop a falls prevention plan using the information from the assessment.

Many tools can be used to assess cognitive status; some are summarised in Table 7.1.

Table 7.1 Tools for assessing cognitive status

Folstein Mini Mental State Examination (MMSE)[125]	
Description	The MMSE is a widely used method for assessing cognitive mental status. It is an 11-question measure that tests five areas of cognitive function: orientation, registration, attention and calculation, recall, and language. The maximum score is 30.
Time needed	5–10 minutes
Criterion	A score ≤23 indicates mild cognitive impairment. A score ≤18 indicates severe cognitive impairment.
Rowland Universal Dementia Scale (RUDAS)[126,127]	
Description	The RUDAS is a simple method for detecting cognitive impairment. RUDAS is valid across cultures, portable and administered easily by primary health care clinicians. The test uses six items to assess multiple cognitive domains, including memory, praxis, language, judgment, drawing and body orientation.
Time needed	10 minutes
Criterion	Cut-point of 23 (maximum score of 30)
Rating	89% sensitivity; 98% specificity

Confusion Assessment Method (CAM)[128]	
Description	CAM is a comprehensive assessment instrument that screens for clinical features of delirium. It comprises four features, which are determined by the patient, nurse and family interview: • an onset of mental status changes or a fluctuating course • inattention • disorganised thinking • an altered level of consciousness (ie other than alert).
Time needed	5 minutes
Criterion	Patient is diagnosed as delirious if they have both the first two features, and either the third or fourth features.
Rating	94% sensitivity; 90% specificity[129]

7.2.2 Providing interventions

Identified falls risk factors should be addressed as part of a multifactorial falls prevention program, and injury minimisation strategies (such as using hip protectors or vitamin D and calcium supplementation) could be instituted. One RCT specifically investigated the effect of a multifactorial program in patients with a hip fracture and found that a team applying comprehensive geriatric assessment and rehabilitation, including prevention, detection and treatment of falls risk factors, can successfully prevent inpatient falls and injuries, even in patients with dementia.[38] Three other studies (two RCTs and a lower quality observational study) included people with cognitive impairment, among other patients, and found an overall reduction in falls.

The results were as follows:

- An RCT showed that a targeted falls prevention program in addition to usual care — including the use of a falls risk alert card with an information brochure, an exercise program, an education program and hip protectors — reduced the incidence of falls in the subacute hospital setting.[39]
- A second RCT showed that the use of a core care plan, targeting reduction of risk factors in older patients, was associated with a reduction in the relative risk of recorded falls.[37]
- An observational study of a multiple-intervention falls prevention program in an aged care hospital setting — involving risk screening with appropriate interventions, work practice changes, environmental and equipment changes, and staff education — significantly reduced the number of falls and serious falls-related injuries.[43]

The following falls prevention strategies are of particular relevance to older patients with cognitive impairment:

- Address reversible causes of acute or progressive cognitive decline.[83]
- Review previously prescribed medications for conditions that the patient no longer has (eg antidepressants, antipsychotics, antihypertensives, antianginals).[83]
- Treat orthostatic hypotension (which is common in patients with dementia).[83]
- Use physical training programs to improve gait, balance, mobility and flexibility.[83]
- Modify the environment to reduce slips and trips, such as lowering beds.[83]
- Avoid the use of restraints or immobilising equipment (including indwelling catheters).[36]
- Provide more frequent observation, supervision and assistance to ensure that older patients with delirium or dementia who are not capable of standing and walking safely receive help with all transfers.[83]
- Use fall-alarm devices to alert staff that patients are attempting to mobilise.[36]

The symptoms of cognitive impairment and delirium should be managed by addressing agitation, wandering and impulsive behaviour (behaviour management) as follows:[107,130]

- Identify causes of agitation, wandering and impulsive behaviour, and reduce or eliminate them.
- Avoid the risk of dehydration by having fluids available and within a patient's reach, or by offering fluids regularly.
- Avoid extremes of sensory input (eg too much or too little light, too much or too little noise).
- Promote exercise and activity programs; more intensive activity programs may need to be offered in the late afternoon or early evening to redirect agitated behaviours (eg pacing may be redirected into walking or dancing; noises may be redirected into singing or music playing).
- Promote companionship, if appropriate.
- Establish orientation programs using environmental cues and supports (including having personal or familiar items available). Repeat orientation and safety instructions regularly, keeping instructions simple and consistent.
- Encourage sleep without the use of medication, and promote and support uninterrupted sleep patterns by reducing noise and minimising disturbance.
- Encourage patients to participate in activities to avoid excessive daytime napping.
- Ensure personal needs are met on a regular basis.
- When communicating with cognitively impaired people, try to instil feelings of trust, confidence and respect (thereby minimising the chance of provoking an aggressive response). This can be achieved by approaching the person slowly, calmly and from the front; respecting personal space; addressing the person by name and introducing yourself; using eye contact; and speaking clearly and simply. Gentle touch and gestures, as well as auditory, pictorial and visual cues used appropriately, may also help with communication. It is important that the patient understands what is being said; this can be helped by using repetition and paraphrasing, and allowing time for them to process the information.

Point of interest: strategies for maintaining hydration in older people

Older people with cognitive impairment may become dehydrated easily, which can lead to delirium. An Australian study used strategies developed by the Joanna Briggs Institute Practical Application of Clinical Evidence System (JBI-PACES)[131] to maintain oral hydration in residents of residential aged care facilities.[132] Although adherence was problematic, the following strategies recommended by the JBI-PACES may be beneficial:

- Drinks (cordial, juice and water, but not caffeinated drinks) were offered by staff every 1.5 hours (as well as morning tea, afternoon tea and supper rounds).
- Residents with cognitive impairment were either helped or prompted to drink.
- An accessible water fountain was set up with a supply of cups.
- Jugs of water were placed on all tables, with cups.
- Drinks were always given with medication.
- Icy poles, jellies and ice-cream were offered throughout the day as snacks and enjoyable treats.
- Fruit with a high water content (eg grapes, peeled mandarins) was placed on kitchen tables for easy access and picking.
- Light broths were given with meals.
- Happy hour was introduced twice a week, with nonalcoholic wines, mocktails, soft drinks and nibbles.
- Warm milk drinks were given to help people settle at night.

These strategies may also be applicable for older people with cognitive impairment in hospital.

Case study

Mr T is an independent, cognitively intact 79-year-old man living with his wife in the community. He was admitted to hospital with respiratory distress and a history of partial blindness and diabetes. Following his admission, Mr T's condition deteriorated, and he became acutely confused secondary to a respiratory tract infection. He pulled out his intravenous line through which he was receiving antibiotics. During the phase of significant agitation, the staff on the ward organised a roster with Mr T's wife and family so that a family member was able to sit with him. As his delirium began to settle, the need for constant one-on-one supervision decreased, but the staff did use a seat alarm device to alert them if Mr T tried to get up without the needed supervision. After active treatment of the infection, Mr T's delirium resolved and the alarm mat was removed.

7.3 Special considerations

7.3.1 Indigenous and culturally and linguistically diverse groups

The Folstein Mini Mental State Examination (MMSE) is the most widely used screening tool for dementia in Australia; however, it has significant limitations in multicultural and poorly educated populations. The Rowland Universal Dementia Scale (RUDAS) is designed to overcome these impediments. It performs at least as well as the MMSE, but with the added advantage of being simpler to use in a multicultural population.[126,127]

A study funded by the National Health and Medical Research Council investigated the validity of a new assessment of cognitive function developed specifically for Indigenous Australians. It is called the Kimberley Indigenous Cognitive Assessment.†

7.4 Economic evaluation

No economic evaluations were found that examined the cost effectiveness of a program related to identifying and managing cognitive impairment in the hospital setting.

Additional information

A range of resources are available from the following associations and websites:

- *Living with Dementia — A Guide for Veterans and their Families:* http://www.dva.gov.au/aboutDVA/publications/health/dementia/Pages/index.aspx
- Alzheimer's Australia, which can provide further information, counselling and support for people with dementia, their families and carers: http://www.alzheimers.org.au/

† Further details can be found at http://www.nari.unimelb.edu.au/research/dementia.htm.

8 Continence

Recommendations

Intervention

- ~~Ward urinalysis should form part of a routine assessment for older people with a risk of falling. (Level II)~~[37]
- As part of multifactorial intervention, toileting protocols and practices should be in place for patients at risk of falling. (Level III-2)[43,133]
- Managing problems with urinary tract function is effective as part of a multifactorial approach to care. (Level II)[37]

Good practice point

- Incontinence can be screened in hospital as part of a validated falls risk screen assessment, such as the St Thomas Risk Assessment Tool in Falling Elderly In-patients (STRATIFY) or the Peter James Centre Fall Risk Assessment Tool (PJC-FRAT).

8.1 Background and evidence

People with urinary incontinence are at increased risk of hospital admission.[134] The relationship between incontinence and falls is likely confounded by impairments of mobility and cognition, suggesting that multiple interventions are necessary to prevent falls. Although evidence from observational studies shows an association between incontinence and falls, there is no direct evidence that incontinence interventions affect the rate of falls.[135]

There are also few data on the prevalence of incontinence in the Australian hospital setting. However, in a sample of 627 patients in acute care in the United Kingdom, 20.7% were incontinent of urine, 4.2% were incontinent of feces, and 9.2% were doubly incontinent.[136] Although urinary incontinence might be seen as a modifiable risk factor, there is little evidence that continence-promotion strategies are included within falls prevention strategies.

Incontinence of any kind is viewed with embarrassment by many sufferers.[134] Therefore, it is important for health care practitioners to ask openly about incontinence symptoms. Symptoms of incontinence can be assessed in the hospital setting using validated assessment tools. The St Thomas Risk Assessment Tool in Falling Elderly In-patients (STRATIFY)[114] and the Peter James Centre Fall Risk Assessment Tool (PJC-FRAT) are two validated falls risk assessment tools that include questions about bladder and bowel control. PJC-FRAT is a multidisciplinary falls risk screening and intervention deployment instrument.[39]

8.1.1 Incontinence associated with increased falls risk

Urinary and fecal incontinence affect both men and women but are not routinely considered part of the normal ageing process. About two-thirds of hospital patients in geriatric wards experience urinary incontinence.[136] Episodes of incontinence are often transitory and may be related to acute illness. Transient incontinence is present in 50% of older hospital patients.[137]

Incontinence,[19,112] urinary frequency[69] and assisted toileting[112,114] have been identified as risk factors for falls in the hospital. People will often make extraordinary efforts to avoid an incontinent episode, including placing themselves at increased risk of falling.

Different types of bladder and bowel symptoms include the following:

- *Stress incontinence* is leaking urine associated with rises in abdominal pressure during physical activity.[104] Although this is a common symptom in younger women, institutionalised elderly women are more likely to have mixed symptoms of stress incontinence and symptoms of overactive bladder (OAB).[138] A systematic review of studies related to urinary incontinence and falls revealed no association between falls and stress incontinence.[139]
- *Overactive bladder syndrome* is defined as 'urgency with or without urge incontinence, usually with frequency and nocturia'.[140] A systematic review of studies related to urinary incontinence and falls revealed a significant association between falls and urge-incontinence symptoms of OAB.[139]
- *Urgency* is defined as 'the sudden compelling desire to void, which is difficult to defer'.[140] The symptom of urgency may be suffered without any concomitant loss of urine.[141]
- *Urge (urinary) incontinence* is involuntary urine leakage accompanied or immediately preceded by urgency.[104] Research suggests that it increases the risk of a person falling and fracturing bones.[142] This is presumably because urge incontinence (as opposed to stress incontinence) is associated with frequent rushed trips to the toilet to avoid incontinent episodes. Additionally, performing a secondary task, such as walking and concentrating on getting to the toilet, may compromise walking stability.[141] Urinary incontinence is significantly associated with self report of constipation in older Australian women who live in the community.[143]
- *Frequency* is defined as the complaint by the patient who considers that they void too often during the day.[140]
- *Nocturia* is defined as being woken at night by the desire to void.[104] It is commonly reported and significantly associated with falls in ambulatory older people who live in the community.[144] Nocturia can be particularly problematic when lighting is poor or when the patient is not fully awake. Nocturia is one of the most common causes of poor sleep and carries a high risk of falling and fractures in older people.[145]
- *Constipation* is a common problem in older people and is related to decreased mobility, reduced fluid intake and the use of a number of high-risk medications. As a consequence, and in relation to falls, constipation may cause delirium and agitation, which may in turn cause falls. Straining during defecation may also shunt blood away from the cerebral circulation, leading to dizziness or syncope (temporary loss of consciousness) due to the vasovagal phenomenon.[146]

Relieving constipation improves lower urinary tract symptoms, including urinary incontinence.[146]

- *Diarrhoea* may cause agitation as well as metabolic disturbance, which may in turn cause falls.
- *Urinary dysfunction* caused by benign prostatic hyperplasia (noncancerous enlargement of the prostate) is common in older men. It affects 50% of men at 60 years and 90% of men over 85 years of age. Symptoms include urinary frequency, nocturia, urgency, poor stream, hesitancy, straining to void, and a sensation of incomplete bladder emptying and post-void dribbling.[147]
- *Bladder dysfunction* is common in older women as a result of deficiencies in the pelvic floor muscles and connective tissue supporting the urethra and the urethral sphincter mechanism.[148] A decline in oestrogen levels after menopause can lead to atrophic changes affecting the vagina and urethra, and also increases a woman's susceptibility to urinary tract infections. Symptoms include urinary frequency, stress incontinence and urge incontinence.[138]

Definitions

Refer to Abrams et al (2002) for a comprehensive list of definitions of the symptoms, signs, urodynamics, observations and conditions associated with lower urinary tract dysfunction and urodynamics studies, for use in all age groups.[104] Also, refer to Abrams (2003) for further explanations of recommended terminology.[140]

Numerous falls in hospitals occur when older people go to or return from the toilet, but causal factors associated with falls in older people with and without cognitive impairment are many and various.[149] The close associations reported between incontinence, dementia, depression, falls and level of mobility suggest that these conditions, which are so common in geriatric patients, may have shared risk factors rather than causal connections.[150]

Other mechanisms by which urinary and fecal incontinence can increase falls risk include the following:

- An incontinence episode increases the risk of a slip on the soiled or wet floor surface.[135]
- Urinary incontinence has been identified as a significant risk factor for falls in people who cannot stand unaided.[139]
- The patients most at risk of falling are those who need to use an assistive device for walking and are incontinent at night, with most of the falls occurring in the early hours of the morning.[140]
- Urinary tract infections can cause delirium, drowsiness, hypotension, pain, urinary frequency and urinary urgency.
- Medications used to treat incontinence (eg anticholinergics or alpha-blockers) can themselves cause postural hypotension and falls; anticholinergics can also cause delirium.
- Drugs such as diuretics used predominantly to manage heart failure can potentially increase the risk of falls through increased urinary frequency or hypovolaemia (low blood volume).
- Deteriorating vision is a common condition in the elderly and is strongly associated with falls;[112] it may also increase the likelihood of falls that are associated with getting out of bed at night and nocturia.

8.1.2 Incontinence and falls intervention

The combination of short length of stay and chronic conditions suffered by many patients means that incontinence is not always identified by hospital staff as a falls risk factor. Patients are often reluctant to discuss issues around urinary and fecal continence. Health care practitioners should be encouraged to enquire routinely about continence, rather than rely on the patient to mention it during a consultation. Many patients will not offer the information without prompting. One study showed that frequent nursing rounds, also including offering toilet assistance, can reduce the frequency of patients' use of call lights, increase their satisfaction with care, and prevent falls.[151]

Pelvic floor muscle training is the most commonly recommended and most effective intervention for women with stress incontinence. A randomised controlled trial showed that well-designed falls prevention interventions aimed at patients with relatively short hospital stays were ineffective.[137] However, other continence promotion interventions that were aimed at staff training, changes to work practices, and environmental and equipment changes (rather than individual patient interventions) had positive outcomes.[43,149] The strategies for promoting continence outlined below have not been part of rigorously conducted, successful, multifactorial falls prevention programs. However, appropriate management is good gerontological practice that may translate into a lower risk of falling.

A Cochrane systematic review showed that pelvic floor muscle training can be used to treat women with mixed incontinence, and less commonly for urge incontinence.[141] However, limitations of the data make it difficult to judge whether pelvic floor muscle training was better or worse than other treatments in managing OAB symptoms.[141] There is evidence from a systematic review to support conservative management of fecal incontinence.[152]

Toileting-assistance programs are an important and practical approach to maintaining continence for many patients, and may also reduce the risk of falls.[104] The three types of toileting-assistance programs (timed voiding, habit retraining, prompted voiding) are discussed in Section 8.2. Cochrane systematic reviews on these interventions found limited evidence for their effectiveness; further investigation is needed.[143,144,153]

Several successful in-hospital falls prevention programs included strategies to promote continence as part of a multifactorial intervention program. Fonda et al (2006) reviewed toileting protocols and practices as part of their effective multifactorial falls prevention program in an aged care hospital setting.[43] Bakarich et al (1997) found that patients in an acute hospital setting who were toileted regularly had fewer falls than patients who were not toileted frequently.[133] Finally, Healey et al (2004) included assessment and management of urinary tract problems as part of their successful intervention for preventing falls.[37] Urinary and fecal incontinence in older hospitalised patients is associated with higher frequency of discharge to an aged care facility rather than discharge home.[154]

8.2 Principles of care

8.2.1 Screening continence

The STRATIFY tool identifies continence status by asking 'Are there any alterations in urination (ie frequency, urgency, incontinence, nocturia)?'[69]

The PJC-FRAT tool identifies continence status by asking whether the patient is in need of especially frequent toileting (day and night).[39]

The cause of incontinence should be established through a thorough assessment. Patients may have more than one type of urinary incontinence, which can make assessment findings difficult to interpret.[155] ~~Patients should be screened for urinary tract infections using ward urinalysis.~~[37] Otherwise, the following strategies can be used to assess the patient's continence status:

- Obtain a continence history from the patient. This might include a bladder chart (a frequency/volume chart) or a continence diary, which could be used to record a minimum of two days to help with assessment and diagnosis. Sometimes a bowel assessment is required, and the patient's normal bowel habits and any significant change must be determined, because constipation can considerably affect bladder function.
- Address, on an individual basis, the suitability of diagnostic physical investigations. Consent from the patient must be obtained before the physical examination, which should be done by a suitably qualified health professional.
- Always check post-void residuals in incontinent older patients.
- Consider risk factors for falling related to incontinence, along with the symptoms and signs of bladder and bowel dysfunction.
- Assess and address functional considerations, such as reduced dexterity or mobility, which can affect toileting.
- Assess the toilet for accessibility (especially if the patient uses a walking aid), and adjust the toilet height if the patient has any hip joint dysfunction.

8.2.2 Strategies for promoting continence

Appropriate management of incontinence may improve overall care. However, it is difficult to make strong recommendations, because specific continence-promotion strategies have not been part of successful falls prevention programs in any health care setting.[112] A practical, stepwise management approach for mobile and nonmobile patients, as well as patients with and without cognitive impairment, should be considered. Such an approach could be based on recommendations made by the United States Government relating to quality management of urinary incontinence in residential aged care facilities.[156]

The following strategies, adapted from those recommended by the Third International Consultation on Incontinence 2005,[133] can be used to promote continence:

- Make sure the patient has access to a comprehensive and individualised continence assessment that identifies and treats reversible causes, including constipation and medication side effects.
- Use an adequate trial of conservative therapy as the first line of management.
- Establish treatment strategies as soon as incontinence has been diagnosed. The aim of managing urinary incontinence is to alter the factors causing incontinence and to improve the continence status of the patient. Management of incontinence is a multidisciplinary task that ideally involves doctors, nurse continence advisers, physiotherapists, occupational therapists and other suitably qualified health professionals.
- Address all comorbidities that can be modified.
- Make sure toileting protocols and practices are in place for patients at risk of falling.[43,151]
- Offer toileting assistance during frequent nursing rounds (every one to two hours), because this can prevent falls in hospital patients.[135]
- Encourage habit retraining, prompted voiding or timed voiding programs to help improve the patient's control over their toileting regime, and reduce the likelihood of incontinence episodes
  - timed voiding is characterised by a fixed schedule of toileting
  - habit retraining is based on identifying a pattern of voiding and tailoring the toileting schedule to the patient
  - prompted voiding aims to increase continence by increasing the patient's ability to identify their own continence status and to respond appropriately.
- Minimise environmental risk factors as follows
  - keep the pathway to the toilet obstacle free and (where relevant) leave a light on in the toilet at night
  - ensure the patient is wearing suitable clothes that can be easily removed or undone
  - recommend appropriate footwear to reduce slipping in urine
  - use a nonslip mat on the floor beside the bed for patients who experience incontinence on rising from the bed, particularly if on a noncarpeted floor in the bedroom; however, care must be taken when using mats to ensure the person does not trip on the mat
  - check the height of the toilet and the need for rails to assist the patient sitting and standing from the toilet (reduced range of motion in hip joints, which is common after total hip replacement or surgery for fractured neck of femur, might mean the height of the toilet seat should be raised).
- Where possible, consult with a continence adviser if usual continence management methods, as described above, are not working or the patient is keen to learn simple exercises to improve their bladder or bowel control. Some men are resistant to the idea of doing pelvic floor exercises. This should be recognised and the benefits explained.
- Consider the use of continence aids as a trial management strategy.

Case study

Mrs U is an 85–year-old woman who was admitted to hospital after falling and breaking her arm. When the nurse asked why she fell, she said she was rushing to the toilet. ~~A urinalysis done by the nurse showed leucocytes and nitrites.~~ The sample was sent for culture and sensitivity. Mrs U had a confirmed urinary tract infection, which was then treated with a short course of antibiotics. Her urinary frequency and urgency settled with the treatment. Having sustained a low-trauma fracture, she was referred on discharge for a bone mineral density scan and formal assessment of bone health.

8.3 Special considerations

8.3.1 Cognitive impairment

Acute delirium can be caused by both urinary and gastrointestinal problems. Cognitive impairment and dementia can also lead to problems with both urinary and fecal continence. In patients with cognitive impairment, regular toileting is recommended. Patients with cognitive impairment may benefit from prompted voiding,[144] scheduled toileting and attention to behaviour signals indicating the desire to void. Aim to identify each patient's toileting times and prompt them to go around those times. Patients with severe dementia may need to be reminded where the bathroom is.

8.3.2 Rural and remote settings

It is important that the strategies outlined above are also in place in rural and remote locations. If access to specialist continence assessment and advice is difficult, additional strategies, such as teleconferencing, may support health practitioners to implement best practice. Resources (such as leaflets) providing advice on managing incontinence are available.

8.3.3 Indigenous and culturally and linguistically diverse groups

Hospital staff and all members of the health care team need to be aware of cultural and religious requirements with respect to toileting. Generic signage for toileting facilities and requirements could be used. In some cultures, incontinence is a taboo topic. Specific information on dealing with these issues may be obtained from the person, their carers or the Continence Foundation of Australia.

Incontinence is not a condition that is well understood by Indigenous Australians, and it causes shame for many. When discussing incontinence, it is important to be aware that Indigenous men will frequently discuss this matter only with a male health worker and women only with a female health worker.

Specific Indigenous resources may be accessed from the Continence Foundation of Australia.

8.4 Economic evaluation

No economic evaluations were found that examined the cost effectiveness of continence management in the hospital setting.

Additional information

- The Continence Foundation of Australia and the National Continence Helpline have leaflets and booklets on different continence-related topics, Indigenous-specific resources and information leaflets translated into 14 community languages: http://www.continence.org.au
- The Continence Foundation of Australia manages the National Continence Helpline for the Australian Government. This free service, staffed by nurse continence advisers, provides confidential information on incontinence, continence products and local services: National Continence Helpline: 1800 33 00 66
- The National Public Toilet Map gives information on toilet facilities along travel routes throughout Australia. Access the map via their website, or by contacting the National Continence Helpline, which can mail out copies of toilets along your planned journey: http://www.toiletmap.gov.au
- The fact sheet, 'Continence: caring for someone with dementia', can be found on the Alzheimer's Australia website: http://www.alzheimers.org.au/content.cfm?infopageid=83#co
- The National Institute for Health and Clinical Excellence, based in the United Kingdom, provides guidance on promoting good health and preventing and treating ill health. See its evidence based guidelines on managing urinary incontinence: http://www.nice.org.uk/

9 Feet and footwear

Recommendations

Assessment

- In addition to using standard falls risk assessments, screen patients for ill-fitting or inappropriate footwear upon admission to hospital.

Intervention

- Include an assessment of footwear and foot problems as part of an individualised, multifactorial intervention for preventing falls in older people in hospital. (Level II)[37]
- Hospital staff should educate patients and provide information about footwear features that may reduce the risk of falls. (Level II)[37]

Good practice points

- Safe footwear characteristics include
  - *soles:* shoes with thinner, firmer soles appear to improve foot position sense; a tread sole may further prevent slips on slippery surfaces
  - *heels:* a low, square heel improves stability
  - *collar:* shoes with a supporting collar improve stability.
- As part of discharge planning, refer patients to a podiatrist, if needed.

9.1 Background and evidence

9.1.1 Footwear associated with increased falls risk

The use of inappropriate footwear by older people in hospital settings is a significant issue. One study of 65 older patients admitted to a hospital rehabilitation ward found that 72% wore ill-fitting footwear.[157] Footwear is a contributing factor to falls[158] and fractures in older people.[159] Studies (of varying design and quality) have reported the following results:

- Poorly fitting footwear or footwear inappropriate for the environmental conditions impairs foot position sense in both younger and older men.[160]
- Wearing shoes with inadequate fixation (ie shoes without laces, buckles or velcro fastening) has been associated with an increased risk of tripping.[159]
- Wearing high-heeled shoes impairs balance compared with low-heeled shoes or being barefoot.[161]
- Medium–high-heeled shoes and shoes with a narrow heel significantly increase the likelihood of sustaining all types of fracture, while slip-on shoes and sandals increase the risk of foot fractures as a result of a fall.[162]
- Slippers are often the indoor footwear of choice for many older people, but have been associated with an increased risk of injurious falls.[163]
- Walking barefoot or in socks is associated with a 10–13-fold increased risk of falling, and athletic shoes are associated with the lowest risk.[164]

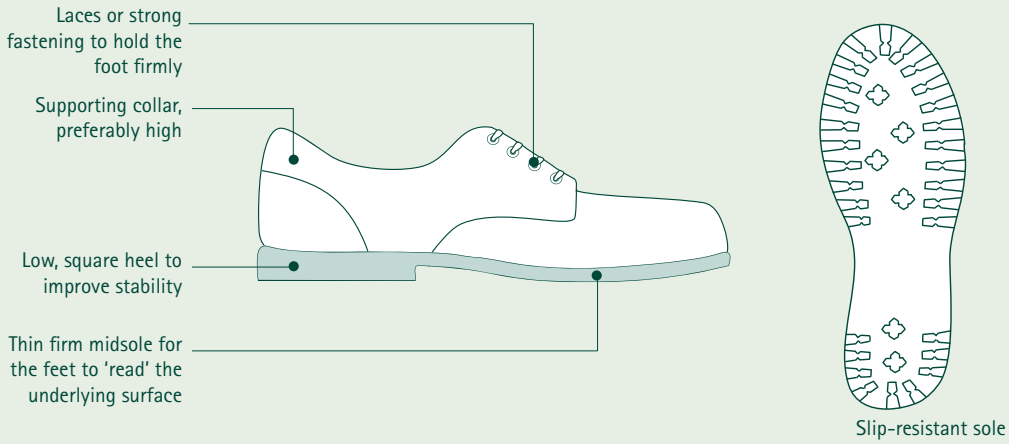
A retrospective observational study showed that three-quarters of people who suffered a fall-related hip fracture in the community were wearing footwear with at least one suboptimal feature at the time of the fall.[159]

Older people should wear appropriately fitted shoes, both inside and outside the house. However, many older people wearing inappropriate footwear believe it to be adequate.[165] A review of the best footwear for preventing falls identified the following shoe characteristics as safe for older people:[166]

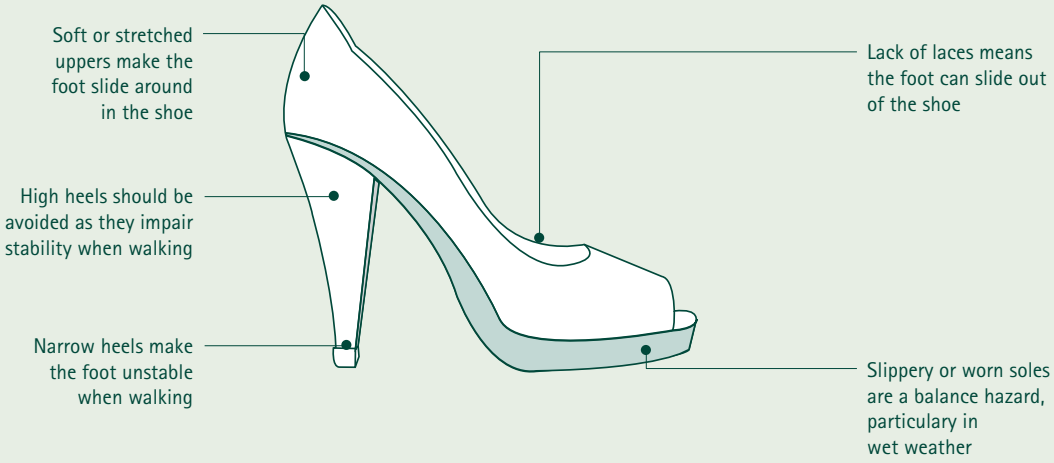
- *Soles*: shoes with thinner, firmer soles appear to improve foot position sense; a tread sole may further prevent slips on slippery surfaces.
- *Heels*: a low, square heel improves balance.
- *Collar*: shoes with a supporting collar improve balance.

Figure 9.1 shows an optimal 'safe' shoe, and a theoretical 'unsafe' shoe. However, the level of evidence for these recommendations is very low, since there are no experimental studies of footwear that have examined falls as an outcome.

What makes a shoe safe?



What makes a shoe unsafe?



Source: Lord (2007)[135]

Figure 9.1 The theoretical optimal 'safe' shoe, and 'unsafe' shoe

9.1.2 Foot problems and increased falls risk

Foot problems are common in older people, affecting 60–80% of older people who live in the community.[167,168] Women report a higher prevalence of foot problems than men, which might be influenced by fashion footwear.[169] The most commonly reported foot problems reported are:[168,170,171]

- pain from corns, calluses and bunions
- foot deformities, such as hallux valgus, hammer toes and nail conditions.

Foot problems are well recognised as contributing to mobility impairment in older people. Older people with foot pain walk more slowly than those without and have more difficulty performing daily tasks.[167] The presence of foot problems, such as pain, toe deformities, toe muscle weakness and reduced ankle flexibility, can alter the pressure distribution beneath the feet, impairing balance and functional ability.[172,173] Additionally, these foot problems are associated with increased falls risk,[174] and the risk rises as the number of foot problems increases.[175]

Ageing is associated with reduced peripheral sensation, and several prospective studies have found that people who fall perform worse in tests of lower limb proprioception,[176] vibration sense[177] and tactile sensitivity.[178] Reduced plantar tactile sensitivity has also been mentioned as a risk factor for falls,[173] because it might influence the ability to maintain postural control when walking, particularly on irregular surfaces.[179] This is particularly relevant in people with diabetes.[180] People with diabetic neuropathy have impaired standing stability[181] and are at increased risk for falls and fractures.[182] Podiatry may help manage these conditions.[183-185]

9.2 Principles of care

9.2.1 Assessing feet and footwear

Hospital staff should arrange for the patient's feet and footwear to be assessed upon admission to hospital. As part of a multifactorial falls prevention program, this assessment should be done by a health professional skilled in the assessment of feet and footwear, such as a podiatrist. The following components of the assessment are most relevant:

- Footwear
  - Use the safe shoe checklist to assess footwear. This checklist is a reliable tool for evaluating specific shoe features that could potentially improve postural stability in patients[186] (see Appendix 3).
  - Discourage patients from walking in socks, because this is associated with a 10-fold increased risk of falling.[164] This is particularly relevant in the hospital setting: patients should not walk in antiembolism stockings without appropriate footwear on their feet.
- Foot problems
  - Assess foot pain and other foot problems regularly. A patient with an undiagnosed peripheral neuropathy should be assessed for potentially reversible or modifiable causes of the neuropathy. Some of the more common causes of a peripheral neuropathy include diabetes, vitamin B12 deficiency, peripheral vascular disease, alcohol misuse and side effects of some drugs.[182]
- Refer the patient to a health professional who is skilled in the assessment of feet and footwear (eg a podiatrist) for additional investigations and management, as required.[187]

A detailed assessment by a podiatrist for a falls-specific examination of feet and footwear should include:[188]

- *fall history:* including foot pain and footwear
- *dermatological assessment:* skin and nail problems, infection
- *vascular assessment:* peripheral vascular status
- *neurological assessment:* proprioception; balance and stability; sensory, motor and autonomic function
- *biomechanical assessment:* posture, foot and lower limb joint range of motion testing, evaluation of foot deformity (eg hallux valgus), gait analysis
- *footwear assessment:* stability and balance features; prescription of footwear, footwear modifications or foot orthoses, based on assessment of gait in shoes
- *education:* foot care and footwear, link between footwear or foot problems and falls risk.

9.2.2 *Improving foot condition and footwear*

All health care professionals can play an important role in:

- identifying ill-fitting or inappropriate footwear[37,43]
  - providing information about footwear to patients and carers[37]
  - ensuring shoes are repaired as needed, and cleaned regularly
  - recognising that patients who have a shuffling gait may be at higher risk of falling if they wear nonslip shoes on certain carpeted floors
  - ensuring that patients with urinary incontinence have dry, clean footwear
  - ensuring that patients have more than one pair of shoes, in case shoes are soiled or damaged
  - discouraging walking while wearing slippery socks and stockings
  - discouraging the use of talcum powders, which may make floors slippery
- screening patients for foot pain or foot problems
- educating patients and carers about basic foot care
- referring a patient to a podiatrist for further assessment and management, as appropriate, if any of the following conditions or clinical signs are evident
  - foot pain
  - foot problems, such as swelling, arthritis, bunions, toe deformities, skin and nail problems (especially corns and calluses) or other foot abnormalities (eg collapsed arch or high-arched foot)
  - conditions affecting balance, posture or proprioception in the lower limbs, such as diabetes, peripheral neuropathy or peripheral vascular disease
  - unsteady or abnormal gait
  - inappropriate or ill-fitting footwear or a requirement for foot orthoses.

Case study

Mr R is in hospital for management of his diabetes. He has a recent history of falls. As part of a multifactorial falls prevention program, nursing staff ran a basic foot screening and found that Mr R had poor sensation and some calluses and lesions on his feet. As a result of the assessment findings, they organised a podiatry assessment. The podiatrist found that Mr R had mild peripheral neuropathy and was unsteady on his feet because he wore oversized sports shoes with a thick, cushioned sole to 'help' his calluses. The podiatrist treated his lesions and referred him to a community podiatry service on discharge. The podiatrist also taught Mr R how to buy better fitting footwear that will improve his stability, but that is still safe for his neuropathic feet. Mr R found that his balance improved after he bought more appropriate footwear.

9.3 Special considerations

9.3.1 Cognitive impairment

Patients with cognitive impairment may not report discomfort reliably. Therefore, when they have their footwear checked, hospital staff should check their feet for lesions, deformity and pressure areas. Footwear and foot care issues should also be discussed in detail with carers.

9.3.2 Rural and remote settings

The Australasian Podiatry Council† in each state can provide details of practitioners visiting rural and remote areas. In areas where podiatry services are infrequent or unavailable, other health care providers will need to screen feet and footwear. Services for Australian Rural and Remote Allied Health‡ are developing resources that may help rural and remote practitioners (see the website for more information).

9.3.3 Indigenous and culturally and linguistically diverse groups

Culturally appropriate resources are currently being developed by Services for Australian Rural and Remote Allied Health as part of an Indigenous Diabetic Foot Program (see the box containing additional information, below).

9.4 Economic evaluation

No economic evaluations were found that examined the cost effectiveness of a program related to feet and footwear assessment in the hospital setting. Some multiple-intervention approaches to falls prevention in the community have included feet and footwear assessments; however, it is unclear whether the results of these analyses are applicable in the hospital setting (see Section 4.4 in the community guidelines for details).

Additional information

- Australasian Podiatry Council: http://www.apodc.com.au

Footwear:

- Safe shoe checklist (See Appendix 3)
- Queensland Government 'Stay on Your Feet' falls prevention resources: http://www.health.qld.gov.au/stayonyourfeet

Foot care and ageing feet:

- American Podiatric Medical Association has brochures, fact sheets and other information on topics such as ageing feet: http://www.apma.org/MainMenu/Foot-Health/FootHealthBrochures/GeneralFootHealthBrochures.aspx
- Indigenous Diabetic Foot Program, Services for Australian Rural and Remote Allied Health: http://www.sarrah.org.au/site/index.cfm?display=65940
- Society of Chiropodists and Podiatrists: http://www.feetforlife.org

† http://www.apodc.com.au

‡ http://www.sarrah.org.au

10 Syncope

Recommendations

Assessment

- Patients who report unexplained falls or episodes of collapse should be assessed for the underlying cause.

Intervention

- Patients with unexplained falls or episodes of collapse who are diagnosed with the cardioinhibitory form of carotid sinus hypersensitivity should be treated by inserting a dual-chamber cardiac pacemaker. (Level II)[189]
- Assessment and management of postural hypotension and review of medications, including medications associated with presyncope and syncope, should form part of a multifactorial assessment and management plan for falls prevention in hospitalised older people (this can also be part of discharge planning). (Level I)[31]

10.1 Background and evidence

Syncope is defined as a transient and self-limiting loss of consciousness. It is commonly described as *blacking out* or *fainting*. Presyncope describes the sensation of feeling faint or dizzy and can precede an episode of loss of consciousness. A number of conditions can present with syncope, and all share the final common pathway of cerebral hypoperfusion, leading to an alteration in consciousness. Older people are more predisposed to syncopal events due to age-related physiological changes that affect ability to adapt to changes in cerebral perfusion.

The overall incidence of syncope in older people who live in the community has been reported as 6.2 per 1000 person years.[190] Some of the more common causes of syncope in older people are vasovagal syncope, orthostatic hypotension, carotid sinus hypersensitivity, cardiac arrhythmias, aortic stenosis and transient ischaemic events. Epilepsy may present as a syncopal-like event. Less common causes of syncope include micturition, defecation, cough and postprandial syncope.

10.1.1 Vasovagal syncope

Vasovagal syncope (usually described as fainting) is the most common cause of syncope and has been reported to be the cause of up to 66% of syncopal episodes presenting to an emergency department.[190] Vasovagal syncope is often preceded by pallor, sweatiness, dizziness and abdominal discomfort, although these features are not always seen in the older person.[190] Commonly reported precipitants of vasovagal syncope include prolonged standing (particularly in hot or confined conditions), fasting, dehydration, fatigue, alcohol, acute febrile illnesses, pain, venepuncture and hyperventilation.

The diagnosis of vasovagal syncope is usually made clinically, although formal assessment with noninvasive cardiac monitoring and prolonged tilting is possible.

Treatment is largely nonpharmacological and is targeted at avoiding the cause. This may include avoiding prolonged standing in hot weather and ensuring that the patient drinks enough to maintain hydration. People also need to be reassured that vasovagal syncope is a benign condition.

10.1.2 Orthostatic hypotension (postural hypotension)

Orthostatic hypotension (also called postural hypotension) refers to a drop in blood pressure on standing, from either the sitting or the lying position. The drop in blood pressure can be enough to cause symptoms of dizziness or precipitate a syncopal event.[135,191] Orthostatic hypotension is associated with an increased risk of falls.[135,190]

A formal diagnosis of postural hypotension is made by recording a drop in systolic blood pressure of at least 20 mm Hg, or a drop in diastolic blood pressure of at least 10 mm Hg, within three minutes of standing. The patient should be lying still for at least five minutes before blood pressure is measured (while the patient remains lying down). Multiple measurements may be required to definitively identify the presence of postural hypotension.

Medications and volume depletion are the two most common causes of postural hypotension in older people. Medications commonly associated with postural hypotension include the antihypertensive agents, antianginals, antidepressants, antipsychotics, antiparkinsonian medications and diuretics. Diuretics can have a direct effect on blood pressure and can also cause volume depletion, which in itself can cause postural hypotension. Certain diseases (eg Parkinson's disease, stroke and diabetes) can directly affect autonomic function and interfere with blood pressure regulation. Prolonged periods of immobility can also disrupt postural control of blood pressure.

Treatment involves identifying the precipitating cause and drug modification, where possible. Maintaining adequate hydration, particularly during hot weather, is important in the patient (see the point of interest box on maintaining hydration in Section 7.2.2). Pharmacological intervention is needed to treat postural hypotension in a small number of cases. Drugs that might be used include fludrocortisone and midodrine (an alpha-agonist).

10.1.3 Carotid sinus hypersensitivity

Carotid sinus hypersensitivity is an abnormal haemodynamic response to carotid sinus stimulation. When associated with symptoms, it is referred to as a carotid sinus syndrome.

Carotid sinus hypersensitivity may occur when the head is rotated or turned, or when pressure is placed on the carotid sinus. Triggers might include carotid massage, shaving, wearing tight collars or neckwear, or tumour compression.[192]

Three abnormal responses can be noted on direct massage of the carotid sinus. A cardioinhibitory response is defined as a three-second period of asystole following massage of the carotid sinus. The vasodepressor response is defined by a 50 mm Hg drop in blood pressure in the absence of significant cardioinhibition. A combination of the vasodepressor and cardioinhibitory responses defines the mixed form of carotid sinus hypersensitivity.

Carotid sinus hypersensitivity is the cause of a small percentage of falls in older people, and is potentially amenable to intervention.[189,193-195] A randomised controlled trial showed that detailed cardiovascular assessment, including carotid sinus massage of older people attending an emergency department after an unexplained fall, led to a subsequent reduction in further falls.[189]

10.1.4 Cardiac arrhythmias

Abnormal heart rhythms can lead to dizziness and syncope. Sick sinus syndrome is an abnormal slowing of the heart caused by degeneration of the cardiac conducting system. It is associated with advanced age. Sick sinus syndrome is managed with the insertion of a cardiac pacemaker. Slowing of the heart rate can also be associated with certain medications (beta-blockers and digoxin), and treatment in these cases is reducing or stopping these medications.

Rapid heart rates from abnormal cardiac rhythms can also cause dizziness and syncope. Diagnosis of an abnormal heart rate requires a person to be monitored at the time of the abnormal heart rate and can often be challenging. Treatment depends on the nature of the abnormal rhythm.

10.2 Principles of care

It is important to ensure that patients reporting dizziness, presyncope or syncope undergo appropriate assessment and intervention. Depending on the history and results of the clinical examination, a number of tests and further investigations may be warranted. These may include an electrocardiogram, echocardiography, Holter monitoring, tilt table testing and carotid sinus massage, or insertion of an implantable loop recorder. The European Taskforce on Syncope has produced a simple algorithm for investigating syncope (see the box containing additional information, below).[191]

Two randomised controlled trials have taken a multifactorial approach to falls prevention in hospitalised older people to prevent falls. The trials included blood pressure and medication reviews as part of the assessment and intervention.[37,39]

Permanent cardiac pacing is successful in treating certain types of syncope. Pacemakers prevent falls by 70% in people with accurately diagnosed cardioinhibitory carotid sinus hypersensitivity.[189]

Most older people who are in hospital are discharged home. A number of successful multifactorial falls prevention strategies in the community setting have included assessments of blood pressure and orthostatic hypotension, and medication review and modification.[57,58,196,197]

The symptoms of orthostatic hypotension can be reduced using the following strategies:

- Ensure good hydration is maintained, particularly in hot weather.[4,198,199]
- Encourage the patient to sit up slowly from lying, stand up slowly from sitting, and wait a short time before walking.[198,199]
- Minimise exposure to high temperatures or other conditions that cause peripheral vasodilation, including hot baths.[199]
- Minimise periods of prolonged bedrest and immobilisation.
- Encourage patients to rest with the head of the bed raised.
- Increase salt intake in the diet if not contraindicated.
- Where possible, avoid prescribing medications that may cause hypotension.
- Identify any need for using appropriate peripheral compression devices, such as antiembolic stockings.[199]
- Monitor and record postural blood pressure.[4]

Case study

Mr L is an 82-year-old man who was brought to the emergency department with acute pulmonary oedema secondary to his ischaemic heart disease. He was admitted and given diuretics to off-load the excess fluid. During the admission, he was also started on an angiotensin-converting enzyme inhibitor and beta-blocker. However, he started to report symptoms of dizziness on standing and almost blacked out on the way to the bathroom. Mr L's lying and standing blood pressures were checked, and he was found to have significant and symptomatic postural hypotension. His medications were reviewed, and his diuretic dose was reduced. Over the next few days, Mr L's lying and standing blood pressures were check regularly to ensure resolution of the postural changes, and his chest was examined to ensure that the oedema did not recur.

10.3 Special considerations

10.3.1 Cognitive impairment

People with cognitive impairment may have problems recalling the events surrounding a fall. Postural hypotension is common in people with vascular dementia, and many people with cognitive impairment and dementia may be taking medications that are associated with postural hypotension and cardiac arrhythmias (eg antihypertensives, antidepressants and antipsychotics).

10.4 Economic evaluation

No economic evaluations were found that examined the cost effectiveness of interventions for syncope in the hospital setting.

Additional information

The following reference may be useful:

- Brignole M, Alboni P, Benditt D, Bergfeldt L, Blanc JJ, Thomsen PE, et al (Task Force on Syncope, European Society of Cardiology) (2004). Guidelines on management (diagnosis and treatment) of syncope — update 2004. *European Heart Journal* 25(22):2054-2072. Also available at: http://eurheartj.oxfordjournals.org/cgi/content/full/25/22/2054

11 Dizziness and vertigo

Recommendations

Assessment

- Vestibular dysfunction as a cause of dizziness, vertigo and imbalance needs to be identified in the hospital setting. A history of vertigo or a sensation of spinning is highly characteristic of vestibular pathology.
- Use the Dix-Hallpike test to diagnose benign paroxysmal positional vertigo, which is the most common cause of vertigo in older people and can be identified in the hospital setting. This is the only cause of vertigo that can be treated easily.

Note: there is no evidence from randomised controlled trials that treating vestibular disorders will reduce the rate of falls.

Good practice points

- Use the Epley manoeuvre to manage benign paroxysmal positional vertigo.
- Use vestibular rehabilitation to treat dizziness and balance problems, where indicated.
- Screen patients complaining of dizziness for gait and balance problems, as well as for postural hypotension. (Patients who complain of 'dizziness' may have presyncope, postural dysequilibrium, or gait or balance disorders.)
- All manoeuvres should only be done by an experienced person.

11.1 Background and evidence

Dizziness and vertigo are common presenting symptoms in hospital emergency departments.[200] The conditions are seen in people of all ages, but are more prevalent in those older than 50 years.[201] The National Hospital Ambulatory Medical Care Survey identified that patient visits to emergency departments in the United States for vertigo or dizziness accounted for 2.5% of all emergency department presentations over a 10-year period.[200] However, dizziness in the hospital setting remains a difficult diagnostic problem because it has many potential causes and may result from disease in multiple systems.[202] A population-based study of people presenting with dizziness symptoms to an emergency department, or directly admitted to hospital, found that stroke or transient ischaemic attack was diagnosed in only 3.2% of all patients and that the most common cause of vertigo and dizziness in this population was a benign peripheral vestibular dysfunction (33%).[203] In the community setting, benign paroxysmal positional vertigo (BPPV) is one of the most common vestibular conditions, accounting for up to 50% of patients with a peripheral vestibular disorder.[204] This is likely to be the case in the hospital setting as well.

When patients describe being 'dizzy', 'giddy' or 'faint', this may mean anything from an anxiety or fear of falling, to postural dysequilibrium, vertigo or presyncope. Therefore, a detailed history is crucial.

11.1.1 Vestibular disorders associated with an increased risk of falling

Vestibular dysfunction is a common cause of dizziness in the older population;[204] however, the association between vestibular dysfunction and falls remains unclear.[205] There is limited research in this area in the hospital setting.

A case-series study looked at approximately 3000 patients who presented to a hospital emergency department after a fall. A portion (16%) of these patients had no known cause for the fall. A vestibular symptom scale questionnaire completed by this group showed a high incidence of the symptoms of vestibular impairment (eg nausea, vomiting, dizziness).[206]

Age-related changes in the vestibular system can be identified in people older than 70 years.[207] These changes include asymmetrical degenerative changes, which may contribute to falls and falls injury by providing inaccurate information about the direction and magnitude of head or body movements, and impairing balance control. A study of 66 adults found that older people who lived in the community and who had fractured their wrist because of an accidental fall were more likely to have vestibular asymmetry on testing than an age-matched group of nonfallers.[208]

It is not clear whether BPPV is a risk factor for falling in older people; however, almost one in 10 older people presenting to an outpatient clinic with a range of chronic medical conditions had undiagnosed BPPV. These people are more likely to have sustained a fall in the previous three months.[209]

11.2 Principles of care

11.2.1 Assessing vestibular function

An important step in minimising the risk from falls associated with dizziness is to assess vestibular function. This can be done using the following steps and tests (these tests should only be done by an experienced person):

- Ask the patient about their symptoms. *Dizziness* is a general term that is used to describe a range of symptoms that imply a sense of disorientation.[210] Dizziness may be used as a term by a patient to describe poor balance. *Vertigo*, a subtype of dizziness, is highly characteristic of vestibular dysfunction and is generally described as a sensation of spinning.[211]
- Assess peripheral vestibular function using the Halmagyi head-thrust test.[212] This test should only be done by an experienced person. It has good sensitivity only if the vestibular dysfunction is severe or complete.[213]
- Use audiology testing to quantify the degree of hearing loss. The auditory and vestibular systems are closely connected, and therefore auditory symptoms (hearing loss, tinnitus) commonly occur in conjunction with symptoms of dizziness and vertigo.[214]
- Use hospitalisation as an opportunity to request computed tomography or magnetic resonance imaging to identify an acoustic neuroma or central pathology, if clinically indicated.[211]
- Use the Dix-Hallpike manoeuvre to diagnose BPPV in the hospital setting. This manoeuvre is considered mandatory in all patients with dizziness and vertigo after head trauma.[215] BPPV should be strongly considered as part of the differential diagnosis in older people who report symptoms of dizziness or vertigo following a fall that involved some degree of head trauma.

11.2.2 Choosing interventions to reduce symptoms of dizziness

The following strategies can be used in the hospital setting to treat dizziness and balance problems caused by vestibular dysfunction. They can be used as part of a multifactorial falls prevention program to reduce the risk of falls related to dizziness.

Medical management

A randomised controlled trial showed that treatment in the hospital emergency department with methylprednisolone within three days of acute onset of vestibular neuritis (viral infection of inner ear structures) improves vestibular function at 12-month follow-up, with complete or almost complete recovery of vestibular function in 76% of the study population.[216]

Based on clinical experience, treatment in the acute hospital setting with antiemetics and vestibular suppression medication may be required to treat the unpleasant associated symptoms of nausea and vomiting. These medications should only be used for a short duration (one to two weeks) because they adversely affect the process of central compensation following acute vestibular disease.[217]

Treating BPPV

A range of options for the treatment of BPPV have been described in the literature. These include:

- Brandt and Daroff exercises — these can be done regularly at home[218]
- the Epley manoeuvre — this is used commonly by clinicians and involves taking the patient slowly through a range of positions that aim to move the freely mobile otoconia back into the vestibule;[219] a meta-analysis showed that this manoeuvre is highly successful for treating BPPV.[220]

Older people with diagnosed BPPV respond as well to treatment as the general population; therefore, no special approaches are needed in this older group.[221] It is important to diagnose and treat BPPV as soon as possible, because treatment improves dizziness and general wellbeing.[221]

Vestibular rehabilitation

Vestibular rehabilitation (VR) is a multidisciplinary approach to treating stable vestibular dysfunction. The physiotherapy intervention component focuses on minimising a person's complaints of dizziness and balance problems through a series of exercises, which are tailored to each person.[222] The occupational therapy intervention component involves incorporating the movements required to do these exercises into daily activities.[223] Psychology input addresses the emotional impact of vestibular dysfunction.[224]

The literature emphasises the following characteristics of VR:

- VR is highly successful in treating stable vestibular problems in people of all ages.[225]
- Starting VR early is recommended in the hospital setting after surgical removal of an acoustic neuroma[226] and vestibular ablation surgery.[227] Delayed initiation of VR is a significant factor in predicting unsuccessful outcomes over time.[228]
- VR can improve measures of balance performance in people living in the community who are older than 65 years.[229] No research has been done on specific vestibular interventions for preventing falls in the hospital setting. However, in the first six weeks after acoustic neuroma surgery, older people receiving VR had greater improvements in balance than those who received general instructions only.[230] This may translate to reduced risk of falling.

Regular training courses in VR are held across Australia, and an increasing number of physiotherapists working in acute and subacute hospital systems are now trained to assess and manage dizziness. These physiotherapists can be found by contacting the Australian Physiotherapy Association† or the Australian Vestibular Association.‡

Discharge planning

Discharge planning (or 'post-hospital care planning') is a critical part of an integrated program of patient care, and should ensure that interventions started in hospital continue in the home, as necessary and possible. Older people who are discharged from hospital may still need care and support to manage dizziness when they return to their own homes or residential aged care facilities. Discharge planning may include the following:

- Use a vestibular function test to evaluate the integrity of the peripheral (inner ear) and central vestibular structures. These tests are available at some specialised audiology clinics and may be recommended following discharge from hospital.[231]
- Refer the patient to a specialist, such as an ear, nose and throat specialist or a neurologist.[211]
- Arrange ongoing management of BPPV; this can be done on an outpatient basis.

Case study

Ms T is a 75-year-old woman who was admitted to the orthopaedic ward with a Colles' fracture of her left wrist after a fall at home. Since her admission, Ms T has been reporting an intense sensation of spinning and nausea when lying flat in bed and now sleeps with the head of her bed elevated. The sensation of spinning is so severe when she lies down that Ms T has become very anxious and feels that she will be unable to manage by herself at home.

The orthopaedic physiotherapist on the ward was trained to assess and manage benign paroxysmal positional vertigo (BPPV) and identified this condition in Ms T's right inner ear using the Dix-Hallpike test. Ms T was subsequently treated with an Epley manoeuvre, and felt much better within 24 hours. Repeat Dix-Hallpike testing identified that the BPPV had resolved.

Ms T was discharged one day later and can now lie flat in bed with no symptoms of spinning. She was taught Brandt-Daroff exercises to do at home should the symptoms return.

† http://members.physiotherapy.asn.au

‡ http://www.dizzyday.com/avesta.html

11.3 Special considerations

Dix-Hallpike testing should not be done on patients with an unstable cardiac condition or a history of severe neck disease,[232] but can be modified in older people with other comorbidities.[233]

Patients with symptoms of dizziness should be medically reviewed before starting a rehabilitation program as outlined above.

11.4 Economic evaluation

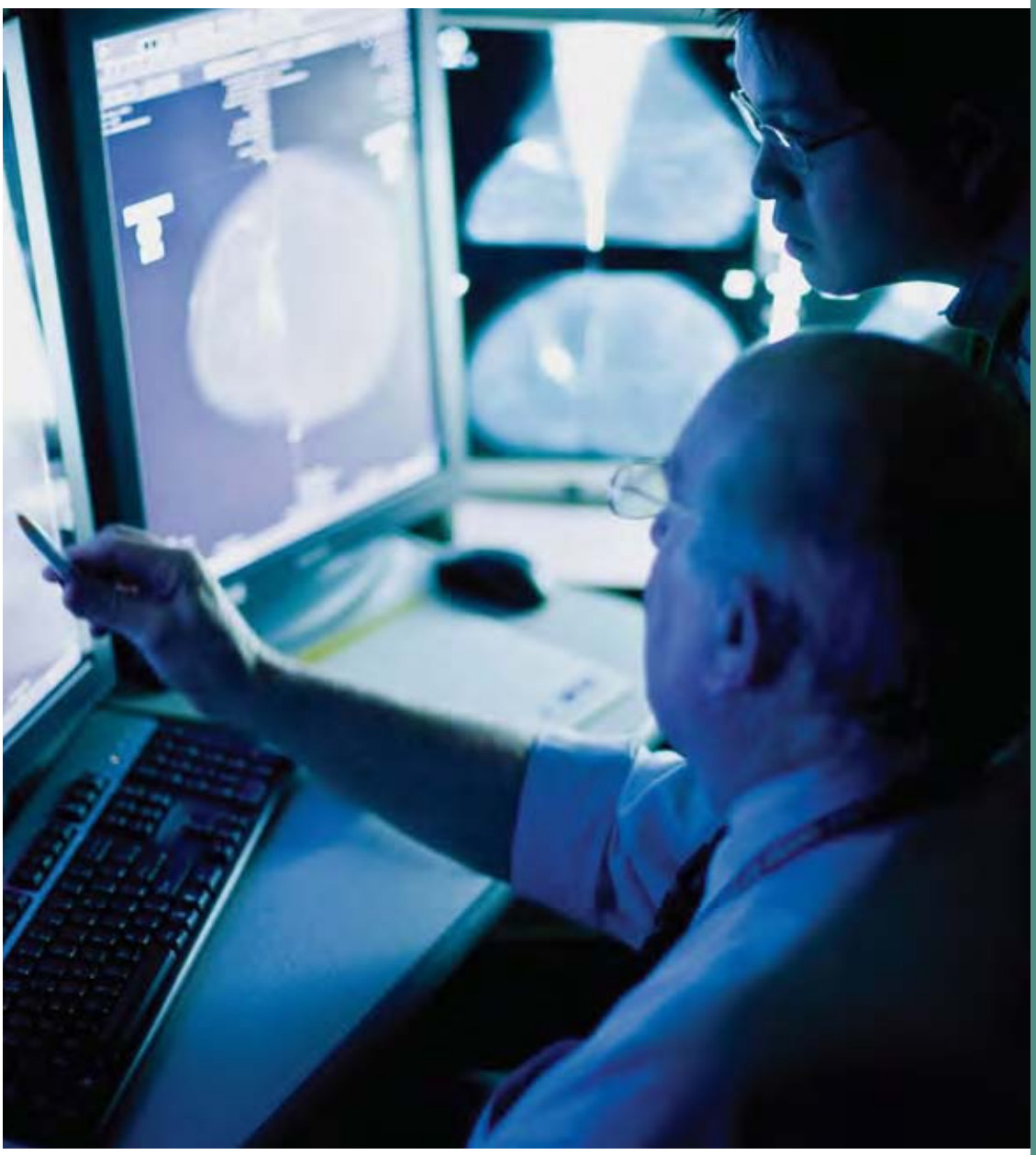
No economic evaluations were found that examined the cost effectiveness of interventions for dizziness and vertigo in the hospital setting.

Additional information

The following reference may be useful:

- Herdman S (2007). *Vestibular Rehabilitation (Contemporary Perspectives in Rehabilitation)*, FA Davis Company, Philadelphia.[234]

More information on noncardiac dizziness and a video demonstration of the Dix-Hallpike manoeuvre can be found at: http://www.profane.eu.org/CAT/



12 Medications

Recommendations

Intervention

- Older people admitted to hospital should have their medications (prescribed and nonprescribed) reviewed and modified appropriately (and particularly in cases of multiple drug use) as a component of a multifactorial approach to reducing the risk of falls in a hospital setting. (Level I)[31]
- As part of a multifactorial intervention, patients on psychoactive medication should have their medication reviewed and, where possible, discontinued gradually to minimise side effects and to reduce their risk of falling. (Level II-*)[37,235]

12.1 Background and evidence

A number of epidemiological studies have shown an association between medication use and falls in older people. The risk of falls can be increased by medication interaction, unwanted side effects (such as dizziness) and even the desired effects of medications (such as sedation). It is important that the health care team recognises that pharmacological changes with ageing can lead to potentially avoidable events in older people, including falls and fractures.

12.1.1 Medication use and increased falls risk

A number of factors affect an older person's ability to deal with and respond to medications, which can lead to an increased risk of falls.[135] These factors include the following:

- The ageing process, as well as disease, can result in changes in pharmacokinetics (the time course by which the body absorbs, distributes, metabolises and excretes drugs) and pharmacodynamics (the effect of drugs on cellular and organ function).
- Nonadherence with drug therapy, including medication misuse and overuse, and inappropriate prescribing, can increase the risk of adverse effects.

Certain classes of medication are more likely to increase the risk of falls in older people; for example:

- Central nervous system drugs, especially psychoactive drugs, are associated with an increased risk of falls.[236] In hospital, psychoactive medications are associated with an increased risk of falls due to their side effects, such as sedation, postural hypotension and impaired balance and mobility.[114,115,237-240]
- Benzodiazepine use is a consistently reported risk factor for falls and fractures in older people, both after a new prescription and over the long term. These drugs also affect cognition, gait and balance.[236]
- Antidepressants are associated with higher fall risk;[241] in particular, selective serotonin reuptake inhibitors and tricyclic antidepressants.[242]
- Antiepileptic drugs and drugs that lower blood pressure are weakly associated with an increased risk of falls.[236]
- Cardiovascular medications (diuretics, digoxin[238,243] and type IQ anti-arrhythmic drugs) are weakly associated with an increased risk of falls.[243]

Other types of cardiac drugs, and analgesic agents, are not associated with an increased risk of falls.[243]

Taking more than one medication is associated with an increased risk of falls.[57,236,244] This may be a result of adverse reactions to one or more of the medications, detrimental drug interactions, or incorrect use of some or all of the medications. According to one study, the relative risk of falling for people using only one medication (compared with people not taking any medication) is 1.4, increasing to 2.2 for people using two medications, and to 2.4 for people using three or more medications.[244]

For each drug, the potential falls risk modification should be balanced against the benefit of the drug.

12.1.2 Evidence for interventions

Review of medication should be a core part of the assessment of an older person while in hospital.

A randomised controlled trial reviewed medications as part of a multifactorial intervention for hospital patients with a history of falls.[37] As part of the intervention, suspect medications (including sedatives, antidepressants and diuretics) were evaluated, as well as multiple drug use. The intervention included a medical review of prescribed drugs associated with increased falls risk. Compared with a control group, patients who were screened using the multifactorial risk-factor prevention plan had a significant reduction in the risk of falls. Therefore, addressing medication history is effective when combined with other risk-reducing interventions. However, more research is needed to see what effect it has when used alone.

12.2 Principles of care

12.2.1 Assessing medications

Appropriateness of medication should be reviewed routinely in all hospitalised older people. Each hospital should take a proactive organisational approach to medication review, which should include the following:

- reviewing the patient's medications on admission to, and discharge from, hospital[47,245-247]
- reviewing medication charts regularly during the patient's stay in hospital (because medical conditions can change quickly in the hospital setting).[245]

Given that changes are often made to a patient's medication during a hospital stay, it is important to ensure that all changes made are conveyed to the local prescribing practitioner. A home medicines review may also be suggested where substantial changes have been made to medications or where there are concerns about adherence following discharge.

Older people who live in the community are eligible for a home medicines review, which is a service that encourages collaboration between the older person, their general practitioner and their pharmacist to review medication use. The home medicines review is available following a referral from a general practitioner; see the Pharmacy Guild of Australia website.†

12.2.2 Providing in-hospital interventions

The following interventions can be used as part of a multifactorial falls risk prevention program:

- Withdraw psychoactive medication gradually and under supervision to prevent falls significantly.[235] The National Prescribing Service has guidelines on withdrawing benzodiazepines.‡
- Limit multiple drug use to reduce side effects and interactions and the tendency towards proliferation of medication use.[37]
- If centrally acting medications such as benzodiazepines are prescribed, increase surveillance and support mechanisms for older people during the first few weeks of taking these drugs, because the risk of falling is greatest during this period.[248]
- Drugs that act on the central nervous system, especially psychoactive drugs, are associated with an increased risk of falls; therefore, they should be used with caution and only after weighing up their risks and benefits.[242]

In addition, the following strategies help to ensure quality use of medicines, and are good practice for minimising falls in older people in the hospital setting:

- Prescribe the lowest effective dosage of a medication specific to the symptoms.
- Provide support and reassurance to patients who are gradually stopping the use of psychoactive medication(s).
- If the patient needs to take medications known to be implicated in increasing the risk of falls, try to minimise the adverse effects (drowsiness, dizziness, confusion and gait disturbance).
- Provide the patient (and their carer) with an explanation of newly prescribed medications or changes to prescriptions.
- Avoid initiating psychoactive medications in an older person while they are in hospital. Alternative approaches (eg behavioural and psychosocial treatments) to manage sleep disorders, anxiety and depression should be tried before pharmacological treatment. This may avoid the longer term problems associated with side effects and difficulties with withdrawal from the medications.
- Educate the whole multidisciplinary team, patients and their carers to improve their awareness of the medications associated with an increased risk of falls.
- Document information when implementing, evaluating, intervening in, reviewing, educating and making recommendations about the patient's medication use.

† http://www.guild.org.au/mmr/content.asp?id=421

‡ http://www.nps.org.au/__data/assets/pdf_file/0004/16915/ppr04.pdf

12.2.3 Providing post-hospital interventions

Patients who have complex medication regimes should be considered for a home medications review when they are discharged from hospital.

Case study

Mrs C is a 90-year-old woman who was admitted to hospital after falling at home and fracturing her hip. During admission, hospital staff reviewed Mrs C's medications, and noticed that she had been taking a benzodiazepine for a number of years. After discussion with Mrs C, the health care team agreed that a withdrawal program be instituted. By the time Mrs C had undergone a period of inpatient rehabilitation, she had managed to successfully stop her benzodiazepine. Because of her recent hip fracture, she was also started on calcium, vitamin D and a bisphosphonate while in hospital. The cessation of the benzodiazepine was communicated to the general practitioner on Mrs C's discharge from hospital.

12.3 Special considerations

12.3.1 Cognitive impairment

Adherence with medication can be a problem in older people with cognitive impairment. Blister packs and other technical prompts can be used to aid adherence. Some people will require medication supervision. Prescribers should aim to keep drug regimens simple and, where possible, keep frequency of medication intake to a maximum of daily or twice daily.

Where there is concern about cognition and the ability of a patient to take medications, the health care team should consider a trial of self medication, including trialling a blister pack, while the older person is in hospital, to identify potential problems.

Possible communication difficulties experienced by older people with cognitive impairment can make subjective assessments unreliable. Special attention needs to be given to altered behaviours and nonverbal cues in this population.

12.3.2 Rural and remote settings

The health care team may need to seek further professional advice in a remote facility. The websites of the National Prescribing Service† and the Therapeutic Advice and Information Service‡ may be useful.

12.4 Economic evaluation

No economic evaluations were found that specifically considered a medication-related intervention in the hospital setting. Some interventions have been found to be effective or cost effective in other settings; however, it is unclear whether the results are applicable to the hospital setting (see Chapter 12 in the community guidelines, and Chapter 12 in the residential aged care guidelines for details).

† http://www.nps.org.au/

‡ http://www.nps.org.au/health_professionals/consult_a_drug_information_pharmacist

Additional information

Physician and pharmacist roles in assessment and evaluation procedures are governed by the relevant professional practice standards and guidelines:

- Australian Pharmaceutical Formulary
- Pharmaceutical Society of Australia:
  http://www.psa.org.au
- Society for Hospital Pharmacists (SHPA):
  http://www.shpa.org.au

Useful resources for staff

- *Australian Medicines Handbook*, 5th edition (2004), produced by Australian Health Consumers Forum, the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists, the Pharmaceutical Society of Australia, and the Royal Australian College of General Practitioners.
- *Australian Medicines Handbook: Drug Choice Companion: Aged Care 2001* — includes a falls prevention section.
- National Medicines Policy:
  http://www.health.gov.au/internet/main/publishing.nsf/Content/National+Medicines+Policy-1
- National Strategy for Quality Use of Medicines:
  http://www.health.gov.au/internet/main/publishing.nsf/Content/nmp-pdf-natstrateng-cnt.htm
- Australian Pharmaceutical Advisory Council:
  http://www.health.gov.au/internet/main/publishing.nsf/Content/nmp-advisory-apac_mem.htm
- National Prescribing Service — incorporates a drug information service for health professionals:
  http://www.nps.org.au
- Therapeutic Advice and Information Service – can be contacted on 1300 138 677
- Relevant state and territory drug information centres
- Relevant state and territory pharmaceutical advisory services
- SHPA Committee of Speciality Practice in Drug Use Evaluation (2004). SHPA Standards of Practice for Drug Use Evaluation in Australian Hospitals, *J Pharm Pract Res* 34(3):220-223.
- *Australian Pharmaceutical Formulary and Handbook*, 19th edition (2004), published by the Pharmaceutical Society of Australia, includes guidelines and practice standards for medication management review:
  http://www.psa.org.au
- MIMS medicines database — includes full and abbreviated information and over-the-counter information
  Contact: CMPMedica Australia
  Phone: 02 9902 7700
  http://www.mims.com.au
- Pharmaceutical Health and Rational Use of Medicines Committee:
  http://www.health.gov.au/internet/main/publishing.nsf/Content/nmp-advisory-apac-pharm

Useful resources for patients

- Adverse Medicine Events Line
  Phone: 1300 134 237
- National Prescribing Service — incorporates a drug information service for patients on the Medicines Line
  Phone: 1300 888 763
- Pharmaceutical Society of Australia (PSA) — self-care health information cards entitled 'Preventing falls' and 'Wise use of medicines' are available from the PSA, local pharmacy or at:
  http://www.psa.org.au
- Pharmacy Guild of Australia
  Phone: 02 6270 1888
  Fax: 02 6270 1800
  Email: guild.nat@guild.org.au
  http://www.guild.org.au/index.asp

13 Vision

Recommendations

Assessment

- Use hospitalisation as an opportunity to screen systematically for visual problems that can have an effect both in the hospital setting and after discharge.
- For a rough estimate of the patient's visual function, assess their ability to read a standard eye chart (eg a Snellen chart) or to recognise an everyday object (eg pen, key, watch) from a distance of two metres.

Intervention

- As part of a multidisciplinary intervention for reducing falls in hospitals, provide adequate lighting, contrast and other environmental factors to help maximise visual clues; for example, prevent falls by using luminous commode seats, luminous toilet signs and night sensor lights. (Level III-3)[43]
- Where a previously undiagnosed visual problem is identified, refer the patient to an optometrist, orthoptist or ophthalmologist for further evaluation (this also forms part of discharge planning). (Level II)[37]
- When correcting other visual impairment (eg prescription of new glasses), explain to the patient and their carers that extra care is needed while the patient gets used to the new visual information. (Level II-*)[249]
- Advise patients with a history of falls or an increased risk of falls to avoid bifocals or multifocals and to use single-lens distance glasses when walking — especially when negotiating steps or walking in unfamiliar surroundings. (Level III-2-*)[250]
- As part of good discharge planning, make sure that older people with cataracts have cataract surgery as soon as practicable. (Level II-*)[251,252]

Note: there have not been enough studies to form strong, evidence based recommendations about correcting visual impairment to prevent falls in any setting (community, hospital, residential aged care facility), particularly when used as single interventions. However, considerable research has linked falls with visual impairment in the community setting, and these results may also apply to the hospital setting.

Good practice points

- If a patient uses spectacles, make sure that they wear them, and that they are clean (use a soft, clean cloth), unscratched and fitted correctly. If the patient has a pair of glasses for reading and a pair for distance, make sure they are labelled accordingly, and that they wear distance glasses when mobilising.
- Encourage patients with impaired vision to seek help when moving away from their immediate bed surrounds.

13.1 Background and evidence

Vision plays a major role in falls risk in the community setting, but there is limited research on specific visual interventions for preventing falls in hospitals. A systematic review[71] identified two studies using crude assessments of vision that reported visual impairment as an independent risk factor for falls[69] and in-hospital hip fracture.[115]

A study indicated that the prevalence of visual impairment is high (45%) in hospital inpatients, with cataracts and refractive errors being the main causes of visual impairment.[253] Detection and specialist referral led to improved visual outcomes in only 2% of cases. The biggest predictor of nonattendance was being discharged before eye specialist review.

A 2004 Cochrane review found that there have not been enough studies to form evidence based recommendations about correcting visual impairment to prevent falls in any setting (community, hospital, residential aged care facility).[7] Furthermore, studies have shown that multidisciplinary interventions are the most effective for falls prevention; little evidence showed that single interventions are effective, indicating that interventions to improve vision should form part of a multidisciplinary approach to falls prevention.

Considerable research in the community setting has linked reduced vision (including visual acuity, as well as depth-of-field and contrast sensitivity) with an increased risk of falls or fractures. These findings may be applicable to the hospital setting and highly relevant to this high-risk group, given their higher rate of visual impairment and increased frailty. This chapter outlines interventions that can be considered good practice, despite limited data to evaluate their effectiveness when used in isolation.

Point of interest

Much of the information in this chapter is based on research in older people living in the community. In most cases, the findings and recommendations can be extrapolated to the hospital setting; however, recommendations should be followed with due caution.

13.1.1 Visual functions associated with increased fall risk

A retrospective observational study showed that the risk of multiple falls increases 2.6 times if visual acuity is worse than 6/7.5.[254] Similarly, a prospective observational study showed that visual acuity of 6/15 or worse almost doubles the risk of hip fracture, and this risk is greater with even lower visual acuity levels.[255] Other visual functions have also been associated with an increased risk of falling in prospective cohort studies. These visual functions include reduced contrast sensitivity,[205,256] poor depth perception (measured in the community setting)[205,257] and reduced visual field size.[254,258-261]

13.1.2 Eye diseases associated with an increased risk of falling

Visual changes resulting from cataracts (see Figure 13.2) are associated with increased postural instability[262] and falls risk in older people who live in the community.[263] People with glaucoma can present with a range of loss of peripheral visual fields (side vision), depending on disease severity, which can affect a person's postural stability[264] and their ability to detect obstacles and navigate through cluttered environments (see Figure 13.3).[259,265] Macular degeneration can cause loss of central vision, depending upon disease severity (see Figure 13.4) and is associated with impaired balance[266,267] and an increased risk of falls.[266]

Figure 13.1 shows normal vision, as a comparison.

Source: Vision 2020 Australia

Figure 13.1 Normal vision

Source: Vision 2020 Australia

Figure 13.2 Visual changes resulting from cataracts

Source: Vision 2020 Australia

Figure 13.3 Visual changes resulting from glaucoma

Source: Vision 2020 Australia

Figure 13.4 Visual changes resulting from macular degeneration

13.2 Principles of care

13.2.1 Screening vision

Hospitalisation provides an opportunity for systematic screening for visual problems that have an impact both in the hospital setting and after discharge.

Methods of screening vision include the following:

- Visual function can be screened as part of the St Thomas Risk Assessment Tool in Falling Elderly In-patients (STRATIFY): 'Is the patient visually impaired to the extent that everyday function is affected?'[75] (See Chapter 5 on screening and assessment for more information.)
- A randomised controlled trial of falls risk factor prevention included a vision test as part of a multifactorial intervention. The trial concluded that vision could be tested in a quick and simple way, by checking a patient's ability to recognise an everyday object (eg a pen, key or watch) from a distance of two metres.[37] However, this test will only pick up major vision problems.

The following additional visual function assessments can also be used as good practice:

- Ask the patient about their vision and record any visual complaints and history of eye problems and eye disease.
- Check for signs of visual deterioration. These can include an inability to see detail in objects, read (including avoiding reading) or watch television; a propensity to spill drinks; or a propensity to bump into objects.
- Measure visual acuity or contrast sensitivity quantitatively using a standard eye chart (eg a Snellen eye chart) or the Melbourne Edge Test (MET), respectively (see Table 13.1).
- Check for signs of visual field loss using a confrontation test (see Table 13.1) and refer for a full automated perimetry test by an optometrist or ophthalmologist if any defects are found. Large prospective studies found that an increase in falls occurred when there was a loss of field sensitivity, rather than loss of visual acuity and contrast sensitivity.[259]

Table 13.1 summarises the characteristics of eye-screening tests.

Table 13.1 Characteristics of eye-screening tests

Snellen eye chart (for testing visual acuity)	
Description	Standardised eye test of visual acuity. Comprises a series of symbols (usually letters) in lines of gradually decreasing sizes. Participant is asked to read the chart from a distance of 6 m for standard charts (charts designed for shorter test distances are available; the examiner should check that they are using the correct working distance for the chart). Visual acuity is stated as a fraction, with 6 being the numerator and the last line read the denominator (the larger the denominator, the worse the visual acuity). Pocket versions of Snellen charts are available for a clinical screen of visual acuity (these smaller charts can be used at a shorter distance than the standard 6 m to test visual acuity).
Time needed	5 minutes
Criterion	A score of 6/12 indicates visual impairment; however, this depends on the age of the person (the cut-off score will decrease with increasing age).

Melbourne Edge Test (MET) (for testing contrast sensitivity)[97]	
Description	The test presents 20 circular patches containing edges with reducing contrast. Correct identification of the orientation of the edges on the patches provides a measure of contrast sensitivity in decibel units, where dB = $-10\log_{10}$ contrast, where contrast defines the ratio of luminance levels of the two halves of the circular patch.
Time needed	5 minutes
Criterion	Score of less than 18/24 indicates visual impairment; however, the results are age dependent.[268]
Confrontation Visual Field Test[269]	
Description	Crude test of visual fields. Participant and examiner sit between 66 cm and 1 m apart at the same height, with the examiner's back towards a blank wall. To test the right eye, the participant covers the left eye with the palm of their hand and stares at the examiner's nose. The examiner holds up both hands in the upper half of the field, one either side of the vertical, and each with either 1 or 2 fingers extended, and asks the participant, 'What is the total number of fingers I am holding up?' The procedure is repeated for the lower half of the field but changing the number of fingers extended in each hand. The procedure is repeated for the left eye. If the participant incorrectly counts the number of fingers in the upper or lower field, the test should be repeated and then recorded. If the participant moves fixation to view the peripheral targets, repeat the presentation. Results are recorded as finger counting fields R√ and L√ if the patient correctly reports the number of fingers presented. For those who fail this screening, a diagram should be drawn to indicate the part of the field in which the participant made an error.
Time needed	4 minutes
Criterion	If the participant incorrectly reports the number of fingers held up in either eye, they should be referred for a full visual field test.

If more detailed visual assessment is needed once the patient has been assessed using the crude visual screening methods described above, or if the patient scores poorly on these tests, hospital staff should refer them to an optometrist, orthoptist or ophthalmologist for a full vision assessment.

13.2.2 Providing interventions

The following interventions should be applied:

- Make sure that patients have their prescription spectacles with them in hospital.[37]
- Where a previously undiagnosed visual problem is identified, refer the patient to an optometrist or ophthalmologist for further evaluation.[37]
- Provide adequate lighting, contrast and other environmental factors to help maximise visual cues.[43]

Additionally, make sure that if the person wears spectacles, they are clean, in good repair, and fitted properly. Encourage people with impaired vision to seek help when moving away from their immediate bed surrounds.

13.2.3 Discharge planning

If an undiagnosed visual problem is detected, encourage the patient to see an eye specialist when they are discharged from hospital. Healey et al (2004) suggested referral to an optometrist if the patient has lost their glasses, and to an ophthalmologist if there is no known reason for poor vision.[37]

When a visual deficit is identified, the health care team should seek a diagnosis and offer an intervention. Several visual improvement interventions should be considered after discharge from the hospital:

- *Expedited cataract surgery.* This is the only evidence based intervention to date that has been shown to be effective in reducing both falls and fractures in older people.[251,252]
- *Occupational therapy interventions* in people with moderate to severe visual impairment, to manage the function and safety aspects of visual impairment. Home safety should be assessed by an occupational therapist to identify potential hazards, lack of equipment, and risky behaviour that might lead to falls. Interventions that help to maximise visual cues and reduce visual hazards should also be used. These include providing adequate lighting and contrast (eg painting white strips along the edges of stairs and pathways)[270,271] (see Chapter 14 on environmental considerations for more information).
- *Prescription of optimal spectacle correction, with caution.* Make sure the patient's prescription is correct, and refer them to an optometrist if necessary. However, caution is required in frail older people: a randomised controlled trial found that comprehensive vision assessment with appropriate treatment does not reduce — and may even increase — the risk of falls.[249] The authors speculated that large changes in visual correction may have increased the risk of falls, and that more time may be needed to adapt to updated prescriptions or new glasses.
- *Advice on the most appropriate type of spectacle correction.* Wearing bifocal or multifocal spectacle lenses when walking outside the home and on stairs has been associated with increased falls in older people who live in the community, doubling the risk of falls.[250] These results may also apply to older people in a hospital setting. The health care team should advise patients with a history of falls or identified increased falls risk to use single-vision spectacles (instead of bifocals or multifocals) when walking, especially when negotiating steps or moving about in unfamiliar surroundings. A study also suggested telling older people who wear multifocals and distance single-vision spectacles to flex their heads rather than just lowering their eyes to look downwards to avoid postural instability.[272]
- Education. Educating health care workers on how to manage patients with reduced visual function may help to reduce the risk of falls.

Point of interest: mobility training

Vision Australia† specialises in safe mobility training for visually impaired people.

Case study

Mrs J is a 75-year-old hospital inpatient who fell while walking over a step in a doorway. On admission to the ward, Mrs J was assessed by an ophthalmologist, who found that Mrs J had severe visual impairment caused by macular degeneration. Hospital staff inspected Mrs J's spectacles for scratches, and made sure that they were clean and fitted her correctly. Staff also made sure that there was adequate lighting in her room at all times. Mrs J was given clear instructions about how to move around and was encouraged to call for help when walking in unfamiliar surroundings. On discharge, she was advised to have a full eye examination to ensure optimal spectacle correction. Given her severe visual impairment, Mrs J was also referred for an occupational therapy home assessment.

† http://www.visionaustralia.org.au

13.3 Special considerations

13.3.1 Cognitive impairment

Where possible, patients with cognitive impairment should have their vision tested using standard testing procedures. Where this is not possible, visual acuity can be assessed using a Landolt C or Tumbling E chart. These tests contains near-vision, distance and reduced Snellen tests, and can be used to measure and record visual acuity in the same way as standard letter charts.

The Landolt C is a standardised symbol (a ring with a gap, similar to a capital C) used to test vision. The symbol is displayed with the gap in various orientations (top, bottom, left, right), and the person being tested must say which direction it faces. The Tumbling E chart is similar, but uses the letter E in different orientations.

13.3.2 Rural and remote settings

Health care practitioners or carers can contact their local Optometric Association Australia in their state or territory for an up-to-date list of optometrists providing services in rural and remote areas. The patient's general practitioner or optometrist can provide a referral to a local ophthalmologist. Alternatively, contact the Royal Australian and New Zealand College of Ophthalmologists on +61 2 9690 1001. The strategies outlined earlier in this chapter should be implemented before a referral to an ophthalmologist is made.

13.3.3 Indigenous and culturally and linguistically diverse groups

Where appropriate, visual acuity can be measured for Indigenous patients using a culturally appropriate chart known as the 'Turtle Chart',[273] which has a series of turtles of different sizes and orientations. Similarly, there is a series of culturally appropriate brochures and posters that describe different eye diseases and conditions, and different types of spectacle corrections.

13.3.4 Patients with limited mobility

Home visits by optometrists or ophthalmologists may be necessary for housebound older people. The Optometric Association Australia in each state or territory will provide a current list of optometrists willing to provide such services.

13.4 Economic evaluation

No economic evaluations were identified that specifically considered interventions for vision in the hospital setting. Some community interventions have been found to be effective and cost effective; however, it is unclear whether the results are applicable to the hospital setting (see Chapter 13 in the community guidelines for more information).

Additional information

The following organisations may be helpful:

- Optometrists Association Australia:
  Phone: 03 9668 8500
  Fax: 03 9663 7478
  Email: oaanat@optometrists.asn.au
  http://www.optometrists.asn.au (contains details for state and territory divisions)
- Vision Australia provides services for people with low vision and blindness across Australia:
  http://www.visionaustralia.org.au
- Macular Degeneration Foundation promotes awareness of macular degeneration and provides resources and information:
  http://www.mdfoundation.com.au
- Guide dog associations in Australia help people with visual impairment to gain freedom and independence to move safely and confidently around the community and to fulfil their potential:
  http://www.guidedogsaustralia.com


Department of

14 Environmental considerations

Recommendations

Assessment

- Regular environmental reviews are advisable; procedures should be in place to document environmental causes of falls; and staff should be educated in environmental risk factors for falls in hospitals.

Intervention

- Environmental modifications should be included as part of a multifactorial intervention. (Level II)[37,38]
- As part of a multifactorial intervention, falls can be reduced by using luminous toilet signs and night sensor lights. (Level III-3)[43]

Good practice points

- Make sure that the patient's personal belongings and equipment are easy and safe for them to access.
- Check all aspects of the environment and modify as necessary to reduce the risk of falls (eg furniture, lighting, floor surfaces, clutter and spills, and mobilisation aids).
- Conduct environmental reviews regularly (consider combining them with occupational health and safety reviews).

14.1 Background and evidence

For older people, the risk of falling while in hospital may be greater than in other settings, because of risk factors such as acute conditions (stroke, hip fractures, illness, etc) or unfamiliar surroundings.[31] Those identified as having the highest risk for falls in hospital are people with unsteady gait, confusion, urinary incontinence or frequency of using the toilet, or a history of falls, and those taking sedatives.[81] The consequences of falls in hospitals are great, with a high associated mortality and morbidity: older people who fracture their hip while staying in hospital have poorer outcomes than older people who fracture their hip in the community.[81] The cost of acute public hospital care for fallers accounts for 24% of total costs but only 11% of total fall injuries.[274]

Falls prevention programs in hospitals have trialled different ways of reducing falls, including modifying the hospital room or environment to reduce obvious risk factors. Environmental review and modification refers to checking the hospital room for hazards that might cause people to fall, and then modifying or rearranging the environment to remove or minimise these hazards. For example, this could include removing clutter, improving lighting and installing handrails.

A Cochrane review looked at the effectiveness of different interventions for preventing falls in older people in hospitals or nursing care facilities. The review found that multifactorial interventions targeting several different risk factors (eg falls prevention programs that include environmental modification in a suite of interventions) may help to prevent falls in hospitals.[31] However, these multifactorial interventions seemed to be more effective for long-term patients (that is, people who were in hospital for more than three weeks). Also, interventions are most effective for people who already have an increased risk of falls (eg those with cognitive impairment or heart conditions, or those who have suffered a stroke).[7]

It is difficult to analyse rates of falls in hospitals because there have been few randomised controlled trials. As well, these trials have looked at different types of hospitals settings (eg acute wards, longer-term wards, geriatric wards), which greatly affects the falls rates because they contain different populations who have varying risk factors for falls. Also, there is a difference between short-term and long-term patients.[2]

14.2 Principles of care

14.2.1 Targeting environment interventions

Environmental modification interventions are most likely to be effective in patients who already have an increased risk of falls.[7] Various tools are available for screening older people for falls risk in hospitals (see Chapter 5).

14.2.2 Designing multifactorial interventions that include environmental modifications

As mentioned earlier, there are not enough data to make recommendations about single interventions used alone to prevent falls and injuries in hospitals. However, multifactorial interventions should incorporate environmental modifications, such as:[2,21,274-276]

- ensuring chairs and beds are at the correct height (ie when the patient's feet are flat on the ground, their hips are slightly higher than their knees)
- installing even lighting at stairs and way-finding night lighting to the toilet; making sure night lighting is used consistently and safely
- installing slip-resistant floor surfaces
- cleaning spills and urine promptly
- reducing clutter and other trip hazards in patients' rooms and wards
- providing and repairing walking aids
- providing stable furniture for handhold distances between furniture, beds, chairs and toilets
- ensuring bed, wheelchair and commode brakes are on when a patient is transferring
- using a flooring pattern that does not create an illusion of slope or steps for patients with impaired eyesight or cognitive impairment
- making sure the patient wears safe footwear and avoids ill-fitting footwear with slippery soles
- moving patients who have a high risk of falling closer to the nurses' station
- reducing the unnecessary use of physical restraints, and reviewing the use of restraints regularly
- using electronic warning devices.

14.2.3 Incorporating capital works planning and design

When hospitals or hospital wards are being built or renovated, the following issues should be considered:

- Safety and practicality are just as important as aesthetics.
- Facilities should conform to legislated safety requirements.[274,277]
- A design that allows observation or surveillance of people is important for safety.[277]
- Lighting and handrails at steps and stairs, and design of stairs to allow safer descent are important.[274]
- Slip-resistant flooring or products should be used in all wet areas.[274]
- Impact-absorbent flooring (or underlay) should be used.

14.2.4 Providing storage and equipment

The risk of falls needs to be considered when new equipment is acquired, or when equipment arrangements are being designed or modified (eg new seating or shower chairs).[277] Health professionals and hospital staff should be involved in decisions about buying equipment.

Clutter should be reduced by providing adequate storage space for equipment,[277] and equipment should be reviewed at least monthly.[135]

14.2.5 Conducting environmental reviews

Regular environmental reviews should be done with the following points in mind:

- Make modifications based on the findings of the review.
- Prioritise reviews by considering the following environments
  - high-risk environments (bedrooms, dining areas, bathrooms and toilets)
  - environments identified through incident monitoring, hazard identification or near-miss reporting
  - environments identified through environmental checklists (Appendix 4 contains a general environmental checklist that may be useful when reviewing the environment).
- Include external environments in environmental reviewing.[277]
- Consider how environmental reviews may fit in with existing workplace health and safety reviews.
- Involve a range of disciplines in environmental reviews and interventions, including health professionals such as occupational therapists, workplace health and safety personnel, infection-control personnel,[277] staff working in that particular environment, specialists in geriatric assessment or ergonomics, technical advisers, and older people's carers, where appropriate.
- Ensure a mechanism is in place for reporting environmental hazards.

When considering environmental change, hospital staff should explore a range of products, equipment and solutions. Keep in mind that changing a person's environment could have a negative impact. For example, reorganising furniture may be contraindicated for people who are visually impaired or have dementia.

Appendix 4 contains useful information on modifying flooring, lighting, bathrooms and toilets, hallways, stairways and steps, furniture, beds, chairs, alert or call systems, and external environments.

14.2.6 Orientating new residents

Many falls occur during a person's first few days in a new setting.[278] Therefore, hospital staff should help patients to become familiar with new environments and teach them to use equipment.[279] This orientation could include teaching the patient to transfer themselves between furniture or equipment that they are unfamiliar with.

14.2.7 Review and monitoring

Environmental strategies are likely to be done in conjunction with other interventions. As discussed earlier, their effectiveness in isolation from other risk factors is difficult to measure. The effectiveness of environmental interventions is likely to be reflected in falls indicators, such as a change in the location of falls and a reduction in falls associated with particular environmental hazards.

Staff should review and assess environments in hospitals regularly (particularly high-risk environments, such as bedrooms, bathrooms and dining areas). A floor plan of the hospital is a useful tool for mapping falls locations and for showing the number of falls and near misses in particular environmental hotspots. Such mapping before and after environmental modification can provide feedback on the effectiveness of environmental adjustments.

Case study

Mr B has been hospitalised in a subacute rehabilitation ward following a recent stroke. He has regained most movement; however, he finds it difficult to get out of bed and into his armchair, and to go to the toilet. His geriatrician undertook a medical review, and occupational therapy staff assessed his activities of daily living. His chair and bed height were adjusted; his family replaced his slippers with safer footwear; and LED night lights were provided in the toilet and as a way-finding guide to the bathroom. The staff were instructed on how to best help him with transfers, given his condition. Mr B now attends regular group sessions with the physiotherapist. As a result of this process, Mr B is now safer in his activities of daily living and has a lower risk of falling.

14.3 Special considerations

14.3.1 Cognitive impairment

The physical environment takes on greater significance for people with diminished physical, sensory or cognitive capacity.[279] The unique characteristics of people who are cognitively impaired may adversely affect their interaction with the environment. As well as reviewing the environmental factors noted in Appendix 4, staff in hospitals should make sure that residents who are agitated or show behavioural disturbances are monitored adequately.

Specific environmental changes can help patients with cognitive impairment to be more comfortable and independent, and reduce confusion and the risk of falls. For example, consider positioning the patient close to nursing staff, using bed or chair alarms, or using electronic surveillance systems.[280] Other things that may help include:

- using calming colour schemes to reduce agitation[2]
- making sure the hospital layout supports improved continence (toilet close by, easy to find, clearly marked)[279]
- providing a predictable, consistent environment
- using suitable furniture without sharp edges[247]
- providing adequate lighting with enough coverage to ensure clear vision and to prevent casting shadows.[247]

14.3.2 Rural and remote settings

Many of the environmental strategies suggest multidisciplinary involvement, and this may not be readily available in rural and remote settings. Videoconferencing, teleconferencing and interagency collaboration may be beneficial.

In facilities where only a visiting occupational therapist is available, it would be useful to conduct an environmental review (see Appendix 4) and an equipment review (see Appendix 5) and take corrective action before the therapist's visit. This would help to identify key areas requiring specialist advice.

14.3.3 Nonambulatory patients

Falls occurring in nonambulatory patients are more likely to involve equipment and occur while the patient is seated or during transfers.[281] Therefore, interventions to reduce the risk of falls for these patients should consider transfer and equipment safety.

14.4 Economic evaluation

Some community interventions have been found to be effective and cost effective; however, it is unclear whether the results are applicable to the hospital setting (see Chapter 14 in the community guidelines for more information).

Additional information

The following associations and organisations may be helpful:

- OT AUSTRALIA
  Phone: 03 9415 2900
  Fax: 03 9416 1421
  Email: info@ausot.com.au
  http://www.ausot.com.au
- Independent living centres, which are available in most states and territories, provide independent information and advice on the ranges of equipment, floor surfacing products, etc. See Independent Living Centres Australia:
  http://www.ilcaustralia.org/home/default.asp
- Home Modification Information Clearinghouse collects and distributes information on home maintenance and modifications and has a number of useful environmental reviews:
  http://www.homemods.info/

15 Individual surveillance and observation

Recommendations

Intervention

- Include individual observation and surveillance as components of a multifactorial falls prevention program, but take care not to infringe on people's privacy. (Level III-2)[43]
- Falls risk alert cards and symbols can be used to flag high-risk patients as part of a multifactorial falls prevention program, as long as they are followed up with appropriate interventions. (Level II)[39]
- Consider using a volunteer sitter program for patients who have a high risk of falling, and define the volunteer roles clearly. (Level IV)[42,64]

Good practice points

- Most falls in hospitals are unwitnessed. Therefore, the key to reducing falls is to raise awareness among staff of the patient's individual risk factors, and reasons why improved surveillance may reduce the risk of falling.
- If appropriate, hospital staff should discuss with carers, family or friends the patient's risk of falling and their need for close monitoring.
- Family members or carers can be given an information brochure to use in discussions with the patient about falls in hospitals.
- Encourage family members or carers to spend time sitting with the patient, particularly in waking hours, and encourage them to notify staff if the patient requires assistance.
- A range of alarm systems and alert devices are available, including motion sensors, video surveillance and pressure sensors. They should be tested for suitability before purchase, and appropriate training and response mechanisms should be offered to staff. Alternatively, find another hospital that already has an effective alarm system, see what their program includes, and try their system.
- Patients who have a high risk of falling should be checked regularly.
- A staff member should stay with patients with cognitive impairment and a high risk of falls while the patient is in the bathroom.

15.1 Background and evidence

Many falls that occur in hospitals are unwitnessed.[24,25] A range of approaches have been reported for identifying when a person at high risk of falling is getting out of a bed or chair unsupervised (particularly for patients with cognitive impairment). These include:

- locating the patient in an area of higher visibility[24,37]
- flagging those at high risk (eg by using falls risk alert cards or symbols)[39]
- observing high-risk patients frequently[48]
- using sitter programs[24,64,282]
- using alarm systems and alert devices.[2,283,284]

Observational studies have looked at technologies for reducing falls, such as infrared movement detectors, fall alarms (which sound when the patient is already on the floor), bed and chair alarms, and movement alarms. However, these studies are generally of poor quality. A systematic review concluded that trials in hospitals and care homes that investigate specific interventions, such as alarms, are lacking.[36]

The use of surveillance can have ethical and legal considerations (deprivation of liberty, mental capacity and infringement of autonomy). Care must be taken that surveillance does not infringe on the patient's autonomy or dignity. Hospitals must have clear policies and procedures in place for using surveillance. See also Chapter 16 on the use of restraints and associated ethical and legal considerations.

15.2 Principles of care

The following general principles of observation and surveillance represent expert opinion of best practice in the hospital setting, in the absence of trials testing their effectiveness.

The choice of surveillance and observation approaches will depend on a combination of the findings from the assessment of each patient, clinical reasoning and access to resources and technology. More than one surveillance and observation approach should be used, thereby avoiding dependence on a single approach.

An important strategy to consider for improving surveillance is to review staff practices, such as staff handover practices and timing of tea and lunch breaks, to ensure that adequate supervision is available when required. Personal preference for the frequency of showers or personal hygiene needs to be considered on an individual basis and balanced against existing routines in the hospital.[43]

Where possible, high-visibility beds or rooms (such as near nurses' stations) should be allocated to patients who require more attention and supervision, including patients who have a high risk of falling.[24] Positioning patients with a history of falls close to nurses' stations was an intervention in a randomised controlled trial that investigated a targeted risk factor care plan. Overall, the trial significantly reduced falls in the intervention group compared with the control group. However, the individual contribution of bed positioning was not clear, nor was the number of patients who were repositioned.[37]

15.2.1 Flagging

Patients who have a high risk of falling should be told about their risk. In hospitals, the patient's risk of falling should be identified ('flagged') in such a way that considers the person's privacy, yet is recognised easily by staff and the patient's family and carers. A range of methods other than verbal and written communication may be used to ensure ongoing communication of high-risk status (flagging), including:

- coloured stickers or markers (positioned on case notes, walking aids, bed heads)[285]
- signs, pictures or graphics on or near the bed head.[39,285]

Flagging reminds staff that a person has a high risk of falling, and should trigger interventions that may prevent a fall. These interventions must be available; otherwise, the flagging may not be beneficial. Flagging may also improve a patient's own awareness of their potential to fall.[247] A multifactorial trial in three Australian subacute hospital wards included a risk alert card by the bedside.[39] The researchers deliberately used a symbol, rather than words, on the A4-sized card, to minimise violating patient privacy or causing distress to patients or their families. Across the study duration, no official complaints were made about the alert card being displayed. Other components of the intervention included an information brochure, an exercise program, an education program and hip protectors. The incidence of falls in the intervention group was reduced compared with the control group.

15.2.2 Colours for stickers and bedside notices

The Australia-wide consultation process that facilitated the production of these guidelines found that green or orange were frequently used colours for stickers and bedside notices to signify high risk of falling. Although some falls prevention studies have used 'high-risk' alert stickers, the results are conflicting. In the absence of data to the contrary, it may be beneficial for staff to flag high-risk patients, using colours or symbols consistently. Ongoing staff education about the purpose and importance of flagging is essential.

Ideally, in the hospital setting, patients who have a high risk of falling should be checked regularly and offered assistance.[48] A staff member should remain with the high-risk patient while they are in the bathroom.[48]

15.2.3 Sitter programs

Some hospitals have introduced sitter programs. These programs use volunteers, families or paid staff to sit with patients who have a high risk of falling.[286] A pretest–post-test comparative study in two South Australian hospitals evaluated the effectiveness of using volunteer sitters in reducing falls.[282] Volunteers worked four-hour shifts between the hours of 9 am and 5 pm. No falls were reported at either hospital during the hours that volunteers were present. Volunteers maintained journals throughout the study, and the journals indicated high satisfaction with their roles. Semistructured interviews with family members indicated high satisfaction with the volunteers. However, some nurses ($n = 7$; 29%) reported that volunteers could be demanding of their time and required too much supervision.

A second Australian study looked at the effect of volunteer companion-observers in preventing falls in an acute aged care ward.[64] Patients were situated in a four-bed room if they were identified to have a high falls risk. Volunteers completed a minimum shift of two hours, between 8 am and 8 pm on weekdays. The key role of the volunteers was to alert nursing staff if patients showed high-risk behaviours, such as becoming agitated or attempting to climb out of bed. After 20 months, no falls were reported in the observation room, and falls in the ward were reduced by 51%. Family members expressed satisfaction with the volunteers; however, the volunteers' role needed clarification, because nurses sometimes asked volunteers to walk or feed patients, and volunteers sometimes became frustrated if nurses were slow to respond to patient call bells.

A limitation of volunteer sitters is that they are typically only available in 'business' hours.[64] Providing 24/7 surveillance coverage by volunteers would require an additional 15 volunteers per week in a hospital ward.[282]

15.2.4 Response systems

Response systems are usually a form of monitor, incorporating an alarm that sounds when a patient moves. A number of response systems are commercially available. In some systems, an alarm is activated by a pressure sensor when a patient starts to move from a bed or chair. A randomised controlled trial of residents of a geriatric evaluation and treatment unit did not find any statistically significant difference between an intervention group (who received a bed alarm system) and a control group (who did not).[287] However, the authors concluded that bed alarm systems may still be beneficial in guarding against bed falls and may be an acceptable method of preventing falls. Therefore, it is difficult to make recommendations about using bed alarm systems in the hospital setting.

An Australian study conducted in 12 hospitals included alarms in a multifactorial falls prevention intervention.[42] Adherence was high: 40 of the 49 participants who were given the recommendation complied with wearing the alarm. The alarm was a pressure switch under the heel that, when stood on, activated a high-pitched sound, amplified by a speaker concealed in a pocket in the wearer's sock. The intervention had no effect on fall rates, and the authors suggested that the median length of stay (seven days) was too short for interventions to take effect.

In other alarm systems, an alarm sounds when any part of a patient's body moves within a space monitored by the alarm. Yet another style of alarm activates when a patient falls but does not get up. Response systems require capital investment and rely on a third party (eg hospital staff or the patient's carer) to respond when the alarm sounds. The issues of who responds and how, and what impact this has on ward practice — including what it may take away from other areas of care — need to be considered before any system is implemented.

Alarms may perceivably pose risk-management problems for hospitals, in that failure to respond to an alarm because of lack of staffing could be seen as a failure in care. Moreover, it is not necessarily correct to assume that if someone lacks mental capacity due to dementia, they should be subjected to intrusive surveillance to prevent falls.[288] Care should be taken that alarms do not infringe autonomy. The lack of clear research results (probably due to the difficulties in researching this area), and the ethical and legal considerations of monitoring people should be factored into decisions.

15.2.5 Review and monitoring

Evaluation of the effectiveness of surveillance and observation systems will depend on the range and mix of systems that are used. Indicators of the acceptance of these systems may include:[64,282]

- frequency of use of surveillance and observation methods
- satisfaction of staff, patients, their family, carers or friends with surveillance and observation methods.

An indicator of the effectiveness of surveillance and observation systems may include the number of falls after an improved surveillance program has been introduced, compared with the number of falls before it was introduced.

Case study

Mr P is 81 years old and normally lives alone at home. He was admitted to the medical ward because he was malnourished, dehydrated and falling over on a weekly basis. He was delirious on admission and wandered frequently out of the ward and into other patients' rooms, sometimes getting into the wrong bed. Medical assessment indicated the presence of an acute delirium, and appropriate medical and nursing management was instituted. He became quite agitated if made to sit by his bed and remain in the ward all day. Staff decided to place a chair near the nurses' station for him to sit on when he wanted. The physiotherapist assessed his mobility and arranged for family and available staff to take Mr P for a walk outside when possible. Hospital volunteers, trained in the facility's patient sitter program, were also recruited to sit with Mr P and alert staff if he attempted to walk without supervision. As the delirium settled with medical and nursing management, Mr P became safer with his mobility and orientation, and the observation strategies were gradually withdrawn.

15.3 Special considerations

15.3.1 Cognitive impairment

Surveillance and observation approaches are particularly useful for patients who forget or do not realise their limitations. Improved surveillance and observation may be preferable to the use of restraints as an injury minimisation strategy.[2]

15.3.2 Indigenous and culturally and linguistically diverse groups

In some cultures, it is accepted practice to sit for long periods with ill relatives and elders. This may afford a greater role to carers, family members and friends in supervising the person's activity to reduce the risk of falls.

15.4 Economic evaluation

Three studies have examined the costs and effects of hospital-based individual surveillance programs.

Spetz et al (2007) reported an economic evaluation of a medical vigilance system (LG1) that incorporated a bed exit alert module.[286] The evaluation was based on a small, nonrandomised study in a postneurosurgery ward, and ran for eight weeks. The medical vigilance system was compared with the ad hoc use of patient sitters (sitters were not used for all patients, or on all shifts). An average fall rate of 1.94% in the LG1 group was reported, compared with 3.23% in the control group. There was a mean incremental cost per fall prevented of between US$5959 and US$6301 for the LG1 system, compared with usual care by ad hoc patient sitters.

Giles et al (2006) conducted a pretest-post-test feasibility study that looked at the effect of volunteer companions on preventing falls among patients in two four-bed 'safety bays' in medical wards in Australian hospitals.[282] Volunteers observed patients in safety bays from 9 am to 5 pm, Monday to Friday, and for four hours on Saturday. No falls occurred when volunteers were present. During the baseline (pre-) period, there was a fall rate of 14.5 falls per 1000 occupied bed days, compared with 15.5 falls per 1000 occupied bed days during the implementation period. Volunteers donated a total of 2345 hours over the trial period. If this labour had to be paid for (at a rate of A$24.25 per hour), the total cost would have been A$56866 (excluding travel time and travel costs). A cost per fall prevented was not calculated, because the fall rate was higher during the intervention period. Similarly, Boswell et al (2001)[289] also reported that patient falls increased slightly for each sitter shift, and thus a cost-effectiveness ratio was not calculated.

Additional information

Successful observation practices have targeted changes in nursing practice, so that nurses are able to observe patients for longer periods during the course of their shift by modifying long-established practices related to nurse documentation, nursing handover, patient hygiene practices, staff meal breaks and patient eating times, and creation of a high-observation bay.[43] The Australian Resource Centre for Health Care Innovations provides information and resources for health care professionals, including information on preventing falls: http://www.archi.net.au/e-library/safety/falls

16 Restraints

Recommendations

Assessment

- Causes of agitation, wandering and other behaviours should be investigated, and reversible causes of these behaviours (eg delirium) should be treated, before restraint use is considered.

Note: there is no evidence that physical restraints reduce the incidence of falls or serious injuries in older people.[290-293] However, there is evidence that they can cause death, injury or infringement of autonomy.[294,295] Therefore, restraints should be considered the last option for patients who are at risk of falling.[296]

Good practice points

- The focus of caring for patients with behavioural issues should be on responding to the patient's behaviour and understanding its cause, rather than attempting to control it.
- All alternatives to restraint should be considered and trialled for patients with cognitive impairment, including delirium.
- If all alternatives are exhausted, the rationale for using restraints must be documented and an anticipated duration agreed on by the health care team.
- If drugs are used specifically to restrain a patient, the minimal dose should be used and the patient should be reviewed and monitored to ensure their safety. Importantly, chemical restraint must not be a substitute for quality care. See the alternative methods of restraint outlined in this chapter.
- Follow hospital protocol if physical restraints must be used.
- Any restraint use should not only be agreed on by the health team, but also discussed with family or carers.

16.1 Background and evidence

A restraint is a mechanism used to control or modify a person's behaviour. Physical restraints include lap belts, table tops, meal trays and backwards-leaning chairs (or 'stroke chairs') that are difficult to get out of, and possibly bed alarm devices. Covert restraint practices may occur, such as tucking bed clothes in too tight, wedging cupboards against beds or locking doors. Drugs, such as sedatives, have sometimes been used as chemical restraints. In most situations, this is regarded as an inappropriate form of restraint. However, when a patient's behaviour is disturbed and their risk of falling is increased, there may be a case for chemical restraint. Bed rails are also sometimes used as a type of restraint.

Physical restraint of patients during admission to hospital has been common practice for many years.[291] The prevention of falls is cited as the most common reason for the use of physical restraints.[297] Studies have shown that some health care workers believe that restraining patients will prevent a fall;[298] however, evidence suggests that restraints may have the opposite effect and that patients who are restrained are more likely to fall.[247,297] In some instances, reducing the use of restraints may actually decrease the risk of falling.[284]

An observational study from Finland recorded the use of psychoactive and other drugs as chemical restraints in long-term hospital care. They found that, out of 154 participants, 33% received three or more psychoactive drugs regularly, and 24% received two or more benzodiazepine derivatives or related drugs regularly. The authors concluded that psychoactive drugs were used as chemical restraints in these long-term care wards.[299]

If used, restraints should be the last option considered.[300] A systematic review of use of physical restraint and injuries found an association between restraint use and increased risk of injury and death.[291]

If drugs are used specifically to restrain a patient, the minimal dose should be used, and the patient should be reviewed and monitored to ensure their safety. Importantly, chemical restraint must not be a substitute for alternative methods of restraint outlined in this chapter.

16.2 Principles of care

16.2.1 Assessing the need for restraints and considering alternatives

Hospitals should have clear policies and procedures on the use of restraints, in line with state or territory legislation and guidelines. Causes of agitation, wandering or other behaviours should be investigated, and reversible causes of these behaviours (eg delirium) should be treated before restraint use is considered.[4,301] Restraints should not be used at all for patients who can walk safely and who wander or disturb other patients.[247] Wandering behaviour warrants urgent exploration of other management strategies, including behavioural and environmental alternatives to restraint use. These alternatives may include:[300]

- using strategies to increase observation or surveillance
- providing companionship
- providing physical and diversionary activity
- meeting the patient's physical and comfort needs (according to individual routines as much as possible, rather than facility routines)
- using low beds
- decreasing environmental noise and activity
- exploring previous routines, likes and dislikes, and attempting to incorporate these into the care plan.

Hospital staff should be provided with appropriate and adequate education about alternatives to restraints. Education can reduce the perceived need to use restraints, as well as minimise the risk of injury when restraints are used.

16.2.2 Using restraints

When the patient's health care team has considered all alternatives to restraints, and agreed that the alternatives are inappropriate or ineffective, restraints could be considered. In such cases, restraints should only be used temporarily to:

- prevent or minimise harm to the patient
- prevent harm to others
- optimise the patient's health status.

The health care team must also take into account the rights and wishes of the patient, their carers and family.[4] Any decision to use restraints should be made by discussing their use and possible alternatives with the patient, their carers and family.

When the use of restraints is unavoidable, the type of restraint chosen should always be the least restrictive to achieve the desired outcome. Furthermore, restraint use should be monitored and evaluated continually. Restraints should not be a substitution for supervision, or used to compensate for inadequate staffing or lack of equipment,[45,300] and they should not be applied without the support of a written order.[300] The minimum standard of documentation for restraint use includes:[296]

- date and time of application
- name of the person ordering the restraint
- type of restraint
- reasons for the restraint
- alternatives considered and trialled
- discussion with the patient, carers or substitute decision makers
- any restrictions on the circumstances in which the restraint may be applied
- intervals at which the patient must be observed
- any special measures necessary to ensure the patient's proper treatment while the restraint is applied
- duration of the restraint.

16.2.3 Review and monitoring

Hospitals should have a restraint policy, which should be reviewed regularly. Staff should also be assessed on their knowledge and skill in using alternatives to restraints, as well as their knowledge of the hospital's restraint policy. Trends in the use of restraints should also be monitored; for example, why a restraint is used, for how long, and what alternatives were considered.[300] A restraint-use form may be useful for this purpose.

Case study

Mr M is 70 years old and was recently admitted to hospital for a routine hernia operation. He had no history of confusion but had recently fallen a number of times at home and suffered minor injuries. Immediately after the operation, Mr M became very confused, agitated and restless. He tried several times to get out of bed. Medical review indicated acute delirium, and medical management was instituted to address the cause. Given Mr M's current lack of awareness of his potential high risk of falling, he was allocated a bed in an area of high supervision and checked more frequently by nursing staff, and his family was contacted and asked to help by sitting with him. The family preferred this option rather than using restraints, when Mr M's cognitive impairment and risk of falling were explained to them.

16.3 Special considerations

16.3.1 Cognitive impairment

For patients with cognitive impairment who cannot stand or mobilise safely on their own, restraints should be used only after their falls risk has been evaluated and alternatives to restraint have been considered. If restraints are applied, they should be used only for limited periods and should be reviewed regularly. The use of physical restraints has been associated with delirium, and therefore their use should be kept to a minimum.[301] See Chapter 7 for more information on delirium.

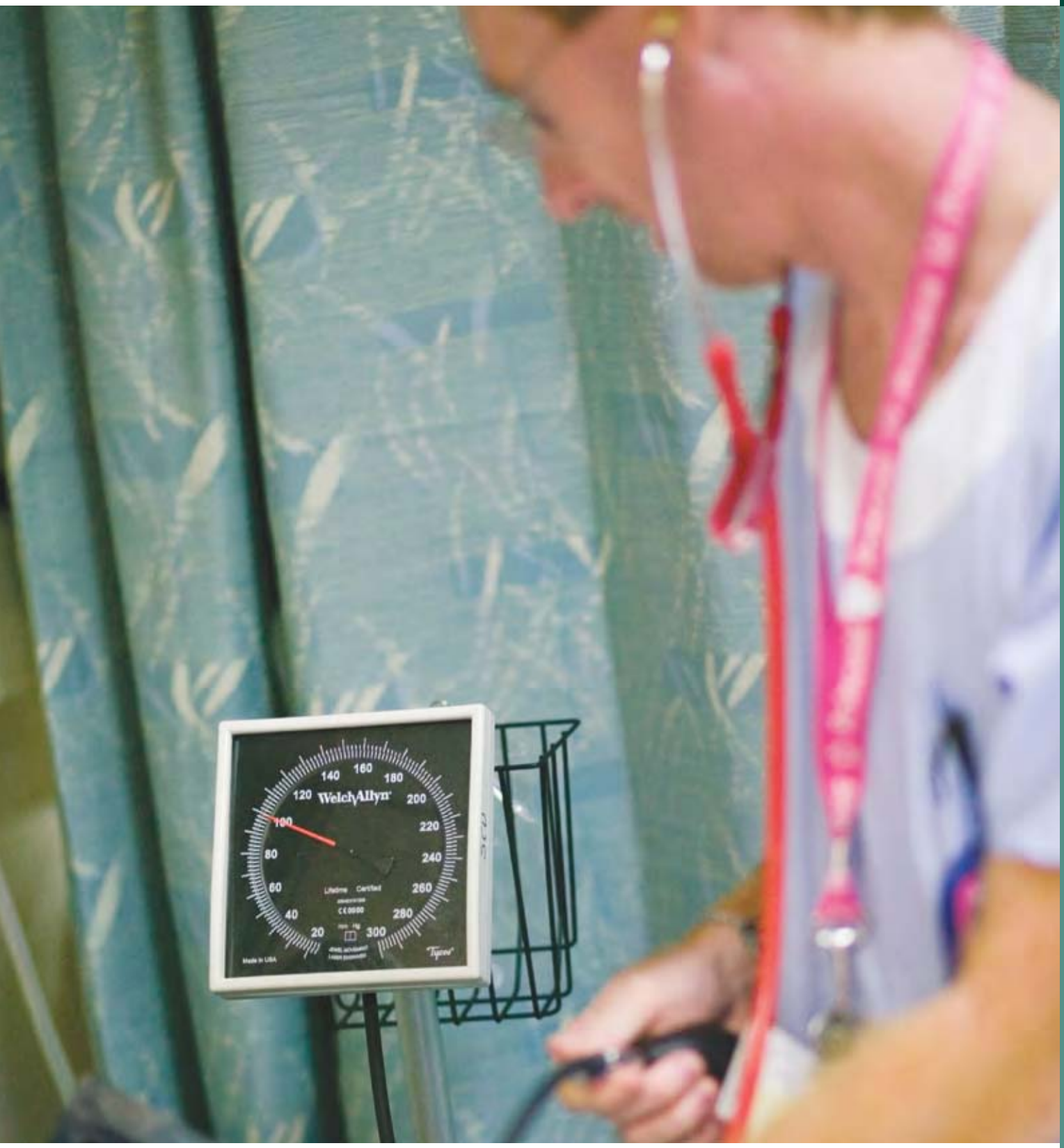
16.4 Economic evaluation

No economic evaluations were found that examined the cost effectiveness of restraints in the hospital setting.

Additional information

Below are some useful guidelines, policy statements and tools for the use of restraints and alternatives:

- Australian Government Department of Health and Ageing (2004). *Decision-Making Tool: Responding to Issues of Restraint in Aged Care*. This is a comprehensive resource that includes useful tools and flow charts: http://www.health.gov.au/internet/main/publishing.nsf/Content/ageing-decision-restraint.htm
- Nursing Board of Tasmania (2008). *Standards for the Use of Restraint for Nurses and Midwives 2008*: http://www.nursingboardtas.org.au/domino/nbt/nbtweb.nsf (and view the drop-down list for 'Nursing Code' under the publications tab
- Australian Medical Association (2001). *Restraint in the Care of Older People 2001*, position statement: http://www.ama.com.au/node/1293
- Nurses Board of South Australia (2008). *Restraints: Guidelines for Nurses and Midwives in South Australia*: http://www.nmbsa.sa.gov.au/documents/Restraints-GuidelineforNursesandMidwives.pdf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Part D
Minimising injuries from falls

17 Hip protectors

Recommendations

Assessment

- When assessing a patient's need for hip protectors in hospital, staff should consider the patient's recent falls history, age, mobility and steadiness of gait, disability status, and whether they have osteoporosis or a low body mass index.
- Assessing the patient's cognition and independence in daily living skills (eg dexterity in dressing) may also help determine whether the patient will be able to use hip protectors.

Intervention

- Hip protectors must be worn correctly for any protective effect, and the hospital should introduce education and training for staff in the correct application of hip protectors. (Level II-*)[302]
- When using hip protectors as part of a falls prevention strategy, hospital staff should check regularly that the patient is wearing their protectors, and ensure that the hip protectors are comfortable and the patient can put them on easily. (Level I-*)[303]

Good practice points

- Although there is no evidence of the effectiveness of hip protectors in the hospital setting, their use can be considered in individual cases where the patient is able to tolerate wearing them, and has a high risk of injurious falls.
- If hip protectors are to be used, they must be fitted correctly and worn at all times.
- The use of hip protectors in hospitals is challenging but feasible in subacute wards. In hospital wards where patients are acutely ill (acute wards), effective use of hip protectors has not been shown to be possible.
- Hip protectors are a personal garment and should not be shared between patients.

17.1 Background and evidence

Hip fractures are fractures to the top of the femur (thigh bone) immediately below the hip joint, and are usually the result of a fall.[303] Hip fractures occur in approximately 1.65% of falls[304] and are one of the more severe injuries associated with a fall. They usually require surgery and lengthy rehabilitation, and many patients do not regain their previous level of mobility even after 12 months.[122] Pelvic fractures can also occur, although these are less common.

Hip protectors are one approach to reducing the risk of hip fracture. They come in various styles, and are designed to absorb or dissipate forces at the hip if a fall onto the hip area occurs. Hip protectors consist of undergarments with protective material inserted over the hip regions. They are sometimes called 'hip protector pads', 'protector shields' or 'external hip protector pads'. These guidelines refer to them all as hip protectors.

17.1.1 Studies on hip protector use

Early studies (up to 2001) on hip protectors seemed to show that they reduced the incidence of hip fractures in institutional settings, and so they were introduced widely into practice. However, design flaws in these studies limit the strength of their conclusions.[303] Nevertheless, there is some evidence that, when worn correctly, hip protectors may prevent hip fractures in older people in hospitals or residential aged care facilities — although more recent research indicates that their benefits may be less than originally thought.[303] Hip protectors can therefore be used as part of a multifactorial falls and injury prevention intervention in hospitals, although they will not prevent falls or protect other parts of the body.[305]

Whatever their effectiveness, hip protectors must be worn — and worn correctly — if they are to have any benefit. An Australian study looked at the feasibility of introducing hip protectors into the hospital ward environment.[306] Patients with the highest risk of falling were identified, using a falls risk assessment tool, and then encouraged to wear hip protectors for the rest of their time in hospital ($n = 30$). Of these 30 patients, 29 wore the hip protectors for their remaining time in hospital, and 27 still wore the hip protectors two weeks after discharge. A questionnaire showed that nursing staff had high acceptance of hip protectors and only experienced minor problems with adherence and wearing hip protectors during the day. This study indicates that the use of hip protectors in the hospital setting may be useful; however, larger studies are needed.

17.1.2 Types of hip protectors

There are three types of hip protectors:

- Soft hip protectors (type A) are available in a variety of designs. Their common feature is that they are made from a soft material, rather than a rigid plastic shell.
- Hard hip protectors (type B) consist of a firmer, curved shell, sewn or slipped into a pocket in a lycra undergarment similar to underpants or bike pants. Most research on hip protectors has evaluated hard hip protectors.
- Adhesive hip protectors (type C) are stuck directly to the skin of the wearer. Few studies investigate this type of hip protector.

As a general observation, type A is preferred in hospitals, because type B is difficult to use due to laundering difficulties. The key factor for success appears to be the commitment of staff to patient care and quality improvement, particularly when this is supported by senior staff. Adherence of both the patient and staff is an issue in all environments and is lower in warmer climates (see Section 17.3.3).

17.1.3 How hip protectors work

Hip protectors work by absorbing the energy created by a fall or dispersing it away from the hip joint, so that the soft tissues and muscles of the surrounding thigh absorb the energy instead. The hard plastic hip protector shields divert the force of the fall from the bones of the hip to the surrounding muscles of the thigh. The soft hip protectors seem to work mainly by absorbing the energy of the fall. Hip protectors must be worn over the greater trochanter of the femur to be effective.

More than 95% of hip fractures occur from a fall with direct impact on the hip,[235] with only a small number of spontaneous fractures caused by osteoporosis or other bone pathology. Other hip fractures may occur if a person falls onto their buttock or if a rotational force through the neck of the femur is applied.[307]

The force generated by a fall from a standing height is large and has the potential to break the hip of a person of almost any age. The force applied to the femur near the hip in a fall from standing height is approximately 6000 newtons. The most effective padding system can reduce this to approximately 2000 newtons in a laboratory test.[308]

It is not necessary to wear a hip protector over a hip that has been surgically repaired with internal fixation or hip replacement, because the neck of the femur has been either replaced or reinforced (by hemiarthroplasty, or a pin and plate, etc).[307]

A randomised controlled trial of hip protectors noted adverse effects in 5% of people.[309] Hip protectors can cause bruising if the person falls onto the hip protector. Skin infections and pressure ulcers (bedsores) can develop under or around the area where a hip protector is worn.

Hip protectors can make toileting difficult for frail, older people. For example, older people can become less independent in everyday activities because of the extra time and effort needed to put on and take off the hip protectors (this can also cause incontinence in some people; see Chapter 8 on continence for more information).

17.1.4 Adherence with use of hip protectors

A disadvantage of hip protectors is a low level of adherence because of discomfort, practicality,[310] the extra effort needed to put them on, or urinary incontinence.[311-314] In some settings, cost might also be a barrier to hip protector use.[315]

Adherence with use of hip protectors is crucial to their effectiveness.[316] In the first reported randomised trial of hip protectors, only 24% of a subgroup of participants were wearing hip protectors when they fell.[317] This trial was included in a 2005 Cochrane review of hip protectors, and the other trials included also reported low adherence rates, which may have influenced the outcome.[303]

To help patients to keep wearing their hip protectors, the patient's needs and preferences must be matched with the availability of different types of undergarment material, removable or sewn-in hip protector shields and different styles of undergarments, including those allowing use of continence aids.[318] In many cases, adherence is most affected by the patient's motivation to wear the hip protectors,[318] and by the type of hip protector (eg hard, soft).[303] In other cases, wearing hip protectors may be a visual reminder of the consequences of falling, and cause the patient or their carer to modify their behaviour to minimise risk.[303]

The attitudes of staff in hospitals may have a substantial effect on whether a patient wears hip protection.[319]

Queensland Health developed a set of best practice guidelines for residential aged care facilities (which may also be useful for the hospital setting) that included the following feedback from focus groups and health professionals on why hip protectors were difficult to introduce as standard practice:[247]

- They caused skin rashes and increased perspiration.
- They were uncomfortable to sleep in and had the potential to cause pressure sores.
- They were difficult to launder, particularly for people with incontinence.
- Replacing hip protectors was costly.
- There were infection-control issues.
- Some older people refused to wear, or pulled out, hip protectors.
- They were considered too big or bulky, particularly with incontinence pads, catheters and dressings.
- They moved and could become uncomfortable.
- There was not enough information on how to fit hip protectors.
- Some staff did not always support older people to use hip protectors, or were sceptical about their efficacy.
- There were problems with price, style and comfort for the wearer, including image perception.

Point of interest: Cochrane review of hip protector use and adherence

The 2005 Cochrane Collaboration review of hip protectors[303] contains tables that summarise the randomised trials of hip protectors.†

17.2 Principles of care

Because of the diversity of patients, service settings and climates, patients should have a choice of types and sizes of hip protectors. Soft, energy-absorbing shields are often reported as more comfortable for wearing in bed. A choice of underwear styles and materials means that problems with hot weather, discomfort and appearance can be addressed.

17.2.1 Assessing the use of hip protectors

When assessing a patient's need for hip protectors, hospital staff should consider the patient's recent history of falls, their age, their mobility, whether they have a disability, whether they are unsteady on their feet, and whether they have osteoporosis or osteomalacia. Assessing the patient's cognition and independence in daily living skills (eg dexterity in dressing) may also help determine whether they will be able to use hip protectors. Hospital staff can use a falls risk assessment tool (see Chapter 5) to help decide whether someone has a high risk of falling and therefore may be considered for the use of hip protectors.

17.2.2 Using hip protectors at night

Older patients' risk of falling can increase during the evening and night. Therefore, patients who have a high risk of falling, or osteoporosis, or a history of falling at night, may benefit from wearing hip protectors when they go to bed. The soft pads (type A) are relatively comfortable when correctly positioned and can be worn more easily in bed than the hard shell protectors (type B) because they are less obtrusive.[247]

17.2.3 Cost of hip protectors

Cost of hip protectors appears to be a factor influencing uptake, particularly where they are supplied by the facility. Reimbursement by private health funds or by appliance supply schemes may improve this problem. It is unclear to what degree cost affects adherence with longer term use of hip protectors (see Section 17.4 on economic evaluation).

17.2.4 Training in hip protector use

Fitting and managing hip protectors are often the responsibilities of a particular member of the health team. Nurses and other care staff are in a key position to encourage adherence with use of hip protectors, because they often help frail older people with dressing, bathing and toileting. Nurses and other care staff should have education and support in developing strategies to encourage adherence with, and correct application of, hip protectors.

Two studies have researched the benefits of training staff in the correct application, rationale for use, and importance of encouraging the use of hip protectors.[302,320] Training the individual wearer may also improve adherence, by addressing any barriers that the person sees in wearing hip protectors and providing precise instructions and demonstration on how to wear them.

Before the patient starts wearing hip protectors, health care staff and carers should discuss arrangements for cleaning the hip protectors. Washing in domestic washing machines and dryers is feasible, but some hip protectors will not withstand commercial laundering. Although self-adhesive hip protectors may be appealing in some respects (eg the patient can use their own undergarments), it is unclear whether they can be safely used in the long term.

† See http://www.thecochranelibrary.org and search for 'hip protectors'.

17.2.5 Review and monitoring

Currently, the design and production of hip protectors is unregulated, and there are no national or international testing procedures for their effectiveness.[303]

A standard definition of adherence with use of hip protectors should be used when reviewing and monitoring their use.[321] The most easily measured marker of adherence is the number of 'protected falls', which is the proportion of falls in which a hip protector is worn.

Case study

Mrs J was hospitalised after a fall in which she sustained a fractured pelvis. In the rehabilitation ward, she agreed to use hip protectors. The ward nurses showed her how to use the hip protectors and encouraged their use in hospital. She continued to wear them at home after discharge from hospital. Mrs J's adherence with use of the hip protectors was checked when she attended the clinic for a follow-up visit. While watering her garden, Mrs J fell onto the hip protectors. It is likely that a fracture was prevented as she had a bruise on her upper thigh under the hip protector.

17.3 Special considerations

17.3.1 Cognitive impairment

Patients with cognitive impairment have a higher prevalence of falls and fractures[322] and should be considered for hip protector use. These patients often need help to use hip protectors in the first instance, and then to continue wearing them. Hip protectors may need to be used with an additional risk management strategy for patients known to have balance difficulties and who wander.

17.3.2 Indigenous and culturally and linguistically diverse groups

The use of hip protectors in people from Indigenous and culturally and linguistically diverse groups has not been researched specifically. Firmly fitting underwear may be unfamiliar in some cultures, but the extent to which this may influence adherence with use of hip protectors is unknown.

17.3.3 Climate

Much of the research in relation to hip protectors has been done in cooler climates. Adherence in warmer and more humid areas may be problematic.

17.4 Economic evaluation

The effectiveness of hip protectors in hospitals is uncertain. No economic evaluations have examined the cost effectiveness of hip protectors in the hospital setting. A number of analyses considered the use of hip protectors in other settings (such as residential care or mixed residential care/community settings); however, it is uncertain whether the results of these analyses are applicable in the hospital setting because of differences in patient characteristics and likely resource use across the settings. In addition, many of the analyses conducted in a mixed or residential care setting have methodological limitations, such as the use of optimistic estimates of efficacy, adherence, and quality of life impacts of wearing hip protectors (see Chapter 16 in the community guidelines and Chapter 17 in the residential aged care guidelines for more information).

Additional information

The following appendices and website provide additional information:

- Appendix 6 contains a checklist of issues to consider before using hip protectors.[318]
- Appendix 7 is a sample hip protector care plan.
- Appendix 8 is a sample hip protector observation record.
- The description of the educational program used in the study of Meyer and colleagues[302] provides a guide to hip protector implementation in residential aged care facilities (Appendix 9).
- Cochrane Collaboration website — the Cochrane Library: http://www.thecochranelibrary.org (and search for 'hip protectors').

18 Vitamin D and calcium supplementation

Recommendations

Assessment

- To screen for possible vitamin D deficiency, dieticians, nutritionists or health professionals can collect information on the patient's eating habits, food preferences, meal patterns, food intake and sunlight exposure. Alternatively, a blood sample can be taken.

Intervention

- Vitamin D and calcium supplementation should be recommended as an intervention strategy to prevent falls in older people. Benefits from supplementation are most likely to be seen in patients who have vitamin D insufficiency (25(OH)D of <50 nmol/L) or deficiency (25(OH)D of <25 nmol/L), comply with the medication, and respond biochemically to supplementation. (Level I-*)[31]

Note: it is unlikely that benefits from vitamin D and calcium supplementation will be seen in hospital (particularly in acute care or short stays), but there is evidence both from the community and residential aged care settings to support dietary supplementation, particularly in patients who are deficient in vitamin D.

Good practice points

- Hospitalisation of an older person provides an opportunity for comprehensive health care assessment and intervention. There is no direct evidence to suggest that calcium and vitamin D supplementation will prevent falls in hospital; however, because most older people will return home or to their residential aged care facility, hospitalisation should be viewed as an opportunity to identify and address falls risk factors, including adequacy of calcium and vitamin D. This information should be included in discharge recommendations.
- As part of discharge planning, any introduction of vitamin D and calcium supplementation should be conveyed to the person's general practitioner or health practitioner.

18.1 Background and evidence

Low vitamin D levels have been associated with reduced bone mineral density, high bone turnover and increased risk of hip fracture.[323] Furthermore, vitamin D may prevent falls by improving muscle strength and psychomotor performance, independently of any other role in maintaining bone mineral density.[324,325]

Point of interest: how vitamin D reduces the risk of falling

The active vitamin D metabolite (25-hydroxyvitamin D) binds to a highly specific nuclear receptor in muscle tissue. This improves muscle function, which may be the reason that vitamin D reduces the risk of falling.[324] Furthermore, vitamin D deficiency has also been associated with osteoporosis, urinary incontinence, cognitive decline and macular degeneration.[326]

Vitamin D levels are measured by blood 25-hydroxyvitamin D (25(OH)D) levels. The levels of 25(OH)D that were previously recommended for adequate vitamin D stores are now thought to be too low.[323,327] The incidence of vitamin D deficiency (25(OH)D levels less than 25 nmol/L) in Australia has been reported as 22-86% in residential aged care, 67% of geriatric hospital admissions, and 61% of people experiencing hip fractures.[323] Another study found that, in Australia, 86% of women and 68% of men in residential aged care facilities (RACFs) have frank vitamin D deficiency, and virtually all the remainder have a level in the lower half of the reference range.[328]

People at high risk of vitamin D deficiency include older people (particularly in RACFs), those with skin conditions that require them to avoid the sun, dark-skinned people (particularly if veiled), and people with malabsorption.[323] Vitamin D deficiency is significantly more common among people with dementia and people from culturally and linguistically diverse groups.[329]

Intervention to improve levels of vitamin D has used a range of approaches with varying success levels, including vitamin D supplementation alone, vitamin D supplementation with calcium supplementation, and exposure to sunlight. Older people in hospital are discharged to both the community and RACF settings; therefore, the evidence and recommendations for both settings are considered here. These are explained in the following sections.

Nutrition management is an important element of good aged care practice, and can play an important role in some aspects of falls prevention, directly and indirectly (eg good nutrition is required to gain optimal effect from an exercise program). Other than vitamin D and calcium supplementation (and related nutritional involvement in osteoporosis management), nutrition is not included as a separate core falls prevention activity in these guidelines, because it is an area with limited research to guide best practice in falls prevention to date (see Appendix 10 for a chart for monitoring food and fluid intake, and Appendix 11 for food guidelines for calcium intake for preventing falls in older people).

18.1.1 Vitamin D supplementation (with or without calcium) in the community setting

A high-quality systematic review (a Cochrane review) analysed 111 randomised controlled trials (RCTs) of various falls prevention interventions for older people living in the community.[31] The review included RCTs that assessed vitamin D supplementation, with or without calcium supplementation (among other interventions, such as exercise and multifactorial falls prevention programs). The review found no evidence for an effect of vitamin D (with or without calcium supplementation) on the rate or risk of falling. However, a subgroup analysis of people with vitamin D deficiency showed a significant reduction in both the rate and risk of falls — although this result must be interpreted with caution and followed up with further research.

A study of the alfacalcidol form of vitamin D supplementation in older people who live in the community, and who are not vitamin D deficient, supports the hypothesis that treatment with vitamin D (or its analogues) requires a minimum daily calcium intake of 500 mg/day to produce clinically significant results.[327] The Australian recommended daily intake (RDI) for calcium in older people is 800 mg for men and 1000 mg for women.[330] However, this level may be too low, with other sources recommending daily intake of 1500 mg for both men and women.[331]

Vitamin D analogues (eg calcitriol — 1,25(OH)2D3) are associated with adverse effects, such as hypercalcaemia. In a position paper on vitamin D and adult bone health, the Australian Working Group of the Australian and New Zealand Bone and Mineral Society, the Endocrine Society of Australia and Osteoporosis Australia state that calcitriol is not appropriate for treating patients with deprivational vitamin D deficiency because it has a narrow therapeutic window, may result in hypercalcaemia or hypercalciuria, and does not increase serum 25(OH)D levels.[332]

18.1.2 Vitamin D combined with calcium supplementation in the RACF setting

A high-quality systematic review (a Cochrane review) looked at interventions — including vitamin D supplementation — for preventing falls in the hospital and RACF settings.[31] The review included five trials in total, two of which were similar enough for the data to be pooled. The pooled results showed that vitamin D with calcium appeared to be effective in preventing falls in long-term residents of RACFs, and that the benefits of supplementation were more certain in people who had low serum vitamin D.

18.1.3 Vitamin D supplementation alone in RACF settings

There is uncertainty about the effect of vitamin D supplementation without calcium. A meta-analysis found that vitamin D supplementation appears to reduce the risk of falls among ambulatory or institutionalised older people with stable health by more than 20%.[324] Although not looking at the same outcome, an earlier Cochrane review of vitamin D for preventing fractures associated with osteoporosis reported uncertainty about the efficacy of regimens.[242] In this review, vitamin D without any calcium cosupplementation was not associated with a reduced risk of hip fracture or other nonvertebral fractures.[242,333] The position paper on vitamin D and adult bone health from the Working Group of the Australian and New Zealand Bone and Mineral Society, the Endocrine Society of Australia and Osteoporosis Australia states that calcium is likely to be needed with vitamin D to reduce fracture rates, because most studies have used a combination of vitamin D and calcium supplementation.[332]

18.1.4 Vitamin D, sunlight and winter in the community setting

The main source of vitamin D is from sunlight.[330] Evidence suggests that sourcing vitamin D from dietary intake alone is not sufficient.[323]

Sun exposure may not work if the skin of older adults does not convert cholesterol precursors to vitamin D efficiently. Additionally, sun exposure recommendations are difficult to implement in frailer people. In the absence of routine fortification of food with vitamin D, sunlight exposure or vitamin D supplementation are the only reasonable options to ensure adequate levels of calcitriol.

The Geelong Osteoporosis Study found that in winter there was reduced serum vitamin D, increased bone resorption and an increase in the proportion of falls resulting in fracture.[334] The role of vitamin D supplementation during the Australian winter has yet to be investigated.

Point of interest: vitamin D and latitude

Little vitamin D is produced beyond latitudes of about 35° (ie Victoria and Tasmania) in winter, especially in older people. This is because of an increase in the zenith angle of the sun (angle between directly overhead and a line through the sun), resulting in more photons being absorbed by the stratospheric ozone layer.[335]

18.1.5 Toxicity and dose

Toxicity of vitamin D cannot be caused by prolonged sun exposure; however, it can occur from supplementation with vitamin D.[330] Hypercalcaemia may occur if vitamin D is given, particularly in the form of the vitamin D analogues,[242] and calcitriol is not recommended.[332] However, toxicity with cholecalciferol (vitamin D3) up to 10000 IU daily is rare and occurs predominantly if dietary or oral calcium supplements are high, or if granulomatous disorders are present. There is no RDI for vitamin D, although trials that show benefit from vitamin D have used a minimum of 800 IU daily. The United States Institute of Medicine's Food and Nutrition Board proposes a daily vitamin D intake of 600 IU in people over 71 years of age.[323] In Australia and New Zealand, a minimum daily dose of 400 IU is recommended, with higher doses required for those with vitamin D (25(OH)D) levels lower than 50 nmol/L.[332]

18.2 Principles of care

18.2.1 Assess vitamin D adequacy

Dieticians, nutrition and dietetic support staff, or nursing and medical staff, can collect information on eating habits, food preferences, meal patterns, food intake and sunlight exposure. To do this, they can use:

- food preference records
- food and fluid intake records (see Appendix 10)
- 25(OH)D blood levels.

18.2.2 Ensure minimum sun exposure to prevent vitamin D deficiency

Osteoporosis Australia (in association with the Cancer Council Australia) recommends that, for most older Australians, vitamin D deficiency can be prevented by 5–15 minutes exposure of the face and upper limbs to sunlight four to six times each week, although deliberate exposure to sunlight between 10 am and 3 pm in the summer months for more than 15 minutes is not advised.

If this modest sunlight exposure is not possible, a vitamin D supplement of at least 800 IU per day is recommended.

18.2.3 Consider vitamin D and calcium supplementation

Hospitalisation of an older person provides an opportunity for comprehensive health care assessment and intervention. There is no direct evidence to suggest that calcium and vitamin D supplementation will prevent falls in hospital; however, because most older people will return home or to their RACF, hospitalisation should be viewed as an opportunity to identify and address falls risk factors, including adequacy of calcium and vitamin D.

For confirmed cases of vitamin D deficiency, supplementation with 3000–5000 IU per day for at least one month is required to replenish body stores. Increased availability of larger dose preparations of cholecalciferol (vitamin D3) would be a useful therapy in the case of severe deficiencies.[323,332,336]

For most older adults in long-term care in Australia, it is appropriate to supplement with 1000 IU vitamin D without measuring 25(OH)D blood levels. This is based on the prevalence of deficiency, and the low risk and benefit of supplementing with vitamin D in this untargeted way to prevent hip fractures.[323,337,338]

18.2.4 Encourage patients to include foods high in calcium in their diet

The food guidelines in Appendix 11, which outline calcium and vitamin dietary suggestions and hints, are useful for encouraging people to include more calcium in their diet.[339] Referral to a dietician may be appropriate if a person is having trouble consuming adequate calcium, has lactose intolerance, does not include calcium as a normal part of their diet (culturally) or does not consume dairy foods (eg they follow a vegan diet).

18.2.5 Discourage patients from consuming foods that prevent calcium absorption

Oral calcium intake needs to meet the RDI. Patients should be discouraged from consuming too many foodstuffs that lower or prevent calcium absorption (eg caffeine, soft drinks containing phosphoric acid). Instead, they should be encouraged to include foods high in calcium in their diet.

Analysis of food intake records or diet history should show a daily intake of calcium of 800 mg for men and 1000 mg for women.[339]

Case study

Mrs F was admitted to hospital following a fall. In keeping with her culture and religious beliefs, she only allows her face, hands and feet to be exposed. Blood tests revealed severe vitamin D deficiency – a vitamin D level of 12 nmol/L. Mrs F's deficiency was initially managed with one month of 3000 IU units of vitamin D each day. This was reduced to 800 IU daily after the initial period of replacement.

Because Mrs F was admitted to hospital after a fall, hospital staff reviewed her medications while she was in hospital, and an occupational therapist undertook a home assessment before she was discharged.

18.3 Special considerations

18.3.1 Cognitive impairment

Cognitive impairment can be associated with nutritional deficiencies, including a reduced calcium and vitamin D intake in the diet. Hospital staff should monitor patients' oral intake closely, and refer them to a dietician if intake is low. Oral calcium and vitamin D supplementation are frequently required to maintain levels of both calcium and vitamin D in this population.

18.3.2 Indigenous and culturally and linguistically diverse groups

Increased skin pigment reduces the amount of vitamin D production after sun exposure, so dark-skinned people are more susceptible to low vitamin D levels. People who are heavily clothed and veiled for religious or cultural reasons are also at increased risk of low vitamin D levels.

18.4 Economic evaluation

A number of vitamin D and calcium-based compounds are publicly funded via the Pharmaceutical Benefits Scheme. See Chapter 19 on osteoporosis management for more information.

Additional information

The following useful publications provide information on dietary intake of vitamin D and calcium:

- National Health and Medical Research Council (2003). *Dietary Guidelines for All Australians:* http://www.nhmrc.gov.au/publications/synopses/dietsyn.htm
- Nowson CA, Diamond TH, Pasco JA, Mason RS, Sambrook PN and Eisman JA (2004). Vitamin D in Australia: issues and recommendations. *Australian Family Physician* 33(3):133-138: http://www.osteoporosis.org.au/files/research/vitamind_nowson_2004.pdf
- Osteoporosis Australia (2005). Recommendations from the Vitamin D and Calcium Forum (Melbourne, 28-29 July 2005). *Medicine Today* 6(12):43-50: http://www.osteoporosis.org.au/files/research/Vitdforum_OA_2005.pdf
- Working Group of the Australian and New Zealand Bone and Mineral Society, Endocrine Society of Australia and Osteoporosis Australia (2005). Vitamin D and adult bone health in Australia and New Zealand: a position statement. *Medical Journal of Australia* 182:281-285.

Osteoporosis Australia provides information and resources to reduce fractures and improve bone health in the community: http://www.osteoporosis.org.au/


General Practice Clinic

19 Osteoporosis management

Recommendations

Assessment

- Patients with a history of recurrent falls should be considered for a bone health check. Also, patients who sustain a minimal-trauma fracture should be assessed for their risk of falls.

Intervention

- People with diagnosed osteoporosis or a history of low-trauma fracture should be offered treatment for which there is evidence of benefit. (Level I)[283]
- Hospitals should establish protocols to increase the rate of osteoporosis treatment in patients who have sustained their first osteoporotic fracture. (Level IV)[340]

Good practice points

- The health care team should consider strategies for minimising unnecessary bedrest (to maintain bone mineral density), protecting bones, improving environmental safety and vitamin D prescription, and this information should be included in discharge recommendations.
- When using osteoporosis treatments, patients should be co-prescribed vitamin D with calcium.

19.1 Background and evidence

19.1.1 Falls and fractures

Only a small proportion of falls result in fractures and most, if not all, fractures occur after falls.[341] Bone mineral density is an important measure in predicting fractures in both men and women, and quadriceps strength and postural sway are of similar importance in predicting fractures.[342] No therapy is likely to normalise bone mineral density, but small improvements can reduce fracture risk.[343]

With this in mind, interventions that prevent falls risk may prevent fractures, even if bone density is not altered. This is of particular relevance to the very old, whose low bone density places them at particular risk, and in whom each additional fall increases the likelihood of a fracture.

19.1.2 Diagnosing osteoporosis

Osteoporosis Australia (a national nongovernment organisation that aims to reduce fractures and improve bone health in the community) states that the presence of osteoporosis can sometimes be recognised by a fracture, usually of the wrist, hip or spine; an increased curve of the thoracic (mid) spine; or loss of height.[344] A 30% loss of anterior vertebral height is sufficient to diagnose osteoporosis for the Pharmaceutical Benefits Scheme (PBS).

Osteoporosis is diagnosed by having a bone mineral density test. There are several methods for testing bone density. The most reliable and accurate test is the DXA test (dual energy X-ray absorptiometry), which is widely available in Australia. All bone mineral density tests measure the amount of mineral in a specific area of bone. The DXA test will give results as the following two scores:[344]

- *T score*, which compares bone density with that of an average young adult of the same sex. A T score of zero means that bones are the same density as the average younger population, and no treatment is necessary. A T score above one means that bones are denser than the average younger population. A T score below zero means that bones are less dense than the average younger population. Treatment should be considered if the score is below one (osteopaenia = 1 to –2.5) and there are several clinical risk factors for osteoporosis. T scores below –2.5 indicate osteoporosis, and treatment is strongly recommended to stop further bone loss and fractures.
- *Z score*, which compares bone density with the average for the person's age group and sex. If the Z score is zero, bones are average for the person's age and sex. Below zero indicates that bones are below average density, and above zero indicates that bones are above average density for age. A Z score below –2 means that bone is being lost more rapidly than in matched peers, so treatment needs to be monitored carefully. A Z score below –2 may also indicate that an underlying disease is responsible for the osteoporosis.

Hospital staff (particularly in emergency departments) should be vigilant in detecting anyone who has obvious manifestations of osteoporosis (eg thoracic kyphosis, a new low-trauma fracture). Also, people with multiple risk factors for osteoporosis may be detected opportunistically in hospitals, particularly in general medical inpatients.

19.1.3 Evidence for interventions

A previous fracture is one of the strongest risk factors for future fracture.[340] However, studies suggest that many people who sustain fractures do not undergo investigation or treatment for osteoporosis, or are not treated adequately to reduce future fracture risk, even when a diagnosis of osteoporosis has been made.[345,346]

Despite this, several effective drug treatments are now available. A meta-analysis and various randomised controlled trials have shown beneficial effects of oral or intravenous bisphosphonates in postmenopausal women who have low bone density;[347,348] a systematic review has shown the benefits of selective oestrogen receptor modulators in postmenopausal women with osteoporosis;[349] and a randomised controlled trial has shown the benefits of strontium ranelate for preventing osteoporosis in postmenopausal women.[350] These drugs are now considered the first-line treatments for osteoporosis.

As most of the randomised controlled trials of antiresorptive agents have used concomitant calcium and vitamin D (see Chapter 18), it is appropriate to ensure that vitamin D deficiency is corrected and to add a calcium supplement to these therapies when dietary calcium intake is suboptimal.

Bisphosphonates

Bisphosphonates are potent inhibitors of bone resorption. They stick to the bone surface and make the cells that destroy bone tissue less effective. This allows bone-rebuilding cells to work more effectively, resulting in increased bone density.[344,348] Currently, four bisphosphonates are available on the PBS to treat osteoporosis. The following three medications are available for men and postmenopausal women with an osteoporotic fracture:[344]

- risedronate (Actonel, Actonel Combi and Actonel Combi D), which increases bone density and reduces the risk or frequency of fractures at the spine and hip in postmenopausal women who have low bone density[348]
- alendronate (Fosamax, Fosamax Plus, Alendro), which increases bone density and reduces frequency of fractures at the hip and spine
- zoledronic acid (Aclasta), which is also used to treat osteoporosis in postmenopausal women or to prevent additional fractures in men and women who have recently had a hip fracture; because zoledronic acid works for a long time, only a single dose is required each year, making this osteoporosis therapy advantageous for frail older people living in the community or residential aged care.

A fourth bisphosponate medication is also available for osteoporosis:

- etidronate (Didrocal), which increases bone density and reduces risk of fractures in the spine, but not the hip.[283,344,351]

An association between bisphosponate use and a rare dental condition termed osteonecrosis of the jaw has been reported.[348] Osteoporosis Australia recommends that the small risk of this condition needs to be considered against the significantly reduced risk of fracture and other skeletal complications in older people with established osteoporosis. One approach is to ensure appropriate oral health and dental treatment before prescription, particularly if high doses or intravenous drugs are prescribed, or if a dental extraction is already planned.[352]

Alendronate and risedronate have been associated with adverse gastrointestinal effects (eg dyspepsia, abdominal pain, oesophageal ulceration).[348] Therefore, patients who have reflux oesophagitis or hiatus hernia should be screened before use.[352] Most studies have shown that the overall risk of adverse gastrointestinal events associated with risedronate or alendronate use is low, although a small number of studies report the opposite.[353] There is also evidence that risedronate is less risky than alendronate.[354] The potential for gastrointestinal side effects from either drug is lowered when the dosing is decreased to once per week.[354]

Selective oestrogen receptor modulators

Selective oestrogen receptor modulators (SERMs) are a special class of drug with many features similar to oestrogen used in hormone replacement therapy; however, they do not stimulate the breast and uterus tissues. As a result, SERMs have the positive effect of oestrogens on bone without increasing the risk of breast and uterine cancer. Raloxifene (Evista) increases bone density and reduces the risk of fractures in the spine. Evidence also shows it reduces the incidence of breast cancer.[283,344,351] However, SERMS have been associated with an increased risk of venous thromboembolism.[355]

Strontium ranelate

Strontium ranelate has been shown in randomised controlled trials to reduce the risk of both vertebral and peripheral fractures.[350] Strontium ranelate is the only antiosteoporotic agent that both increases bone formation markers and reduces bone resorption markers, resulting in a rebalance of bone turnover in favour of bone formation.

19.2 Principles of care

Screening for osteoporosis is important for minimising falls-related injuries. It is important to recognise that patients sustaining low-trauma fractures after the age of 60 years probably have osteoporosis and an increased risk of subsequent fracture.[356,357] Bone densitometry and specific antiosteoporosis therapy should be considered in these patients. Also, older patients with a history of recurrent falls should be considered for a bone health check.

In both cases (recurrent fallers and those sustaining low-trauma fractures), the health care team should consider strategies for optimising function, minimising a long lie on the floor, protecting bones, improving environmental safety and vitamin D prescription.[358,359]

Postmenopausal women who have low bone density, or who have already had one fracture in their spine or wrist, should be treated with a bisphosphonate (such as risedronate) to reduce their risk of further fractures in the spine or hip.[348] Consider using bisphosphonates, strontium or raloxifene to reduce the risk of vertebral fractures and increase bone density in older men at risk of osteoporosis (ie those with a low body mass index). Bisphosphonates work best in people with adequate vitamin D and calcium levels, and should therefore be co-prescribed.

Hospitals should establish protocols to increase the rate of osteoporosis treatment in patients who have sustained their first osteoporotic fracture.[340]

19.2.1 Review and monitoring

A good practice clinical indicator among hospital populations may be to review medication charts to see whether vitamin D supplements are being ordered and adjust for the number of patients who go outside regularly and for the latitude of the facility. Also, identify whether patients sustaining fractures are reviewed with regard to the possible diagnosis of osteoporosis. Finally, it may be possible to compare fracture rates in patients treated with specific antiosteoporosis therapy with those in patients not receiving therapy, if patients can be matched on a number of other key domains, such as age, sex and falls risk.

Case study

Mrs E, who is 75 years old, fell and fractured her humerus (upper arm), and was admitted to her local hospital. Specific questioning revealed that she had an early menopause and that she rarely goes outside because of concern about skin cancer. The orthopaedic surgeon treated her fracture. The nurse at the hospital clinic asked the doctor whether the fracture was related to osteoporosis and whether there was some way to reduce the chance of further similar falls and fractures. As a result of their discussion, the surgeon suggested that Mrs E start taking calcium and vitamin D and referred her to the osteoporosis clinic for a weekly bisphosphonate review, a nutritional review, and strength and balance training.

19.3 Special considerations

19.3.1 Cognitive impairment

Some people with cognitive impairment need to be supervised in the correct and safe manner of taking some oral bisphosphonates. This is because there are restrictions on lying down or eating after taking these medications.

19.4 Economic evaluation

A number of antiresorptive agents (such as bisphosphonates and strontium) and vitamin D analogues (alone or in combination with antiresportive agents) are available on the PBS for treatment of osteoporosis (prevention of fracture) in specific patient populations. The safety, effectiveness and cost effectiveness of these agents have been reviewed by the Pharmaceutical Benefits Advisory Committee. The fact that these agents are subsidised by the PBS indicates that they offer acceptable value for money in the Australian context, for specific patient populations.

Table 19.1 shows specific PBS subsidy details for various agents affecting bone mineral density (current at 27 August 2009).

Table 19.1 Pharmaceutical Benefits Scheme details for osteoporosis drugs

Drug	Subsidised indications
Alendronate Alendronate + cholecalciferol Risedronate Risedronate + calcium carbonate Risedronate + calcium carbonate + cholecalciferol	Treatment as the sole PBS-subsidised antiresorptive agent for osteoporosis in a patient aged 70 years or older with a bone mineral density T-score of –3.0 or less. Treatment as the sole PBS-subsidised antiresorptive agent for established osteoporosis in patients with fracture due to minimal trauma.
Etidronate + calcium carbonate	Treatment as the sole PBS-subsidised antiresorptive agent for established osteoporosis in patients with fracture due to minimal trauma.
Zoledronic acid	Treatment as the sole PBS-subsidised antiresorptive agent for (a) established osteoporosis in women with fracture due to minimal trauma; (b) established osteoporosis in men with hip fracture due to minimal trauma; or (c) osteoporosis in women aged 70 years or older, with a bone mineral density T-score of –3.0 or less (only one treatment each year for three consecutive years per patient is subsidised).
Calcitriol	Treatment for established osteoporosis in patients with fracture due to minimal trauma.
Raloxifene	Treatment as the sole PBS-subsidised antiresorptive agent for established postmenopausal osteoporosis in patients with fracture due to minimal trauma.
Strontium ranelate	Treatment as the sole PBS-subsidised antiresorptive agent for osteoporosis in a woman aged 70 years or older with a bone mineral density T-score of –3.0 or less. Treatment as the sole PBS-subsidised antiresorptive agent for established postmenopausal osteoporosis in patients with fracture due to minimal trauma.

Drug	Subsidised indications
Teriparatide	Treatment as the sole PBS-subsidised agent by a specialist or consultant physician, for severe, established osteoporosis in a patient with a very high risk of fracture who (a) has a bone mineral density T-score of –3.0 or less; and (b) has had two or more fractures due to minimal trauma; and (c) has experienced at least one symptomatic new fracture after at least 12 months continuous therapy with an antiresorptive agent at adequate doses.

Note: All agents require authority permission for prescription.

Additional information

For readers seeking definitive information on osteoporosis management, particularly related to medication management, the following resources are recommended:

- The National Institute for Health and Clinical Excellence, an independent organisation in the United Kingdom, produces clinical practice guidelines, including guidelines on osteoporosis management, based on the best available evidence. The guidelines contain recommendations on the appropriate treatment and care of people with specific diseases and conditions: http://www.nice.org.uk/.
- Osteoporosis Australia is a national organisation that aims to reduce fractures and improve bone health in the community. It provides information kits on falls and fractures.
  Phone: 02 9518 8140
  Fax: 02 9518 6306
  Toll free: 1800 242 141
  http://www.osteoporosis.org.au/html/index.php


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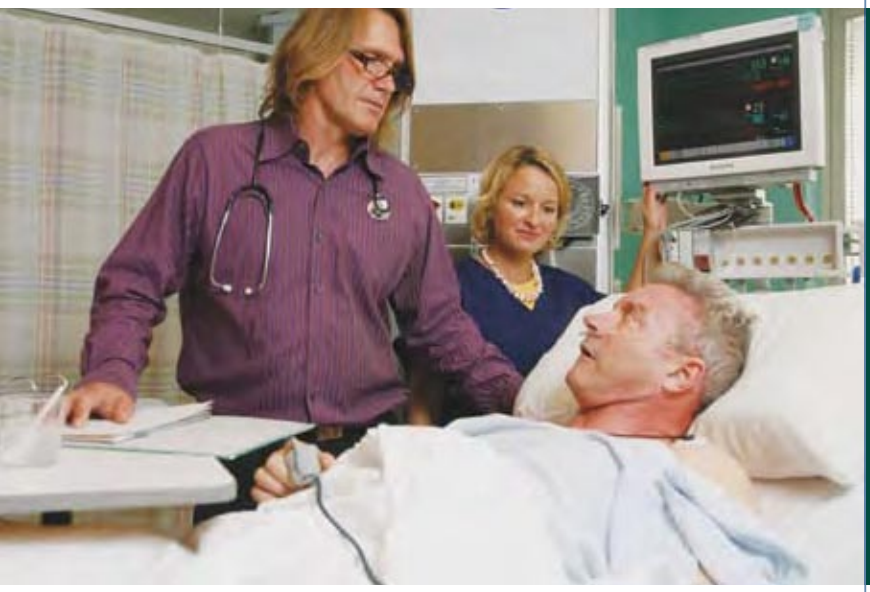

Part E
Responding to falls

20 Post-fall management

Good practice points

- Hospital staff should report and document all falls.
- It is advisable to ask a patient whether they remember the sensation of falling or whether they think that they blacked out, because many patients who have syncope are unsure whether they blacked out.
- Staff should follow the hospital protocol or guidelines for managing patients immediately after a fall.
- After the immediate follow-up of a fall, determine how and why a fall may have occurred, and implement actions to reduce the risk of another fall.
- Analysing falls is one of the key ways to prevent future falls. Organisational learning from this analysis can be used to inform practice and policies, and to prevent future falls.
  A post-fall analysis should lead to an interdisciplinary care plan to reduce the risk of future falls and injuries, and address any identified comorbidities or falls risk factors.
- An in-depth analysis of the fall (eg a root-cause analysis) is required if there has been a serious injury following a fall, or if a death has resulted from a fall.

20.1 Background

Hospital staff must take all falls seriously, because falls may be the first and main indication of another underlying and treatable problem in a patient.[45] Older people who fall are also more likely to fall again.[360] All hospital staff should be aware of what constitutes a fall (see Section 1.3.1 for a definition), what to do when a patient falls, and what follow-up is necessary (including completing a falls form). This chapter describes the responsibilities of hospital staff after a patient has fallen.

20.2 Responding to falls

Hospital staff should review the circumstances of every patient fall (eg do a root-cause analysis; see below), because doing so may guide the actions taken to reduce the incidence of further falls.[43] Staff should also complete a falls report, including recommendations for the immediate and longer term care required to manage consequences of the falls (injuries, loss of confidence) and to minimise risk of future falls.[4]

The circumstances surrounding a fall are of critical importance. However, this information is often difficult to obtain and may need to be sourced from people other than the patients themselves, including staff, visitors and other patients sharing the same ward. This may be particularly important if the patient does not recall, on direct questioning, the circumstances of the fall or hitting the ground.

Hospitals should have their own falls policy, or follow a clinical practice guideline for preventing and responding to falls. Staff should be made aware of, and have access to, these policies or guidelines. The following checklist for hospital staff is a guide to what should be included in a falls policy.

Checklist for managing the patient immediately after a fall

Offer basic life support and provide reassurance

- Check for ongoing danger.
- Check whether the patient is responsive (eg responds to verbal or physical stimulus).
- Check the patient's airways, breathing and circulation.
- Reassure and comfort the patient.[45,247]

Take baseline measurements

- Conduct a preliminary assessment that includes taking baseline measurements of pulse, blood pressure, respiratory rate, oxygen saturation and blood sugar levels. If the patient has hit their head, or if their fall was unwitnessed, record neurological observations (eg using the Glasgow Coma Scale).[45]

Check for injuries

- Check for signs of injury, including abrasion, contusion, laceration, fracture and head injury.[45,247,361]
- Observe changes in the level of consciousness, headache, amnesia or vomiting.

Move the patient

- Assess whether it is safe to move the patient from their position, and identify any special considerations in moving them. Staff members should use a lifting device rather than trying to lift the person on their own. Follow the hospital's policy or guideline on lifting.[45,362]

Monitor the patient

- Observe patients who have fallen and who are taking anticoagulants or antiplatelets (blood-thinning medications) carefully, because they have an increased risk of bleeding and intercranial haemorrhage. Patients with a history of alcohol abuse may be more prone to bleeding.
- Arrange for ongoing monitoring of the patient, because some injuries may not be apparent at the time of the fall.[247] Make sure that hospital staff know the type, frequency and duration of the observations that are required.

Report the fall

- Report all falls to a medical officer, even if injuries are not apparent.[361] Document all details in the patient's medical record, including their observations, appearance or response; evidence of injury; location of the fall; notification of medical provider; and actions taken.[247,361]
- Complete a falls reporting form according to local policy guidelines for all falls,[45,247,361] regardless of where the fall occurred, or whether the patient was injured.
- Note any details of the fall for reference in reporting the fall, including the patient's description of the fall, if possible.[45,361] As a minimum, this should include the location and time of the fall, what the patient was doing immediately before they fell, the mechanisms of the fall (eg slip, trip, overbalance, dizziness), and whether they lost consciousness or had a conscious collapse.

Discuss the fall and future risk management

- Communicate to all relevant staff, family and carers that the patient has fallen and has an increased risk of falling again.[361] At the earliest opportunity, notify the person nominated to be contacted in case of an emergency.[45,361]
- Discuss the circumstances of the fall, its consequences, and actions planned to reduce future falling risk with the patient and their family.
- Assume that once a patient has fallen, they automatically become at high risk of falling again until they have been assessed.[247]
- Follow local guidelines for identifying patients as being at increased risk of falling.

20.2.1 Post-fall follow-up

After the fall, determine how and why a fall may have occurred, and implement actions to reduce the risk of another fall. To do this, complete the following steps:

- Investigate the cause of the fall, including assessing for delirium.
- Review the implementation of existing falls prevention strategies.[247,361]
- Complete a falls risk assessment (see Chapter 5), because new risk factors may be present.[247,361]
- Implement a targeted, individualised plan for daily care, based on the findings of the falls risk assessment tool. Multifactorial interventions should be carried out as appropriate. They may include, but are not limited to, gait assessment, balance and exercise programs, footwear review, medication review, hypotension management, increased observation, environmental modification and treatment of cardiovascular disorders.[363] This will often involve referral to other members of the health care team.
- Encourage the patient to resume their normal level of activity, because many older people are apprehensive after a fall, and the fear of falling is a strong predictor of future falls.[322]
- Consider the use of injury-prevention interventions (see Part D).[247,361]
- Consider investigations for osteoporosis in the presence of low-trauma fractures.
- Ensure effective communication of assessment and management recommendations to everyone involved.[247,361]

20.3 Analysing the fall

A more in-depth analysis of the fall may be required, particularly where there has been a serious injury or adverse outcome for the patient. A review of a serious fall can address both individual and broader system issues to provide greater understanding of causation and future prevention. This is sometimes known as a root-cause analysis. A root-cause analysis is always required if a fall results in serious injury or death. In some jurisdictions, a fall in hospital that results in death must be reported to the state coroner. Each hospital should have a falls review process in place.

20.4 Reporting and recording falls

Accurate reporting of falls will occur only in a culture that is fair and just — that is, a 'no blame culture'. Staff often feel anxious when having to complete a falls form and can associate the fall with feelings of guilt and blame. For accurate reporting of falls, the leaders in the health service must promote falls reporting as a part of the improvement process, rather than a punitive tool to identify potential staff negligence.[364] This requires a fair and just culture for achieving safe and high-quality health care services.

For high-quality care and risk management, information about falls must be collected and collated to monitor falls incidence, identify falls patterns, identify ways of preventing future falls and provide feedback on the effectiveness of falls prevention programs.[4,45] Feedback should also be provided to staff regularly (eg monthly) so that local trends can be identified at a ward or unit level, and can be addressed as part of the routine continuous quality cycle.

Any data collected should be used to inform changes in hospital practice aimed at reducing patient falls rates. This requires analysing collected data regularly, monitoring trends, comparing falls data with that from other hospitals, and making changes to usual ward care based on findings.

20.4.1 Minimum dataset for reporting and recording falls

A minimum dataset should be collected about all falls to improve the safety and quality of health care. This includes the following information, which is based on expert opinion of best practice:

- What risk factors for falls and injury were present?
- What was the activity at the time of the fall?
- Has the patient had a falls risk assessment?
- What was the mechanism of the fall?
- What interventions were in place at the time of the fall?
- Was it a confirmed or suspected fall?

Based on the *Queensland Health Falls Prevention Guidelines* (2003) and the Australian Incident Monitoring System, a more comprehensive list may include the following additional data about falls:[364]

- type of fall (eg slip, trip, bumping into or falling on an object), and activity at the time of the fall (eg attempting to stand, walking)
- whether the person depends on a carer, aids or hospital staff
- if the person has a high risk of falls, what steps they have taken previously to prevent falls risk and injury risk
- relevant information about clothing, footwear, eyewear and mobility aids used at the time of the fall
- any restraints in use
- any recent change in medications that might be associated with falls risk
- any staff supervision provided at the time of the fall
- factors contributing to the fall, such as environmental conditions (eg floor, lighting, clutter) or staffing levels
- status following the fall (eg baseline observations, injuries)
- interventions to be implemented following the fall, and medical treatment required
- the person's perception of the fall, including description of any preceding sensations or symptoms and what they consider could have prevented the fall
- any witnesses to the fall
- any other comments.

Information should be completed whenever a fall or near miss occurs in a hospital. If information is already being collected, the hospital's current falls monitoring processes may not need to be altered. Hospitals may need to put processes in place to record falls incidences and outcomes if this information is not routinely collected, and this may be incorporated into existing falls reports.

To achieve the most accurate information about the fall, the description of the fall should also allow for free text. There should be room on the falls form for additional comments to be made. Staff should be encouraged to complete all sections of the falls report to minimise missing information when the fall is being reviewed.

20.5 Comprehensive assessment following a fall

Patients who fall repeatedly (eg two or more times per year) and people prone to injurious falls require a comprehensive and detailed assessment.[363] For a more detailed assessment, refer the patient to a specialist (eg geriatrician), where possible, or to a falls clinic.

20.6 Loss of confidence after a fall

A common but often overlooked consequence of a fall is the development of a loss of confidence in walking, or a fear of falling,[365] which can occur even in the absence of any injury. In the period after a fall, staff should observe the patient to note any change in usual activity that might indicate the presence of, or an increase in, fear of falling. Discussion with the patient about any concerns about falling might also be an opportunity to identify a fear of falling.

In community and residential aged care settings, common approaches to improving loss of confidence or fear of falling include participation in a balance and mobility training exercise program, and other falls prevention activities, including use of hip protectors.[365,366] Similar approaches are likely to be beneficial for older patients who fall while in hospital.

Additional information

The following are useful resources and websites:

- Department of Human Services (2001). *Falls and Mobility Clinics: Program Guidelines and Performance Indicators*, Department of Human Services, Acute Health Division, Melbourne.
- Victorian Falls Clinic Coalition: http://www.nari.unimelb.edu.au/vic_falls/vic_falls_contact.htm

Appendices

Appendix 1
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Involving older people in falls prevention	Dr Constance Vogler	Dr Constance Vogler
Part B — Standard falls prevention strategies		
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Appendix 2
Falls risk screening and assessment tools

A2.1 The St Thomas Risk Assessment Tool in Falling Elderly In-patients (STRATIFY)[69]

STRATIFY risk screen	
1. Did the patient present to hospital with a fall or has he or she fallen in the ward since admission?	Yes = 1 No = 0
Do you think the patient (Questions 2–5):	
2. Is agitated?	Yes = 1 No = 0
3. Is visually impaired to the extent that everyday functioning is affected?	Yes = 1 No = 0
4. Is in need of especially frequent toileting?	Yes = 1 No = 0
5. Has a transfer and mobility score of 3 of 6?	Yes = 1 No = 0

Transfer	Mobility
0 = unable – no sitting balance, mechanical lift	0 = immobile
1 = major help (one strong, skilled helper or two normal people; physical), can sit	1 = wheelchair independent, including corners, etc
2 = minor help (one person easily or needs supervision for safety)	2 = walks with help of one person (verbal or physical)
3 = independent (use of aids to be independent is allowed)	3 = independent (but may use any aid, eg cane)
Total score	**/5**

A2.2 The Ontario Modified STRATIFY

The Ontario Modified STRATIFY[74] was developed to adapt the St Thomas Risk Assessment Tool in Falling Elderly In-patients (STRATIFY), which was developed in the United Kingdom, to the Canadian hospital setting.

Ontario Modified STRATIFY risk screen		
Falls history	1. Did the patient present to hospital with a fall or has he or she fallen in the ward since admission? If not, has the patient fallen within the past 2 months?	Yes = 1 No = 0
Mental status	2. a. Is the patient confused (ie unable to make purposeful decisions, disorganised thinking, and memory impairment)? b. Is the patient disorientated (ie lacking awareness, being mistaken about time, place or person)? c. Is the patient agitated (ie fearful affect, frequent movements, and anxious)?	Yes = 1 No = 0 (on at least one question)
Vision	3. a. Does the patient require eyeglasses continuously? b. Does the patient report blurred vision? c. Does the patient have glaucoma, cataracts or macular degeneration?	Yes = 1 No = 0 (on at least one question)
Toileting	4. Are there any alterations in urination (ie frequency, urgency, incontinence, nocturia)?	Yes = 1 No = 0
Transfer and mobility	5. Transfer and mobility score of 3 of 6?	Yes = 1 No = 0

Transfer	Mobility
0 = unable – no sitting balance, mechanical lift	0 = immobile
1 = major help (one strong, skilled helper or two normal people; physical), can sit	1 = wheelchair independent, including corners, etc
2 = minor help (one person easily or needs supervision for safety)	2 = walks with help of one person (verbal or physical)
3 = independent (use of aids to be independent is allowed)	3 = independent (but may use any aid, eg cane)
Total score	**/5**

For each item, 0 (no risk) or 1 (risk) is substituted in the equation:
R = 6 (falls history) + 14 (mental status) + 1 (vision) + 2 (toileting) + 7 (transfer and mobility)

A2.3 Ontario Modified STRATIFY (Sydney Scoring)

The Ontario Modified STRATIFY – Sydney Scoring[74] was developed to adapt the St Thomas Risk Assessment Tool in Falling Elderly In-patients (STRATIFY) to the Australian hospital setting.

Ontario Modified Stratify – Sydney Scoring	
Date: / /	**MR Number** **Surname** **Date of birth** Please fill in if no patient label is available

Item	Falls risk screen		Value	Score
1 History of falls	Did the patient present to hospital with a fall or have they fallen since admission?	☐ No ☐ Yes	Yes to any = 6	
	If not, has the patient fallen within the last 2 months?	☐ No ☐ Yes		
2 Mental Status	Is the patient confused? (ie unable to make purposeful decisions, disorganised thinking and memory impairment)	☐ No ☐ Yes	Yes to any = 14	
	Is the patient disorientated? (ie lacking awareness, being mistaken about time, place or person)	☐ No ☐ Yes		
	Is the patient agitated? (ie fearful affect, frequent movements and anxious)	☐ No ☐ Yes		
3 Vision	Does the patient require eyeglasses continually?	☐ No ☐ Yes	Yes to any = 1	
	Does the patient report blurred vision?	☐ No ☐ Yes		
	Does the patient have glaucoma, cataracts or macular degeneration?	☐ No ☐ Yes		
4 Toileting	Are there any alterations in urination? (ie frequency urgency, incontinence, nocturia)	☐ No ☐ Yes	Yes = 2	
5 Transfer score (TS) *[means from bed to chair and back]*	Independent use of aids to be independent is allowed	0	Add transfer score (TS) and mobility score (MS) If value total between 0–3 then score = 0 If values total between 4-6 then score = 7	
	Minor help, one person easily or needs supervision for safety	1		
	Major help — one strong skilled helper or two normal people; physically can sit	2		
	Unable no sitting balance; mechanical lift	3		
6 Mobility score (MS)	Independent (but may use an aid eg cane)	0		
	Walks with help of one person (verbal or physical)	1		
	Wheelchair independent including corners etc	2		
	Immobile	3		
Action total score and follow risk recommendations as per level of risk (As validated tool patient at risk if total score ≥9)			0–5 Low risk 6–16 Medium risk 17–30 High risk	**Total score**

Medication checklist		
If one or more of the below medications are taken please refer for medication review. **These can increase falls risk:**		
☐ Antihypertensives	☐ Aperients	☐ Opioids
☐ Anticonvulsants	☐ Antiparkinsonians	☐ Diuretic
☐ Benzodiazepines	☐ Psychotropics	☐ Hypoglycaemics

Strategies for managing patients risk status:	
Low risk 0–5 points	1. Orientation to the bed area and ward facilities, ward routine and staff. 2. Lower bed if possible. Ensure brakes are on. 3. Place call bell and side table within reach, and instruct patient to call for assistance as required. 4. Ensure safe footwear when mobilising ie well-fitted shoes. 5. Provide safe footwear brochure to patient and carer. 6. Clothing to fit well and of appropriate length. 7. Clear area of hazards-spills, clutter, unstable furniture. 8. Fall prevention brochure provided to patient/carer. 9. Ensure patient has access to adequate nutrition and hydration. 10. Medication review 11. Bone protection medication review: consider vitamin D and calcium supplementation. 12. Ensure that patient has their glasses and hearing aid (if appropriate).
Medium risk 6–16 points	All of the above plus (if available): 12. Falls identifiers used (sign & sticker). 13. Supervise patient during mobilisation. 14. Supervise patient during self care and toileting. 15. Supervise patient with nutrition and hydration. 16. Regular toileting regimen, and prior to settling for the evening. 17. Use non-slip matting by the bed. 18. Referral to physiotherapy and/or occupational therapy for assessment.
High risk 17–30 Points	All of the above plus (if available): 19. Do not leave patient unattended during planned toileting, self care or mobilising. 20. Locate patient close to the nurses station. 21. Ensure bed height is appropriate to the needs of the patient. 22. Consider constant observation – particularly if confused/delirious. 23. Consider use of hip protectors.

Acknowledgments:

Northern Sydney Central Coast Area Health Service
Greater Southern Area Health Service
Sydney West Area Health Service
Clinical Excellence Commission
Prince of Wales Medical Research Institute

A2.4 Peninsula Health FRAT (screening component)

The Peninsula Health Falls Risk Assessment Tool (FRAT) has several parts. It is part of a comprehensive falls prevention package called the FRAT Pack (available for purchase), which includes detailed guidelines for use of the full Peninsula Health FRAT. The first part of the Peninsula Health FRAT can be used as a falls risk screen, and is provided below.

Permission to use this tool was provided by the Peninsula Health Falls Prevention Service. The tool was developed through funding from the Victorian Department of Human Services.

Acknowledgment is required if the tool is used by your organisation. Contact details for further information:

Ms Vicki Davies and Ms Carolyn Stapleton
Peninsula Health Falls Prevention Service
Jackson's Road (PO Box 192)
Mt Eliza VIC 3930
Email: VDavies@phcn.vic.gov.au or CStapleton@phcn.vic.gov.au

Peninsula Health FRAT (screening component)

Patient's name: Date:

Risk factor	Level		Risk score
Recent falls	None in the past 12 months		2
	One or more between 3 and 12 months ago		4
	One or more in the past 3 months		6
	One or more in the past 3 months while inpatient/resident		8
Medications *Sedatives, antidepressants, antiparkinsons, diuretics, antihypertensives, hypnotics*	Not taking any of these		1
	Taking one		2
	Taking two		3
	Taking more than two		4
Psychological *Anxiety, depression, ↓ cooperation, ↓ insight or ↓ judgment, especially regarding mobility*	Does not appear to have any of these		1
	Appears mildly affected by one or more		2
	Appears moderately affected by one or more		3
	Appears severely affected by one or more		4
Cognitive status *m-m: Hodkinson Abbreviated Mental Test Score*	m-m score 9–10/10 **OR**	intact	1
	m-m score 7–8	mildly impaired	2
	m-m score 5–6	moderately impaired	3
	m-m score 4 or less	severely impaired	4
		Total score	**/20**
	Low risk: 5–11 Medium risk: 12–15 High risk: 16–20	**Risk category**	

A2.5 Falls Risk for Hospitalised Older People (FRHOP)

MELBOURNE EXTENDED CARE & REHABILITATION

Falls Risk for Hospitalised Older People (FRHOP)

(To be completed on patient admission and after an acute episode)

Date of Assessment: / /

Place UR sticker here or add patient details:

Name:

UR number:

General (do not score, but ensure appropriate actions)	Nursing:
• Has the patient been oriented to the ward & routines, and a patient information brochure/booklet provided?	☐ Yes ☐ No
• Patient's environment assessed and safe? (seating type and height, bed height and assistive equipment eg monkeybar/bedstick)	☐ Yes ☐ No
• Is English the patient's preferred language?	☐ Yes ☐ No

Medical staff

Recent falls (0–3)		**SCORE**
• Has the patient fallen recently?	☐ Nil in 12 months (0) ☐ 1 in the last 12 months (1) ☐ 2 or more in 12 months (2) ☐ 1 or more during their current hospitalisation (3)	[ ]
• Did they sustain an injury?	☐ No (0) ☐ Minor injury, did not require medical attention (1) ☐ Minor injury, did require medical attention (2) ☐ Severe injury (fracture, etc) (3)	[ ]
Medications (0–3)		
• Is the patient on any medication?	☐ No medication (0) ☐ 1–2 medications (1) ☐ 3 medications (2) ☐ 4 or more medications (3)	[ ]
• Does the patient take any of the following type of medication? ☐ sedative ☐ analgesic ☐ psychotropic ☐ antihypertensive ☐ vasodilator/cardiac ☐ diuretics ☐ antiparkinsonian ☐ antidepressants ☐ vestibular supressant ☐ anticonvulsants	☐ None apply (0) ☐ 1–2 apply (1) ☐ 3 apply (2) ☐ 4 or more apply (3)	[ ]
	Sub total for this page	**[ ]**

Falls Risk Classification (please circle): Low / Medium / High

Patient Name: UR Number:

Medical staff

	Sub total from previous page	[ ]
Medical conditions (0–3)		
• Does the patient have a chronic medical condition/s affecting their balance & mobility? ☐ Arthritis ☐ Respiratory condition ☐ Parkinson's Disease ☐ Diabetes* ☐ Dementia ☐ Peripheral neuropathy ☐ Cardiac condition ☐ Stroke/TIA ☐ Other neurological conditions ☐ Lower limb amputation. ☐ Vestibular disorder (dizziness, postural dizziness, Meniere's disease...)	☐ None apply (0) ☐ 1–2 apply (1) ☐ 3–4 apply (2) ☐ 5 or more apply (3) *(* refer patients to Podiatry for a foot care review)*	[ ]
Sensory loss & communications		
• Does the patient have an uncorrected sensory deficit/s that limits their functional ability?	Vision: ☐ No (0) ☐ Yes (1) Hearing: ☐ No (0) ☐ Yes (1) Somato sensory: ☐ No (0) ☐ Yes (1)	[ ]
Is there a problem with communication (eg NESB or dysphasia)?	☐ No (0) ☐ Yes (1)	[ ]
Cognitive status: (score 0–3 points)		
• AMTS score	☐ 9–10 (0 point) ☐ 7–8 (1 point) ☐ 5–6 (2 points) ☐ 4 or less (3 points)	[ ]

Nursing staff

Continence		
• Is the patient incontinent? • Do they require frequent toileting or prompting to toilet? • Do they require nocturnal toileting?	☐ No (0) ☐ Yes (1) ☐ No (0) ☐ Yes (1) ☐ No (0) ☐ Yes (1)	[ ] [ ] [ ]
Nutritional conditions (score 0–3 points)		
• Has the patient's food intake declined in the past three months due to a loss of appetite, digestive problems, chewing or swallowing difficulties?	☐ No (0) ☐ Small change, but intake remains good (1) ☐ Moderate loss of appetite (2) ☐ Severe loss of appetite / poor oral intake (3)	[ ]
• Weight loss during the last 3–12 months.	☐ Nil (0) ☐ Minimal (<1 kg) (1) ☐ Moderate (1–3 kg) (2) ☐ Marked (>3 kg) (3)	[ ]
	Sub total for this page	[ ]

Falls Risk Classification (please circle): Low / Medium / High

Occupational Therapist

Patient Name: UR Number:

	Sub total from previous page	[ ]
Functional behaviour (score 0–3)		
• Observed behaviours in activities of daily living & mobility indicate:	☐ Consistently aware of current abilities/ seeks appropriate assistance as required (0) ☐ Generally aware of current abilities/ occasional risk-taking behaviour (1) ☐ Under-estimates abilities/ inappropriately fearful of activity (2) ☐ Over-estimates abilities/ frequent risk-taking behaviour (3)	[ ]
Feet & footwear and clothing		
• Does the patient have foot problems, eg corns, bunions etc.	☐ No (0) ☐ Yes (1) (specify):	[ ]
• The patient's main footwear are/have:- ☐ an inaccurate fit ☐ poor grip on soles ☐ in-flexible soles across the ball of foot ☐ heels greater than 2 cm high/less than 3 cm wide ☐ flexible heel counter** ☐ without fastening mechanism (ie lace, velcro or buckle. ☐ slippers or other inappropriate footwear?	☐ None apply (0) ☐ One applies (1) ☐ 2 apply (2) ☐ 3 or more apply (3) *(** half moon shape structure/stiffening at back of shoe)*	[ ]
• Does the patient's clothing fit well (not too long or loose fitting)?	☐ Yes (0) ☐ No (1)	[ ]

Physiotherapist

Balance (score 0–3 points)		
• Were the patient's scores on the Timed Up and Go test and the Functional Reach test within normal limits? Normal limits:— Timed up and Go — less than 18 seconds Functional Reach — 23 cm or more	☐ Both within normal limits (0) ☐ One within normal limits (1) ☐ Both outside normal limits (2) ☐ Requires assistance to perform (3)	[ ]
Transfers & mobility (score 0–3 points)		
• Is the patient independent in transferring and in their gait? (Includes wheelchair mobility)	☐ Independent, no gait aid needed (0) ☐ Independent with a gait aid (1) ☐ Supervision needed (2) ☐ Physical assistance needed (3)	[ ]
	Total risk score	[ ]

Score legend: 0 to 5 = Low risk; 6 to 20 = medium risk; 21 to 45 = high risk

A2.6 Falls Risk for Older People in the Community Screen (FROP-Com Screen)[60]

Falls Risk for Older People in the Community (FROP-Com) Screen

Screen all people 65 years and older
(50 years and older Aboriginal & Torres Strait Islander people)

Date of screen: / /

(Affix Patient ID Label)

UR No _____

Surname _____

Given Name _____

FALLS HISTORY		SCORE
1. Number of falls in the past 12 months?	☐ None (0) ☐ 1 fall (1) ☐ 2 falls (2) ☐ 3 or more (3)	[ ]
FUNCTION: ADL status		
2. Prior to this fall, how much assistance was the individual requiring for instrumental activities of daily living (eg cooking, housework, laundry)? • If no fall in last 12 months, rate current function	☐ None (completely independent) (0) ☐ Supervision (1) ☐ Some assistance required (2) ☐ Completely dependent (3)	[ ]
BALANCE		
3. When walking and turning, does the person appear unsteady or at risk of losing their balance? • Observe the person standing, walking a few metres, turning and sitting. If the person uses an aid observe the person with the aid. Do not base on self-report. • If level fluctuates, tick the most unsteady rating. If the person is unable to walk due to injury, score as 3.	☐ No unsteadiness observed (0) ☐ Yes, minimally unsteady (1) ☐ Yes, moderately unsteady (needs supervision) (2) ☐ Yes, consistently and severely unsteady (needs constant hands on assistance) (3)	[ ]
	Total risk score	[ ]

Total score	0	1	2	3	4	5	6	7	8	9
Risk of being a faller	0.25		0.7		1.4		4.0		7.7	
Grading of falls risk	0–3 Low risk				4–9 High risk					
Recommended actions	Further assessment and management if functional/balance problem identified (score of one or higher)				Perform the Full FROP-Com assessment and / or corresponding management recommendations					

Date: / /

Name _____ Signature _____ Designation _____

A2.7 Peter James Centre Fall Risk Assessment Tool (PJC-FRAT): risk assessment tool for the subacute rehabilitation setting

The Peter James Centre Fall Risk Assessment Tool (PJC-FRAT) is a multidisciplinary falls risk assessment tool. It was used as the basis for developing intervention programs in a randomised controlled trial in the subacute hospital setting that successfully reduced patient/resident falls. Permission to reproduce this tool was granted by Peter James Centre and BMJ Publishing Group.

Acknowledgment is required if the tool is used by your organisation. Contact details for further information:

Peter James Centre
Mahoney's Road
Burwood East VIC 3151
Phone: 03 9881 1888
Fax: 03 9881 1801

Falls Risk Assessment Tool	
(To be completed on admission)	Name: UR/MR number: Ward/Unit: Date of birth: Gender: Admission Date:
Tick box or add number as appropriate	*Place UR sticker here or add patient details:*
Medical	
Does the patient suffer from frequent falls with no diagnosed cause?	☐ → Refer for hip protector.
Is the patient suffering from an established medical condition that is currently unable to be adequately managed, that may cause a fall during their Inpatient stay (e.g. drop attacks due to vertebro-basilar artery insufficiency?	☐ → Refer for hip protector.
Is the patient taking any medications/medication amounts/ medication combinations that you anticipate may directly contribute to a fall (e.g. sedatives)?	☐ → Refer for hip protector.
	Signature: Date:
Nursing	
Toileting (day) F.I.M.	☐ → Document level of assistance required in patient/ resident record/file.
Toileting (night) F.I.M.	☐ → Document level of assistance required in patient/ resident record/file.
Would this patient benefit from a Falls Risk Alert Card and a Falls Prevention Information Brochure?	☐ → Refer for a Falls Risk Alert Card and a Falls Prevention Information Brochure
	Signature: Date:
Physiotherapy	
Gait F.I.M. (Gait aid + distance)	☐ → (_____/_____)
Transfer (bed <—> chair F.I.M)	☐
Would this patient benefit from attending a Balance Exercise Class?	☐ → Refer for Balance Exercise Class.
	Signature: Date:

Falls Risk Assessment Tool

Occupational Therapy

Bathing F.I.M	☐
Dressing F.I.M.	☐
Would this patient benefit from attending a Falls Prevention Education Program?	☐ → Refer for Falls Prevention Education Program.
	Signature: Date:

All disciplines

Has the patient demonstrated non-compliance or do you strongly anticipate non-compliance with the above prescribed level of aids/ assistance/supervision such that the patient becomes unsafe?	☐ → Refer for hip protector. Signature: Date:

The Modified Functional Independence Measure (F.I.M.)

(7) Independent with nil aids.
(6) Independent with aids.
(5) Supervision/prompting
(4) Minimal assistance required (patient greater than 75% of the task).
(3) Moderate assistance required (patient performs between 50% and 75% of the task).
(2) Maximal assistance required (Patient performs between 25% and 50% of the task).
(1) Fully dependent (patient performs less than 25% of the task).

Falls Risk Assessment Tool – Amendment sheet

Name:
UR/MR number:
Ward/Unit:
Date of birth: Gender:
Admission Date:
Place UR sticker here or add patient details:

This amendment section of the Falls Risk Assessment Tool is to be used when a patient's condition changes such that the employment of interventions is now indicated or now no longer indicated. For example, if a patient's confusion due to a UTI is now resolved, they may no longer require a hip protector.

Has the patient's condition changed such that the patient:

• Does now require a hip protector:	☐ → Refer for hip protector.
• Does no longer require a hip protector:	☐ → Note in record and make appropriate change
• Would now benefit from balance exercise class:	☐ → Refer for balance exercise.
• Would now benefit from a falls prevention education class:	☐ → Refer for falls prevention education.
• Would now benefit from a falls risk alert card and information brochure:	☐ → Refer for falls alert card.
	Signature: Date:

Has the patient's condition changed such that the patient:

• Does now require a hip protector:	☐ → Refer for hip protector.
• Does no longer require a hip protector:	☐ → Note in record and make appropriate change
• Would now benefit from balance exercise class:	☐ → Refer for balance exercise.
• Would now benefit from a falls prevention education class:	☐ → Refer for falls prevention education.
• Would now benefit from a falls risk alert card and information brochure:	☐ → Refer for falls alert card.
	Signature: Date:

A2.8 Falls Assessment Proforma – Emergency Department and Department of Health Care of the Elderly

Falls Assessment Proforma

Emergency Department & Department of Health Care of the Elderly

Name:		**Hosp No**	**Attending Dr**	
Date of attendance:			Time:	
Fall History				
First fall:	Yes / No	• No of falls in previous year:		(>1 = high risk)
		• Location of fall: Indoors / Outdoors		(indoors = high risk)
Was fall witnessed:	Yes / No			
Definite slip/trip:	Yes / No	Associated dizziness:	Yes / No	
LOC:	Yes / No	Palpitations:	Yes / No	
*Able to get self off floor:	Yes / No (N=high risk)	Time on floor (mins):		
Medical History		***Full Drug History (4+ meds = high risk)**		
Heart disease	☐			
Stroke	☐			
COPD/Asthma	☐			
Hypertension	☐			
Diabetes	☐			
Degenerative joint disease	☐			
Cognitive impairment	☐			
Visual impairment	☐			
Syncope	☐			
Epilepsy	☐			
Incontinence	☐			
Other – (please state)			Smoking:	no/week
			Alcohol:	units/week

Social Circumstances

Lives in: Flat / House / Bungalow / Maisonette / WCF / Residential Home / Nursing Home

Lives alone: Yes / No — Stairs: Yes / No

Lambeth / Southwark / Other — Usually able to go out: Yes / No

Mobility:	Services:	Carer:
☐ Independent	☐ MOW	☐ None
☐ Stick	☐ HH	☐ Spouse
☐ Frame	☐ Personal Care	☐ Other family
☐ Wheelchair	☐ District Nurse	☐ Friend/neighbour
	☐ Day Centre	
	☐ Day Hospital	

Examination

GCS: | BM

Temp: | Pulse: | BP; Lying / | Standing /

AMT

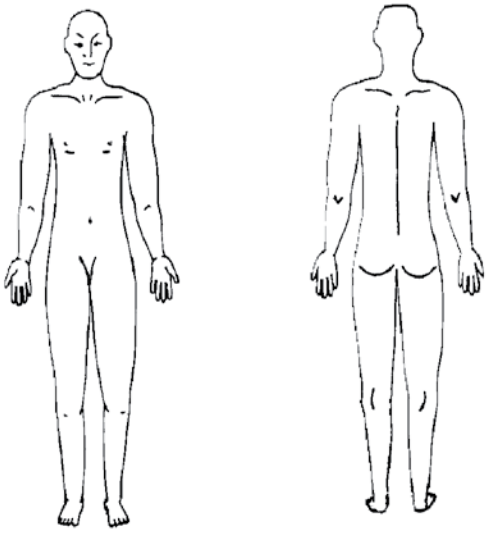
- ☐ Age
- ☐ Time (to nearest hour)
- ☐ Address for recall
- ☐ Year
- ☐ Location
- ☐ Recognition of two persons
- ☐ Date of Birth
- ☐ WW2
- ☐ Present monarch
- ☐ Count backwards 20 – 1

Score: / 10

Injuries Sustained

- ☐ Head injury – no laceration
- ☐ Head injury - laceration
- ☐ Fracture _____
- ☐ Laceration requiring stitches _____
- ☐ Laceration but no stitches _____
- ☐ Superficial bruising _____
- ☐ No injury

Indicate site of injury including pressure areas



Relevant Systems Examination

Current Level of Function

- ☐ No change from pre-fall level of function
- ☐ Decreased mobility / function but able to go home
- ☐ Decreased mobility / function – unable to discharge

Results

Conclusions

Likely cause of fall: ☐ simple slip/trip, ☐ acute illness, ☐ multifactorial, ☐ unexplained

Comments

* High risk – recommend referral to Falls Clinic if Falls Nurse not available to assess

Outcome:

- ☐ Home with GP letter
- ☐ Refer to Falls Clinic
- ☐ Refer to Rapid Response team
- ☐ Refer to Geriatric Out-Patients
- ☐ Refer for hospital admission

Signature _____ Print Name _____ Date / /

Appendix 3

Safe shoe checklist[247]

The requirement for safe, well-fitting shoes varies, depending on the individual and their level of activity. The features outlined below may help in the selection of an appropriate shoe. The shoe should:

Heel	☐	Have a low heel (ie less than 2.5 cm) to ensure stability and better pressure distribution on the foot. A straight-through sole is also recommended.
	☐	Have a broad heel with good ground contact.
	☐	Have a firm heel counter to provide support for the shoe.
Sole	☐	Have a cushioned, flexible, nonslip sole. Rubber soles provide better stability and shock absorption than leather soles. However, rubber soles do have a tendency to stick on some surfaces.
Weight	☐	Be lightweight.
Toe box	☐	Have adequate width, depth and height in the toe box to allow for natural spread of toes.
	☐	Have approximately 1 cm space between the longest toe and the end of the shoe when standing.
Fastenings	☐	Have laces, buckles, elastic or velcro to hold the shoe securely onto the foot.
Uppers	☐	Be made from accommodating material. Leather holds its shape and breathes well; however, many people find walking shoes with soft material uppers are more comfortable.
	☐	Have smooth and seam-free interiors.
Safety	☐	Protect feet from injury
Shape	☐	Be the same shape as the feet, without causing pressure or friction to the foot.
Purpose	☐	Be appropriate for the activity being undertaken during their use. Sports or walking shoes may be ideal for daily wear. Slippers generally provide poor foot support and may only be appropriate when sitting.
Orthoses	☐	Comfortably accommodating orthoses, such as ankle foot orthoses or other supports, if required. The podiatrist, orthotist or physiotherapist can advise the best style of shoe if orthoses are used.

This is a general guide only. Some people may require the specialist advice of a podiatrist for the prescription of appropriate footwear for their individual needs.

Appendix 4
Environmental checklist[45]

This tool was adapted from CERA — '*Putting your Best Foot Forward*' — *Preventing and Managing Falls in Aged Care Facilities*', by staff at the rehabilitation unit, Bundaberg Base Hospital Health Service District, as part of Queensland Health's Quality Improvement and Enhancement Program.

General environment checklist

Surname _____

First name _____

U.R. No _____

Date of birth / /

(Please affix patient ID label here if available)

Client location:	Bed/room No:		
Bathroom and toilets	**Please ✓ appropriate box**	**Yes**	**No**	**N/A**
Grab rails are appropriately positioned and secured in the toilet, shower and bath			
Floors are nonslip			
Baths/showers have nonslip treatment and/or mats			
Are areas immediately around the bath and sink marked in contrasting colours?			
Raised toilet seats are available			
Toilet surrounds and/or grab rails are available in toilets			
Soap, shampoo and washers are within easy reach and do not require bending to reach			
Do all shower chairs have adjustable legs, arms and rubber stoppers on the legs?			
Is there room for a seat in AND near the shower?			
Is the shower base without steps? (not necessary for most patients)			
Are call buttons accessible from sitting position in shower area?			
Are doors lightweight and easy to use?			
Furniture	**Please ✓ appropriate box**	**Yes**	**No**	**N/A**
Is furniture secure enough to support a client should they lean on or grab for balance?			
Are bedside lockers or tables available to clients so they can put things on safely without undue stretching and twisting?			
Are footstools in good repair and stoppers in good condition?			
Is space available for footstool when required?			

Client location:	Bed/room No:		
Floor surfaces Please ✓ appropriate box	Yes	No	N/A
Are carpets low pile, firmly attached and a constant colour rather than patterned?			
Are walls a contrasting colour to the floor?			
Is non-skid wax used on wooden and vinyl floors?			
Do floors have a matted finish which is not glary?			
Are 'Wet Floor' signs readily available and used promptly in the event of a spillage?			
Do steps have a non-slip edging in contrasting colour to make it easier to see?			
Is routine cleaning of floors done in a way to minimise risk to residents eg. well signed, out of hours?			
Lighting Please ✓ appropriate box	Yes	No	N/A
Is lighting in all areas at a consistent level so that patients are not moving from darker to lighter areas and vice versa?			
Do staircases have light switches at the top and bottom of them?			
Do patients have easy access to night lights?			
Are the hallways and rooms well lit (75 watts)?			
There is minimal glow from furniture/floorings			
Are all switches marked with luminous tape for easy visibility?			
Passageways Please ✓ appropriate box	Yes	No	N/A
Are all passageways kept clear of clutter and hazards?			
Are firm and colour contrasted handrails provided in passageways and stairwells?			
Is there adequate space for mobility aids?			
Is there adequate storage space for equipment?			
Are ramps/lifts available as an alternative to stairs?			
Do steps have a nonslip edging in contrasting colour?			
Is there enough room for two people with frames/wheelchairs to pass each other safely?			
Passageways Please ✓ appropriate box	Yes	No	N/A
Are all passageways kept clear of clutter and hazards?			
Are firm and colour contrasted handrails provided in passageways and stairwells?			
Is there adequate space for mobility aids?			
Is there adequate storage space for equipment?			
Are ramps/lifts available as an alternative to stairs?			
Do steps have a nonslip edging in contrasting colour?			
Is there enough room for two people with frames/wheelchairs to pass each other safely?			

Client location:	Bed/room No:			
Lifts	**Please ✓ appropriate box**	**Yes**	**No**	**N/A**
Do doors close slowly?				
Are buttons easily accessible to avoid excessive reaching?				
Are floor signs at eye level to prevent stretching the neck?				
Are handrails available?				
External areas	**Please ✓ appropriate box**	**Yes**	**No**	**N/A**
Are pathways even and with a nonslip surface?				
Are pathways clear of weeds, moss and leaves?				
Are steps marked with a contrasting colour and nonslip surface?				
Are there handrails beside external steps and pathways?				
Are there any overhanging trees, branches and shrubs?				
Are sensor lights installed?				
Are there sufficient numbers of outdoor seats for regular rests?				
Security of environment	**Please ✓ appropriate box**	**Yes**	**No**	**N/A**
Are all exits from the facility secured to prevent confused patients leaving?				
Are there clear walking routes both inside and outside where patients can wander safely without becoming lost?				
Does the layout of the facility, or allocation of rooms, allow staff to monitor high risk patients?				
Remedial actions that need to be taken:				

Appendix 5

Equipment safety checklist[361]

Reproduced with permission from VA National Centre for Patient Safety 2004 Falls Toolkit, page 43.

Equipment safety checklist:		Please ✓
Wheelchairs		
Brakes	Secure chair when applied	
Arm rest	Detaches easily for transfers	
Leg rest	Adjust easily	
Foot pedals	Fold easily so that patient may stand	
Wheels	Are not bent or warped	
Anti-tip devices	Installed, placed in proper position	
Electric wheelchairs/scooters		
Speed	Set at the lowest setting	
Horn	Works properly	
Electrical	Wires are not exposed	
Beds		
Side rails	Raise and lower easily	
	Secure when up	
	Used for mobility purposes only	
Wheels	Roll/turn easily, do not stick	
Brakes	Secures the bed firmly when applied	
Mechanics	Height adjusts easily (if applicable)	
Transfer bars	Sturdy, attached properly	
Over-bed table	Wheels firmly locked	
	Positioned on wall-side of bed	
IV poles/stand		
Pole	Raises/lowers easily	
Wheels	Roll easily and turn freely, do not stick	
Stand	Stable, does not tip easily (should be five-point base)	
Footstools		
Legs	Rubber skid protectors on all feet	
	Steady—does not rock	
Top	Non-skid surface	

Equipment safety checklist:		Please ✓
Call bells/lights		
Operational	Outside door light	
	Sounds at nursing station	
	Room number appears on the monitor	
	Intercom	
	Room panel signals	
Accessible	Accessible in bathroom	
	Within reach while patient is in bed	
Walkers/canes		
Secure	Rubber tips in good condition	
	Unit is stable	
Commode		
Wheels	Roll/turn easily, do not stick	
	Are weighted and not 'top heavy' when a person is sitting on it	
Brakes	Secure commode when applied	
Chairs		
Chair	Located on level surface to minimize risk of tipping	
Wheels	Roll/turn easily, do not stick	
Brakes	Applied when chair is stationary	
	Secure chair firmly when applied	
Footplate	Removed when chair is placed in a non-tilt or non-reclined position	
	Removed during transfers	
Positioning	Chair is positioned in proper amount of tilt to prevent sliding or falling forward	
Tray	Secure	

Completed by: _____ Date: / /

Appendix 6

Checklist of issues to consider before using hip protectors[318]

A checklist of issues to consider before using hip protectors is as follows:

- Is the risk of hip fracture high enough to justify their use?
- Will the user wear them as directed?
- Will the user be able to put them on and pull them down for toileting; if not, is assistance available?
- How will they be laundered?
- Who will encourage their use?
- Who will pay for them?
- Is the potential wearer aware of the different types of hip protector available?

Additionally a checklist of issues when using hip protectors is as follows:

- Is the fit adequate?
- Are they being worn in the correct position?
- Are they being worn at the correct times and should they be worn at night?
- Are continence pads worn if needed?
- Should other underwear be worn under the hip protectors?
- Is additional encouragement needed to improve compliance?
- When should the hip protectors be replaced?
- Has education been provided to care staff?

Appendix 7

Hip protector care plan[247]

This chart was developed by staff at Eventide Nursing Home, Sandgate, Prince Charles Health Service District, as part of Queensland Health's Quality Improvement and Enhancement Program.

Hip protector pad care plan	
Date: / /	Affix ID label

Identified/expressed needs	Negotiated outcomes	
Total of hip protector pads (type).	To allow independent mobility with less associated risks due to protective device	
Management plan	**Review date**	**Signature**
Hip protector pads to be individually marked and stored with incontinence aids.		
Two pairs of hip protector pads per person.		
Removable cover can be changed if soiled or wet (these are washable).		
Stretch pants secure hip protector pads in place. For those people who already wear stretch pants for incontinence pads, a second pair of stretch pants may be needed and worn over the first pair.		
For type A hip protector pads, position just below the person's waist with Velcro closure at the top. This allows cover for the entire hip region.		
Please choose clothing with a loose fit to allow for hip protector pad insertion.		
Please complete hip protector pad observation form with time applied and removed. Comment on compliance, fit, comfort etc. and any problems.		

Please contact _____ if any problems

Appendix 8

Hip protector observation record[247]

This chart was developed by staff at Eventide Nursing Home, Sandgate, Prince Charles Health Service District, as part of Queensland Health's Quality Improvement and Enhancement Program.

Hip protector pad observations	
Observations (please specify):	Affix ID label

Date	Time applied	Time removed	Hours in use	Comment	Initials

Appendix 9

Hip protector education plan[302]

The following information is taken from Meyer G, Warnke A, Bender R, Muhlhauser I. (2003). Effect of hip fractures on increased use of hip protectors in nursing homes: cluster randomised controlled trial. *British Medical Journal;* 326: 76–80.

> 'The education session lasted for 60–90 minutes, took place in small groups (average 12 members of staff from each cluster), and was delivered by two investigators. It covered: information about the risk of hip fracture and related morbidity; strategies to prevent falls and fractures; effectiveness of hip protectors; relevant aspects known to interfere with the use of protectors, such as aesthetics, comfort, fit, and handling; and strategies for successful implementation. The session included experience based, theoretical, and practical aspects. Staff members were encouraged to try wearing the hip protector. Apart from the printed curriculum we also developed and provided 16 coloured flip charts illustrating the main objectives and leaflets for residents, relatives, and physicians.
>
> At least one nurse from each intervention cluster was then responsible for delivering the same education programme to residents individually or in small groups. Nursing staff were encouraged to wear a hip protector during these sessions and to include residents who readily accepted the hip protector as activating group members.
>
> About two weeks later we visited the intervention clusters again to encourage the administration of the programme. Otherwise frequency and intensity of contacts were similar for intervention and control groups.'

Appendix 10

Food and fluid intake chart

Reproduced with permission of Toowoomba Health Services District, Queensland Health.

Food and fluid intake chart	
	Please affix client identification label here

What is the patient eating?							
(please write down all foods and fluids this patient is consuming – specify amounts)							
Day:	**Consumed (please circle)**					**Fluid (mL)**	**Comments**
Breakfast juice	None	1/4	1/2	3/4	All		
Fruit	None	1/4	1/2	3/4	All		
Cereal	None	1/4	1/2	3/4	All		
Yoghurt	None	1/4	1/2	3/4	All		
Bread/toast	None	1/4	1/2	3/4	All		
Drink	None	1/4	1/2	3/4	All		
Other *(specify fluid type and volume)*							
Morning tea							
Food	None	1/4	1/2	3/4	All		
Drink	None	1/4	1/2	3/4	All		
Other							
Midday meal							
Soup	None	1/4	1/2	3/4	All		
Meat	None	1/4	1/2	3/4	All		
Vegetables	None	1/4	1/2	3/4	All		
Bread	None	1/4	1/2	3/4	All		
Fruit	None	1/4	1/2	3/4	All		
Dessert	None	1/4	1/2	3/4	All		
Drink	None	1/4	1/2	3/4	All		
Other *(specify fluid type and volume)*							

What is the patient eating?							
Afternoon tea							
Food	None	1/4	1/2	3/4	All		
Drink	None	1/4	1/2	3/4	All		
Other *(specify)*							
Evening meal	**Consumed (please circle)**					**Fluid (mL)**	**Comments**
Soup	None	1/4	1/2	3/4	All		
Meat	None	1/4	1/2	3/4	All		
Vegetables	None	1/4	1/2	3/4	All		
Bread	None	1/4	1/2	3/4	All		
Fruit	None	1/4	1/2	3/4	All		
Dessert	None	1/4	1/2	3/4	All		
Drink	None	1/4	1/2	3/4	All		
Other *(specify fluid type and volume)*							
Supper							
Food	None	1/4	1/2	3/4	All		
Drink	None	1/4	1/2	3/4	All		
Other *(specify fluid type and volume)*							

NB: Extra fluids ie from taking medications, swallow tests, sips of water etc must be recorded in the above chart as 'other' with a volume provided (eg Medication–20 mL).

Appendix 11

Food guidelines for calcium intake for preventing falls in older people[339]

Guidelines	More information and hints
• Men: provide 3 serves of dairy products every week. • Women: provide 4 serves of dairy products every week.	• One serve of dairy products is equal to: – 250 mL milk (whole, reduced fat, skim, fortified soy) – 250 mL custard – 200 mL high-calcium milk – 200 g yoghurt – 45 g cheese. • Soft cheeses (eg cottage and ricotta cheeses) have less calcium. • Encourage some high-calcium foods (eg a glass of milk) before bed, because calcium is best absorbed overnight. • Soy milk, oat milk and rice milk are not naturally high in calcium, so check for supplementation with calcium of at least 100 mg of calcium per 100 mL milk.
• Provide a menu low in salt and advise limiting salt use.	Sodium chloride (salt) can increase calcium loss. • Provide lower salt versions of processed foods, canned foods and margarines. • Low-salt foods contain 120 mg or less of sodium per 100 g of food. • Do not add salt to cooking. • Discourage addition of salt at meal times.
• Avoid providing large amounts of caffeine-containing drinks and alcohol.	• Keep coffee intake to 3–4 cups of weak coffee a day. • Lower intake of other drinks that contain caffeine (eg tea, cola, soft drinks). • Provide no more than 1–2 standard drinks per day. • Have at least 2 alcohol-free days a week.

Appendix 12

Post-fall assessment and management

Post-fall assessment and management

Falls and hits head	Falls and does not hit head	Unwitnessed fall
SPECIAL CONSIDERATION – Patients on anticoagulant and/or antiplatelet therapy and patients with a known coagulopathy are at an increased risk of intracranial haemorrhage. Anticoagulants include: Warfarin, Heparin, Enoxaparin (Clexane), Dalteparin (Fragmin). Antiplatelet drugs include: Aspirin, Clopidogrel, Aspirin+Dipyridamole (Asasantin). Alcohol dependent persons are considered coagulopathic.		
• Do not move initially • Call for assistance • Immobilise Cervical Spine if head and neck pain is reported • Baseline Vital signs (BP, heart rate, respiratory rate, oxygen saturation, Blood Sugar Level (BSL)) • Neurological Observations – initial Glasgow Coma Scale (GCS) • Observe for change in the level of consciousness, headache, amnesia or vomiting • Clean and dress any wounds	Potential Injuries: fracture, soft tissue injury or no observable injury. • Do not move initially • Call for assistance • Baseline Vital signs (BP, heart rate, respiratory rate, oxygen saturation, BSL) • Clean and dress any wounds	Potential Injuries: Head or neck injury, fracture, soft tissue injury or no observable injury. • Do not move initially • Call for assistance • Immobilise Cervical Spine if head and neck pain is reported • Baseline Vital signs (BP, heart rate, respiratory rate, oxygen saturation, BSL) • Neurological Observations – initial Glasgow Coma Scale (GCS) • Observe for change in the level of consciousness, headache, amnesia or vomiting • Clean and dress any wounds
↓ Contact Medical Officer for review	↓ Contact Medical Officer for review	↓ Contact Medical Officer for review
↓ Consider need for analgesia	↓ Consider need for analgesia	↓ Consider need for analgesia
↓ Liaise for appropriate test (consider CT Scan if patient has any high risk factors, see Section 6 of *NSW Health PD2008_0081 Head Injury*)	↓ Liaise for appropriate test (eg X rays)	↓ Liaise for appropriate test (eg CT Scan if patient has any high risk factors, see Section 6 of *NSW Health PD2008_0081 Head Injury*)
↓ Notify registrar/consultant (if required)	↓ Notify registrar/consultant (if required)	↓ Notify registrar/consultant (if required)
Observations • Record vital signs and neurological observations hourly for 4 hours then review • Continue observations at least 4 hourly for 24 hours or as required • Notify MO immediately if any change in observations	**Observations** Monitor vital signs for 24 hours	**Observations** • Record vital signs and neurological observations hourly for 4 hours then review • Continue observations at least 4 hourly for 24 hours or as required • Notify MO immediately if any change in observations
↓ Notify family	↓ Notify family	↓ Notify family
↓ If not already flagged as high risk of fall injury, flag as per hospital protocol	↓ If not already flagged as high risk of fall injury, flag as per hospital protocol	↓ If not already flagged as high risk of fall injury, flag as per hospital protocol
↓ IIMS report	↓ IIMS report	↓ IIMS report
Post Fall review Document in medical record strategies implemented	**Post Fall Review** Document in medical record strategies implemented	**Post Fall review** Document in medical record strategies implemented
Reassess Falls Risk Status – Refer to relevant staff to review, update care plan and implement Falls prevention strategies		
Communication – All staff involved in the care of the patient to be informed of incident outcome and revised care plan		

Acknowledgments:

1. Adapted From RNS and RHS Policy Per RNS2005/46
2. Hook, ML., Winchel, S (2006) Fall Related Injuries in Acute Care: Reducing the Risk of Harm, *MEDSURG Nursing*, Vol 15/No.6
3. NSW Department of Health, Policy Directive: *Initial Management of Closed Health Injury in Adults, PD2008_0081 Head Injury*, 2008.
4. NSW Institute of Trauma and Injury Management http://www.itim.nsw.gov.au

Glossary

Cognitive impairment	Impairment in one or more domains of normal brain function (eg memory, perception, calculation).
Cognitively intact	Suffering no form of cognitive impairment.
Comorbidity	Two or more health conditions or disorders occurring at the same time.
Consumer	Refers to patients, clients and carers in acute and subacute settings. It also refers to people receiving care in residential aged care settings and their carers.
Delirium	An acute change in cognitive function characterised by fluctuating confusion, impaired concentration and attention.
Dementia	Impairment in more than one cognitive domain that impacts on a person's ability to function, and that progresses over time.
Extrinsic factors	Factors that relate to a person's environment or their interaction with the environment.
Facility	Used to refer to both hospitals and residential aged care facilities.
Fall	A standard definition of a fall should be used in Australian facilities, so that a nationally consistent approach to falls prevention can be applied. For these guidelines, the expert panel and taskforce agreed on the following definition: 'A fall is an event which results in a person coming to rest inadvertently on the ground or floor or other lower level'. World Health Organization: http://www.who.int/ageing/publications/Falls_prevention7March.pdf
Falls Guidelines	Used in place of the full title of the three guidelines, *Preventing Falls and Harm From Falls in Older People: Best Practice Guidelines for Australian Hospitals 2009, Preventing Falls and Harm From Falls In Older People: Best Practice Guidelines for Australian Residential Aged Care Facilities 2009* and *Preventing Falls and Harm From Falls in Older People: Best Practice Guidelines for Australian Community Care 2009*.
Falls risk assessment	Falls risk assessment is a more detailed and systematic process than a falls risk screen and is used to identify a person's risk factors for falling.
Falls risk screen	Falls risk screening is the minimum process for identifying older people at greatest risk of falling. It is also an efficient process, because fewer than five risk factors are usually required to identify who should be assessed more comprehensively for falls risk.
Hip protector	A device worn over the greater trochanter of the femur, designed to absorb and deflect the energy created by a fall away from the hip joint. The soft tissues of the surrounding thigh absorb the energy instead.
Hospital	Refers to both acute and subacute settings.
Hypotension, orthostatic	A drop in blood pressure resulting from a change in position from lying to standing.
Hypotension, postprandial	A drop in blood pressure experienced after eating.
Incremental cost-effectiveness ratio (ICER)	A measure of the cost effectiveness of an intervention, which is calculated by comparing the costs and health outcomes of the new program with the costs and health outcomes of an alternative health care program. Interventions with lower ICERs are better value for money.

Injurious fall	These guidelines use the Prevention of Falls Network Europe (ProFaNE) panel definition of an injurious fall. They consider that the only injuries that could be confirmed accurately using current data sources were peripheral fractures (defined as any fracture of the limb girdles and of the limbs). Head injuries, maxillo-facial injuries, abdominal, soft tissue and other injuries are not included in the recommendation for a core dataset. However, other definitions of an injurious fall include traumatic brain injuries (TBIs) as a falls-related injury, particularly as falls are the leading cause of TBIs in Australia.
Intervention	A therapeutic procedure or treatment strategy designed to cure, alleviate or improve a certain condition.
Intrinsic factors	Factors that relate to a person's behaviour or condition.
Life years saved or life years generated (LYS)	A measure of the gain in health outcomes from an intervention.
Multifactorial interventions	Where people receive multiple interventions, but the combination of these interventions is tailored to the individual, based on an individual assessment.
Multiple interventions	Where everyone receives the same, fixed combination of interventions.
Older person or older people	The guidelines define older people as 65 years of age and over. When considering Indigenous Australians, the term 'older people' refers to people 50 years of age and over.
Patient	Refers to both patients and clients in acute and subacute settings.
Pharmacodynamics	The study of the biochemical and physiological effects that medications have on the body.
Pharmacokinetics	The study of the way in which the body handles medications, including the processes of absorption, distribution, excretion and localisation in tissues and chemical breakdown.
Psychoactive medication	A medication that affects the mental state. Psychoactive medications include antidepressants, anticonvulsants, antipsychotics, mood stabilisers, anxiolytics, hypnotics, antiparkinsonian drugs, psychostimulants and dementia medications.
Quality-adjusted life year (QALY)	A summary measure used in assessing the value for money of an intervention. It is based on the number of years of life that would be added by an intervention, and combines survival and quality of life in a single composite measure.
Resident	Refers to people receiving care in residential aged care settings.
Residential aged care facility (RACF)	Refers to both high-care and low-care settings.
Root-cause analysis	An in-depth analysis of an event, including individual and broader system issues, to provide greater understanding of causes and future prevention.
Single interventions	Interventions targeted at single risk factors.
Syncope	A temporary loss of consciousness with spontaneous recovery, which occurs when there is a transient decrease in cerebral blood flow.
Vision	The ability of the unaided eye to see fine detail.
Visual acuity	A measure of the ability of the eye to see fine detail when the best spectacle or contact lens prescription is worn. Visual acuity (VA) = d/D (written as a fraction) where d = the viewing distance (usually 6 metres), and D = the number under or beside the smallest line of letters that the person is able to see. Normal visual acuity is 6/6 or better. If someone can only see the '60' line at the top of the chart, the acuity is recorded as being 6/60. Some people can see better than 6/6 (eg 6/5, 6/3); however, 6/6 has been established as the standard for good vision.

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