

A literature review on falls prevention for older people presenting to Emergency Departments following a fall: Effective approaches and barriers to best practice

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Table of Contents

Introduction	5
Methodology.....	7
Definition of a fall	7
Search strategy	7
Selection criteria	8
Appraisal of selected papers	8
Data synthesis	9
Results	10
Falls risk amongst older people presenting to an ED	10
Falls risk screening and assessment.....	11
Falls prevention in the Emergency Department setting	12
Falls prevention reviews	14
Falls prevention guidelines	14
Adherence with falls prevention recommendations	15
Client perspectives.....	16
Health services and health providers perspectives	17
Discussion.....	19
Conclusions.....	20
References:.....	21
Appendix 1	27
Falls prevention guidelines	27

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Abbreviations:

ED	Emergency Department
GP	General Practitioner
ProFaNE	Prevention of Falls Network Europe
RCT	Randomised Controlled Trial

For the purposes of this literature review the phrase “older people” refers to people aged 65 years and older, but for people of Aboriginal and Torres Strait Islander (ATSI) communities an age of 50 years and older is meant.

Key words: falls, elderly, emergency department, screening, review

Introduction

Falls account for around 20% of Emergency Department (ED) presentations for people aged 65 and over (Close et al. 1999; Bell et al. 2000; Lightbody et al. 2002a; Lightbody et al. 2002b). Each year in Victoria at least 10,000 older people present to hospital for fall-related injuries and about half are discharged home (Cassell 2001). Approximately a quarter of ED falls presentations amongst people aged 65 and over are from residential care facilities (Bell et al. 2000).

There is no national data on the number of presentations to an ED due to falls. The indicator used nationally to detail the prevalence of falls related injuries is falls related hospitalisations. The age-standardised rate of hospitalisations for injuries due to falls for all people aged 65 years and older in 2003–04 in Australia was 2,295 per 100,000 population that is, over 60,000 hospitalisations due to falls (Bradley and Harrison 2007). Given the Victorian data on discharge destination from ED (Cassell 2001), we can assume that about the same number are seen in EDs and sent home.

The majority of older people presenting to an ED have sustained an injury as a result of a fall, with fracture reported as the most common injury (Bell et al. 2000; Russell et al. 2006). Assessment and management of falls in the ED often mainly focuses on the injury, with limited time and resources utilised to investigate falls further (Close and Glucksman 2000). Injuries can result in physical impairments such as pain, decreased strength, and also in secondary problems such as depression, fear of falling, and general de-conditioning (Close et al. 1999; Russell et al. 2006). These problems can lead to further issues such as loss of independence, poor lifestyle, reduced quality of life and death.

Falls presentations to the ED by older people impact on the burden of the health system in Australia. The health system cost in Western Australia alone was estimated at around \$83 million in 2001 and is projected to increase to \$174 million in 2021 if there is no change in falls rates (Hendrie et al. 2004). Furthermore, this study also reported that over half of this cost was due to hospital inpatient treatment and the overall cost became more pronounced with increasing age.

There is strong research evidence from randomised controlled trials that demonstrate that falls can be prevented among older people living in the community (Gillespie et al. 2003; Hill et al. 2004). Single intervention approaches that have been shown to be effective include:

- exercise programs that incorporate balance (home exercise, tai chi, group exercise);
- psychotropic medication withdrawal;
- home visits by Occupational Therapists ;
- cataract extraction; and
- vitamin D and calcium supplementation.

In addition, falls prevention approaches that combine two or more approaches (multi-factorial programs), usually based on addressing risk factors identified through a comprehensive falls risk assessment process, have been shown to be effective.

Evidence from randomised controlled trials indicates that vitamin D and calcium supplementation can reduce the risk of fractures (Bischoff-Ferrari et al. 2004). However, early promise of injury prevention research of hip protectors in the residential care setting has not been sustained in community dwelling populations, where compliance with use is poor (Parker et al. 2005).

This literature review aims to examine effective approaches and barriers in providing best practice falls prevention for people aged 65 years and over (50 years and older for ATSI people), presenting to the ED following a fall. A second aim is to highlight areas for future research and clinical practice improvement based on the current research findings and gaps identified in the literature.

Methodology

Definition of a fall

There are many definitions of falls, however for the purpose of this systematic review, a fall is defined as:

“An event which results in a person coming to rest inadvertently on the ground or floor or other lower level” (World Health Organisation)

Search strategy

Computerised literature searches were conducted using MEDLINE, Ovid and Pubmed between January 2007 and March 2007.

The search strategy included

[fall* OR
stumble* OR
trip* OR
slip*]

AND

[emergency* OR
Casualty OR
“ED” OR
“A&E” OR
accident* OR
“EMS”]

AND

[prevent* OR
guideline* OR
“best practice” OR
treat* OR
“risk assessment” OR
strateg* OR
screen* OR
intervention*]

The MEDLINE search included articles in English, human, people aged 65+ years and time span 1990-2007, the search field being the abstract. The search was then refined using the MESH terms Accidental Falls/prevention & control OR Accidental Falls

The Pubmed search was refined using the limits English language, humans, people aged 65+ years and with the search field being the title and abstract.

The Ovid search was refined by including the search terms:

[old* OR
aged* OR
elder* OR
senior* OR
geriatr* OR
"65+"]

The search fields for the Ovid search were the title, abstract, full text and caption text.

Further articles were found using a snowballing approach by obtaining other references from reference lists at the conclusion of articles. Other articles were obtained from previous literature searches completed by NARI staff members as well as through searching the Australian federal and state departments' key references and publications on falls amongst older people. Researchers in the area of falls in older people were also contacted and secondary references checked.

Selection criteria

All articles relating to falls for older people who presented to an ED following a fall were identified. Titles and abstracts of articles were examined to determine the appropriateness of the article in relation to the aim of this literature review.

Appraisal of selected papers

Levels of evidence based on the National Health and Medical Research Council (NHMRC) guidelines were applied to all articles on older people presenting to the Emergency Department following a fall. Selected articles were appraised and rated based solely on their study design.

<i>Level of evidence</i>	<i>Description</i>
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 controls, 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 pre-test and post-test.

Also used for the purpose of this review is the term “Consensus Opinion”, which is used to describe evidence based on consensus of expert opinion and the findings of expert working parties (The Victorian Quality Council 2004).

Data synthesis

All articles identified as relevant were read by at least one member of the project team. Key themes related to effectiveness of falls prevention approaches in the ED, and factors influencing best practice were extracted and integrated into the review. As the type of interventions, study designs and study populations were heterogenous, a meta-analysis was not undertaken.

Results

The initial electronic search identified 648 articles, this was reduced to 160 on the inclusion of the MESH terms. On review of article titles, 62 articles were selected as being of direct relevance and abstracts were obtained. The abstracts were further reviewed and 16 articles with a specific emergency department focus were found.

Of these

- 5 were randomised controlled trials involving patients recruited through an ED;
- 2 were cohort studies examining the preventative measures taken and falls outcomes;
- 2 from a single pre and post study of the implementation of falls practice Guidelines examining i) falls documentation and ii) self-reported preventive health measures and falls rates post ED presentation;
- 2 cross sectional descriptions of falls risks present and functional decline associated with the fall;
- 1 file audit of documentation;
- 1 descriptive study of the reported practices of healthcare providers in regard to evidence based falls prevention; and
- 3 were reviews of the literature.

A number of other falls prevention reports, reviews and guidelines were reviewed. These documents addressed fall prevention in the community; in hospitals both acute and sub-acute; and residential care facilities. However none of them specifically addressed falls prevention in the Emergency Department. They included:

- Australian Government Department of Health and Ageing, literature review by NARI;
- Australian Quality Council Guidelines;
- Victorian Quality Council Guidelines; and
- NHS Patient Safety Observatory reports.

Falls risk amongst older people presenting to an ED

Falls are multifactorial and can be caused by extrinsic risk factors, intrinsic risk factors or a combination of both (Hill and Schwarz 2004). Extrinsic risk factors include environment or activities associated with high risk of falling such as uneven footpaths, poor lighting or loose mats on the floor. Intrinsic risk factors refer to age-related physiological and pathological changes in the sensory, neurological and musculoskeletal systems relating to balance. Medications are considered one of the intrinsic risk factors for falls. Older people presenting to an ED with a fall exhibit multiple risk factors (Bell et al. 2000). Evaluation of risk factors in an Australian group of fallers over 60, who had presented to an Emergency Department after a fall and were discharged home showed a mean of 7.3 risk factors per participant, the most common

being: polypharmacy, home hazards, balance deficit, arthritis and a history of falls in the last 12 months (Russell et al. 2006).

Older people who present to an ED after a fall are at high risk of falls. Two thirds reported having one or more falls in the year prior to attending an ED (Close et al. 1999; Russell et al. 2006a). Falls rates after an ED presentation range from:

- 25% (Lightbody et al. 2002b) to 33% (Salter et al. 2006) after 6 months;
- 19.3% (Baraff et al. 1999a) to 52% (Close et al. 1999) after 12 months and up to 68% after 12 months in a high risk group (Davison et al. 2005); and
- Nearly half of older people had fallen again after 18 months (Donaldson et al. 2005).

Re-presenting to an ED with further falls can be common with 6% re-presenting within 24 hours (Salter et al. 2006).

Despite the documented presence of risk factors, the proportion of older fallers being discharged directly home varies between 35% to 63% (Bell et al. 2000; Cassell 2001a; Lightbody et al. 2002a; Lightbody et al. 2002b; and Paniagua et al. 2006). Those discharged home were often managed for their injury alone, and 10% (Paniagua et al. 2006), 28% (Salter et al. 2006) and 37% (Reeson and Wafer 2001) had no follow up plan documented. There is some evidence to suggest that older people being discharged home from an ED have limited usage of support services after returning home (Rowland et al. 1990).

Even those who fall but do not present to an ED may be at high risk. A recent study in the UK found that of people who called an ambulance after a fall, more than a third were left at home, and of these 49% called an ambulance at least once during the next two weeks. This group was at 5.4 times greater risk of death during that two weeks, compared to an age matched population (Snooks et al. 2006).

Key Points

- People who present to an ED for a falls related presentation are at high risk of further falls.
-

Falls risk screening and assessment

Screening refers to a quick process to identify patients who are at greatest risk of falling and in need of more detailed assessment. Assessment refers to a more detailed process to identify the falls risk factors that contribute to a persons overall risk of falls and falls related injuries (The Victorian Quality

Council 2004). Information from a falls risk assessment should inform decisions about appropriate interventions to reduce the risk of future falls.

It is important that risk factors, if present, are appropriately assessed. This may not happen without raised awareness and follow through. No-one in a cohort of older women who had fallen and presented to an ED reported being referred for a vision assessment in the next 18 months (Donaldson et al. 2005). Lack of appropriate care may mean that people face an increased risk of falling. Falls risk profile increased significantly in the six months after a falls related ED presentation for a Canadian cohort of older people, who failed to receive guideline care (Salter et al. 2006).

Studies examining falls risk factors in people who have presented to an ED after a fall have reported multiple modifiable risk factors that are able to be identified on assessment (Close et al. 1999; Whitehead et al. 2001; Lightbody et al. 2002a; Lightbody et al. 2002b; Davison et al. 2005). One study using retrospective screening of medical records identified polypharmacy, contributing medical conditions and cognitive impairment as important falls risk factors, although falls history was not collected in most fallers (Paniagua et al. 2006). These risk factors may not be identified or addressed at the current level of usual care (Salter et al. 2006).

Key Points

- Screening people for falls risk targets those in need of detailed assessment.

Falls prevention in the Emergency Department setting

There have been a number of RCT's that have worked with groups of older people who have presented to an ED after a fall. These studies, by recruiting through an ED, are effectively screening for falls and referring on for further assessment, in these cases, by the research team.

Close and colleagues (1999), found that medical assessment by a Geriatrician; focusing on visual acuity, balance, cognition and medication review, with appropriate referral and direct contact with the general practitioner, and an occupational therapy home safety visit reduced the risk of falling by 61% after one year. The authors recommend the adoption of clear fall prevention strategies for older people presenting to an ED (Close et al. 1999).

A similar study included medical assessment and intervention - visual acuity, cardiovascular assessment and medication review; physiotherapy assessment and intervention for gait and balance; and occupational therapy home safety assessment and interventions. The study selected people who had at least one fall in the 12 months preceding the index fall leading to the ED presentation and were thus a higher risk group. Falls were reduced by

36% after one year, although the percent of people who fell did not change (Davison et al. 2005).

A nurse-led falls prevention intervention that addressed similar risk factors as the above two studies, failed to find a significant reduction in falls after six months. This study was reliant on referrals to GP's to make changes to medical treatments such as changes to medications, and referrals to physiotherapists and occupational therapists (Lightbody et al. 2002b).

An Australian study to investigate the effect of an individualized falls risk profile based on screening for known risk factors, failed to find a reduction in falls after 6 months. This study screened for risk factors and then sent a letter to the person's GP detailing the risks found and suggestions for appropriate falls reduction strategies (Whitehead et al. 2001).

A key group of people excluded from the above studies is people with cognitive impairment. One study was identified that selected people over 65 who had presented to an ED and had cognitive impairment. All people recruited to this study were given a multifactorial risk assessment, while only those in the intervention group had recommended interventions identified. This study failed to find a significant difference in falls after one year (Shaw et al. 2003).

From the reviewed studies of older people presenting to ED's after a fall, a number of points can be drawn.

- This group is at high risk of recurrent falls, although lack of consistent format of reporting falls rates (eg falls per 1,000 person days) makes comparisons difficult;
- Follow up periods need to be long enough for outcomes to become apparent, increasing the power of the studies. One year is recommended by ProFaNE (Lamb et al. 2005);
- Falls can be reduced in people aged 65 and over who present to an ED;
- Interventions arising from a specialist, multifactorial falls risk assessment, are a common theme in the successful trials; and
- To date people with cognitive impairment have generally been excluded from successful falls prevention studies. Different falls and injury prevention strategies may be required for this group.

The evidence from RCT's may show that multifactorial treatments can reduce the risk of falls, there is however little evidence that such interventions are routine for this high risk group. Of older women who had fallen and presented to an ED, most did not receive guideline care with 32% reporting being referred to their family physician, 24% reporting being referred for physiotherapy, and none reporting being referred for a vision examination (Donaldson et al. 2005). Older ED patients received appropriate fall evaluation in 3.4% of files audited in an assessment of the quality of care received (Wenger et al. 2003) and 3.7% of cases on review of file and interview (Salter et al. 2006).

Key Points

- The risk of future falls can be reduced in older people who have presented to an ED after a fall;
 - A falls risk assessment forms the basis for referral and treatment in successful programs for older people presenting to an ED after a fall; and
 - Falls and falls related injury prevention strategies may need to be different for people with cognitive impairment.
-

Falls prevention reviews

There have been a number of systematic reviews of the falls prevention literature. These include Cochrane reviews (Gillespie et al. 2003; McClure et al. 2005), other systematic reviews and meta analyses (Hill-Westmoreland et al. 2002; Moreland et al. 2003; Chang et al. 2004), a review for the WHO (Todd and Skelton 2004), a report for the Australian Government Department of Health and Ageing (Hill et al. 2004) as well as reviews made as part of guidelines development (*see below*). The reviews generally concur as to the evidence on falls prevention. Multidisciplinary, multifactorial, health/environmental risk factor screening/intervention programs are likely to be beneficial, as are single interventions such as exercise programs designed to increase strength and balance, Tai Chi, home hazard identification and modification and cardiac pacemakers where appropriate (Gillespie et al. 2003; Todd and Skelton 2004; Rubenstein 2006; Ganz et al. 2007). The importance of identifying people at high risk of falling is a consistent theme across reviews (American Geriatrics Society et al. 2001; Hill and Schwarz 2004; Todd and Skelton 2004), and the ED has been identified as a key point for conducting risk screening and/or assessments (Currie 2006).

The foregoing reviews were falls prevention in general and mainly covered community-dwelling older people. Another three reviews specifically examined falls prevention for older people presenting to the ED following a fall (Babcock Irvin et al. 2000; Burns 2001; Weigand and Gerson 2001). The reviews suggested that multidisciplinary intervention was effective in reducing falls and that early identification of ED patients at risk of falling was feasible. The reviews also found a lack of falls prevention research based at an ED as there was only one randomised controlled trial, the PROFET study (Close et al. 1999), at the time.

Falls prevention guidelines

There have been a number of guidelines published for the prevention of falls (Feder et al. 2000; American Geriatrics Society et al. 2001; Moreland et al. 2003; The Victorian Quality Council 2004; Australian Council for Safety and Quality in Health Care 2005; McInnes et al. 2005). Only one of these guidelines (Baraff et al. 1997) specifically targets Emergency Departments

(others have been developed for one or more of the main settings for falls prevention – community, hospital, or residential care facilities), although some guidelines identify the Emergency Department as a venue where those who have had a fall can be identified and targeted for follow up. Each of the guideline documents and their recommendations are reviewed in detail in Appendix 1. Common elements across the various guidelines include recommendations for:

- screening or assessment to identify those at increased risk of falls, and factors contributing to the increased falls risk. It is recommended that a validated screening / assessment tool be used. Details about circumstances of previous falls should be included as they can provide useful information in determining possible contributory factors;
- developing a plan of referrals / interventions that address the key identified falls risk factors;
- implementing the referrals / interventions to reduce risk of future falls. These include single interventions that have been shown to be effective in reducing falls (eg balance related exercise programs, reduction of psychotropic medications, home assessment and modifications (including behavior modification) by occupational therapists, cataract surgery), and injury prevention approaches such as hip protectors, and strategies to increase vitamin D levels. Combinations of these single intervention approaches (ie multi-factorial interventions combining two or more single interventions) have also been shown to be effective, including in high risk populations such as people presenting to Emergency Departments after a fall, and people in residential care settings;
- providing information to older people with increased risk of falls (verbal and / or written) to support their understanding that falls can be prevented, and strategies that can achieve this;
- providing falls prevention training for staff involved with assessment, referral, and implementation of interventions for people with increased falls risk; and
- organisations should periodically review processes to minimize risk of falls, for example, audit the completion rate of falls risk screening tools, and of referrals / interventions being implemented.

Adherence with falls prevention recommendations

One critical issue with falls prevention is that of adherence to fall prevention initiatives. The point has been made that effective falls prevention requires a considerable commitment from the person participating (Skelton and Todd 2005), yet adherence to falls prevention recommendations can be highly variable. The best adherence data for fall prevention activities is on home modifications and exercise. At least 50% of home modification recommendations were adhered to 65% (Cumming et al. 2001) to 70% (Clemson et al. 2004) of the time. However adherence to individual modifications range from 19% to 72% (Cumming et al. 2001; Stevens et al. 2001; Clemson et al. 2004).

Adherence rates are highly implicated in the efficacy of exercise programs to prevent falls. A report on the Otago exercise program found a significantly lower rate of falls in the highest adherence group (exercise three or more session per week) compared to the lowest (exercise less than once per week) (Campbell et al. 2005). Another study used attendance records of exercise classes to determine adherence. While this 12-month exercise program for older women did not reduce falls overall, the data suggested that the high adherence group had fewer falls than the group with low adherence to the program (Lord et al. 1995).

Key Points

- Adherence to falls prevention recommendations increased the likelihood of successful outcomes.
-

Client perspectives

Recognition that adherence to falls prevention interventions is problematic has led to some examination of older peoples' attitudes and beliefs behind non adherence with recommendations (Clemson et al. 1999; Managing Innovation 2000; Yardley et al. 2006). There are also a number of factors related to the client that can influence uptake and longer term adherence to recommendations to reduce falls. Pride can act as a barrier to the adoption of falls prevention strategies, with many unwilling to appear dependent on anything from spectacles to walking sticks even when they definitely need them (Managing Innovation 2000). Older people may agree that falls prevention is important, but underestimate their risk (Braun 1998), and thus think such prevention is for other older people (Yardley et al. 2006). The term 'falls prevention' may be unfamiliar and the concept difficult for many older Australians to grasp. Older people appear more likely to be motivated by references to falls prevention if it is presented in the context of being in control, remaining independent and in one's own home for longer (Managing Innovation 2000).

Ownership of strategies and the concept of exerting control over ones environment have been found to be central to why older women do or don't follow through with recommendation on home modifications to reduce the risk of falls (Clemson et al. 1999) and future approaches must be owned by and make sense to clients.

Key Points

- Older people can have ambivalent attitudes to falls prevention advice.
 - Maintaining independence, rather than "falls prevention", may be a more acceptable approach to older people.
-

Health services and health providers perspectives

Whilst the steps taken to disseminate an evidence based fall risk assessment and management strategy have been published, (Baker et al. 2005) and facilitators and barriers to physician uptake of falls risk assessment elicited (Fortinsky et al. 2004; Chou et al. 2006), no studies were found that successfully implemented guidelines in an Emergency Department. Nor were studies showing good take up of falls prevention guidelines in Emergency Departments found. The production of guidelines appears inadequate in isolation to improve practice (Baraff et al. 1999a; Baraff et al. 1999b; Donaldson et al. 2005; Salter et al. 2006).

Barriers to appropriate intervention were perceived by ED staff to be:

- lack of patient compliance;
- patient co-morbidities;
- time and staffing shortages; and
- economic restraints on patients.

Barriers to appropriate referral were noted as:

- lack of physician availability;
- lack of relevant resources in the community; and
- patient non-compliance (Fortinsky et al. 2004).

This same study identified a need for an organised referral protocol to facilitate comprehensive assessment and long term follow up (Fortinsky et al. 2004). Primary care physicians when interviewed identified the following barriers to fall risk evaluation;

- physician factors of:
 - lack of awareness;
 - competing priorities; and
 - lack of training.
- logistic factors of:
 - lack of transport for patients;
 - lack of time to conduct a full evaluation;
 - lack of reimbursement for the time to do a full evaluation; and
 - patient attitudes.

They identified circumstances which improve outcomes, including:

- link in to already performed activities such as osteoporosis prevention;
- involvement of family;
- requests from patients to review medications;
- reports from patients of dizziness; and
- positive feedback from patients about physiotherapy

as facilitators to appropriate falls evaluation and management (Chou et al. 2006).

Key Points

- Having falls prevention guidelines in isolation is unlikely to change practice and improve outcomes. Strategies to support implementation of guidelines, facilitate appropriate change in practice, and address identified barriers are likely to improve outcomes.
 - Practitioners have an important role in identifying and working to minimise individual and service system factors that could limit uptake and adherence to falls prevention recommendations
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Discussion

Falls in older people are a substantial burden on the healthcare system in terms of both the Emergency Department presentations and in admissions to hospital. With an ageing population, projections indicate that demands on the healthcare system will escalate unless effective preventive steps are implemented.

Falls are a complex problem with many, very different contributing factors which may lead to a fall. The more risk factors present the higher the risk of a fall (Tinetti et al. 1988). Research has shown that a multi-factorial, multidisciplinary approach can reduce the chance of falling in community dwelling older people, even those with high risk of falls (Gillespie et al. 2003).

There is emerging evidence that falls prevention strategies at a population level may be effective in reducing falls (Beard et al. 2006). However, the primary focus of falls prevention activities has been to identify those people at increased risk of falls, and implement targeted interventions to address risk factors.

Studies have shown that people who have presented to an ED for a fall related injury are likely to have fallen previously (Close et al. 1999; Russell et al. 2006a; Russell et al. 2006b), and likely to fall again (Close et al. 1999; Bell et al. 2000; Davison et al. 2005; Donaldson et al. 2005; Russell et al. 2006a; Russell et al. 2006b; Salter et al. 2006). Clearly this is a high risk group of people who are highly likely to benefit from falls prevention initiatives.

There appears to be challenges in implementing fall prevention care to this high risk group. A busy ED may not be the appropriate setting for a comprehensive falls risk assessment. However, it may be an appropriate place to perform screening and initiate referrals for ongoing assessment and management (Hegney et al. 2006).

There have been a number of guidelines developed to assist clinical staff provide evidence based care for older fallers. These guidelines are typically aimed at either the community at large (Feder et al. 2000; American Geriatrics Society et al. 2001; Moreland et al. 2003; The Victorian Quality Council 2004; Australian Council for Safety and Quality in Health Care 2005; McInnes et al. 2005) or to hospitals and residential care facilities (The Victorian Quality Council 2004; Australian Council for Safety and Quality in Health Care 2005). Only one set of guidelines was aimed at ED's (Baraff et al. 1997). This was implemented through a one off educational intervention, and as it was not an official guideline of the organization, there were no ongoing quality management activities to support practice change. This study obtained small but important improvements in the documentation of selected history and physical examination items and the prescribing of calcium and vitamin D, (Baraff et al. 1999b), but did not reduce the rate of repeat falls following the ED visit after the implementation (Baraff et al. 1999a).

Barriers to effective falls prevention management in an ED have been reported, including lack of time and staffing shortages, complexity of patients, lack of resources in the community and lack of patient adherence (Fortinsky et al. 2004). An approach that incorporated an organised referral protocol to access local expertise in assessment of falls risk factors was felt to be promising by ED physicians (Fortinsky et al. 2004).

Older peoples attitudes to, and engagement with, falls prevention need to be taken into consideration when determining the most appropriate falls prevention interventions for an individual. Older people may have ambivalent attitudes to falls prevention, which may stand in the way of their adoption or follow through with falls prevention interventions. Strategies are needed to support older people to understand the need and potential benefits of the falls prevention recommendations being made, and to support them in the uptake and longer term participation in these recommendations.

Conclusions

There is high quality evidence that falls by older people may be prevented in high risk groups in the community. The presentation at an Emergency Department with a falls related injury is often preceded by other falls, which means that this group is at high risk of falling again. Best practice falls prevention indicates that a multi-factorial, multidisciplinary approach based on a detailed assessment of falls risk factors is most likely to be effective in this high risk group.

The challenge is to identify those people coming into an ED who would benefit from falls prevention interventions and to embed in routine practice activities that would support implementation and sustained involvement of the patient in recommended falls prevention activities.

A guidelines document has been produced (NARI 2007) which outlines recommendations based on this literature review, to support practice change to embed an evidence based falls prevention approach within the ED setting.

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Appendix 1

Falls prevention guidelines

There have been a number of guidelines published for the prevention of falls (Feder et al. 2000; American Geriatrics Society et al. 2001; Moreland et al. 2003; The Victorian Quality Council 2004; Australian Council for Safety and Quality in Health Care 2005; McInnes et al. 2005). Only one of these guidelines (Baraff et al. 1997) specifically targets Emergency Departments, although others identify the Emergency Department as a venue where those who have had a fall can be identified and targeted for follow up. Each of the guideline documents and their recommendations will be detailed below.

Practice guideline for the ED management of falls in community-dwelling elderly persons (Baraff et al. 1997).

These guidelines were developed in the US by an expert panel including emergency physicians and geriatricians using a review of the falls literature from 1975 to 1995. The guidelines are targeted to community-dwelling older patients who present to an ED after a fall. They define essential history and physical examination items and interventions for patients who are discharged from the ED, and include a reminder sheet to be included in the file/record of each person older than 65 years who presents for treatment of injuries sustained from a fall. Quality of evidence or strength of recommendations was not graded in these guidelines.

Statement/steps	Target group`	Recommendation	Strength of recommendation
ED Evaluation	Persons over 65 years who present to an ED for treatment of injuries sustained from a fall.	History and physical examination, specifically items that are: <ul style="list-style-type: none"> • Extremely important; • Often overlooked; • May lead to diagnosis and interventions that may prevent future falls. Examples of items recommended for review include: <ul style="list-style-type: none"> • Review of medications; • Falls history (last 3 months); • Eye examination in preceding year; • Hydration and nutritional status; • Gait, strength and balance. 	Not graded
Interventions		Begin appropriate interventions in the ED. Provide guidance to patients on how they can improve functional status or delay functional decline. Make referrals for specific interventions.	Not graded
Selective preventive health measures		<ul style="list-style-type: none"> • Pneumonia and influenza vaccinations; • Calcium and Vitamin D supplementation. 	Not graded

Guidelines for the prevention of falls in people over 65 by Feder et al (Feder et al. 2000).

These guidelines were developed in the UK based on randomised controlled trials and were piloted in 2 general practices, a residential home and a general hospital. The guidelines were developed to translate trial findings on falls prevention into recommendations for implementation in different health settings.

Type	Component	Recommendations	Strength of recommendations (1-3)#
Exercise interventions alone	Unselected groups	Tai chi classes with individual instruction should be offered to older people living in the community.	2
	Selected groups such as over 80s or those with mild deficits in strength and balance	Individually tailored exercise by qualified professionals should be established.	1-2
Multifaceted interventions	All groups	Prioritise programmes for prevention of falls that include more than one intervention. Specific targets include; postural hypotension, number of drugs, balance, transfer and gait.	2-3
Assessment in the community	Home based	Establish a program of medical and environmental assessment, with client education about risks and with referrals to relevant health professionals.	1
	Accident and Emergency Department	Identification of patients attending after falls, with assessment and follow-up for medical and occupational therapy using an interdisciplinary approach.	2
Residential settings	All residents of nursing homes	All residents of nursing homes should be offered hip protectors.	2

Type	Component	Recommendations	Strength of recommendations (1-3)#
	High risk residents	Fall risk assessment after a fall with individualised management plan and staff education.	2

Strength of recommendation grading specific to these guidelines, with 3 being the strongest.

Guideline for the prevention of falls in older persons by the American Geriatrics Society, British Geriatrics Society and American Academy of Orthopaedic Surgeons Panel on Falls Prevention (American Geriatrics Society et al. 2001).

The guidelines recommended identifying risk factors for falling, undertaking assessments depending on the risk level and implementing multifactorial or single interventions.

Low risk group refers to community-dwelling older people who have not presented to a doctor or other health professional after a fall. The assessment recommended for this group involves a brief assessment (screening) as part of routine care and includes yearly history of falls, check for unsteadiness upon walking, and refer for further assessment if unsteadiness is observed.

High risk group refers to people with recurrent falls, living in residential care facilities, prone to injurious falls or presenting after a fall. This group requires a more comprehensive assessment and a falls evaluation that may involve further referrals to a specialist. Falls evaluation includes history of falls, medical conditions, medications, neurological, gait, balance and vision assessments.

Type of recommendations	Living type	Intervention	Strength of recommendation (A-D)*
Multifactorial interventions	Community-dwelling	Gait training and advice on the appropriate use of assistive devices.	B
		Review and modification of medication especially psychotropic medication.	B
		Exercise programs with balance training as one of the components.	B
		Treatment of postural hypotension.	B
		Modification of environmental hazards.	C
		Treatment of cardiovascular disorders including cardiac arrhythmias.	D
		Staff education programs.	B
Single intervention	Long-term care and assisted living	Gait training advice on the appropriate use of assistive devices.	B
		Review and modify medications especially psychotropic medications.	B
		Exercise such as balance training and Tai Chi.	B-C

		Environmental modification.	B
		Medications review particularly polypharmacy and psychotropic medications.	C
		Assistive devices such as canes, bed alarms, walkers and hip protectors.	C
		Behavioral and educational programs.	C

*Strength of recommendation grading specific to these guidelines with A being the strongest (American Geriatrics Society et al. 2001).

Evidence-based guidelines for the secondary prevention of falls in older adults (Moreland et al. 2003).

These guidelines were developed based on rigorous appraisal on effectiveness studies. A clinical summary check sheet was provided to assist health practitioners.

Key priorities for implementation	Target group	Recommendation	Strength of recommendation (A-C)*
Screening for falls risk factors and environmental hazards followed by targeted intervention	Older people living in the community and institutions	Screening for falls risk factors and environmental hazards followed by multifactorial intervention, and possible referral to specialists if indicated.	A-B
Psychotropic medication withdrawal	Older people living in the community	Reducing psychotropic and number of medications as part of the multifactorial intervention.	A
Exercises	Older people living in the community and institutions	Participation in a home based, individualised exercise program including balance, gait, strength and endurance.	B
Screening of the home environment	Older people with history of falls	Occupational Therapy home assessment with implementation of recommended modifications.	A
Repeated assessment using disability rating scale	Community-dwelling older people	Periodic 3 month to 6 month disability assessment with any increase in disability reported to family physician.	Not graded

*Strength of recommendations specific to these guidelines with A being the strongest.

Minimising the risk of falls and fall-related injuries: guidelines for acute, sub-acute and residential care settings (The Victorian Quality Council 2004)

These guidelines were developed in Melbourne, Australia using a process model for minimising the risk of falls and fall-related injuries.

Statement/Steps	Target	Recommendation	Level of evidence (I-IV)*
Conduct a falls risk screen as the minimum process for identifying clients who are at risk of falling	Older people in acute, sub-acute and residential care	Conduct screening for all clients who are not part of high falls risk populations.	Consensus opinion
		Screening at following times: <ul style="list-style-type: none"> • On admission; • When client is transferred to another ward/department; • There is a change in health and functional status; • Client has a fall; and • As part of discharge planning. 	
		Use recognised tool.	
		Document results and include in clients' record/file.	
		Carry out a falls risk assessment for: <ul style="list-style-type: none"> • Clients whose risk exceeds threshold; and • Clients who are in high falls risk populations. OR Refer client for assessment as soon as practicable.	

Statement/Steps	Target	Recommendation	Level of evidence (I-IV)*
<p>Conduct a falls risk assessment for each patient/resident who is identified as being at risk of falling</p>	<p>Older people in acute, sub-acute and residential care</p>	<p>Assess clients for falls risk when:</p> <ul style="list-style-type: none"> • Client is classified as high risk on the screening tool; • All clients in high risk populations (eg people with stroke, Parkinson's disease); and • All clients in high risk settings (eg dementia specific residential care units). 	<p>II</p>
		<p>Assess or reassess a clients falls risk when:</p> <ul style="list-style-type: none"> • As soon as practicable after admission; • If there is evidence of a change in the client's health/functional status; • A client's environment or setting is changed; • A client's treatment is changed; • A client has had a fall; • As part of a routine review; and • As required by the organization's policy. 	
		<p>Use a recognized tool to carry out the assessment</p>	
		<p>Identify and describe all factors that contribute to the client's risk of falling and fall related injuries, including:</p> <ul style="list-style-type: none"> • Personal risk factors; and • Environmental risk factors. 	
		<p>Record the level of risk and identified risks in the client's record/file.</p>	
		<p>Develop and Implement an Action List.</p>	

Statement/Steps	Target	Recommendation	Level of evidence (I-IV)*
Develop and implement action list for minimizing the risk of falls and fall-related injuries and include in clients plan for daily care	Older people in acute, sub-acute and residential care	Determine which personal risk factors identified in the assessment are modifiable.	II
		For each personal risk factor with a modifiable cause, determine actions to minimize the risk of falls and falls related injury.	
		Determine appropriate actions to manage risk factors that are non-modifiable.	
		For clients with high overall falls risk, determine additional actions to minimize overall risk.	
		Determine how often these actions should be carried out, by whom and when.	
		Either document all actions in an action list or delegate this task.	
		Include the identified risk factors and an Action List in the client's documentation including: <ul style="list-style-type: none"> • Plan for daily care; • Permanent file/record; and • Discharge summary. Implement Action List as indicated.	

Statement/Steps	Target	Recommendation	Level of evidence (I-IV)*
	Organisation that provides sub-residential care for older people	<p>Provide information and required resources to staff, to enable them to develop and implement the Action List, including:</p> <ul style="list-style-type: none"> • Improve capacity for observation of high risk clients, which may involve restructuring work practices; and • Policies for discharge planning which include communication of falls risk information to those involved in ongoing care. 	
		Decide how the Action List should be integrated into the clients plan for daily care.	
		Provide staff education and training in developing and implementing an Action List.	
		Audit the implementation of the Action Lists.	
		Ensure regular environmental audits are undertaken and actions implemented.	
Respond to a falls incident appropriately	Older people in acute, sub-acute and residential care	<p>At a minimum an appropriate post fall response should include: Responding to a client's immediate need for care, ie examine the client for injury, minimize adverse effects of the fall, institute neurological observations if a head injury is suspected, only move the client after assessment of the situation. Using a consistent and standard definition of a "fall" Reporting the falls incident using the organization's process and documents.</p>	Consensus Opinion
		Document the fall in the clients file/record, including either a copy of the incident report or the information from the incident report.	
		Review the client's risk assessment and Action List in the plan for daily care, and make changes to reduce the risk of another fall.	

Statement/Steps	Target	Recommendation	Level of evidence (I-IV)*
	Organisation that provides sub-acute and residential care for older people	Develop a protocol for care of clients after a fall has occurred. Ensure staff are aware of the protocol.	
		Develop a stand alone Falls Incident report template or add a falls section to the organization's existing incident report.	
		Provide staff education on the purpose of incident reporting and training in the use of the incident report.	
		Audit the use of the incident report for compliance with relevant policy.	

*Strength of recommendation using the NHMRC classification, with the addition of consensus opinion as the weakest level of evidence.

Preventing falls and harm from falls in older people. Best practice guidelines for Australian hospitals and residential aged care facilities (Australian Council for Safety and Quality in Health Care 2005)

Statement/steps	Target group	Recommendation	Strength of recommendation *
Standard fall-prevention strategy	Older people in acute, sub-acute and residential care	A multifaceted approach to prevention of falls should be considered as part of routine care for all older people in hospitals and residential care facilities.	II C
Assessment		As part of a multi-component program conduct a systematic and comprehensive, multidisciplinary fall-risk assessment to inform the development of an individualized plan to prevent falls.	II B
Interventions		Develop and implement a targeted and individualized fall-prevention plan of care based on the findings of a fall screen or assessment.	II B
		As part of a multifactorial fall-prevention program, identify balance, mobility and strength problems then tailor an individual program to address these in hospital, post hospital and residential aged care settings.	II B

Statement/steps	Target group	Recommendation	Strength of recommendation *
		<p>Managing the symptoms of cognitive impairment by addressing agitation, wandering and impulsive behaviour is necessary. When an older person presents with a cognitive impairment, it is important that strategies are included to prevent delirium. It is essential to confirm that any disruptive behaviour is not due to an acute delirium or delirium superimposed on dementia. Multi-component interventions to prevent delirium may provide an effective strategy for reducing falls in older patients. Provide supervision and assistance to ensure that patients/residents with delirium or dementia, who are not capable of standing and walking safely, receive help with all transfers.</p>	<p>IV D</p>
		<p>Identify, assess and introduce a management plan for people with incontinence or who are at risk of becoming incontinent.</p>	<p>III D</p>
		<p>Staff in hospitals and residential aged care facilities should screen older people for ill-fitting or inappropriate footwear and give education and information about footwear features that may reduce fall risk (ie use of slippers should be discouraged).</p>	<p>III C</p>
		<p>Older people in hospitals and residential care facilities should be screened for foot pain and other foot problems, receive education and information about foot care and be referred to a podiatrist where indicated.</p>	<p>IV D</p>

Statement/steps	Target group	Recommendation	Strength of recommendation *
		<p>Medications related to falls needs to be reviewed and appropriately modified as a component of a multifactorial approach to reducing the risk of falls in older people.</p> <p>As part of a multifactorial intervention, older people on benzodiazepines should have their medication reviewed and discontinued if possible to reduce their risk of falling.</p>	<p>II B</p>
		<p>Ensure annual eye examinations are undertaken to reduce the incidence of visual impairment, which is associated with an increased risk of falls.</p> <p>Attention to visual function screening and referral for visual function maximisation should be included as a part of a multifaceted fall prevention program.</p> <p>Ensure that people who have had falls involving environmental obstacles (such as stairs and curbs) consider using spectacles rather than bi-focal; or multi-focal spectacles when walking.</p>	<p>III D</p>
		<p>Environmental modifications should be included in multi-factorial, multidisciplinary fall-prevention interventions.</p>	<p>II B</p>
		<p>People considered to be at higher risk of falling should be assessed by an occupational therapist for specific environmental/equipment needs and training to maximise safety.</p>	<p>II C</p>
		<p>Alternatives to restraint should be considered and trialed for people with cognitive impairment. Restraint should be considered the last option for people who are at risk of falling.</p>	<p>III C</p>

Statement/steps	Target group	Recommendation	Strength of recommendation *
Injury prevention interventions		<p>Hip protector use should be considered for people living in residential aged care facilities with a high risk of hip fracture (defined as having limited independent mobility, a history of falls and osteoporosis). There needs to be commitment from the facility to introduce training for staff and continuing support for the use of hip protectors.</p>	I D
		<p>Older people who are at high risk of hip fracture (defined as greater than 80 years of age with a history of falls and/or osteoporosis), and who believe that they will be able to use hip protectors and see no barriers to their use, should be offered hip protectors.</p>	I D
		<p>Hip protector use should be considered for patients in sub-acute hospital wards who are at high risk of falls. There needs to be commitment from the facility to introduce training for staff and continuing support for the use of hip protectors.</p>	III D
		<p>Vitamin D and calcium supplementation should be considered as a routine management strategy as it appears to significantly reduce the risk of falls and fall-related fractures among ambulatory or institutionalised older people.</p>	I A
		<p>To decrease subsequent fracture rates, appropriate treatment of those who have previously sustained a fracture and who have osteoporosis with bisphosphonates should be undertaken.</p>	II B
		<p>Hospitals should establish protocols that increase osteoporosis treatment rates in people who have sustained their first osteoporotic fracture.</p>	IV D

Statement/steps	Target group	Recommendation	Strength of recommendation *
Post-fall management		As part of a multi-component fall-prevention program post-fall assessment should be completed on all older people who fall whilst in hospital or residential aged care facilities.	II C

* Level of evidence based on the NHMRC classification (I-IV), with the addition of consensus opinion included in level IV. Also includes a strength of recommendation classification A – D with A the strongest.

Clinical practice guideline for the assessment and prevention of falls in older people (McInnes et al. 2005).

This guideline by the UK based National Institute for Clinical Excellence (NICE) was developed to assist clinicians directly involved with the care of older people who have fallen or at risk of falling as well as those who have been taken to hospital following a fall.

Key priorities for implementation	Target group	Recommendation	Strength of recommendation (A-D)*
Case/risk identification	Older people in contact with health professionals	Ask routinely if they have had a fall in the last year, and asked about frequency, context and characteristics of the fall.	C
	Older people reporting a fall or considered at risk of falling	Observation of balance and gait deficits and considered for their ability to benefit from intervention to improve balance and mobility.	C
Multifactorial falls risk assessment	Older people who present for medical attention due to falls or report recurrent falls in the past year or demonstrate gait and balance deficits.	<p>These groups should be offered a multifactorial falls assessment of risk, offered by skilled health professional, normally in a specialist falls service as part of an individualised intervention.</p> <p>Multifactorial assessment includes:</p> <ul style="list-style-type: none"> • Falls history; • Gait, balance, mobility and muscle weakness; • Osteoporosis risk; • Functional ability and fear of falling; • Visual impairment; • Cognitive impairment and neurological examination; • Urinary incontinence; • Home hazards; and • Cardiovascular examination and medication review. 	C

Key priorities for implementation	Target group	Recommendation	Strength of recommendation (A-D)*
Multifactorial intervention	Older people with recurrent falls or assessed at being at increased risk of falling.	<p>These groups should be offered an individualised multifactorial intervention including:</p> <ul style="list-style-type: none"> • Strength and balance training; • Home hazard assessment and intervention; • Vision assessment and referral; and • Medication review with modification/withdrawal. 	A
Encouraging participation of older people in falls prevention program including education and information giving	Individuals at risk of falling and their carers.	Provide information (verbal and written) on measures to prevent further falls.	D
Professional education	All staff dealing with patients known to be at risk of falling	Develop and maintain basic professional competence in falls assessment and prevention.	D

*Strength of recommendation specific for these guidelines with A being the strongest.