



Occupational therapy in the prevention and management of falls in adults

Practice guideline

Second Edition

Royal College of Occupational Therapists



Royal College of
Occupational
Therapists



Specialist Section
Older People

Front cover photograph ©Kate Robertson.

Ken Williams described his experience when he fell outside his home:

“I have lived alone since my wife died 8 years ago. I am usually fit and well and up to last year still enjoyed playing a few holes of golf once a week. However, over the last few months I have noticed I am less steady on my feet and certainly less agile than I was. Then I fell – I was in my drive and missed the step to the front door, falling forward onto my right knee. I cannot describe how frightening it was – there was nothing I could do to stop myself falling and once on the ground I realised I could not get up without help. Thankfully my son-in-law was close by and helped me up, but the whole experience really shook my confidence. I had fallen heavily on my knee, so as the hours progressed and the swelling increased I became virtually immobile. Thankfully an occupational therapist was able to visit the next day. She provided me with equipment to help me get back on my feet as I could not get on and off my chair or toilet without extreme difficulty. This immediately made a huge difference and enabled me to maintain my independence. But I soon realised that equipment, however useful, cannot restore your lost confidence. The occupational therapist supported me in gradually doing more around the house and then walking outside again – that confidence-building was so important in enabling me to resume my daily life again. I am still worried about falling but have taken the occupational therapist’s advice and put contingencies in place in case I do fall and cannot get up myself.”

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NICE has renewed accreditation of the process used by the Royal College of Occupational Therapists to produce its practice guidelines. The renewed accreditation is valid until 16 January 2023. More information on NICE accreditation can be viewed at www.nice.org.uk/accreditation.

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This guideline was developed using the processes defined within the Practice guideline development manual (College of Occupational Therapists [COT] 2017a).

Readers are referred to the manual to obtain further details of specific stages within the guideline development process.

The manual is available at: <https://www.rcot.co.uk/sites/default/files/Practice-guidelines-development-manual-Third-edition%20update%202018.pdf>

Forewords

Thank you for the opportunity to introduce the practice guideline for occupational therapy in falls prevention. This edition further strengthens the evidence-based interventions we have that not only significantly reduce the risk of falling but make a difference to the older person's safety, confidence and functional capacity. Occupational therapy in fall prevention is a specialty area. There are unique skills and contributions we can make in all aged care contexts and the quality and depth of this document in supporting this are impressive.

There are now two additional recommendations, one recommending a pre-discharge home assessment to prevent readmission and another that occupational therapists should consider interventions that have been shown to have impact and cost effectiveness. These are both highly relevant in justifying these services to decision makers. This edition updates policy and outlines practical approaches such as how occupational therapists can advocate for and lobby to ensure quality interventions are implemented and maintained. The occupational role in falls prevention is broad and covers identifying risk, assessment, education and intervention from hospital to home, in primary care, and in promoting self-management and prevention. The methodological quality of the guideline is exemplified by the rigour of research into a wide range of service contexts, the careful interpretation of evidence, and relevant examples of implementation issues so important for translation and sustainability. The depth is strengthened by the framing of recommendations across four key foci of safety, fear of falling, managing fall risk, and impact and cost effectiveness.

These guidelines are a useful and current tool for implementing fall prevention. I encourage occupational therapists to engage with this resource and to use it wisely.

Lindy Clemson

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Honorary Professor, Nottingham University*

This second edition of the practice guideline for occupational therapy in falls prevention and management presents clear recommendations, strengthened by the most recent evidence base. Such high-quality guidelines are important, as they inform health and social care providers, managers and commissioners of the standards we as a community should aim to achieve. The rigour of such documents helps guide the delivery of optimal care for all, aiming to minimise unwarranted variation in service provision. Given our ageing population demographics and the associated frailty and vulnerability to falls this conveys, clearly articulated evidence-based guidance for the prevention and management of falls is essential. The new section addressing the impact and cost effectiveness of occupational therapy intervention is a timely addition which will help inform service commissioning. These up-to-date recommendations are informative for all members of the multidisciplinary team involved in the care of those who fall or fear falling, to whom I endorse this document. Having reviewed the evidence base in such detail, the authors have helpfully added a summary of the current gaps in the evidence

base, with suggested priorities for future research; this makes helpful reading for researchers developing new project proposals and, it is hoped, for research funders.

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Chair, British Geriatric Society Falls and Bone Health Section*

I was honoured to be asked to provide a few words for the falls guidance document in 2014. I am a nurse who also has a diagnosis of relapsing remitting multiple sclerosis. One of my more severe relapses left me with very impaired balance and this in turn led to me suffering large numbers of falls on a daily basis. The resultant fear of falling was all encompassing and led to me avoiding social activity and being unable to work. This was extremely disabling in all aspects of my daily life; I felt unsafe to perform many routine tasks. At the time I was offered no specialist specific assessment for the prevention of falls.

The original guideline offered an excellent framework for occupational therapists to work towards. During the time I was a frequent faller I was unable to access a service whereby an occupational therapist could have offered assessment, advice and a plan. I would have felt far more supported and able to live a more productive life. The person-centred focus of this guideline is particularly impressive to me as a person who has fallen, and I feel that anyone at risk of or experiencing falls should have access to assessment from a therapist in accordance with this guideline.

Five years down the line it is great to see these guidelines being used in the community by individual therapists. The reviewed guidelines should reinforce the central themes and help therapists to embed them in their day-to-day practice, which hopefully will lead to better focus on the patients affected by falls. The reviewed guidelines retain the focus on a real-world issue and it is my firm belief that this is where the document will prove to be most effective in enhancing the lives of people who have fallen.

Tony Wilde

Member of the public

Key recommendations for implementation

The aim of this practice guideline is to provide specific evidence-based recommendations that describe the most appropriate care or action to be taken by occupational therapists working with adults who have fallen, are at risk of falling or are fearful of falling. The recommendations are intended to be used alongside the therapist's clinical expertise in their assessment of need and implementation of interventions. The practitioner is, therefore, ultimately responsible for the interpretation of this evidence-based guideline in the context of their specific circumstances and the person they are working with.

Recommendation statements should not be taken in isolation and must be considered in conjunction with the contextual information provided in this document, together with the details on the strength and quality of the recommendations.

Recommendations are graded based on the Grading of Recommendations Assessment, Development and Evaluation (GRADE) process (Grade Working Group 2004), as described in the *Practice guidelines development manual* (College of Occupational Therapists [COT] 2017a). The strength of the recommendations is identified via a scoring of 1 (strong) or 2 (conditional), and the quality of the supporting evidence via a grading on a scale of A (high) to D (very low). This revised edition of the guideline strengthens and adds to the previous recommendations. It is strongly advised that readers study Sections 10 and 11, to understand the guideline methodology, together with the evidence tables in Appendix 7, to be fully aware of the outcome of the literature search and overall available evidence.

The recommendations are based on the best available evidence and so cannot cover all aspects of occupational therapy practice. The four recommendation categories, however, reflect key aspects of occupational therapy in the prevention and management of falls in adults:

- i. Keeping safe at home: reducing risk of falls.
- ii. Keeping active: reducing fear of falling.
- iii. Falls management: making it meaningful.
- iv. Occupational therapy intervention: impact and cost effectiveness.

All recommendations were confirmed by the Guideline Review Group (GRG) as being strong (score 1). It should be noted that the recommendations below are not presented in any order of priority. The overall quality of evidence grade reflects the robustness or type of research supporting a recommendation, but it does not necessarily reflect the recommendation's significance to occupational therapy practice.

Summary of recommendations by category

Keeping safe at home: reducing risk of falls

It is recommended that:

<p>1. Occupational therapists should carry out with people who have fallen or are at risk of falls an occupational therapist-led home hazard assessment, including intervention and follow-up, to optimise functional activity and safety.</p> <p><i>(Elliot and Leland 2018 [B]; Maggi et al 2018 [B]; Stark et al 2017 [B]; Pighills et al 2016 [A]; Gillespie et al 2012 [A]; Pighills et al 2011 [A]; Clemson et al 2008 [A]; Costello and Edelstein 2008 [B]; La Grow et al 2006 [A]; Campbell et al 2005 [A]; Clemson et al 2004 [A]; Nikolaus and Bach 2003 [A])</i></p> <p>[Statement amended and new evidence 2020]</p>	1A
<p>2. Occupational therapists should carry out home safety assessment and modification for older people with a visual impairment.</p> <p><i>(Maggi et al 2018 [B]; Blaylock and Vogtle 2017 [B]; Gillespie et al 2012 [A]; Clemson et al 2008 [A]; La Grow et al 2006 [A]; Campbell et al 2005 [A])</i></p> <p>[New evidence 2020]</p>	1A
<p>3. Occupational therapists should carry out a pre-discharge home assessment to prevent readmission to hospital.</p> <p><i>(Lockwood et al 2015 [A]; Johnston et al 2010 [C])</i></p> <p>[New recommendation 2020]</p>	1A
<p>4. Occupational therapists should carry out a post-discharge home assessment to reduce the risk of falls following discharge from an inpatient rehabilitation facility, taking into account the person's falls risk, functional ability and diagnosis.</p> <p><i>(Chu et al 2017 [A]; Di Monaco et al 2012 [B]; Di Monaco et al 2008 [B])</i></p> <p>[Statement amended and new evidence 2020]</p>	1A
<p>5. Occupational therapists should provide people living in the community advice, instruction and information on assistive devices as part of a home hazard assessment.</p> <p><i>(Chu et al 2017 [A]; Jensen and Padilla 2017 [B]; Steultjens et al 2004 [B])</i></p> <p>[New evidence 2020]</p>	1A

Keeping active: reducing fear of falling

It is recommended that:

<p>6. Occupational therapists should explore with the person whether fear of falling may be restricting activity, both in and outside the home, and include the promotion of occupational activity within individualised intervention plans.</p> <p><i>(De Coninck et al 2017 [A]; DeLaney et al 2016 [B]; Boltz et al 2014 [C]; Painter et al 2012 [C]; Kempen et al 2009 [C]; Wijlhuizen et al 2007 [C])</i></p> <p>[New evidence 2020]</p>	1A
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<p>7. Occupational therapists should listen to an individual's subjective views about their falls risk, alongside using objective functionally based outcomes to determine the influence of fear of falling on the person's daily life.</p> <p><i>(Schepens et al 2012 [B]; Wijlhuizen et al 2007 [C])</i></p>	1B
<p>8. Occupational therapists should seek ways of enabling the person to minimize the risk of falling when performing chosen activities, wherever possible, as this may improve confidence and enable realistic risk taking.</p> <p><i>(Wijlhuizen et al 2007 [C]; Zijlstra et al 2007 [B])</i></p>	1B
<p>9. Occupational therapists should facilitate caregivers, family and friends to adopt a positive approach to risk.</p> <p><i>(Boltz et al 2014 [C])</i></p>	1C
<p>Falls management: making it meaningful</p> <p><i>It is recommended that:</i></p>	
<p>10. Occupational therapists should share knowledge and understanding of falls prevention and management strategies with the person. This should provide personally relevant information and take account of the person's individual fall risk factors, lifestyle and preferences.</p> <p><i>(Stenhagen et al 2014 [C]; Groot and Fagerström 2011 [C]; Stern and Jayasekara 2009 [B]; Ballinger and Clemson 2006 [C]; Haines et al 2006 [C]; Haines et al 2004 [B])</i></p> <p>[New evidence 2020]</p>	1B
<p>11. Occupational therapists should take into account the person's perceptions and beliefs regarding their ability, and personal motivation, which may influence participation in falls intervention.</p> <p><i>(Taylor et al 2017 [B]; Jang et al 2016 [B]; Harvey et al 2014 [C]; Gopaul and Connolly 2012 [D]; Groot and Fagerström 2011 [C]; Nyman 2011 [C])</i></p> <p>[New evidence 2020]</p>	1B
<p>12. Occupational therapists should optimise the extent to which the person feels in control of the falls intervention.</p> <p><i>(Taylor et al 2017 [B]; Currin et al 2012 [C]; Wilkins et al 2003 [C])</i></p> <p>[Statement amended and new evidence 2020]</p>	1B
<p>13. Occupational therapists should support the engagement of the person in identifying the positive benefits of falls intervention.</p> <p><i>(Hill et al 2013 [B]; Nyman 2011 [C]; Ballinger and Clemson 2006 [C])</i></p> <p>[New evidence 2020]</p>	1B

<p>14. Occupational therapists should ensure falls prevention and management information is available in different formats and languages to empower and engage all populations (e.g. web-based support, written information leaflets).</p> <p><i>(Harper et al 2017 [C]; Mahoney et al 2017 [C]; Hill et al 2013 [B]; Nyman et al 2011 [C]; Hill et al 2009 [B])</i></p> <p>[Statement amended and new evidence 2020]</p>	<p>1B</p>
<p>15. Occupational therapists should encourage and support physical and social activity, as a means of reducing the person's risk of falls and their adverse consequences, through the use of activities meaningful to the individual.</p> <p><i>(Rosendahl et al 2008 [B])</i></p> <p>[Statement amended 2020]</p>	<p>1B</p>
<p>16. Occupational therapists should deliver targeted strength and balance training that is incorporated into daily activities and occupations that are meaningful to the person, to improve and encourage longer-term participation in falls prevention interventions.</p> <p><i>(Pritchard et al 2013 [B]; Clemson et al 2012 [A]; Clemson et al 2010 [B])</i></p> <p>[Statement amended 2020]</p>	<p>1A</p>
<p>Occupational therapy intervention: impact and cost effectiveness</p> <p><i>It is recommended that:</i></p>	
<p>17. Occupational therapists should use interventions that have been shown to be cost-effective and have impact.</p> <p><i>(Harper et al 2017 [C]; Pighills et al 2016 [A]; Lockwood et al 2015 [A]; Sheffield et al 2013 [B]; Irvine et al 2010 [B]; Campbell et al 2005 [A])</i></p> <p>[New recommendation 2020]</p>	<p>1A</p>

It is recommended that occupational therapists participate in the national and local audit of falls prevention services, and use the tool available to support this guideline to undertake audit against the above recommendations.

1 Introduction

The prevention and management of falls presents significant challenges for health and social care. However, it also presents opportunities for occupational therapists to help support those living with long-term conditions and our ageing population by building resilience and improving their health and wellbeing. This practice guideline focuses on the important contribution that occupational therapy makes to the prevention and management of falls in adults, no matter the context.

Definition of a fall:

An event which results in a person coming to rest inadvertently on the ground or floor or other lower level. (WHO 2007, p1)

Falls are a growing public health concern worldwide and occur most frequently as a consequence of an interaction between diverse risk factors and situations, some of which can be prevented and others modified (Public Health England 2017, Public Health England 2018a, World Health Organization [WHO] 2018).

Falls are often a symptom of something else, either acute (e.g. chest infection/urinary tract infection/exacerbation of a medical condition) or gradual deterioration (e.g. frailty, medication reaction, balance/mobility).

There are key groups of individuals who may be at higher risk of falls. These include adults experiencing the following:

- Balance/mobility issues.
- Frailty.
- End of life care.
- Neurological conditions such as stroke, Parkinson's disease, multiple sclerosis.
- Conditions associated with learning disabilities.
- Mental health issues (due to potential medications and lifestyle choices).
- Visual impairment.
- Dementia/delirium.
- A transition (due to bereavement, house move or move from/to home, hospital, care homes).

These also include adults in the following settings:

- Prison.
- Care homes.
- Hospital.

Individuals are not always aware of their risk factors for falling until they have experienced a fall. Falls are often not reported as people perceive them to be a consequence of their condition or an inevitable part of ageing. Fall risk and interventions to prevent falls may differ depending on the setting. It is therefore important to consider the context of the fall.

Half the individuals who fall will fall again within one year (Close et al 1999). Of particular concern are falls resulting in injuries such as hip fracture and its associated high mortality and morbidity (NICE 2011). It is recognised that recurrent falls have a significant impact on increased rates of hospitalisation, accelerated admission to care homes, lifestyle limitation, quality of life, mobility, independence and self-efficacy (Baker and Harvey 1985, Cummings et al 2000, Gryfe et al 1977, Tinetti 1987).

There is growing evidence that having early identification, multifactorial assessment and early intervention can make a significant impact on individuals at risk of falls (NICE 2013, Public Health England 2017). Positive risk taking, increasing activity and building strength and balance are encouraged to support individuals to improve their health and wellbeing and future proof their risk of falls.

Occupational therapists must seek opportunities to discuss an individual's risk of falls and seek opportunities to maximise the interventions available to the individual to reduce their risk and prevent harm. This should include summoning help quickly following a fall and may incorporate teaching a person strategies to get up and down from the floor. The Public Health England Consensus Statement (2017) highlighted that Falls Management Exercise (FaME) strength and balance programmes including strategies to rise from the floor were a cost-effective way to reduce falls.

The Person-Environment-Occupation Model (Law et al 1996, Duncan 2011) provides a unique opportunity for occupational therapists to utilise their expertise to identify the complex interaction of these multifactorial falls risk factors with each other, and how they interact with the individual, their environment and their occupations. Occupational therapists are skilled in providing interventions that include public health, positive risk taking, rehabilitation and resilience training.

1.1 Background to clinical condition – falls

Falls may occur at any age, but the combination of risk factors means that while falls are not an inevitable part of ageing, they are more likely to occur with increasing age. There has been a paucity of research on the impact of falls on younger people who are at risk of falls; however, the consequences of a fall can be as detrimental to them.

A key stage of any falls pathway for older people is to identify those who may be at risk of falling. Guidance within all four countries of the UK recommends that older people who are in contact with healthcare professionals should be asked about falls experienced in the previous year and, if relevant, the frequency, context and characteristics of those falls (DHSSPSNI 2013, NICE 2013, Scottish Government 2014).

Over 400 risk factors associated with falling have been identified (NHS Centre for Reviews and Dissemination 1996), but these can be divided broadly into intrinsic (person-related), extrinsic (environment-related) and behavioural (activity-related) risk factors (Connell and Wolf 1997, Masud and Morris 2001, Stalenhoef et al 2002) (see Appendix 9).

The annual incidence of falls in older people with dementia is around 70–80%, which is approximately twice the incidence of falls in cognitively intact older people (Shaw et al 2003, Dijk et al 1993). Older people with dementia have a three-fold risk of sustaining a fracture, and among these fractures they have an additional three times greater risk of sustaining a fractured neck of femur (Tinetti et al 1998, Dijk et al 1993). The highest proportion of hospital admissions for people with dementia occurs where the individual has had a fall, and the second highest occurs for individuals sustaining a hip fracture as a result of a fall (Alzheimer's Society 2009). People with dementia who fall are approximately five times more likely to be institutionalised than those who do not fall (Morris et al 1987).

People with learning disabilities have also been identified as having a higher prevalence of falls and related injuries. There is a relative absence of evidence, but particular risk factors include early-onset age-related degenerative changes, use of psychotropic and antiepileptic medication, behavioural issues and poor risk awareness (Willgoss 2010).

Older people with sight loss are also a high-risk group who are more likely to fall, but vision loss can often be improved by appropriate detection and correction (College of Optometrists 2014). The risk of injury from falls and the rate of hip fractures in this group are nearly two times greater compared with the sighted population (Legood et al 2002, Martin 2013).

Older people living in care homes are more likely to fall. The Care Inspectorate (2016) has developed a *Managing falls and fractures in care homes* resource to support anyone working in care homes to help prevent and manage falls in this setting.

Although most falls do not result in serious injury, the negative outcomes of a fall are considerable and can include 'psychological problems (for example, a fear of falling and loss of confidence in being able to move about safely); loss of mobility, leading to social isolation and depression; increase in dependency and disability; hypothermia; pressure-related injury and infection' (NICE 2013, p26). The costs of rehabilitation and social care are great, with up to 90% of older patients who fracture their neck of femur while in hospital failing to recover their previous level of mobility or independence (Murray et al 2007). It has been evidenced in case study review that a broken arm in a highly mobile individual can lead to an increase in sedentary behaviour and this continued four weeks following their injury (Harvey et al 2018). Recent Cochrane reviews (Cameron et al 2018, Kendrick et al 2014, Sherrington et al 2019) have highlighted the benefits of exercise and physical activity on falls prevention to reduce fear of falling and reduce rates of falls.

The importance of a comprehensive multifactorial falls risk assessment and interventions to reduce/modify the factors pertinent for an individual are highlighted by Hopewell et al (2018). NICE recommends that an assessment and interventions should be offered, if a person presents for medical attention because of a fall, if they report recurrent falls in the past year, or if they demonstrate abnormalities of gait and/or balance (NICE 2013).

1.2 Practice requirement for the guideline

Occupational therapy is a key intervention for individuals who have fallen, are at risk of falling or are fearful of falling.

The Royal College of Occupational Therapists Specialist Section – Older People (RCOTSS – Older People) Falls Clinical Forum developed *Falls management* guidance to support

occupational therapy staff to implement the national guidance available at the time of its publication (COT 2006). The guidance has been frequently downloaded, used and valued by practitioners, indicating a need for continued information to support evidence-informed best practice.

The 2006 guidance was withdrawn and replaced by the first edition of this practice guideline.

1.3 Topic identification process

The Royal College of Occupational Therapists Specialist Section – Older People (RCOTSS – Older People) identified the prevention and management of falls in adults as the topic for this occupational therapy practice guideline.

NICE has accredited the process used by the Royal College of Occupational Therapists to produce its practice guidelines. Accreditation is valid until January 2023 and is applicable to guidance produced using the processes described in the *Practice guidelines development manual* (COT 2017a).

A guideline project proposal was developed by the RCOTSS – Older People Falls Clinical Forum, in line with the Royal College of Occupational Therapists' accredited guideline development process. This was subsequently approved by the Royal College of Occupational Therapists' Practice Publications Group in March 2013.

2 The occupational therapy role

The role of an occupational therapist in falls prevention and management is not exclusive to specialist falls services. Occupational therapy intervention with adults who have fallen, are at risk of falling or are fearful of falling occurs in a wide range of settings in health, social care, voluntary and independent sectors, including hospitals, people's own homes, care homes, day centres and prisons.

New opportunities are also emerging across the whole system to support people during their transitions of care, a time when falls risk increases. Occupational therapists work within primary care settings where they can make an impact on prevention of hospital admissions for the individual. The person-centred and holistic philosophy of occupational therapy underpins the recommendations within this guideline. Occupational therapy provides practical support to empower people to facilitate recovery, build resilience and overcome barriers to preventing them from doing the occupations that matter to them. 'Occupation' refers to practical and meaningful activities that allow people to achieve their wishes and meet their needs. Support from occupational therapy increases people's independence and wellbeing in areas that are meaningful to individuals.

Occupational therapists consider the person, their environment and their occupation (Law et al 1996, Duncan 2011). These three domains have an alignment with the risk factor categories and interventions for falls: intrinsic (person), extrinsic (environment) and behavioural (occupation). Embracing the three means that occupational therapy falls prevention and management intervention optimise the potential to impact positively on an individual's ability to carry out daily activities (occupational performance).

The occupational therapy role in falls prevention and management may include, but is not necessarily limited to, the key areas described in the sections below.

2.1 Falls risk identification and analysis

Occupational therapists work in a variety of settings with adults of all ages who may be at risk of or have had a fall, or are fearful of falling, and no matter the context should identify an individual's risk factors for falls, including those factors that can and cannot be modified. Occupational therapists can use the analysis of data about falls to understand how these falls impact on the person, their environment, occupation and performance. As part of the risk identification it is important for occupational therapists to understand the need to take further action and when to seek expertise from an advanced practice falls occupational therapist or other members of the health and social care team.

2.2 Assessment and intervention

Occupational therapists contribute to a number of the elements of a multifactorial assessment, notably with respect to the 'assessment of perceived functional ability and

fear relating to falling' and 'assessment of home hazards' (NICE 2013, p13). Assessment should also incorporate perspectives of the caregiver and family.

Interventions include positive risk taking in activity, optimising functional performance, improving self-confidence and social engagement. Environmental advice and modification to reduce home hazards, education and practice in safe moving and handling, with provision of equipment as required, are also appropriate. All interventions should promote independence, build resilience and improve personal safety. Reablement, where indicated, will involve working with support workers to resume activities of daily living and occupational roles. Occupational therapy intervention for falls may be in the context of condition management strategies.

A central tenet of occupational therapy practice is working with people to support self-management of their daily occupations. This can be achieved through building resilience and providing opportunities for people to manage their own health and wellbeing. Reducing sedentary behaviour and encouraging people to improve their activity levels should be embedded within all aspects of intervention.

Occupational therapists have a role both in terms of fracture prevention and in social and rehabilitative prescribing and signposting of strength and balance activities, but these should be evidence based to ensure the maximum benefit and falls risk reduction.

Contingency planning for the management of future falls that may occur should be explored. This may include advice and practice, where appropriate, on how to summon help and how to avoid the consequences of a 'long lie', or lying on the floor after a fall for a period of 60 minutes or more. Occupational therapists should help the person identify behaviours that may increase the risk of falls and assist with behaviour change to reduce those risks.

2.3 Falls prevention and management education

Occupational therapists play a key role in the education of people who are at risk of falls or who have had a fall. They also have a role in supporting carers, family and staff across a wide spectrum of agencies to prevent and manage falls. Education on falls prevention spans across a life journey and should encompass the transitions of care.

Technology-enabled care (technology such as a pendant alarm to summon assistance, or remote monitoring via items such as a falls detector) is an option which may be explored in the context of self-management. The evidence remains mixed with regard to technology-enabled care outcomes and cost effectiveness (Henderson et al 2013, Steventon et al 2013). Qualitative studies have identified that when tailored sensitively to the needs of the individual, technology-enabled care has the potential to increase confidence and reduce fear of falling (Horton 2008, Stewart and McKinstry 2012). The use of technology is likely to be influenced by intrinsic factors associated with the individual's attitude, choice, control, independence and perceived need for safety measures (Hawley-Hague et al 2014).

2.4 Outcome measures

The Royal College of Occupational Therapists promotes the use of evidence-based outcome measures to demonstrate the delivery of high-quality and effective occupational therapy services and to provide credible and reliable justification for the intervention that is delivered. Members can find more information on the RCOT website:

<https://www.rcot.co.uk/practice-resources/library-resources/assessments-and-outcome-measures>.

Occupational therapists working in partnership with people who fall, are at risk of falling or are fearful of falling should evaluate the effectiveness of their intervention. Therapists should use their clinical reasoning to decide which outcome measure is most appropriate for the service/setting they are working in.

2.5 Improving health and wellbeing

Improving health, wellbeing and independence, including reducing falls, is a public health priority (Department of Health and Public Health England 2014). It is important, therefore, to note that allied health professionals have a significant contribution to make in improving public health and wellbeing (Hindle 2014, Allied Health Professions Federation 2019). Public health guidance also identifies that occupational therapists have a valuable contribution in promoting mental wellbeing through physical activity interventions (NICE 2008). The public health guidance complements and supports the falls guideline (NICE 2013), and occupational therapists should therefore explore and support opportunities for the person to participate in appropriate physical activity. Occupational therapists should also take into account potential health inequalities and any social determinants of health which may be appropriate to the provision of services. In falls prevention and management, this can be addressed specifically through optimising individual capacity and control over life and strengthening the role and impact of ill health prevention (Marmot 2010, p15).

2.6 Multiagency working

The multifactorial nature of falls prevention and management strategies means that working as an effective team member is vital. It is recognised that as part of a multidisciplinary, multiagency team, there may be some key areas of assessment and intervention that overlap with the role of other health and social care personnel. Where an occupational therapist is unable to provide the required intervention, the person should be referred to an appropriate service to meet his or her needs (COT 2017b, p14).

Occupational therapy staff must work alongside other professionals in accordance with local service arrangements to ensure the needs of the person are met. Good communication across the primary and secondary care interface, and between health, social care and the independent and voluntary sectors, is imperative.

2.7 Cost effectiveness of occupational therapy interventions

A recent campaign by RCOT (2019) highlighted the value of occupational therapy within falls prevention and management. In addition, Public Health England has recognised the cost effectiveness of home assessment and modification (PHE 2017). Opportunities exist through the NHS long-term plan (NHS 2019) for occupational therapists to intervene early in primary care, embed personalised care, expand therapy-led services and develop wider partnerships. All of these opportunities fit within the context of occupational therapy in the prevention and management of falls. Therefore it is important that cost effectiveness is embedded within the delivery of occupational therapy. Return on investment tools (Public Health England 2018b) exist to support occupational therapists to demonstrate the value of their interventions. In addition,

occupational therapists must consider using evidence-based interventions as these will support a return on investment.

2.8 Summary

Health and social care services continue to move forward at pace. The move towards integrated working, generic roles and multidisciplinary teams means it is important that the roles of different professions and team members are clearly understood. This is vital to ensure that the person can benefit from the range of expertise available to them and that specialist skills are used effectively in falls prevention and management services.

This guideline provides evidence-based recommendations for occupational therapists delivering services. It also sets out to increase understanding about the role of occupational therapy in the prevention and management of falls. In the context of the impact of falls and fractures on the individual, and the resulting treatment costs across the whole health and social care system (Tian et al 2013), the inclusion of occupational therapists as core members of falls prevention and management services should be considered by managers and commissioners as cost-efficient.

The RCOT Specialist Section – Older People Falls Clinical Forum provides an opportunity for occupational therapists to review and discuss current evidence and practice in relation to falls prevention and management. Occupational therapists who would like to become members of the RCOTSS – Older People Falls Clinical Forum can visit the RCOT website for more information: <https://www.rcot.co.uk/about-us/specialist-sections/older-people-rcot-ss>.

3 Objective of the guideline

The guideline objective is:

To provide evidence-based recommendations that inform occupational therapists, working with adults, of their role within the multifactorial assessment and intervention required to prevent and manage falls.

The objective addresses occupational therapy intervention at any point during a person's journey along a falls care pathway, which includes assessment, information and education and intervention (NICE 2019).

It is intended that occupational therapists use this guideline to inform their work, with a particular focus on empowering the person to fully engage and take responsibility for achieving individual goals. It should furthermore inform work with carers and people who support adults who have fallen or are at risk of falls. This may be particularly pertinent when the person has a cognitive impairment. The application of this guideline will also inform the delivery of evidence-based services.

This guideline should be used in conjunction with the current versions of the following professional practice documents, of which knowledge and adherence is assumed:

- *Standards of conduct, performance and ethics* (Health and Care Professions Council [HCPC] 2016).
- *Standards of proficiency: occupational therapists* (HCPC 2013).
- *Code of ethics and professional conduct* (COT 2015).
- *Professional standards for occupational therapy practice* (COT 2017b).
- *Occupational therapy for adults undergoing total hip replacement: practice guideline* (RCOT 2017a).

Occupational therapists should also be familiar with their relevant country-specific policy documents and performance measures, and be cognisant of the following guidelines:

- *Falls: the assessment and prevention of falls in older people* (NICE 2013).
- *Falls in older people: quality standard* (NICE 2015, updated 2017).
- *Hip fracture: the management of hip fracture in adults* (NICE 2011, updated 2017).
- *Quality standard for hip fracture* (NICE 2012a, updated 2017).
- *Management of hip fracture in older people* (SIGN 2009).
- *Osteoporosis: assessing the risk of fragility fracture* (NICE 2012b, updated 2017).
- *Management of osteoporosis and the prevention of fragility fractures* (SIGN 2015).
- *Quality care for older people with urgent and emergency care needs* (Banerjee and Conroy 2012).

Please note the clinical guideline development processes for NICE and the Scottish Intercollegiate Guidelines Network (SIGN) have been NICE-accredited.

Occupational therapists must only 'provide services and use techniques for which [they] are qualified by education, training and/or experience', and within their professional competence (COT 2015, p32). This guideline should be used in conjunction with the therapist's clinical expertise and, as such, the clinician is ultimately responsible for the interpretation of the evidence-based recommendations in the context of their specific circumstances and the person's individual needs.

4 Guideline scope

4.1 Clinical question

The key question covered by this guideline is:

What evidence is there to support occupational therapy in the prevention and management of falls in adults?

The guideline development group (GDG) members identified, from their knowledge of the evidence base and clinical expertise, key outcomes for falls prevention and management interventions. Outcomes included those pertinent to the person and those of importance to health and social care services:

- Improved identification of people at risk.
- Improved assessment of people at risk.
- Improved intervention for people at risk.
- Improved intervention to reduce falls risk.
- Reduction in falls risk and rate of falls.
- Optimised functional independence through evidence-based interventions, including positive risk taking.
- Self-management, incorporating the person and carer/family education and ongoing support and reintegration into community roles.
- Improved understanding of the importance of education and training on the role of occupational therapy in falls prevention and management.

The heterogeneity of the population who fall means that it can be difficult to identify the specific outcomes that will be the most important to the person. A person-centred perspective underpins occupational therapy practice, and intervention must be compatible with the person's preferred outcomes or, where appropriate, in their best interest (considering lack of capacity and conditions such as dementia).

The guideline scope included searching for evidence in the above areas. Although there were no specific exclusions in terms of interventions, a decision was made that the guideline should focus on interventions that were specifically within the remit of core occupational therapy practice. It is acknowledged that occupational therapists may often undertake, for example, exercise-related interventions, but these are unlikely to be within the competencies of all occupational therapy practitioners.

4.2 Target population

This practice guideline applies to adults who have fallen, are at risk of falling or are afraid of falling.

A **fall** is described as:

An event which results in a person coming to rest inadvertently on the ground or floor or other lower level. (WHO 2007, p1)

To further define the target population:

- Adults are defined as any person aged 18 years and over.
- There are no restrictions or limitations on gender, ethnicity or cultural background.
- There are no exclusions for comorbidities, but each person should be assessed individually (taking into account relevant comorbidities) when determining appropriate care or action specific to the guideline recommendations.

All populations and subgroups are covered by this guideline, with the exception of people under 18 years of age. Additionally, people whose falls were caused by a sudden onset of paralysis, epileptic seizure, excessive intake of alcohol in the absence of any other risk factors, or overwhelming external force have been excluded. This is based on the definition of a fall as 'inadvertently coming to rest on the ground or other lower level with or without loss of consciousness and other than as a consequence of sudden onset of paralysis, epileptic seizure, excess alcohol intake, or overwhelming external force' (Close et al 1999, p93).

Falls associated with industrial accidents and sporting accidents were also excluded, as these are usually related to a specific activity and environmental context, involving individuals for whom there are potentially no other significant risk factors for falls.

4.3 Target audience

The principal audience for this practice guideline is occupational therapists who work with adults who have fallen, are at risk of falling or are afraid of falling.

This guideline is therefore applicable to occupational therapy staff delivering services to adults in a wide range of environments across health, social care, voluntary and independent sectors, including hospitals, people's own homes, care homes, day centres and prisons.

This practice guideline will also be relevant to a wider audience, including the following:

- Managers and commissioners: to provide evidence of the role of occupational therapy with adults who have fallen, are at risk of falling or are afraid of falling, and for use as a reference tool for workforce design and funding models.
- Social care providers: to support interagency working, facilitating effective discharge and transition back into the community following hospital admission. This will include, where applicable, providers of reablement services working to optimise safety and independence and prevent fall-related hospital admissions.
- Members of the multidisciplinary team: to provide a greater understanding of the role of the occupational therapist working in falls prevention and management. This will promote closer working between disciplines (including physiotherapists, nursing staff, social workers, support workers, people working in bone health/osteoporosis services, and medically qualified staff), with improved outcomes for the person.

- Education providers: as an educational tool, orienting individuals to the occupational therapy role in falls prevention and management (e.g. occupational therapy students, technical instructors, support workers and assistants).
- Private providers and independent sector: a reference point to tailor service provision and staffing to suit this group of people.
- Equipment providers and trusted assessors: to enhance understanding of the needs of this specific group of people.
- The person and their carer(s): providing information to enable them to be more informed about the occupational therapy process and interventions.

5 Guideline recommendations

The recommendations reviewed and developed by the GRG are underpinned by the available evidence. Synthesis of that evidence resulted in the emergence of four core themes and associated outcomes applicable to occupational therapy interventions:

- Keeping safe at home: reducing risk of falls.
- Keeping active: reducing fear of falling.
- Falls management: making it meaningful.
- Occupational therapy intervention: impact and cost effectiveness.

The four themes cut across the outcomes associated with the guideline question (see Section 10.1 and Table 10.1). Although the recommendation statements have been set out within four categories, there are overlaps and a strong interface across them all. Recommendations should not be considered in isolation but in the wider context of the evidence.

Where applicable, feedback from the public and people who have accessed occupational therapy services has been used as an adjunct to the published evidence.

As presented in Section 10, the strength of the recommendations is identified via a scoring of 1 (strong) or 2 (conditional), and the quality of the supporting evidence via a grading on a scale of A (high) to D (very low). A recommendation grading takes into account the consistency of the evidence used to support that recommendation.

All recommendations were agreed by the GRG as being strong; that is, most people would want to, or *should* receive, the course of intervention or action stated.

Additional details on individual studies (e.g. study design, methodological limitations, recruitment numbers, statistical significance) can be accessed in the evidence tables in Appendix 7.

Outcomes sought, risks, generalisability and social determinants of health associated with each category of recommendations are outlined in this section. Financial and organisational barriers are discussed in Section 7.2.

Recommendations are based on synthesis of the best available evidence. It should therefore be noted that the guideline is not able to be fully reflective of the role of occupational therapy (see Section 2) in the prevention and management of falls in adults.

This guideline does not set out to compare occupational therapy with other interventions. This is in line with the PICO framework (Huang et al 2006, Richardson et al 1995), which for this guideline did not specify a comparative intervention (see Section 10.1). Alternative management options are therefore not explicitly reviewed or discussed. Occupational therapists should, however, be aware of other interventions that may be available from other members of the multidisciplinary team as part of multifactorial intervention, such as strength and balance training, exercise, vision assessment and referral, and medication review (NICE 2013, pp14–15).

5.1 Keeping safe at home: reducing risk of falls

Keeping safe at home: reducing risk of falls

It is recommended that:

- | | |
|---|----|
| 1. Occupational therapists should carry out with people who have fallen or are at risk of falls an occupational therapist-led home hazard assessment, including intervention and follow-up, to optimise functional activity and safety. | 1A |
|---|----|

(Elliot and Leland 2018 [B]; Maggi et al 2018 [B]; Stark et al 2017 [B]; Pighills et al 2016 [A]; Gillespie et al 2012 [A]; Pighills et al 2011 [A]; Clemson et al 2008 [A]; Costello and Edelstein 2008 [B]; La Grow et al 2006 [A]; Campbell et al 2005 [A]; Clemson et al 2004 [A]; Nikolaus and Bach 2003 [A])

[Statement amended and new evidence 2020]

- | | |
|--|----|
| 2. Occupational therapists should carry out home safety assessment and modification for older people with a visual impairment. | 1A |
|--|----|

(Maggi et al 2018 [B]; Blaylock and Vogtle 2017 [B]; Gillespie et al 2012 [A]; Clemson et al 2008 [A]; La Grow et al 2006 [A]; Campbell et al 2005 [A])

[New evidence 2020]

- | | |
|---|----|
| 3. Occupational therapists should carry out a pre-discharge home assessment to prevent readmission to hospital. | 1A |
|---|----|

(Lockwood et al 2015 [A]; Johnston et al 2010 [C])

[New recommendation 2020]

- | | |
|--|----|
| 4. Occupational therapists should carry out a post-discharge home assessment to reduce the risk of falls following discharge from an inpatient rehabilitation facility, taking into account the person's falls risk, functional ability and diagnosis. | 1A |
|--|----|

(Chu et al 2017 [A]; Di Monaco et al 2012 [B]; Di Monaco et al 2008 [B])

[Statement amended and new evidence 2020]

- | | |
|--|----|
| 5. Occupational therapists should provide people who are living in the community advice, instruction and information on assistive devices as part of a home hazard assessment. | 1A |
|--|----|

(Chu et al 2017 [A]; Jensen and Padilla 2017 [B]; Steultjens et al 2004 [B])

[New evidence 2020]

Evidence overview

The evidence for the effectiveness of occupational therapy in home hazard assessments and interventions for people considered at high risk of falls (history of falling in past year, hospitalisation for a fall, severe visual impairment or functional decline) is both high quality and strong.

5.1.1 Introduction

The NICE (2013) and American Geriatrics Society and British Geriatrics Society (2001) guidelines for falls recommend that a multifactorial falls risk assessment should be offered to older people who present for medical attention because of a fall, or recurrent falls during the previous 12 months. Home hazard assessment and intervention is identified as one component of this multifactorial approach.

Occupational therapy should be an integral part of a multifactorial falls prevention programme; occupational therapists have significant skills and expertise in the delivery of home hazards assessment and safety interventions. Environmental assessment must be conceived as greater than a 'checklist' determination of home hazards. It is essential that the assessment explores how the actual use of the environment influences the individual's risk of falling. The willingness of people to accept help with removing or modifying home hazards may be influenced by a number of factors; one large cross-sectional study in the UK identified that these included older age, recent falls and lower economic status (Yardley et al 2008). Motivation and engagement are also fundamental to home hazard assessment, subsequent interventions and follow-up (see Section 5.3).

Person-centred and occupation-focused interventions are provided by occupational therapists, in which 'the physical and psychological benefits of maintaining independence are weighed against potential physical damage if an injury occurs as a result of a fall' (Chase et al 2012, p288). The occupational therapist acknowledges the dynamic relationship between the individual and his or her environment; home hazards and behaviour are modifiable whereas some medical falls risks are not.

When helping to remove and reduce someone's falls risk, occupational therapists take a broad holistic view and work together with the individual client to consider factors within each of these domains [person, environment and occupation] and how they interact. (Ballinger and Brooks 2013, p2)

Provision of occupational therapy within this multifactorial context includes the concurrent potential for a positive impact on activities of daily living, notably mobility and bathing (Chase et al 2012, Gitlin et al 2006, Tolley and Atwal 2003). It is acknowledged, however, that by providing a combination of interventions, determining which part of a programme contributes directly to improvements for the person can be complex.

The evidence and recommendations set out in this section are considered within the framework of the NICE recommendations for home hazard and safety intervention (NICE 2013, p15):

Older people who have received treatment in hospital following a fall should be offered a home hazard assessment and safety intervention/modifications by a suitably trained healthcare professional. Normally this should be part of discharge planning and be carried out within a timescale agreed by the patient or carer, and appropriate members of the health care team. (Recommendation 1.1.6.1)

Home hazard assessment is shown to be effective only in conjunction with follow up and intervention, not in isolation. (Recommendation 1.1.6.2)

The gap in access to home hazard assessment and intervention has, however, been highlighted in the National Audit of Falls and Bone Health in Older People (Royal College of Physicians 2010). The audit identified that only '65% of patients with hip fracture and 19% of patients with non-hip fracture' received home hazard assessment by an

occupational therapist. Of those, less than half took place in the person's home environment (Royal College of Physicians 2010, p7).

The evidence reviewed has been considered with specific regard to the role of the occupational therapist within the delivery of the NICE recommendations.

5.1.2 Evidence

Keeping safe at home: reducing risk of falls

It is recommended that:

- | | |
|---|----|
| 1. Occupational therapists should carry out with people who have fallen or are at risk of falls an occupational therapist-led home hazard assessment, including intervention and follow-up, to optimise functional activity and safety. | 1A |
|---|----|

(Elliot and Leland 2018 [B]; Maggi et al 2018 [B]; Stark et al 2017 [B]; Pighills et al 2016 [A]; Gillespie et al 2012 [A]; Pighills et al 2011 [A]; Clemson et al 2008 [A]; Costello and Edelstein 2008 [B]; La Grow et al 2006 [A]; Campbell et al 2005 [A]; Clemson et al 2004 [A]; Nikolaus and Bach 2003 [A])

[Statement amended and new evidence 2020]

When reviewing evidence on the effectiveness of falls prevention interventions in improving outcomes related to falls and hospital admissions, **Elliott and Leland (2018)** found that home safety assessment and modification as part of a multifactorial intervention could prevent hospital readmission. This systematic review looked at 50 studies that included single-component, multicomponent and multifactorial interventions to prevent falls in community-dwelling older adults.

A Belgian longitudinal study assessed a range of government-funded studies that aimed to keep frail, older adults in their homes longer (**Maggi et al 2018**). These studies varied in their interventions, with some providing home modifications by an occupational therapist. The least effective, lowest-intensity interventions without any home modifications formed a control group compared with an experimental group formed of those interventions that included home modifications or other high-intensity intervention. The authors found that home modifications provided by an occupational therapist reduced the risk of falling in the next six months significantly (odds ratio [OR]=0.46, 95% confidence interval [CI]=0.23–0.91, $p<0.05$) among those who had fallen in the last 90 days compared with the control group.

This finding was further substantiated in a systematic review that investigated whether home modification improved outcomes for older adults (**Stark et al 2017**). It reviewed 35 articles and found evidence that home modifications, as part of a multicomponent intervention or as a single-component intervention, reduce falls among older adults.

A critical review (**Pighills et al 2016**) of two systematic reviews noted that environmental assessments and modifications by occupational therapists for people at a high risk of falling were clinically effective in preventing falls. Both systematic reviews included randomised controlled trials only and focused on community-dwelling older people. The first review aimed to investigate the impact of environmental interventions as the sole intervention. While the second review assessed any interventions to reduce falls, it only reviewed subgroup analysis on interventions with environmental adaptations or provision of assistive technology.

A Cochrane review set out to establish which falls prevention interventions were effective for older people aged 65 years and over living in the community (**Gillespie et al 2012**). The review found that, overall, home safety assessment and modification interventions were effective in reducing the rate of falls (6 trials, n=4,208) and the risk of falling (7 trials, n=4,051). With respect to effectiveness, where there was a higher risk of falls (including those with severe visual impairment), home safety interventions were more effective in reducing the rate of falls. Risk of fracture was not significantly reduced, however. The review identified that there was some evidence that interventions led by an occupational therapist, compared with those not led by an occupational therapist, were more effective with respect to rate of falls and risk of falling.

A UK study aimed to assess the effectiveness of environmental falls prevention for people aged 70 years and over, living in the community and with a history of one or more falls over the previous year (**Pighills et al 2011**). The randomised controlled trial involved three arms: participants were randomised to either an environmental assessment led by an occupational therapist (n=87), an environmental assessment led by a trained assessor (n=73) or usual care in the control group (n=78). After assessing the home environment, fall hazards were discussed and recommendations agreed. Follow-up took place at three, six and 12 months via questionnaire. The study results determined that the group receiving the assessment led by the occupational therapist had significantly fewer falls than the control group 12 months after the assessment. Within the trained assessor group, there was no significant effect on falls. Occupational therapists were more effective than trained assessors in identifying the need for modification, and in their influence on adherence to recommendations and the reduction of falls in high-risk individuals.

The efficacy of environmental interventions in falls prevention was the subject of a systematic review by **Clemson et al (2008)**. This review focused on people aged 65 years and over living in the community, with an analysis of six trials that provided home environmental interventions as a single intervention (n=3,298). Analysis identified there was a significant reduction in the risk of falls (21%) across all studies, with a greater reduction (39%) where the population was at high risk of falls. The review included a rating of intervention and determined that those of high intensity should meet 75% of four criteria: a comprehensive evaluation of hazard identification and priority-setting, taking into account both personal risk and environmental audit; the use of an assessment tool validated for the broad range of potential fall hazards; inclusion of formal or observational evaluation of the functional capacity of the person within the context of their environment; and provision of adequate follow-up and support for adaptations and modification. Studies that provided high-intensity intervention led by an occupational therapist significantly reduced the rate of falls.

A systematic review of studies of falls intervention programmes covering home hazard assessment with modification (4 studies), exercise and/or physical therapy (10 studies) or multifactorial intervention (12 studies) was conducted by **Costello and Edelstein (2008)**. The evidence reviewed indicated that when targeted to older people at high risk of falls, home hazard assessment with modification may be beneficial in reducing falls.

La Grow et al (2006) set out to investigate whether a home safety assessment and modification programme's success in reducing falls was related to the home hazards modification or modification of behaviour, or both. The type and location of the recommendations made by the occupational therapist were examined, together with the number and circumstances of falls experienced. The reduction in falls was found not to be limited to falls associated with an environmental hazard, and therefore the study

concluded that the overall reduction in falls resulted from some mechanism in addition to the removal or modification of hazards or provision of new equipment.

"More home assessments are needed."

Volunteer at the Involvement Centre in Nottingham

A randomised controlled trial looking at home safety and home exercise among those who had low vision provided evidence that these interventions can be effective (**Campbell et al 2005**). Two occupational therapists delivered the home safety programme (n=100), which included an assessment and agreeing interventions and hazard reductions. The exercise programme (n=97) was provided by three physiotherapists and consisted of a modified Otago programme and a vitamin D supplement. Ninety-eight participants received both of these programmes. Participants not randomised to the two intervention groups (n=96) received two social visits from a researcher. Participants who engaged with the home safety programme had 41% fewer falls than the control group who received two social visits, and the intervention was more cost effective than the exercise programme for this group of people.

An Australian randomised controlled trial set out to test whether a multifaceted community-based programme (*Stepping On*) facilitated by an occupational therapist was effective in reducing falls in people aged 70 years or over, living at home and at risk of falls (**Clemson et al 2004**). Participants had experienced a fall in the previous 12 months or had concerns about falling.

The programme included: balance and strength exercises and moving about safely; home hazards (identifying and problem solving); community safety and footwear; vision; vitamin D and hip protectors; management of medication and mobility techniques (including in the community). The intervention group (n=157) attended two-hour group sessions, facilitated by an occupational therapist, on a weekly basis for seven weeks. A follow-up occupational therapy home visit was conducted; the environment assessment included recommendations for removing or modifying home fall hazards such as removal of clutter. Seventy per cent of participants in the programme actioned at least 50% of the home visit recommendations. The control group received up to two social visits when falls or falls prevention were not discussed (n=153). A 31% reduction in falls was experienced within the intervention group; secondary analysis identified the programme was particularly effective for men.

Nikolaus and Bach (2003) conducted a randomised controlled trial that examined the effectiveness of a home assessment and intervention programme in reducing falls among older people living in Germany. During the intervention group's (n=181) hospital stays, the home interventions team (an occupational therapist, together with a nurse or physiotherapist) carried out a home visit to evaluate the person's home and prescribe appropriate equipment. After discharge, at least one further home visit was carried out. The control group (n=179) received usual care but no home visits. Follow-up at one year identified that the intervention group had 31% fewer falls than the control group, with the intervention being most effective for people who reported two or more falls. The intervention for this subgroup resulted in a significant reduction in the rate of falls and proportion of frequent fallers compared with the control group (incidence rate ratio = 0.63, 95% CI=0.43–0.94, p=0.009).

Keeping safe at home: reducing risk of falls

It is recommended that:

- | | |
|--|----|
| 2. Occupational therapists should carry out home safety assessment and modification for older people with a visual impairment. | 1A |
|--|----|

(Maggi et al 2018 [B]; Blaylock and Vogtle 2017 [B]; Gillespie et al 2012 [A]; Clemson et al 2008 [A]; La Grow et al 2006 [A]; Campbell et al 2005 [A])

[New evidence 2020]

As highlighted above, a study of a range of Belgian programmes aimed to determine risk factors for falls (**Maggi et al 2018**). One of the main predictors of falls was visual impairment ($p=0.005$), with an odds ratio of 3.02 (95% CI=1.68–5.46) indicating that vision problems had a strong association with an increased risk of falling.

A scoping review showed that home modifications can reduce falls for those with visual impairment (**Blaylock and Vogtle 2017**). Two studies in the scoping review included home modification interventions, and these were shown to significantly reduce falls among this population. However, these findings should be treated with caution as the authors did not appraise the strength of each study.

A Cochrane review by **Gillespie et al 2012**, noted above, investigated the effectiveness of fall prevention interventions. It found that home safety assessment and modification were more effective where there was a higher risk of falls, including for those with visual impairments.

Environmental interventions were found to have a significant impact in reducing falls among those with visual impairments in a systematic review and meta-analysis by **Clemson et al (2008)**, with details provided previously.

A randomised controlled trial by **La Grow et al (2006)**, discussed previously, provided evidence that home safety assessment and modification conducted by an experienced occupational therapist for those over 75 years old and with a severe visual impairment reduced the number of falls. This was in comparison to social visits.

The **Campbell et al (2005)** randomised controlled trial focused on home safety and home exercise. The sample population comprised people aged 75 years and over who had low vision and who were living in the community in New Zealand. The efficacy and cost effectiveness of a home safety programme and a home exercise programme were assessed. As noted above, some participants participated in the home safety programme only, some in an exercise programme only, some in both, and some in none, which formed the control group.

The home safety programme was modified for people with severe visual impairments and involved a home visit, the use of a modified version of the Westmead Home Safety Assessment, and discussion of recommendations. When equipment was recommended, this was followed by a second home visit. Adherence to the programme was evaluated after six months via a telephone interview.

The home safety programme reduced falls compared to those who did not participate in the programme. The study suggested that an organisation seeking to reduce falls in older people with a visual impairment would 'do best by investing in a proved

programme of home safety assessment and modification delivered by an occupational therapist' (Campbell et al 2005, p4).

Keeping safe at home: reducing risk of falls

It is recommended that:

- | | |
|---|----|
| 3. Occupational therapists should carry out a pre-discharge home assessment to prevent readmission to hospital. | 1A |
|---|----|

(Lockwood et al 2015 [A]; Johnston et al 2010 [C])

[New recommendation 2020]

A systematic review of 14 qualitative and quantitative studies aimed to determine the effectiveness of pre-discharge home assessments by occupational therapists (**Lockwood et al 2015**). Not only did home assessments reduce the risk of falling, they also reduced the risk of hospital readmission by 50% in patients without a diagnosis of stroke. However, the authors found no overall effect on quality of life.

The relationship between pre-discharge occupational therapy home assessments and prevalence of falls in the first month following discharge from a rehabilitation hospital was investigated in a prospective cohort study in Australia (**Johnston et al 2010**). The decision to undertake a home assessment was made by the treating occupational therapist based on clinical reasoning, and the number of falls for one month after discharge was recorded by all participants. The risk of falling one month after discharge was found to increase in all subjects not receiving a home assessment. Falls risk was mitigated by a home assessment for all diagnostic groups, with the exception of participants with neurological conditions.

Keeping safe at home: reducing risk of falls

It is recommended that:

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| 4. Occupational therapists should carry out a post-discharge home assessment to reduce the risk of falls following discharge from an inpatient rehabilitation facility, taking into account the person's falls risk, functional ability and diagnosis. | 1A |
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(Chu et al 2017 [A]; Di Monaco et al 2012 [B]; Di Monaco et al 2008 [B])

[Statement amended and new evidence 2020]

A randomised controlled trial that included a post-discharge environmental assessment and suggested modifications also showed a significant reduction in falls among older adults admitted to accident and emergency after a fall (**Chu et al 2017**). The intervention group received a single home visit from an occupational therapist within two weeks of discharge. It included an environmental hazards evaluation and a daily life routine assessment to understand the potential fall risk in their daily activities. The control group received a well-wishing visit from a research assistant with no background in falls prevention. Each group was followed up every two weeks for 12 months by a blind assessor to record falls. At six months the number of falls and fallers differed significantly from the control group ($p=0.02$, with three falls in the intervention group compared to 12 in the control, and $p=0.03$, with three fallers in the intervention group compared to 12 in the control), and at nine months the number of falls differed

significantly ($p=0.04$, with seven falls in the intervention group and 19 in the control group).

Two studies by Di Monaco et al investigated occupational therapist home visits and adherence to home modification recommendations based on data from a quasi-randomised controlled trial. The trial assessed the role of a post-discharge home visit by an occupational therapist in reducing the risk of falling in females aged 60 years and over who had experienced a hip fracture (**Di Monaco et al 2008**). The usual multiprofessional intervention to prevent falls was delivered to all participants while in the rehabilitation hospital, but participants in the intervention group ($n=45$) received a home visit by an occupational therapist at a median point of 20 days post-discharge. During the home visit, environmental hazards, activity of daily living behaviours, use of assistive devices and individualised targeted modifications were addressed. Falls were recorded by all participants and reported during a home visit taking place approximately six months after discharge. A significantly lower proportion of fallers were found in the intervention group following adjustment for observation length, Barthel Index scores assessed before the observation period, and body height. The study, although relatively small and with some limitations, concluded that in a sample of older females discharged from a rehabilitation hospital following a first hip fracture, a single home visit by an occupational therapist significantly reduced their risk of falling compared to the control group (adjusted absolute risk was 26% for the intervention group and 8.8% for the control group).

A post-hoc analysis of the same study data examined the adherence to the home modification recommendations (**Di Monaco et al 2012**). Uncorrected environmental and behavioural factors significantly predicted fall occurrence for the participants in the high-risk group. These results were suggested as being indicative of a clear need to improve strategies to promote adherence.

Keeping safe at home: reducing risk of falls

It is recommended that:

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| 5. Occupational therapists should provide people who are living in the community advice, instruction and information on assistive devices as part of a home hazard assessment. | 1A |
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(Chu et al 2017 [A]; Jensen and Padilla 2017 [B]; Steultjens et al 2004 [B])

[New evidence 2020]

A randomised controlled trial by **Chu et al (2017)**, noted above, showed that an occupational therapy fall reduction home visit programme aimed at older adults who had been admitted to accident and emergency and then discharged home reduced the number of falls and those who fell. One element of the programme was to prescribe assistive devices, where appropriate, when conducting a visit to assess the person and his or her environment.

A systematic review assessing the evidence related to environment-based falls prevention interventions for people with Alzheimer's or other major neurological disorders found evidence for the use of night monitoring systems such as alarm systems in the home (**Jensen and Padilla 2017**).

The question of whether occupational therapy improves outcomes for people aged 60 years and over who are living independently was examined in a systematic review (**Steultjens et al 2004**). The incidence of falling was measured in three randomised controlled trials, included in the review, which evaluated an intervention in which instructions in the use of assistive devices were combined with training in skills strategies. These provided some limited evidence for the efficacy of the intervention in decreasing falls incidence for people at high risk of falling. Strong evidence was identified within the review for the efficacy of advising on assistive devices as part of a home hazards assessment on functional ability.

5.1.3 Potential impact of the recommendations

Outcomes sought:

- Individuals make informed choices about how to manage the falls risks presented by their particular environments.
- Individuals are enabled to actively manage their risk of falls. Home hazards and behaviour are modifiable, but some medical falls risks are not.

Risks

The context in which home hazard assessment and modification is provided should be considered. NICE (2013) indicates that home hazard assessment and modification is not effective when completed as a standalone intervention, and should therefore be part of a multifactorial assessment and intervention.

Generalisability

Aside from Stark et al (2017), the evidence in this section has come from studies in which individuals are at least 60 years old, and therefore it cannot be definitively generalised to younger people. The targeting of falls prevention to people at high risk (including those with visual impairment) has, however, been particularly highlighted, and these principles should be taken into account when working with younger people, in tandem with an individualised assessment and tailored approach to interventions.

The majority of the evidence originates from studies involving individuals living in the community, and specific research in hospitals or care homes is limited. One UK study carried out a cluster randomised control trial in care homes, with environmental modification as a component of the falls prevention programme (Dyer et al 2004); reduction in falls rates for the intervention groups did not reach statistical significance, and the authors' recommendations were reflective of the potential benefits of targeting people who have fallen or are at highest risk of falls.

Studies involving individuals with cognitive impairment or dementia are very limited, as these generally form exclusion criteria for participation. The potential for individuals with mild dementia to benefit from a home safety and exercise programme is, however, beginning to emerge, albeit in terms of acceptability rather than efficacy (Wesson et al 2013).

Social determinants of health

It is important to note that assistive technology equipment provision in the UK is not universally a free provision, and the type of equipment prescribed or available is variable. Occupational therapists have to work within the eligibility requirements that may be stipulated by their local authority or organisation. The need to purchase equipment, the cost of which may be prohibitive for people on limited incomes, is an important factor to consider. Some individuals may not be able to make an informed

choice about equipment or may not have easy access to obtain items independently. Occupational therapists therefore need to identify options for any equipment needs to be met and be mindful that several factors, of which limited income is an example, may influence the willingness of the person to accept help with home hazards (Yardley et al 2008).

5.2 Keeping active: reducing fear of falling

Keeping active: reducing fear of falling

It is recommended that:

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| 6. Occupational therapists should explore whether fear of falling may be restricting activity, both in and outside the home with the person, and include the promotion of occupational activity within individualised intervention plans. | 1A |
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(De Coninck et al 2017 [A]; DeLaney et al 2016 [B]; Boltz et al 2014 [C]; Painter et al 2012 [C]; Kempen et al 2009 [C]; Wijlhuizen et al 2007 [C])

[New evidence 2020]

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| 7. Occupational therapists should listen to an individual's subjective views about their falls risk, alongside using objective functionally based outcomes to determine the influence of fear of falling on the person's daily life. | 1B |
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(Schepens et al 2012 [B]; Wijlhuizen et al 2007 [C])

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| 8. Occupational therapists should seek ways of enabling the person to minimize the risk of falling when performing chosen activities, wherever possible, as this may improve confidence and enable realistic risk taking. | 1B |
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(Wijlhuizen et al 2007 [C]; Zijlstra et al 2007 [B])

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|---|----|
| 9. Occupational therapists should facilitate caregivers, family and friends to adopt a positive approach to risk. | 1C |
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(Boltz et al 2014 [C])

Evidence overview

The evidence on fear of falling highlights the integral link between fear and activity levels. Although reducing the number of falls may be a key outcome for falls prevention activities, there is the potential to restrict activity as a behavioural response to engagement. People have different attitudes and levels of tolerance to risk. The occupational therapist therefore has a valuable role in working with the person, caregivers, family and friends to achieve a balance of risk and activity.

5.2.1 Introduction

Fear of falling has been suggested as being an umbrella term for 'fear, anxiety, loss of confidence and impaired perception of ability to walk safely without falling' (Parry et al 2013).

Fear may be experienced by people who have fallen and people who have never fallen and is experienced by up to half of older people living in the community (Zijlstra et al 2007). Fear of falling is, therefore, an important factor, particularly given its potentially detrimental consequences on an individual's lifestyle and occupations.

The concept of self-efficacy, in this case meaning the degree of confidence a person has in carrying out everyday occupations without falling, is an important factor that needs to be considered in falls prevention and management.

"Loss or lack of confidence – I know if I fall there is a very high risk I will break a bone as I have osteoporosis. If I broke my hip there is a high chance I could die as a result. That makes you lack confidence."

Rushcliffe 50+ Forum Health Group member

The evidence and recommendations set out in this section can be considered within the framework of the NICE (2013, p16) recommendation focusing on participation in falls prevention programmes:

Falls prevention programmes should also address potential barriers such as low self-efficacy and fear of falling, and encourage activity change as negotiated with the participant.
(Recommendation 1.1.9.1)

The evidence described has been reviewed in the context of the role of the occupational therapist within the delivery of this recommendation.

5.2.2 Evidence

Keeping active: reducing fear of falling

It is recommended that:

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| 6. Occupational therapists should explore whether fear of falling may be restricting activity, both in and outside the home with the person, and include the promotion of occupational activity within individualised intervention plans. | 1A |
|---|----|

(De Coninck et al 2017 [A]; DeLaney et al 2016 [B]; Boltz et al 2014 [C]; Painter et al 2012 [C]; Kempen et al 2009 [C]; Wijlhuizen et al 2007 [C])

[New evidence 2020]

A systematic review aimed to assess whether occupational therapy can improve the performance of physically frail older people living in the community (**De Coninck et al 2017**). In a review of nine studies with varying interventions, it found that occupational therapy contributions, among other positive elements, significantly reduced fear of falling.

To identify whether fear of falling predicts engagement in home activities (EHA), a United States of America (USA) study reviewed a randomised controlled trial's baseline data of community-dwelling older adults who had fallen in the past six months (**DeLaney et al 2016**). It concluded that as fear of falling increases, EHA decreases, and that along with depression and perceived activity performance in the home, fear of falling significantly predicted EHA scores.

Boltz et al (2014) determined that fear of falling in people aged 70 years and over who were admitted to hospital resulted in activity restriction. The research, carried out in the USA, involved 41 participants with whom perceptions around mobility and physical activity and fear of falling were explored via semi-structured interviews and standardised measures. Participants who described themselves as depressed were more likely to describe fear of falling. Four themes were identified from the qualitative results, with a predominant response across those themes being activity restriction ('keeping still') versus self-direction ('use your common sense'). Fear of falling could potentially negatively influence mobility, physical activity and functional performance in older adults in hospital.

"I had a fall on my front path and landed heavily on my knee. I have had a loss of confidence after my fall – although equipment helps, it does not restore your confidence."

Person with experience of falling

The relationship of fear to depression, anxiety, activity level and activity restriction was the focus of a cohort study carried out by occupational therapy staff in the USA (**Painter et al 2012**). A 90-minute intervention delivered fall prevention information (including risk factors, fear of falling and home safety strategies), together with a semi-structured falls questionnaire and measures, including the Survey of Activities and Fear of Falling in the Elderly (SAFE). The intervention was undertaken with 99 participants aged 55 years and over who may or may not have experienced falls. The research found that activity level was correlated negatively with activity restriction, fear of falling, depression and anxiety. Furthermore, anxiety predicted both fear of falling and activity level. Clinical implications from this were that occupational therapy practitioners should assess for fear of falling when the person displays anxiety and decreased motivation to perform functional activities.

A cross-sectional study in the Netherlands used a screening questionnaire to analyse self-reported information on a number of sociodemographic, health-related and psychosocial variables: levels of fear of falling and avoidance of activity due to fear of falling (**Kempen et al 2009**). A total of 540 participants were included from a random selection of people aged 70 years and over living in the community. A number of correlations were identified: severe fear of falling correlated independently with being female, having limitations in activities of daily living, and one or more falls in the previous six months. Avoidance activity correlated independently with older age and limitations in activities of daily living.

"It's so important people listen to your fears and acknowledge them."

Rushcliffe 50+ Forum Health Group member

An earlier study, also in the Netherlands, applied the Task Difficulty Homeostasis Theory to test out an assumption that the level of outdoor physical activity mediates the relationship between fear of falling and actual outdoor falls (**Wijlhuizen et al 2007**). The theory is founded on the principle that perceived task difficulty is related closely to the feeling of risk. This feeling represents an emotional response to a threat, such as fear of falling, and has consequences for related behaviour. The prospective study involved 1,752 people aged 65 years and older; questionnaires were completed about fear of falling outdoors and physical activity. Walking and bicycling were used as the indicators

of outdoor physical activity. Participants who expressed a high fear of falling were more often low to moderately active; where there was a high fear of falls outdoors, participants restricted their outdoor physical activity to prevent an increase in falls in that environment. This research importantly confirmed that the incidence of falls alone as a measure is potentially limited, and the level of physical activity should also be taken into account.

Keeping active: reducing fear of falling

It is recommended that:

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| 7. Occupational therapists should listen to an individual's subjective views about their falls risk, alongside using objective functionally based outcomes to determine the influence of fear of falling on the person's daily life. | 1B |
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(Schepens et al 2012 [B]; Wijlhuizen et al 2007 [C])

Schepens et al (2012) conducted a meta-analytical review to examine relationships between fall-related efficacy and measures of activity and participation of people aged 60 years and over living in the community. A strong positive relationship was identified between fall-related efficacy and activity on analysis of the 20 studies included in the review. The analysis indicated that both occupational-based activities (e.g. activities of daily living performance) and more basic performance skills (e.g. exercise to improve muscle strength) were affected by fall-related efficacy. The authors determined that the findings highlighted the important role of occupational therapists in assessing the link between fall-related efficacy and activity.

Wijlhuizen et al (2007), as noted above, showed a link between fear of falling and restricted outdoor physical activity. Those who felt that they were at a higher risk of falling adjusted their behaviour in an effort to prevent themselves from falling.

Keeping active: reducing fear of falling

It is recommended that:

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|---|----|
| 8. Occupational therapists should seek ways of enabling the person to minimize the risk of falling when performing chosen activities, wherever possible, as this may improve confidence and enable realistic risk taking. | 1B |
|---|----|

(Wijlhuizen et al 2007 [C]; Zijlstra et al 2007 [B])

A systematic review examined the interventions to reduce fear of falling in older people living in the community (**Zijlstra et al 2007**). It concluded that home-based exercise, fall-related multifactorial programmes and community-based Tai Chi delivered in a group format had been effective in reducing fear of falling for this population. The article presented the perspective of fear of falling as being a response to a realistic threat but suggested that fear may also be associated with activities that could actually be performed safely. The potential social, mental and physical health adverse consequences of restricting activity were highlighted in the discussion, with the suggestion that 'the experience of performing activities safely may lead to greater falls self-efficacy and a realistic view of the risk of falling' (Zijlstra et al 2007, p614).

Wijhuizen et al's (2007) link between fear of falling and reduced outdoor physical activity, discussed previously, highlights the need to help individuals reduce their risk of falling while engaging in outdoor activities they express an interest in doing.

Keeping active: reducing fear of falling

It is recommended that:

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|--|----|
| 9. Occupational therapists should facilitate caregivers, family and friends to adopt a positive approach to risk.
<i>(Boltz et al 2014 [C])</i> | 1C |
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One theme from the qualitative results of **Boltz et al (2014)**, highlighted above) emphasised the importance of interpersonal factors, with participants highlighting the role of staff and their families in promoting safe mobility. The responsiveness and availability of staff in the hospital often influenced the level of physical activity. A reluctance to ask busy staff to help led, on occasion, to 'stay[ing] put' (Boltz et al 2014, p7). Families were often described as facilitators and advocates in providing assistance that promoted independence. The need for staff to prioritise occupation-focused interventions within a context of an enabling philosophy emphasising independence and self-direction was identified.

5.2.3 Potential impact of the recommendations

Outcomes sought:

- Occupational therapists are aware of those individuals restricting activity due to fear of falling and can therefore consider intervention strategies.
- People confidently engage in their daily activities and occupations, with a realistic understanding of any potential risk of falling.
- Caregivers are confident in allowing the person to take appropriate and relevant risk.

Risks

Reducing fear may increase activity, which conversely may increase falls and potentially lead to individuals taking risks that are beyond their balance capabilities.

Generalisability

The evidence included studies within the home, in the outside environment and in the hospital setting. Fear of falling is likely to impact on activity within any context or environment, and the recommendations can therefore potentially be translated to all settings. It is acknowledged, however, that some members of the multidisciplinary team may be more circumspect about promoting positive risk taking, for example in the acute hospital environment compared with the familiar environment of the person's home.

Social determinants of health

Fear of falling can affect activities of daily living and occupational engagement. Reducing fear can contribute to optimising individual capacity and control over life and the potential to impact positively on preventing associated ill health such as anxiety.

5.3 Falls management: making it meaningful

Falls management: making it meaningful	
<i>It is recommended that:</i>	
<p>10. Occupational therapists should share knowledge and understanding of falls prevention and management strategies with the person. This should provide personally relevant information and take account of the person's individual fall risk factors, lifestyle and preferences.</p> <p><i>(Stenhagen et al 2014 [C]; Groot and Fagerström 2011 [C]; Stern and Jayasekara 2009 [B]; Ballinger and Clemson 2006 [C]; Haines et al 2006 [C]; Haines et al 2004 [B])</i></p>	1B
[New evidence 2020]	
<p>11. Occupational therapists should take into account the person's perceptions and beliefs regarding their ability, and personal motivation, which may influence participation in falls intervention.</p> <p><i>(Taylor et al 2017 [B]; Jang et al 2016 [B]; Harvey et al 2014 [C]; Gopaul and Connelly 2012 [D]; Groot and Fagerström 2011 [C]; Nyman 2011 [C])</i></p>	1B
[New evidence 2020]	
<p>12. Occupational therapists should optimise the extent to which the person feels in control of the falls intervention.</p> <p><i>(Taylor et al 2017 [B]; Currin et al 2012 [C]; Wilkins et al 2003 [C])</i></p>	1B
[Statement amended and new evidence 2020]	
<p>13. Occupational therapists should support the engagement of the person in identifying the positive benefits of falls intervention.</p> <p><i>(Hill et al 2013 [B]; Nyman 2011 [C]; Ballinger and Clemson 2006 [C])</i></p>	1B
[New evidence 2020]	
<p>14. Occupational therapists should ensure falls prevention and management information is available in different formats and languages to empower and engage all populations (e.g. web-based support, written information leaflets).</p> <p><i>(Harper et al 2017 [C]; Mahoney et al 2017 [C]; Hill et al 2013 [B]; Nyman et al 2011 [C]; Hill et al 2009 [B])</i></p>	1B
[Statement amended and new evidence 2020]	
<p>15. Occupational therapists should encourage and support physical and social activity, as a means of reducing a person's risk of falls and their adverse consequences, through the use of activities meaningful to the individual.</p> <p><i>(Rosendahl et al 2008 [B])</i></p>	1B
[Statement amended 2020]	

Falls management: making it meaningful***It is recommended that:***

16. Occupational therapists should deliver targeted strength and balance training that is incorporated into daily activities and occupations that are meaningful to the individual, to improve and encourage longer-term participation in falls prevention interventions. 1A

(Pritchard et al 2013 [B]; Clemson et al 2012 [A]; Clemson et al 2010 [B])

[Statement amended 2020]

Evidence overview

Occupational therapists should optimise the engagement of the person in falls management interventions, taking into consideration the person's motivation, beliefs and knowledge.

A key message to be incorporated into falls prevention and management interventions is a focus on the potential benefits to the individual of interventions to improve mobility, independence and active participation, as distinct to the language used within the professional arena of 'reducing the incidence of falls' or 'decreasing the risk of falls'. People should be made aware of the potential implications of falling, but occupational therapists should highlight the positive outcomes rather than the negative connotations associated with falls.

Meaningful activity can be linked integrally with motivation. Physical activity which can be incorporated into daily lifestyles is more likely to be sustainable; there is a key role here for occupational therapists given this functional approach. The value of such an occupational and activity-based approach is supported by the high-quality research by Clemson and colleagues. Although the primary research for the LiFE approach was undertaken in Australia (Clemson et al 2012, Clemson et al 2010), potentially it is easily translatable to the United Kingdom.

5.3.1 Introduction

The delivery of occupational therapy services is underpinned by the principles of working in partnership with the person, putting them at the centre of practice, and upholding their right to make choices about the care they receive (COT 2015, RCOT 2019).

Person-centred care is a complex concept with many dimensions, but the evidence related to the meaning of person-centred care has identified common principles (Silva 2014). The principles most pertinent to falls prevention and management include:

- 'Recognising the person's individuality and specificity. Taking a holistic approach to assessing needs and providing care (which may include families and recognising social and environmental factors as part of a biopsychosocial perspective).
- Seeing the patient as an expert about their own health and care; recognising autonomy and thus sharing power and responsibility, including enablement and activation in decisions about care.

- Ensuring that services are accessible, flexible to individual needs and easy to navigate.’
(Silva 2014, p9)

Recommendations for promoting the engagement of older people in activities to prevent falls were developed in a project undertaken by the Prevention of Falls Network Europe (ProFaNE) (Yardley et al 2007). Based on a literature review, including studies of older people’s views, clinical expertise and subsequent consensus, six recommendations were outlined. The recommendations of particular relevance here are the importance of tailoring interventions to the individual’s specific situation and values and ensuring an understanding about the benefits of falls interventions.

“The problem with the term ‘risk assessment’ is that it implies all risks are the same, and they aren’t. Some things you might try and do could be very risky, others hardly risky at all.”

Rushcliffe 50+ Forum Health Group member

A sample of 66 older people’s perceptions of falls prevention advice was reported in a qualitative study. Participants commonly considered falls prevention advice as being useful in principle but not personally relevant or appropriate. Falls were associated with a potential threat to autonomy and identity, and participants identified that falls risk and prevention should be portrayed more constructively (Yardley et al 2006).

The evidence base for multifactorial interventions is strong (NICE 2013), but the effect of this will be negated, and falls prevention and management will not be effective, if the person declines to participate.

The evidence reviewed and recommendations set out in this section can be considered within the framework of the NICE (2013, p15) recommendation for encouraging the participation of older people in falls prevention programmes:

Healthcare professionals involved in the assessment and prevention of falls should discuss what changes a person is willing to make to prevent falls. (Recommendation 1.1.9.1)

The evidence reviewed has been considered specifically with regard to the role of the occupational therapist within the delivery of this recommendation.

5.3.2 Evidence

Falls management: making it meaningful

It is recommended that:

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| 10. Occupational therapists should share knowledge and understanding of falls prevention and management strategies with the person. This should provide personally relevant information and take account of the person’s individual fall risk factors, lifestyle and preferences. | 1B |
|---|----|

(Stenhagen et al 2014 [C]; Groot and Fagerström 2011 [C]; Stern and Jayasekara 2009 [B]; Ballinger and Clemson 2006 [C]; Haines et al 2006 [C]; Haines et al 2004 [B])

[New evidence 2020]

A Swedish prospective cohort study examined the relationship between functional changes in activities of daily living (ADL) over six years and the number of falls that occurred (**Stenhagen et al 2014**). Using data from the Good Ageing in Skåne longitudinal study, part of the Swedish National Study of Aging and Care, ADL function was assessed at baseline and then six years later, and the number of falls in the six months prior to follow-up was reviewed. Analysis of the data found that those who had a functional decline and those who improved their ADL status both increased their risk of falling, suggesting different fall prevention strategies may be necessary for different groups.

A qualitative study carried out by **Groot and Fagerström (2011)** explored the factors that both motivated and presented barriers to participating in a local group exercise intervention, through semi-structured interviews with ten older people. The researchers identified four motivational factors: (1) perceived chance of success (including confidence in oneself, control over and perceptions of one's health); (2) perceived importance of the goal (knowledge, a desire to 'get better' and preferences regarding group or individual intervention); (3) perceived costs; and (4) inclination to remain sedentary. In the context of support from health professionals, most of the participants in the study suggested that it was the duty of the health professional to inform the person about the benefits of the intervention to give them the 'push' to get started (Groot and Fagerström 2011, p157).

An Australian randomised controlled trial aimed to assess the effectiveness of a targeted multiple interventions falls prevention programme in a subacute hospital (**Haines et al 2006, Haines et al 2004, Stern and Jayasekara 2009**). This study recruited adults of all ages, ranging from 38 to 99 years, with an average age of 80 years. One element was an education programme consisting of individual sessions of up to 30 minutes twice a week conducted by an occupational therapist. This included general information on falls and fall prevention strategies, goal setting and review, a quiz, fall risk assessment and booklet. In the study subgroup analysis of 226 participants, there was a significantly lower incidence of falls in the intervention group (n=115) than in the control group (n=111) (30% fewer falls, p=0.004). This finding was applicable to participants who received the education-only intervention and those who received the education and other interventions. Participants were asked to complete an evaluation survey; the majority of those responding (64 of 115) indicated that they agreed or strongly agreed that the written education material was easy to understand, the information was new, and their falls prevention behaviour had been modified as a result. While the authors could not conclude the education programme was solely responsible for the reduction in falls, the findings indicate it was effective and should be incorporated as part of a multifactorial prevention programme for subacute hospital inpatients.

Ballinger and Clemson (2006) undertook a qualitative study in Australia that explored the views of 11 participants (median age 76 years) about the most and least useful aspects of the falls intervention programme in which they had participated. The programme, entitled *Stepping On*, was multifactorial and consisted of seven sessions, including topics such as benefits of exercise and identifying home hazards (Clemson et al 2004). Four themes emerged from the analysis: identity; salience of interventions (meaning attributed to the various components of the programme); social experience; and consequences of participation. Participants reflected on both the content and the process of the programme, identifying some aspects of the programme that they perceived as less useful or relevant to them. Medication management, home hazards and footwear discussions were identified by men as being potentially valuable but not relevant to them.

Falls management: making it meaningful

It is recommended that:

11. Occupational therapists should take into account the person's perceptions and beliefs regarding their ability, and personal motivation, which may influence participation in falls intervention. 1B

(Taylor et al 2017 [B]; Jang et al 2016 [B]; Harvey et al 2014 [C]; Gopaul and Connelly 2012 [D]; Groot and Fagerström 2011 [C]; Nyman 2011 [C])

[New evidence 2020]

The effectiveness of personalised falls prevention education was evidenced in a randomised controlled trial involving 24 adults aged over 65 (**Taylor et al 2017**). The control group received generic information about environmental hazards, while the treatment group had tailored information and as much time as needed to understand the recommendations. Based on self-reporting of participants, those who received personalised information were significantly more likely to adhere to the recommendations (69% versus 37% of those who received generalised information, 95% CI for mean difference=3.4–61.89, $p=0.03$).

A systematic review of qualitative research underscored the importance of culture and background in influencing participation in falls prevention programmes and practices (**Jang et al 2016**). It reviewed 19 studies investigating the perspectives of those with cultural and linguistic backgrounds different to English. These studies reinforced the notion that cultural beliefs and values impact perception and uptake of falls prevention. Motivational, social and environmental factors also played a part, with the culture and values of their new country having a significant effect. Understanding these issues is important for increasing adoption of falls prevention recommendations.

An Australian cohort study looked at the factors that predicted uptake of recommended home modifications and adoption of exercises (**Harvey et al 2014**). In terms of home modifications, the older the person, the more likely they were to carry out recommended changes: 48% of 85 year olds and older reported making changes compared to 17% of 65–74 year olds. Other factors that increased the likelihood of making modifications included having one or more comorbidities, a self-rating of fair or poor health, a high perceived likelihood of falling or fear of falling, or receiving advice from a health professional (such as an occupational therapist). The strongest predictor of exercise uptake was having advice from a health professional.

A Canadian study recruited eight volunteers from a retired older population who had fallen (but not sustained an injury requiring medical attention) within the past 12 months (**Gopaul and Connelly 2012**). The study investigated how knowledge of one's own fall risk influenced self-reported behaviours and beliefs about falls. A mix of qualitative interviews, questionnaires and assessment measures was administered. The intervention consisted of tailored education, based on the individual's estimated risk of falling and their home environment. A personalised home safety booklet was also provided. The authors found that an individual's awareness about falls increased over time during the study, but a recurring barrier was that participants did not want to admit their susceptibility to falling and hence avoided engagement in fall prevention activities.

As noted above, a qualitative study conducted by **Groot and Fagerström (2011)** underscored the significance of motivational factors. Although this study focused

particularly on exercise groups in Norway, the motivational model confirmed the importance of health professionals in identifying the motivating factors and barriers for each person.

"It's so important people have a chance to express what they want, what they need, not to be 'done to' but to be listened to and heard."

Rushcliffe 50+ Forum Health Group member

Nyman's (2011) overview of theory and studies focused on psychosocial factors influencing older people's participation in physical activity interventions aimed at preventing falls. Three variables affecting participation were of particular note: (1) the individual's attitude towards the behaviour, in this context interpreted as perceived falls risk and belief about whether falls can be prevented; (2) the views of others can influence engagement, with favourable opinions from significant others being important in accepting activities; and (3) perceived behavioural control, which in respect of falls is related to confidence and fear of falling. Where perceived behavioural control is low, an individual's fear may reduce their likelihood of participating. Knowledge was also identified as important in influencing engagement in falls prevention interventions, but in isolation knowledge was not a sufficient motivator. Understanding the reasons for falling and recognising external and preventable causes (extrinsic risk factors) were identified as particularly important when encouraging engagement to prevent secondary falls.

Falls management: making it meaningful

It is recommended that:

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| 12. Occupational therapists should optimise the extent to which the person feels in control of the falls intervention. | 1B |
|--|----|

(Taylor et al 2017 [B]; Currin et al 2012 [C]; Wilkins et al 2003 [C])

[Statement amended and new evidence 2020]

In a randomised controlled trial described above, **Taylor et al (2017)** showed that individualised recommendations can translate into higher rates of uptake of occupational therapists' recommendations. Where possible, participants were shown why something was a hazard, given different options to correct the hazard if possible, and were always afforded as much time as necessary to understand why they should address the hazard.

A 2012 study highlighted that the person should be offered choices and options. **Currin et al (2012)** aimed to identify the uptake of home modifications recommended by occupational therapists in a sample of 80 people aged over 60 years living in the community who had experienced a recent fall. The intrinsic and extrinsic factors that might predict the uptake of recommendations were also investigated. Participants in this cohort study nested within a larger randomised control trial all received an initial joint occupational therapist and physiotherapist home visit, with the occupational therapist undertaking an environmental assessment. Usual practice was followed for referrals for equipment or modifications. Fifty-five per cent of the recommendations made had been completed by six months. A 'complex interplay' of intrinsic and extrinsic factors was identified in relation to whether participants adopted recommendations.

Individuals with more comorbidities were more likely to accept modifications, and the coexistence of depression or psychological distress had a negative impact on the uptake of home visit recommendations. Interestingly, adherence was also influenced by the site and type of recommendation and who was responsible for its implementation: recommendations requiring external provider action were more likely to be completed than those where implementation depended on the person or family members. Although potentially having specific features related to the Australian system of the provision of equipment and adaptations, the study reinforces the importance of occupational therapists taking into account a range of factors and giving the person maximum control.

The importance of involving the person in the decision-making process with respect to falls prevention interventions was identified within a critical literature review undertaken by **Wilkins et al (2003)**. The review considered the evidence regarding the effectiveness of community-based occupational therapy education and functional training programmes for older adults. Of the three studies included in the review that were fall related, two identified that not all home modifications recommended were implemented or followed up (Clemson et al 1999, Cummings et al 1999). The ability to take ownership of ideas and retain control, together with the ability to explore options and choices, were found to be strong influences in acceptance and implementation of home modification recommendations.

"People are all different – how they express this [risk of falls] will also be different – some will need encouragement to do more, others may need holding back a bit."

Rushcliffe 50+ Forum Health Group member

Falls management: making it meaningful

It is recommended that:

13. Occupational therapists should support the engagement of the person in identifying the positive benefits of falls intervention. 1B

(Hill et al 2013 [B]; Nyman 2011 [C]; Ballinger and Clemson 2006 [C])

[New evidence 2020]

A pilot randomised controlled trial looked into the effect of tailored information to adults aged 60 years and older discharged from hospital (**Hill et al 2013**). The intervention comprised an educational DVD, follow-up sessions in hospital to create personalised plans to prevent falls while regaining function, and a telephone call post-discharge to reinforce the education and revise (if necessary) the plan. Participants in the control group received usual care. The intervention group was more likely to plan to gradually resume activities. They also perceived themselves to be more knowledgeable about falls risks and more motivated to utilise falls prevention strategies after receiving the treatment.

An overview of psychosocial factors that affect older people's uptake of activities to prevent falls (**Nyman 2011**), discussed previously, also uncovered that older people are more likely to carry out falls prevention activities when they 'perceive that the activities will afford positive benefits and that [those] benefits are highly likely to occur' (Nyman 2011, p48). The review provides evidence that it is not only what is done in falls

prevention interventions, but also how it is approached, that will influence engagement and active participation.

To understand participants' perspectives of *Stepping On*, a multifactorial falls intervention programme, **Ballinger and Clemson (2006)** conducted a qualitative study (details above). Among their findings, the theme of 'consequences of participation' highlighted that participants rarely referred to a decrease in the likelihood of a fall. Outcomes important to the individuals were changes in performance, skills or attributes. An increase in confidence was the major psychological benefit identified. The study concluded that the perceived positive benefits were broader than preventing falls and had a 'connectedness to the more intrinsic values of independence and issues of wellbeing' (Ballinger and Clemson 2006, p269).

Falls management: making it meaningful

It is recommended that:

14. Occupational therapists should ensure falls prevention and management information is available in different formats and languages to empower and engage all populations (e.g. web-based support, written information leaflets). 1B

(Harper et al 2017 [C]; Mahoney et al 2017 [C]; Hill et al 2013 [B]; Nyman et al 2011 [C]; Hill et al 2009 [B])

[Statement amended and new evidence 2020]

In a quasi-randomised controlled clinical trial, the intervention group received scripted information on the probability of falling in the next six months (assessed using the Two Item Screening Tool and The Falls Risk for Older People in the Community) and were encouraged to seek information to reduce their risk of falling (**Harper et al 2017**). Adults aged 65 and over were eligible for the study if they attended accident and emergency for any reason and were eligible for discharge. While the study found no difference in the number of falls in the six-month follow-up period, it did find that the intervention group had significantly fewer hospital admissions ($p=0.003$, 36 admissions in the intervention group versus 57 in the control group).

Stepping On, a multifactorial falls intervention described above, was the subject of a Delphi study to gather the consensus of experts on the key elements of the programme (Clemson et al 2011, **Mahoney et al 2017**). A group of 19 panelists reached consensus that the programme should use plain language and provide information that is right for the person and their context.

A pilot randomised controlled trial which tailored information to prevent falls, discussed previously, showed the importance of using multiple formats to engage participants (**Hill et al 2013**). The intervention comprised an educational DVD, a face-to-face session and a telephone call. The intervention group described themselves as more motivated to put in place their fall prevention strategies compared to the control group.

The presentation of falls prevention information can make a difference to the potential for uptake, and this aspect of falls prevention was explored in an evaluative study undertaken by **Nyman et al (2011)**. The way that older people were represented and how information was presented on 33 fall prevention websites was evaluated using

discourse analysis principles. This identified three potential positions for older people: the passive recipient, the rational learner and the empowered decision maker. The falls prevention advice offered was viewed as being unlikely to be effective, given that many websites were not engaging, representing older people as passive and inert. The importance of projecting an image that would be congruent with positive self-identity and promotion of self-management, in line with the recommendations made by ProFaNE (Yardley et al 2007), was evident. The authors provided suggestions for occupational therapists to ensure that falls prevention advice is written, whether for information leaflets or the internet, in a way that empowers older people.

Alternative modes of delivering falls prevention information were a focus of a two-group randomised controlled trial undertaken in Australia (Hill et al 2009). This research evaluated the effectiveness of falls prevention information delivered to older people in hospital, comparing DVD-delivered education (n=49) with a written workbook (n=51). The control group received no education (n=131), and their data were collected during an initial quasi-experimental phase of the study. No significant difference was established between the two education groups with respect to self-perceived falls risk or knowledge of falls. The DVD group, however, had a higher proportion of participants who were strongly motivated to prevent themselves falling, compared with the workbook group. The research indicated that multimedia offers alternatives to traditional written approaches for providing health-related information.

Falls management: making it meaningful

It is recommended that:

15. Occupational therapists should encourage and support physical and social activity, as a means of reducing the person's risk of falls and their adverse consequences, through the use of activities meaningful to the individual. 1B

(Rosendahl et al 2008 [B])

[Statement amended 2020]

A randomised controlled trial in Sweden evaluated the effectiveness of a high-intensity functional exercise programme in reducing falls (Rosendahl et al 2008). The setting was residential care (nine facilities); the 191 participants were aged 65 years or over. The control activity programme was developed by occupational therapists and consisted of themed activities performed while sitting, such as watching films, singing and conversation. The High-Intensity Functional Exercise Programme (HIFE) used in the intervention group did not significantly reduce the fall rate or the proportion of participants who sustained a fall when all participants were compared during the six-month follow-up period. Analysis revealed that the subgroup of participants who improved their balance in the intervention group had a lower fall rate than the control group. This study showed that the control activity programme had an effect on physical function (determined using the Berg Balance Scale), potentially through 'the impact of social stimulation, meaningful activities, or transferring to another location in the facility' (Rosendahl et al 2008, p73).

Falls management: making it meaningful***It is recommended that:***

- | | |
|---|----|
| 16. Occupational therapists should deliver targeted strength and balance training that is incorporated into daily activities and occupations that are meaningful to the individual, to improve and encourage longer-term participation in falls prevention interventions. | 1A |
|---|----|

(Pritchard et al 2013 [B]; Clemson et al 2012 [A]; Clemson et al 2010 [B])

[Statement amended 2020]

The potential motivational value in promoting participation in occupations that are meaningful to the individual and take place in the everyday environment was highlighted within a systematic review (**Pritchard et al 2013**). Inclusion criteria included people aged 65 years and over in the post-discharge period from a hospital or an emergency department visit. The review identified that longitudinal studies have shown that long-term adoption of falls prevention activities, such as exercise, is often poor. Motivation can be a barrier, and the authors suggested that programmes which are underpinned by embedding activity into everyday routines could be a key principle in promoting uptake.

The importance of meaningful falls prevention interventions was evidenced through the Lifestyle Integrated Functional Exercise (LiFE) approach in a three-arm randomised controlled trial undertaken by **Clemson et al (2012)** in Australia. This built on the outcomes of an earlier pilot study (**Clemson et al 2010**). The LiFE approach, which was developed by two occupational therapists, a gerontologist and a physiotherapist, involved teaching well-researched principles of balance and strength training. These were integrated into balance and strength strategies and applied in individualised daily activities meaningful to the individual. There were four balance strategies: reducing base of support; moving to the limits of sway; shifting weight from foot to foot; and stepping over objects. The principle involved providing activities that could be carried out in the course of everyday life, potentially a number of times a day, and also could be upgraded to be more challenging. A similar principle was applied to strategies to improve strength.

A total of 107 participants were randomised to the LiFE programme. The other two arms of the study comprised a structured programme of exercises carried out three times a week (n=105) and a sham control programme of gentle exercise (n=105). Participants were aged 70 years or more and had a history of falls in the previous six months. The LiFE group resulted in a clinically significant 31% reduction in the rate of falls compared with the control programme, and the structured exercise group showed a 19% non-significant reduction in the rate of falls compared with the control group. Function and participation were greater in the LiFE programme, and the continuation of the balance strategies as opposed to structured exercise was better at 12 months.

5.3.3 Potential impact of the recommendations

Outcomes sought:

- The person continues to engage in occupational life roles while understanding and contributing to reducing their individual risk of falls.
- Adoption of recommendations from falls prevention programmes is improved, thus contributing to reducing the incidence and risk of falls.
- The person has choice and control over what happens and can recognise the potential for positive outcomes in terms of health and wellbeing, independence and social roles.

- Falls risk is reduced by incorporating exercise into daily life activities.
- Information and resources on preventing and managing falls are available in a range of accessible formats that empower the person.
- Cost efficiency for NHS and social care providers in service delivery.

Risks

One of the risks of implementing the engagement and active participation recommendations above is an increased risk of falls. The rationale here is that older people often reduce their risk of falling by reducing their physical activity (Wijlhuizen et al 2010); therefore, if they are encouraged to become more physically active through engagement in falls prevention activities, they may conversely increase their risk (Wijlhuizen et al 2008). Some association between the risk of falls increasing with more active participation in rehabilitation has been identified (Czernuszenko and Członkowska 2009, Lee and Stokic 2008).

Generalisability

Evidence within the area of active participation and engagement was based on research or reviews with participants who were, with the exception of one study, aged 55 years or over. Most studies did not include participants with cognitive impairment.

It is suggested, however, that the fundamental nature of person-centred principles and individualised intervention cuts across all ages and clinical conditions and enables these recommendations to be directly relevant to occupational therapy falls prevention and management with all adults.

Social determinants of health

A person-centred approach to engagement is more likely to ensure that the needs of all populations are considered and enable participation of even the most vulnerable adults in falls intervention, optimising individual capacity and control over life.

5.4 Occupational therapy intervention: impact and cost effectiveness

Occupational therapy intervention: impact and cost effectiveness

It is recommended that:

17. Occupational therapists should use interventions that have been shown to be cost-effective and have impact. 1A

(Harper et al 2017 [C]; Pighills et al 2016 [A]; Lockwood et al 2015 [A]; Sheffield et al 2013 [B]; Irvine et al 2010 [B]; Campbell et al 2005 [A])

[New recommendation 2020]

Evidence overview

Occupational therapists' interventions can have a significant impact, both in terms of outcomes and, as this evidence shows, cost effectiveness. The evidence detailed below, most of it high quality, provides a base for understanding where occupational therapists can increase the cost effectiveness and impact of healthcare.

5.4.1 Introduction

The review of the guideline gave the opportunity to incorporate literature on the cost effectiveness of occupational therapy interventions. The research is still emerging, but it is starting to show the impact occupational therapy interventions can have. In a time of constrained budgets but increasing need, it is important to understand how occupational therapy can be utilised to improve individual and organisational outcomes. The College has highlighted how occupational therapy, with its focus on the whole person, can create positive change that works for individuals and institutions (RCOT 2017b).

The evidence below has been considered in a different light from those above, which were considered in relation to the NICE recommendations on falls prevention (2013). Instead, this evidence was reviewed with regard to how occupational therapists can have the most cost-effective impact.

5.4.2 Evidence

Occupational therapy intervention: impact and cost effectiveness

It is recommended that:

17. Occupational therapists should use interventions that have been shown to be cost-effective and have impact. 1A

(Harper et al 2017 [C]; Pighills et al 2016 [A]; Lockwood et al 2015 [A]; Sheffield et al 2013 [B]; Irvine et al 2010 [B]; Campbell et al 2005 [A])

[New recommendation 2020]

A quasi-randomised controlled clinical trial conducted with older adults who had attended accident and emergency (**Harper et al 2017**, detailed above) found evidence that providing information about the probability of the participant falling in the next six months and encouraging them to source information to reduce their risk of falling decreased hospital admissions ($p=0.003$, 36 admissions in the intervention group versus 57 in the control group).

As noted above, a critical review of two systematic reviews looked at the effectiveness of environmental assessment and modification in preventing falls (**Pighills et al 2016**). It found that interventions led by occupational therapists were effective in preventing falls, and the authors hypothesise that this is because occupational therapists take into account how the person interacts with their environment. It is this recognition of the individual and their chosen activities within the context of their environment which offers the greatest potential for the success of the intervention to prevent falls.

A systematic review by **Lockwood et al (2015)**, as detailed previously, investigated whether pre-discharge home assessments could assist hospital patients when returning to community living. They found that occupational therapy-led assessments could reduce the risk of falling, and additionally reduced the risk of hospital readmission by 50% in patients who had not experienced a stroke.

A pilot randomised controlled trial showed the cost effectiveness of an occupational therapy intervention aimed at limiting the use of assistive care (**Sheffield et al 2013**). For each individual in the intervention group referred for therapy, an occupational therapist assessed their activities and then tailored their intervention, taking into

account the goals of the individual and their family. Provision might include home modifications, assistive devices or home hazard removal. At three months post-intervention the occupational therapist again assessed the individual and recommended a care plan. Overall those who received the intervention had a 39% reduction in the recommended number of hours of care.

An economic evaluation of a randomised controlled trial providing a multidisciplinary programme (including occupational therapy) in a day hospital in the UK indicated an association with fewer falls but was more costly than usual care (**Irvine et al 2010**). A mean cost of £349, which included occupational therapy review and home visit (although not used by all participants), was identified for the prevention programme, but additional costs resulted in a mean incremental cost of £578 for the intervention. When combined with health resource use, the average healthcare cost per intervention participant was £2,238 versus £1,659 per control participant. The estimated incremental cost-effectiveness ratio was £3,320 per fall averted, with the incremental falls averted per person-year equal to 0.17.

Campbell et al (2005) examined cost-effectiveness ratios and undertook a sensitivity analysis as part of their randomised controlled trial of a home safety programme, in New Zealand, for people with a visual impairment. Resource use and unit costs for the intervention led by occupational therapy were included, with details broken down into training costs, recruitment and programme delivery. The mean programme cost per person was equivalent to £117, with the cost per fall prevented calculated at £234. Participants in the home safety programme had 41% fewer falls than those who did not receive the programme (incidence rate ratio = 0.59, CI = 0.42 to 0.83). This study identified that falls can be prevented at a cost but, by applying a targeted approach, the associated costs could be reduced.

5.4.3 Potential impact of the recommendation

Outcomes sought:

- Improved impact and cost effectiveness of occupational therapy interventions in the prevention and management of falls, with fewer falls recorded.
- Cost efficiency for NHS and social care providers in service delivery.

Risks

New approaches can bring increased costs upfront, even if these costs diminish over time. With limited resources, it may be difficult for organisations to prioritise these approaches.

Generalisability

The evidence included studies in the community and hospital settings and mostly focused on environmental assessment and adaptations. Although the studies have limitations, they are of sufficiently high quality to enable the generalisability of the results to a UK population.

Social determinants of health

Cost-effective interventions free up resources to further improve outcomes.

6 People's perspectives of falls – 1st edition

Valuable perspectives of the meaning of a fall were gained from members of the public attending the pre-consultation meeting and participating in the guideline consultation. Quotes from them are included, where relevant, in Section 5; others are provided here.

The personal impact of falls on an individual can be significant:

"Falls mean a loss of independence and a fear of doing more damage to myself (I have fallen and broken my wrist). Also embarrassment about unsteadiness and poor balance."

Younger adult diagnosed with gluten ataxia (2014)

"A loss of independence for some older people, fearful of what might happen to them."

Member of the public (2014)

"You have to accept what is realistic – some things you may not be able to do any more. But that can be very difficult, especially when you are only in your 60s."

Rushcliffe 50+ Forum Health Group member (2013)

"It is the fact a fall is accidental and unexpected – it is a shock."

Rushcliffe 50+ Forum Health Group member (2013)

"Pain, broken bones and anxiety about who was going to look after me, feed me, etc."

Person who has experienced a fall (2014)

"The problem is that it's everything that might not be working so well – like your hands so you can't pull yourself up so easily, then that makes you less steady."

Rushcliffe 50+ Forum Health Group member (2013)

"When I was really unwell I had over ten falls a day. This was often terrifying. I felt disabled and scared of injury. I had many cuts and bruises and was embarrassed to be in public so stopped at home, unable to work or socialise."

Younger adult with multiple sclerosis (2014)

7 Implementation of the guideline

Occupational therapists make a valuable contribution to the health and wellbeing of people at risk of falling or who have experienced a fall. This practice guideline aims to support occupational therapists to take the most appropriate action when working with adults who have fallen, are at risk of falling, or are fearful of falling.

Familiarisation with the guideline document will be an important first step for individual practitioners and their managers. It is therefore imperative that occupational therapists and managers working with adults take responsibility to review the guideline recommendations within the context of their practice, no matter where that may be.

Bringing the guideline to the attention of colleagues within the multidisciplinary team and service commissioners should also be a priority.

A further action to facilitate implementation must be for lead therapists to consider the levers and barriers within their local organisation and culture that may have an impact on any changes that may be necessary to practice. Section 7.2 identifies potential barriers that may be applicable, and Section 7.3 describes resources to facilitate implementation.

7.1 Dissemination and promotion

Awareness and implementation of this practice guideline are important if it is to influence and have an impact on occupational therapy practice.

To facilitate dissemination, the full practice guideline, along with a short summary and implementation guide, is available to download freely from the Royal College of Occupational Therapists' website.

The guideline has been promoted to its key target audience of occupational therapists and to relevant others including commissioners and service providers using professional networks and publications, internet and social media channels.

7.2 Organisational and financial barriers

The recommendations stated within this guideline document are intended to facilitate occupational therapy staff to contribute effectively to the person-centred outcomes of the individual and to the delivery of falls prevention and management within their role.

The occupational therapist's individualised approach, which takes into account the person, the environment and their occupation (Law et al 1996, Duncan 2011), is an important facilitator in the effective implementation of the recommendations.

It is recognised, however, that there will be potential barriers, both organisational and financial, that may influence application of the recommendations. It is important that occupational therapists take these into account when implementing this guideline.

7.2.1 Organisational barriers

There are a number of potential organisational barriers that may impact on an occupational therapist's ability to implement the recommendations within this guideline. The most likely barriers and potential solutions were identified via consensus agreement of the clinical experts in the guideline review group:

- In some organisations, policy means generic, unqualified or lesser-skilled staff complete home hazard checklist risk assessments. However, the evidence for occupational therapists delivering home hazard assessment and interventions is very strong. Occupational therapists should seek opportunities to highlight the value of occupational therapy in delivery of home hazard assessment and interventions for the prevention of future falls and hospital readmissions (for example, see Harper et al 2017, Pighills et al 2016, Lockwood et al 2015, Campbell et al 2005). In addition, occupational therapists should use their expertise in the development of a falls prevention pathway that signposts individuals who may require occupational therapy following their generic home hazard assessment.
- Some services operate with strong drivers for high levels of turnover or there are limits on the number or duration of sessions to deliver fall prevention and management interventions. Working with individuals with fear of falling may require a number of contacts to provide individualised intervention; the need for flexibility may be particularly evident when the person requires more assistance with expressing or determining their wishes, such as people with sensory impairment, learning difficulties, cognitive impairment or dementia. Occupational therapists should lobby commissioners regarding the evidence for longer-term interventions that require an initial financial investment but save money overall, particularly in relation to strength and balance opportunities (see, for example, Clemson et al 2012). Occupational therapists should seek to maximise the opportunities for the person to build their resilience and maintain their health and wellbeing. This may involve working with third sector or community assets who can support the person longer term.
- Some organisations are mandated to achieve a reduction in fall rates with a formulaic or process-driven approach to falls intervention that focuses on reporting falls and their adverse consequences. Occupational therapists can add value by using their knowledge of person, environment, occupation and performance to analyse the data reported on falls and recommend system changes or person-centred interventions to support improvement.
- Some services perceive falls as separate to their specialty or not part of their core remit. Evidence clearly indicates that occupational therapists should provide assessment and interventions for falls prevention no matter what role or context (see, for example, Elliott and Leland 2018, Chu et al 2017, Lockwood et al 2015).
- Occupational therapists may not feel sufficiently skilled in working with the specific needs of people who are visually impaired. There may be a training requirement with both organisational and resource implications and the need for access to visual impairment specialists. Occupational therapists have a role in falls pathway development to ensure that people with a visual impairment receive the correct interventions and that staff are capable of working with people with visual impairment.
- There may be a lack of financial resources to facilitate home assessment from a rehabilitation or acute setting, such as transport of the person with the occupational therapist. Occupational therapists should seek opportunities for commissioning of services across transitions of care.

7.2.2 Cost effectiveness and financial barriers

Falls, and their consequences, have significant financial costs for health and social care services (Tian et al 2013).

The actual costs of implementing the occupational therapy components of multifactorial falls prevention and management interventions are influenced by many factors. Services may be delivered across a wide range of health, social care and other settings, with variables associated with local workforce structure, service design and community equipment policy. Distinguishing costs related directly to falls prevention and management may be more difficult to estimate outside of specific falls prevention services or detailed cost effectiveness or economic evaluation research.

However, RCOT's Improving Lives, Saving Money campaign has identified that initial costs can provide savings in the long term (COT 2016). A Westminster falls intervention service for those with a history of falls or a high risk of falling found that attendees of the programme had 92% fewer admissions to accident and emergency and an 80% reduction in GP appointments compared to the year prior to the programme. In Lancashire, a joint assessment by a paramedic and occupational therapists of those who had fallen meant 78% were able to remain at home, compared to 70% being taken to hospital previously.

Finance-related barriers that occupational therapists may experience in the implementation of the recommendations were identified, via consensus of the clinical experts in the GRG, as potentially including:

- Failure to commission or fund occupational therapists to deliver fall prevention and management interventions.
- Lack of funding for the provision of equipment and assistive devices recommended following assessment, from statutory services or the person.
- Limited resources to provide information and materials for the person in a range of accessible presentation styles, particularly if using multimedia and technologically supported formats.

The overall most critical resource required to implement these guideline recommendations is undoubtedly the availability of occupational therapists within the multidisciplinary team. Although generic working may be a driving force in some services, the evidence demonstrates the effective contribution of the occupational therapist in the delivery of multifactorial assessment and interventions for the prevention and management of falls.

7.3 Implementation resources

Three core implementation resources are available to support this practice guideline. All implementation resources can be downloaded, together with the full guideline document, from the practice resources section (Practice guidelines) of the Royal College of Occupational Therapists' website.

7.3.1 Quick reference and implementation guide

The quick reference and implementation guide is intended to be used by practitioners as an easily accessible reminder of the recommendations for intervention and suggestions for implementing them. It should be used once the practitioner has read

the full guideline document. This is important to ensure an appreciation and understanding of how the recommendations were developed and their context.

The quick reference and implementation guide includes the following:

- List of recommendations, their strengths and the quality of evidence leading to their development.
- Background to clinical condition.
- Occupational therapy role.
- Tips for implementing the recommendations.

7.3.2 Audit form

It is recommended that occupational therapists participate in audit of fall prevention services, including auditing against the recommendations in this guideline.

The audit form for this guideline provides a standard template for individual occupational therapists or services to audit and review their current interventions against the individual recommendations. The aim is to encourage a reflection on current practice and, where this does not follow the recommendations, to consider the clinical reasoning in place to support decisions.

A baseline assessment conducted using the audit tool can be repeated to enable review of progress on actions identified from the audit. It can be useful to undertake a routine audit every 1–2 years to monitor ongoing compliance.

The audit form, although initially providing a tool for use within an individual or service context, offers the potential for future benchmarking.

7.3.3 Continuing professional development session

A set of PowerPoint slides and supporting documentation provide the resources for an individual or service to conduct a continuing professional development session focused on the practice guideline. The learning outcomes for the session are to:

- Explore aspects of the evidence-based guideline/recommendations in relation to current practice.
- Develop an understanding of the importance of using an evidence-based guideline to inform practice.
- Explore and develop an understanding of how to use the Royal College of Occupational Therapists' audit tool for the evidence-based recommendations.

The slides can also be valuable in increasing awareness about the guideline and can be tailored to meet local needs.

In addition to the audit form, which is most likely to be used by services, a reflective practice template is available for occupational therapists to review their own practice.

A feedback form is available to comment on the guideline and implementation resources to the Royal College of Occupational Therapists.

Accessing the implementation resources

The quick reference and implementation guide, audit form and continuing professional development session resources are available as separate documents.

These can be downloaded, together with the full guideline document, from the practice resources section (Practice guidelines) of the Royal College of Occupational Therapists' website: <https://www.rcot.co.uk/practice-resources/rcot-practice-guidelines>.

The resources can also be accessed via the webpages of the Royal College of Occupational Therapists Specialist Section – Older People.

8 Recommendations for future research

The review of the evidence identified primary occupational therapy research predominantly in the areas of home hazard and modification with older people in the context of certain population and setting exclusions.

The effectiveness of occupation-focused interventions remains a priority for research as do studies of their impact and cost effectiveness that support the commissioning of occupation-focused services for people at risk of falling.

The Royal College of Occupational Therapists commenced a research Priority Setting Partnership with the James Lind Alliance in 2019. This will bring together people who access occupational therapy services, their carers, occupational therapists and others working in the health and care environment in Priority Setting Partnerships to identify and prioritise 'uncertainties' or 'unanswered questions' about treatments or interventions that they agree are most important in a particular area. Once the high-level Top 10 research priorities for occupational therapy in the UK are available, an important piece of follow-on work will be supporting the translation of the priorities into more targeted and focused research priorities within the context of specific clinical areas.

The GRG also recommends a number of broad topics for further research, including:

- The unique contribution of occupational therapy intervention within multifactorial programmes.
- Strategies that support behavioural change to encourage the implementation of home-hazard advice and occupational therapy-specific recommendations.
- Occupation-focused falls prevention and management strategies for:
 - Adults under 60 years old.
 - People with cognitive impairment or living with dementia.
 - People with mental health needs.
 - People with a learning disability.
 - People living in care homes.
- Occupational therapy-led education and support for the person, carers (both formal and informal) and staff working with adults at risk of falling.
- Occupational therapy, technology-enabled care and falls prevention and management.
- The role of occupational therapy in the prevention of (re)admission to hospital for those at risk of falling.
- The impact of falling and fear of falling on social isolation in older people and occupation-focused intervention strategies.

- Living well and positive risk taking in the management of falls within a public health context.

The GRG endorses the research recommendations identified by the NICE clinical guideline on falls, but in particular those relating to:

- Identifying which components of multifactorial interventions are important in different settings and among different patient groups (NICE 2013, p20).
- Identifying cost-effectiveness components of multifactorial programmes for particular groups of older people in different settings (NICE 2013, pp20–21).
- Environmental adaptations in inpatient units (NICE 2013, p19).
- Falls prevention intervention effectiveness in inpatient units (NICE 2013, p31).

'I would like to see more guidelines about helping carers of people with dementia, especially for those who care alone, as when they are doing something in another room than the person with dementia like cooking and the person with dementia has been seated in a chair with no support at the side, they can fall.'

Chairman, Carers in Hucknall

9 Guideline development process – 1st edition

Sections 9 and 10 provide the details of the development process and methodology for the first edition of the guideline. Section 11 outlines the various elements of the process for the review and update for this second edition. Detailed information on the following steps in the guideline development process can be found in the *Practice guidelines development manual* (COT 2017a).

9.1 Guideline Development Group

Membership of the core Guideline Development Group (GDG) comprised seven occupational therapists with expertise in the field of prevention and management of falls, and/or experience of guideline development.

The core group members were all practising therapists or researchers who undertook the guideline development work in their private time. Some members received support from their employers to attend meetings. To facilitate timely progression of the guideline development, much of the liaison and activity was carried out using email correspondence.

Two members of the Research and Development Team and one member of the Professional Practice Team at the Royal College of Occupational Therapists were co-opted as additional critical appraisers, together with five members of the Falls Clinical Forum of the RCOTSS – Older People.

The Research and Development Manager at the Royal College of Occupational Therapists was co-opted as Editorial Lead.

Given the very specific occupational therapy nature of this practice guideline, it was determined that the core group would be profession-specific, with expertise from other stakeholders and members of the public obtained outside core group meetings, via consultation with a virtual reference group.

All comments received from stakeholders, members of the public and occupational therapists on the draft scope and draft guideline document were reviewed by the GDG. Where appropriate, revisions were incorporated into the scope form or guideline document before submission for approval to the Royal College of Occupational Therapists' Practice Publications Group. Conflicts of interest declarations were noted and reviewed for any necessary action.

In the interests of openness and transparency, details of the comments submitted as part of the consultation activities are available on request from the Royal College of Occupational Therapists.

9.2 Stakeholder involvement

Stakeholders expected to have an interest in the guideline topic were identified by the core group membership at the preliminary guideline meeting. Specific attention was paid to identifying professional colleagues who may be working as part of the multidisciplinary team and national voluntary organisations that may represent and those who had accessed occupational therapy services.

9.2.1 Scope consultation with stakeholders

All identified stakeholders were approached to comment on an initial draft of the scope, which was provided in the form of a stakeholder information document, together with a comments proforma and conflicts of interest declaration form.

Falls and Fracture Alliance

The Falls and Fracture Alliance, established by Age UK and the National Osteoporosis Society in 2012, was identified as a key collaboration of relevant bodies.

A member of the National Osteoporosis Society agreed to pass the draft scope and draft guideline to members for comment, with replies sent directly to the GDG project lead.

Members of the Falls and Fracture Alliance at the time of the scope consultation included:

Age UK	National Care Forum
Arthritis Research UK	National Hip Fracture Database
Association of Directors of Public Health	National Osteoporosis Society
British Association for Applied Nutrition and Nutritional Therapy	Prevention of Falls Network Europe
British Geriatrics Society	Royal College of Nursing
British Orthopaedic Association	Royal College of Physicians
British Society for Rheumatology	Royal Pharmaceutical Society
Chartered Society of Physiotherapy	Royal Voluntary Service
College of Occupational Therapists	Social Care Institute for Excellence
College of Optometrists	Society and College of Radiographers
	Society of Chiropractors and Podiatrists

Other organisations and individuals contacted separately

Alzheimer's Society, British Association of Social Workers, British Dietetic Association, Clinical Commissioning Group Chief Operating Officer, Skills for Care.

All comments received were reviewed by the GDG and where these could be endorsed, the scope was amended accordingly.

9.2.2 Draft guideline consultation with stakeholders

The draft guideline document was sent to each of the stakeholders, contacted as part of the scope consultation, for their review and comment. Feedback from other stakeholders (who became aware of the guideline via other circulation channels) was also welcomed.

Responses were received from a number of stakeholders, providing valuable suggestions and advice. All comments were discussed at a meeting of the GDG and taken into account during the revision of the final guideline.

9.3 Public involvement

9.3.1 Scope consultation with members of the public

The public and representative groups listed below were consulted on the initial draft of the scope using a stakeholder information document:

- **Rushcliffe 50+ Forum Health Group:** the 50+ Forum is a group of people aged over 50 years who are registered with a general practitioner within the Rushcliffe Clinical Commissioning Group locality. The Health Group is a subcommittee of the 50+ Forum that focuses on local health issues. Rushcliffe borough is the most southerly borough in the county of Nottinghamshire, bordering Lincolnshire and Leicestershire. The registered population for the clinical commissioning group is 121,000 people, and there are 16 general practices. The Rushcliffe 50+ Forum involves local people who work in partnership with statutory, voluntary and community organisations to develop and improve public services.
- **National Osteoporosis Society members' groups:** two groups of the National Osteoporosis Society expressed interest in involvement in the guideline development, namely the Norwich and Nottingham groups.

The GDG recognised that these groups would not necessarily be representative of all individuals experiencing, or at risk of, falls, in terms of experiences and cultural and ethnic diversity. It was determined, however, that individuals from these identified populations could take on a valuable role in the guideline development process, particularly by providing their perspectives as people who had accessed occupational therapy services and members of the public.

Consultation was by email and post via the Chairs of the Rushcliffe 50+ Forum Health Group and the Norwich group of the National Osteoporosis Society.

The Nottingham group of the National Osteoporosis Society invited the GDG project lead to attend a members' meeting to outline the guideline development process and purpose of the guideline. This was followed up by email and postal contact with members.

Feedback on the scope was positive, and no amendments were suggested.

9.3.2 Draft guideline public consultation

Phase 1

Following earlier consultation with the Rushcliffe 50+ Forum Health Group, members who had expressed an interest in continued involvement in the falls guideline development were contacted and invited to discuss the draft recommendations before these were included in the draft guideline to be sent out for stakeholder and public consultation.

Five people responded to this invitation, and a meeting was arranged to discuss the proposed recommendations and associated outcome statements, scheduled for inclusion in the draft guideline.

Views were sought in particular on the following questions:

- Do you think the explanation of what occupational therapy is and how occupational therapists promote independence is clear enough?
- Do you think the title is right, given that not all falls can be prevented?
- Do you think the recommendations are easy to understand?
- Do you think these recommendations will help people understand how they can reduce their risk of falling?
- Do the outcomes make sense?

The views of members of the public and representative groups were incorporated into a subsequent draft of the guideline before the wider consultation.

Phase 2

Further views from the public were sought during the main consultation period. Information was sent to the Rushcliffe 50+ Forum and the National Osteoporosis Society member groups inviting comment on the guideline recommendations and outcome statements. The full guideline document was also available for review.

Five members of the public who had volunteered to review the recommendations and/or guideline also participated in the consultation, three via written or telephone correspondence and two in face-to-face discussions. Younger adults aged 40–60 years were included in this part of the consultation.

Public and representative views and comments on the recommendations established during phases 1 and 2 of the draft guideline consultation are included in Appendix 4.

The meaning of falls, established during the consultation, offers an invaluable insight into the impact of falls on the individual. Some quotes are given in Section 6 or, where applicable, alongside the evidence in Section 5. These statements provide an important perspective as an adjunct to the published evidence.

9.4 Occupational therapist consultation

9.4.1 Scope consultation with occupational therapists

The target group of end users of the guideline is occupational therapists. Members of the RCOTSS – Older People were invited to participate in the scope consultation via the Royal College of Occupational Therapists' website where the scope documentation was provided with a request for feedback and comment.

Other Specialist Sections of the College of Occupational Therapists (Trauma and Orthopaedics; HIV, Oncology and Palliative Care; Housing; Work; Rheumatology; Neurological Practice; Mental Health; Independent Practice; and People with Learning Disabilities) were invited to comment.

Comments received were reviewed by the GDG. Where comments could be endorsed, the scope was amended accordingly.

9.4.2 Draft guideline consultation with occupational therapists

A one-month consultation period enabled members of RCOTSS – Older People to comment on a draft of the full guideline.

The consultation was additionally open to any member of the British Association of Occupational Therapists and was promoted via the monthly professional magazine *Occupational Therapy News*. The draft guideline and a consultation feedback and conflicts of interest form were made available to members via the College of Occupational Therapists' website.

All comments were considered for inclusion within the final guideline.

9.5 External peer review

Three independent external peer reviewers were identified by the GDG to critically appraise a draft of the full guideline. Reviewers were selected for their clinical and research expertise in the field and/or their guideline development experience or knowledge.

The external peer reviewer form asked for comment on both the presentation and the content of the draft guideline, taking into account factors such as its purpose, robustness and unbiased nature. The detailed views and expert opinions received were discussed by the GDG and used to inform the content of the final guideline.

9.6 Conflicts of interest

All GDG members (core group and co-opted), stakeholders, occupational therapists and external peer reviewers were required to declare any pecuniary or non-pecuniary conflicts of interest, in line with the guideline development procedures (COT 2017a). Members of the public also were asked to declare any conflicts of interest.

The nature of the potential or actual conflicts made in the declarations (Appendix 3) was not determined as being a risk to the transparency or impartiality of the guideline development.

9.7 Declaration of funding for the guideline development

This practice guideline has been developed by a group led by a Specialist Section of the Royal College of Occupational Therapists. Specialist Sections are official branches of the Royal College of Occupational Therapists with specialist interests that, through their membership, are able to engage expert practitioners, educators and researchers in the development of guidelines and to access the required clinical and research expertise.

As a membership organisation, the major source of funding for the Royal College of Occupational Therapists and its Specialist Sections is obtained from membership. Other sources of income are primarily from advertising and events.

The development and publication of this practice guideline were funded by the Royal College of Occupational Therapists and the RCOTSS – Older People. The Royal College of Occupational Therapists provided specific resources to cover the meeting venue, travel expenses, literature search, and editorial and publication support. A small research and development grant was awarded by the National Executive Committee of the

RCOTSS – Older People to fund any other costs associated with the development and promotion of the practice guideline. There were no external sources of funding.

The editorial lead for the guideline was a member of staff at the Royal College of Occupational Therapists. The recommendation statements and guideline content were, however, developed and finalised by the GDG with the involvement of stakeholders, members of the public, occupational therapists and external peer reviewers. The views of the Royal College of Occupational Therapists have therefore not unduly influenced the final recommendations in this guideline.

9.8 College appraisal and ratification process

The guideline proposal, scope and final document were all reviewed and subsequently ratified by the Royal College of Occupational Therapists' Practice Publications Group, in line with the requirements of the *Practice guidelines development manual* (COT 2017a).

The scope was approved by the Practice Publications Group in July 2013, and the final version of the original guideline was approved by the Practice Publications Group in August 2014.

10 Guideline methodology – 1st edition

10.1 Guideline question

What evidence is there to support occupational therapy in the prevention and management of falls in adults?

The PICO (patient/population/problem, intervention, comparison and outcome) framework was used to assist in developing the specific practice question further (Huang et al 2006, Richardson et al 1995). PICO describes the specific care group or condition being studied and the nature of the intervention to be investigated. A comparative treatment can be specified where applicable, together with the anticipated outcomes (the desired/undesired or expected results of the intervention) (Table 10.1). This level of specificity is important in developing the question so that it addresses the requirements of the scope (COT 2017a).

Table 10.1 PICO framework

Patient (person accessing the service), Population or Problem/circumstance	Adults aged 18 years and over who are at risk of falling, have fallen or are afraid of falling.
Intervention under investigation or action	Occupational therapy.
Comparison (alternative intervention or action)	None.
Outcome desired	<ul style="list-style-type: none">• Improved identification of people at risk.• Improved assessment of people at risk.• Improved intervention to reduce falls risk.• Reduction in falls risk and rate of falls.• Optimised functional independence through evidence-based interventions, including positive risk taking.• Self-management, incorporating person accessing the service and carer/family education and ongoing support and reintegration into community roles.• Improved understanding of importance of education and training on role of occupational therapy in falls prevention and management.

10.2 Literature search strategy and outcomes

The literature search was carried out by a Royal College of Occupational Therapists librarian, an expert in the field of occupational therapy literature, using a search strategy defined following discussion and agreement with the GDG.

The varied clinical and academic experience of the GDG meant there was prior knowledge that the occupational therapy-specific evidence was likely to be limited. On the basis of this, the search covered a wide remit to ensure it was sufficiently robust to locate any relevant articles.

10.2.1 Key terms

The strategy involved combining concept groups of key words. Five key categories or concepts and their related terms were identified, reflecting in the main the PICO framework categories: falls and related terms; psychological factors; outcomes; interventions; and occupational therapy and related terms. The term ‘occupational therap*’ was used alone for some searches to enhance specificity (see Appendix 5, Table A1).

Specific exclusions identified were material published before 2003, people aged less than 18 years, and language other than English (due to lack of resources for translation). All study designs were considered potentially relevant.

10.2.2 Databases

The databases searched reflected the most likely sources of published peer-reviewed occupational therapy and falls prevention and management evidence. Six core databases were searched from 1 January 2003 to the dates the individual searches were carried out (in 2013) as detailed in Table 10.2.

Table 10.2 Database searches

Core databases	
CINAHL	All searches took place during September 2013.
Medline	
Allied and Complementary Medicine (AMED)	
PsycINFO	
Social Policy and Practice	
Health Management Information Consortium (HMIC)	

Six specialist databases were also searched: OTDBASE; OT Search; OTSeeker; the Cochrane Library of systematic reviews and clinical trials (search date 23.09.13); the NHS Economic Evaluation Database (NHS EED); and the Royal College of Occupational Therapists’ thesis collection (search date 27.09.13). No date range was set for specialist database searches, with the exception of OTDBASE (01.01.03–23.09.13).

Searches included title, abstract or descriptor fields. The date of each search, search fields and search result numbers are detailed in Appendix 5 (Tables A2 and A3).

Full search histories are available on request from the Royal College of Occupational Therapists.

10.2.3 Search results

The search identified a total of 3,422 results. These were scrutinised for duplicates within both database searches and cross-database search returns by the Royal College of Occupational Therapists' Research and Development Manager. A total of 2,287 duplicates were removed. The unique results list was given to the project lead and GDG members undertaking the screening activity.

10.3 Criteria for inclusion and exclusion of evidence

The resultant 1,135 search findings (title and abstracts) were independently screened by two different members of the GDG (three group members were involved) against an eligibility checklist.

Inclusion criteria were:

- Adults aged 18 years and over.
- Related to falls.
- Occupational therapy or intervention that can be undertaken by occupational therapists discussed.

Exclusion criteria were:

- Workplace/industry-related falls.
- Sports or leisure activity-related falls.
- Falls related to excessive alcohol intake, sudden onset of paralysis, epileptic seizure or overwhelming external force.
- Grey literature (given the awareness of the availability of a body of peer-reviewed evidence).

Where two screeners disagreed over whether an abstract should be included or excluded for appraisal, the abstracts were reviewed further against the eligibility criteria at a GDG meeting to achieve a consensus.

This process enabled the identification of abstracts that would be potentially relevant to the practice guideline and should therefore be included within the critical appraisal process.

Following the screening, 901 items were further excluded, resulting in a total of 234 items identified for full paper review and critical appraisal. The GDG was alerted to an additional pertinent publication subsequent to the date of the literature search by the library; this met the inclusion criteria and was critically appraised.

A total of 235 articles were critically appraised and their details transferred into evidence tables (see Section 10.4). A total of 33 items of evidence were subsequently used in developing the recommendations.

An overview of the literature search outcomes is provided in Figure 10.1.

10.4 Strengths and limitations of body of evidence

Each of the 235 articles identified as potential evidence was critically appraised by two independent reviewers. Appraisals were undertaken by all members of the GDG, with additional support provided by co-opted members. The allocation process ensured that reviewers did not appraise any evidence that they had authored or co-authored. Any discrepancy in grading was reviewed by a third person, and agreement of the final grading was confirmed with the two original reviewers.

The quality of the evidence was assessed initially using forms based on the Critical Appraisal Skills Programme (CASP) checklists (CASP 2013). Assessment took into account factors such as the appropriateness of the study design and recruitment strategy, procedural rigour in data collection and analysis, confounding factors and potential biases, transferability, precision of results, and the value of the findings.

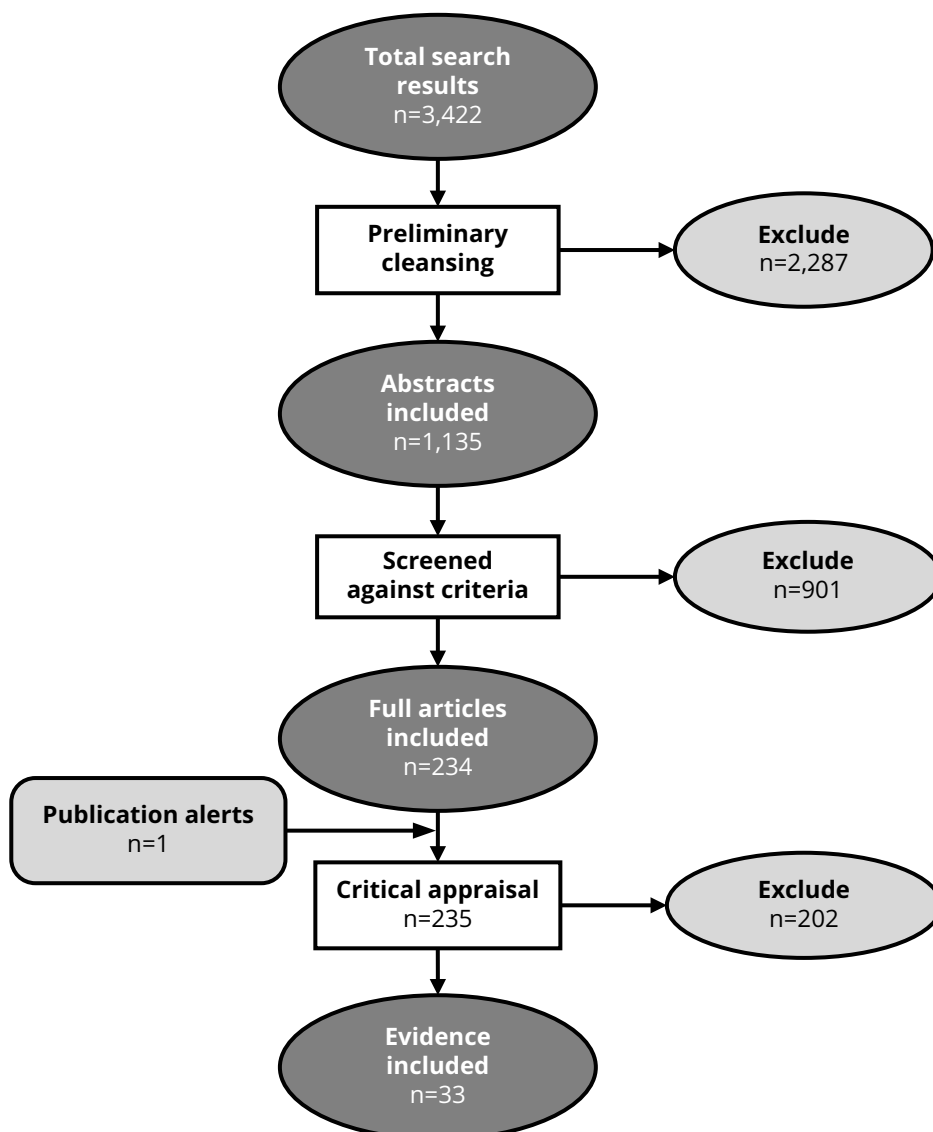


Figure 10.1 Literature search outcomes

A quality of evidence grade was then assigned to each individual article using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach, as defined within the *Practice guidelines development manual* (COT 2017a). The grading reflects the research design and the confidence in the research findings.

The initial grading was allocated as follows:

- Randomised controlled trial (RCT)/systematic review = High.
- Observational study = Low.
- Any other evidence = Very Low.

Limitations in the design of a study or its implementation may, however, bias the estimates of the treatment effect. If there were serious limitations, then downgrading of the quality of the evidence was considered, as in Table 10.3.

Table 10.3 Grading evidence up or down (after GRADE Working Group 2004)

<p>Decrease* grade if *Each quality criterion can reduce the quality by one or, if very serious, two levels</p>	<ul style="list-style-type: none"> • Serious or very serious limitation to study quality • Important inconsistencies in results • Some or major uncertainty about directness of the evidence • Imprecise or sparse data (relatively few participants or events) • High probability of reporting bias
<p>Increase grade if</p>	<ul style="list-style-type: none"> • Magnitude of treatment effect is very large and consistent • Evidence of large dose–response relationship • All plausible confounders/biases would have decreased magnitude of an apparent treatment effect <p><i>Only studies with no major threats to validity should be upgraded</i></p>

A decision to increase or decrease the initial grade of the evidence was recorded and justified on the critical appraisal forms. A moderate category became relevant only if there was a suggested change in the initial grading of an article due to up- or downgrading. Evidence was ultimately graded in one of four categories, as detailed in Table 10.4. If there was no reason to up- or downgrade the evidence, then the original grading remained.

Once the methodological quality of each piece of evidence was assessed, details for each item of evidence were collated into an evidence table (see Appendix 7).

Table 10.4 GRADE quality of evidence grading (after GRADE Working Group 2004)

Quality of evidence	Grading	Characteristics	Confidence
High	A	Based on consistent results from well-performed randomised controlled trials, or overwhelming evidence of an alternative source, e.g. well-executed observational studies with strong effects.	True effect lies close to that of the estimate of the effect. Further research very unlikely to change confidence in the estimate of the effect.
Moderate	B	Based on randomised controlled trials where there are serious flaws in conduct, inconsistency, indirectness, imprecise estimates, reporting bias or some other combination of these limitations, or from other study designs with special strengths.	True effect likely to be close to the estimate of the effect, but there could be a substantial difference. Further research is likely to have an important impact on confidence in the estimate of the effect and may change the estimate.
Low	C	Based on observational evidence, or from controlled trials with several very serious limitations.	True effect may be substantially different from the estimate of the effect. Further research very likely to have an important impact on confidence in the estimate of the effect and is likely to change the estimate.
Very low	D	Based on case studies or expert opinion.	Any estimate of effect is very uncertain and may be far from the true effect.

10.5 Methods used to arrive at recommendations

The evidence tables were used by the GDG to synthesise the evidence available and as the basis to evaluate and judge the potential contribution of each item of evidence to the development of the guideline recommendations.

The identified outcomes (see Section 4.1) were used as the starting point in conjunction with themes identified from the appraised evidence. Where evidence was identified to support an outcome or theme, this was reviewed. Each individual group member contributed their expert views to the discussion to develop recommendation options.

Where a number of items of evidence supported an identified outcome and subsequent recommendation, an overall quality of evidence GRADE rating was determined. This overall rating was established as follows:

- Where the evidence outcomes pointed in different directions towards both benefit and harm, the lowest quality grade of evidence determined the overall quality of evidence.
- Where the outcomes pointed in the same direction towards either benefit or harm, the highest grade of quality of evidence was appropriate to recommend an intervention and determined the overall quality of evidence.
- Where the balance of benefits and harm was uncertain, the lowest grade of quality of evidence was assigned.

Strength of recommendation was the second element of the GRADE system applied using the categories ‘strong’ or ‘conditional’ to reflect the strength (see Table 10.5).

Table 10.5 Strength of grade (after Guyatt et al 2008)

Strength	Grade	Benefits and risks	Implications
Strong	1 ‘It is recommended . . .’	Benefits appear to outweigh the risks (or vice versa) for the majority of the target group.	Most people would want or should receive this course of intervention or action.
Conditional	2 ‘It is suggested . . .’	Risks and benefits are more closely balanced, or there is more uncertainty in the person’s values and preferences.	The majority of people would want this intervention but not all, and therefore they should be supported to arrive at a decision for intervention consistent with the benefits and their values and preferences.

The development of the recommendations, including assignment of the overall quality and strength grading, was a consensus decision obtained at the GDG meeting and by subsequent email correspondence as required for any revisions. There were no recommendations that were not agreed by all members, and so no formal voting system or use of the nominal group technique was required. A total of 33 items of evidence were used to develop the recommendations.

A recommendation decision form was completed for each recommendation developed. This form recorded key information about the evidence used to form the basis of that recommendation, the overall allocation of the quality of evidence, and the strength of the recommendation. The form also facilitated discussion and recording of any specific or associated risks and benefits, and this was reflected in the final strength of recommendation. Any judgement by the GDG was documented as part of this decision-making process. (The forms are available on request from the Royal College of Occupational Therapists.)

11

Guideline review process – 2nd edition

The guideline review followed the review process as outlined in the *Practice guideline development manual* (COT 2017a, Section 3.14); this commenced three years after publication of the guideline.

The guideline question, objective and scope were unchanged, as were the criteria for inclusion or exclusion of evidence. This section outlines the process followed and, where necessary, cross-references to the first edition development process and methodology.

11.1 Guideline review group established

The review group consisted of four members of the original guideline development group, and two new members, who were also members of the Royal College of Occupational Therapists – Specialist Section Older People. All were occupational therapists with expertise and specialist interest in fall prevention. Conflicts of interest were declared in line with the guideline development process requirements.

11.2 Identification of new evidence

Two monitoring searches were undertaken at yearly intervals. These were ‘light-touch’ searches to ensure no significant studies had been published which would require an immediate change to the recommendations. These searches used fewer search terms.

The full review search replicated the original guideline search terms with the addition of a search string to incorporate literature on cost effectiveness.

All searches were undertaken by the College’s Library and Information Service.

11.2.1 Key search terms

The monitoring search strategy involved combinations of search terms from three categories: condition and two types of intervention (Appendix 6 Table A4).

The full review search strategy involved combining groups of search terms from seven categories or concepts and their related terms: fall and related terms, psychological factors, desired outcomes, interventions, occupational therapy and related terms, occupational therapy and finance/value terms (Appendix 6 Table A5).

11.2.2 Databases

The monitoring searches covered two periods, 2013–2016 and 2016–2017, and only searched the EBSCOHOST and OVID platforms.

For the full search, core and specialist databases were searched from the last date of the guideline original search (September 2013) to November 2017. The databases accessed were: EBSCOHOST platform (MEDLINE, CINAHL); OVID platform (AMED, HMIC, PsycINFO,

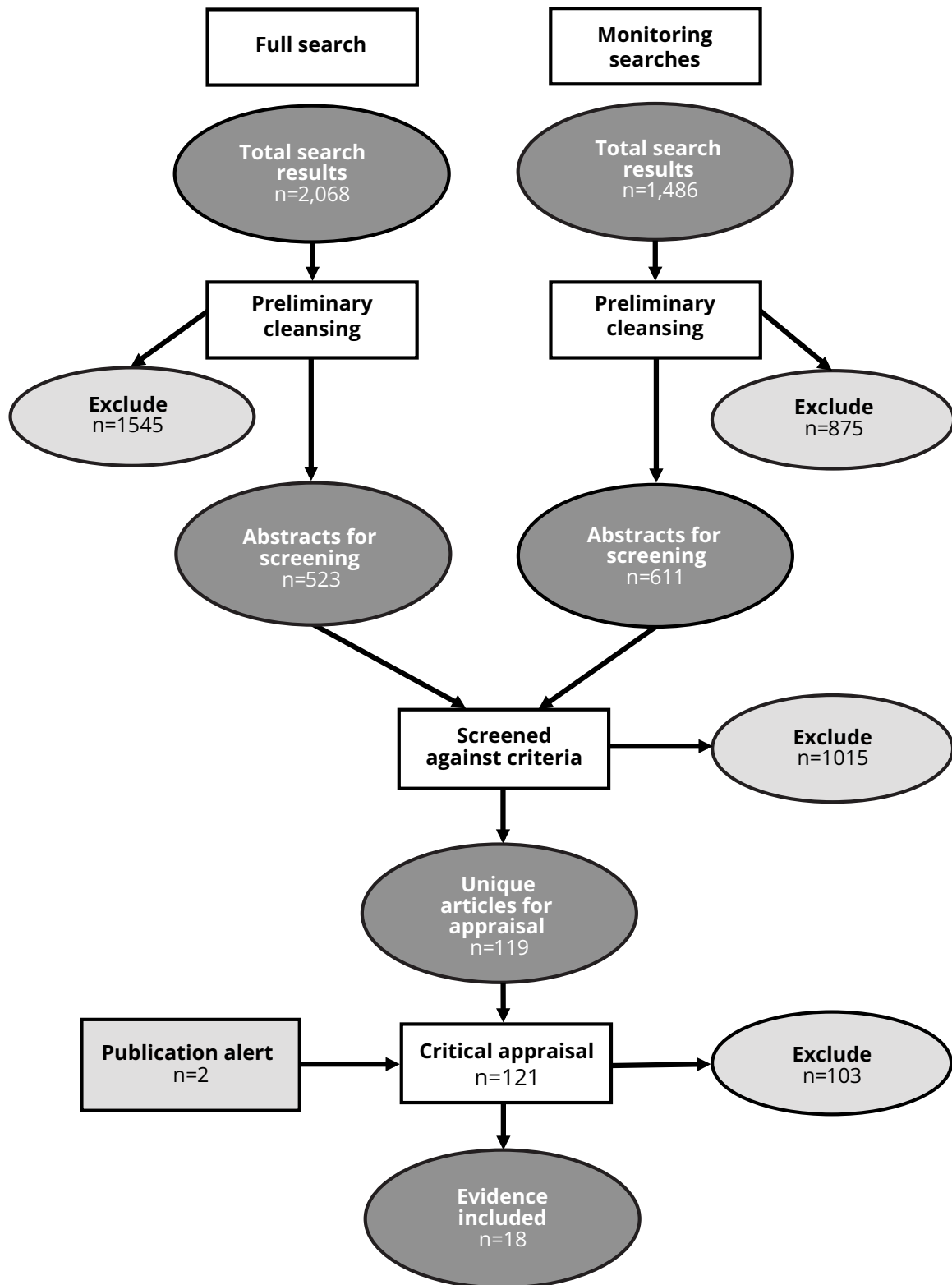


Figure 11.1 Review literature search

Social Policy and Practice); OTseeker; OTDBASE; OT SEARCH; Cochrane Library; and RCOT Library online catalogue.

Details for the specific database searches (including period of search) are provided in Appendix 6 Tables A6, A7 and A8.

11.2.3 Search results

The monitoring searches returned 1,486 results (EBSCOHOST platform n=1,201 and OVID platform n=285). The College Officer cleansed these for duplicates within and across databases. After cleansing, 611 abstracts required screening.

For the full search, the core and specialist searches produced a total of 2,068 results (EBSCOHOST platform n=1,481; OVID platform n=442 and specialist databases n=145). These were scrutinised for duplicates and anomalies by a College Officer both within database and cross-database search findings. As a result of cleansing 523 abstracts were returned for screening.

11.2.4 Screening and appraisal of evidence

A total of 1,134 abstracts were independently screened by two members of the guideline review group or RCOT Officers against criteria identified in the guideline development process (Sections 11.2.1, 11.3). This resulted in 1,015 items being excluded, and 119 items of evidence being selected for independent appraisal by two group members. Two items subsequently screened in via publication alerts, between May 2018 and the guideline development group meeting held in October 2018, were also appraised.

An overview of the literature search is provided in Figure 11.1.

11.3 Assessment of update requirements

The guideline review group's discussions focused on:

- New evidence appraised.
- Consideration of any original material that was no longer appropriate and how this might need to be superseded or withdrawn.
- Consideration of any relevant feedback and comments received since the publication of the guideline.
- Development of recommendations where indicated by new evidence or knowledge.

The review group identified that there was new evidence that was directly relevant to the guideline scope.

A total of 18 articles were agreed by consensus as being suitable for inclusion in an update of the guideline. These provided additional evidence to support 10 existing recommendation statements, minor amendments to one of those existing recommendation statements and the development of two additional recommendations. Additionally, one piece of evidence appraised for the original guideline but not included at that time was added as support for a new recommendation.

The 19 items of evidence were mostly graded as either Moderate (Grade B, n=10) or Low (Grade C, n=5), with four graded High (A).

11.4 External review

A consultation of the revised draft guideline was held with stakeholders, members of the public and occupational therapists for a month mid-February to mid-March 2019. Where permission was obtained, those who participated are listed in the acknowledgements in Appendix 2.

Occupational Therapists: the draft updated guideline was made available to occupational therapists, particularly members of the College's Specialist Section – Older People. All members were alerted to the consultation via the professional body's magazine OTnews, website and via social media.

Stakeholders: stakeholders who had been invited to participate in the original consultation were contacted and invited to provide any comments on the full updated version of the guideline along with new stakeholders identified by guideline review members.

Members of the Public: People were asked to comment on the guideline via three groups: Lanarkshire Public Partnership Forum, Leicester-Shire and Rutland Sports, and the Norwich Older People's Forum. A Guideline Review Group member attended a meeting of the Lanarkshire Public Partnership Forum on 28 February 2019 and gave attendees an opportunity to review the guideline and discuss their feedback. The Leicester-Shire and Rutland Sports and Norwich Older People's Forum were asked via email to comment on the updated guideline.

Peer review: two peer reviewers, experienced in both the topic and research, were identified to carry out an independent peer review of the updated draft.

11.5 College appraisal and ratification process

A draft of the 2nd edition of the guideline was submitted to the College's Practice Publications Group for review and approval was granted in July 2019.

11.6 Overview of limitations and any potential bias of the guideline

Evidence included in the development of the guideline recommendations was sourced from published, peer-reviewed journal articles. Relevant policy documents have been referenced within the contextual information where applicable, but it is acknowledged that grey literature has not been included in the evidence.

The literature search identified limited primary research specific to occupational therapy and fall prevention.

The review of the literature for the first and second editions combined identified 52 items of evidence from which recommendations were developed. The majority of this evidence was assessed as either moderate (B) or low grade (C) and was predominantly made up of systematic reviews, randomised controlled trials and cohort studies:

Grade A = 23.1% (12)
Grade B = 46.2% (24)
Grade C = 28.8% (15)
Grade D = 1.9% (1)

The evidence did provide a number of higher quality studies from a design and methodological perspective. The guideline group downgraded a proportion of the potential grade A studies due to concerns about confidence in the estimate of the effect of the research. Systematic reviews were mainly graded as A or B, which was based on the robustness of the review methodology and reported outcomes. This did not necessarily reflect, however, the quality of the individual studies included within the review.

Table 11.1 Summary of evidence used to develop the recommendations

Category	Author	Year	Evidence quality
Keeping safe at home: reducing risk of falls	Blaylock and Vogtle	2017	B
	Campbell et al	2005	A
	Chu et al	2017	A
	Clemson et al	2008	A
	Clemson et al	2004	A
	Costello and Edelstein	2008	B
	Di Monaco et al	2012	B
	Di Monaco et al	2008	B
	Elliott and Leland	2018	B
	Gillespie et al	2012	A
	Jensen and Padilla	2017	B
	Johnston et al	2010	C
	La Grow et al	2006	A
	Lockwood et al	2015	A
	Maggi et al	2018	B
	Nikolaus and Bach	2003	A
	Pighills et al	2016	A
	Pighills et al	2011	A
Stark et al	2017	B	
Steultjens et al	2004	B	
Keeping active: reducing fear of falling	Boltz et al	2014	C
	De Coninck et al	2017	A
	DeLaney et al	2016	B
	Kempen et al	2009	C
	Painter et al	2012	C
	Schepens et al	2012	B
	Wijlhuizen et al	2007	C
	Zijlstra et al	2007	B

Category	Author	Year	Evidence quality
Falls management: making it meaningful	Ballinger and Clemson	2006	C
	Clemson et al	2010	B
	Clemson et al	2012	A
	Currin et al	2012	C
	Gopaul and Connelly	2012	D
	Groot and Fagerström	2011	C
	Haines et al	2006	C
	Haines et al	2004	B
	Harper et al	2017	C
	Harvey et al	2014	B
	Hill et al	2009	B
	Hill et al	2013	B
	Jang et al	2016	B
	Mahoney et al	2017	C
	Nyman	2011	C
	Nyman et al	2011	C
	Pritchard et al	2013	B
	Rosendahl et al	2008	B
	Stenhagen et al	2014	C
	Stern and Jayasekara	2009	B
Taylor et al	2017	B	
Wilkins et al	2003	C	
Occupational therapy intervention: impact and effectiveness	Campbell et al	2005	A
	Harper et al	2017	C
	Irvine et al	2010	B
	Lockwood et al	2015	A
	Pighills et al	2016	A
	Sheffield et al	2013	B

The literature search identified a body of primary occupational therapy research, predominantly within the area of home hazards and environmental assessment and intervention. The evidence did, however, have a number of limitations; this was particularly evident with respect to the lack of diversity of the participants. Most studies also had a bias towards female participants being recruited.

The inclusion criteria of most of the studies focused on older people (aged over 60, 65 or 70 years), community settings, and those without impaired cognition. Most studies excluded participants with cognitive deficits, despite the fact that cognitive impairment is an important risk factor for falls. The lack of research in the area of fall prevention interventions for older people with mental health conditions, and the inconclusive evidence that does exist, have been highlighted within systematic reviews (Bunn et al 2014, Winter et al 2013).

Substantiation of the applicability of the recommendations to the wider population of adults who fall or are at risk of falling cannot currently be evidenced. It is suggested, however, that the majority of the recommendations will be appropriate to people who fall, are at risk of falling or are fearful of falling, whatever their predisposing circumstances. Implementation of the recommendations should, nonetheless, take place in the context of the occupational therapist's clinical reasoning and the individual needs of the person.

It is important to highlight that this guideline is based on the best available evidence, and therefore the recommendations cannot explicitly address all clinical, health and social care areas or outcomes identified within the scope. The guideline does not therefore reflect the full range of interventions used by occupational therapists in the prevention and management of falls.

Details on specific limitations of individual studies are noted in the evidence tables in Appendix 7.

The involvement of the College and the Specialist Section in the development, authoring and funding of this practice guideline is fully acknowledged (Section 9.6). Involvement is inherent because of the organisational structure of the professional body and its relationship with its members.

The potential for any bias in development and authoring was, however, minimised through the rigorous nature of the guideline development process. This was achieved through the systematic methodology adopted, the contributions of stakeholders and people who access services, the valued opinions of the independent peer reviewers and occupational therapists, and the judicious management of any potential or actual conflicts of interest.

12 Updating the guideline

The National Executive Committee of the Royal College of Occupational Therapists Specialist Section – Older People is responsible for monitoring new evidence over the next five-year period and will provide a focal point for feedback received following publication of the 2nd edition of the guideline.

In line with College procedures, this reviewed guideline will be available until 2025 and then withdrawn; however, relevant literature will be monitored regularly to detect evidence that has a significant impact on the recommendations. If this occurs, the guideline may be updated or withdrawn, depending on the evidence.

Further information about the Royal College of Occupational Therapists Specialist Section – Older People is available at <https://www.rcot.co.uk/about-us/specialist-sections/older-people-rcot-ss>.

Appendix 1: Guideline Development and Review Groups

Guideline Development Group, 2013–2015

Kate Robertson (Project Lead)

- MSc, PGCert (Falls and Osteoporosis), DipCOT
- Consultant Therapist in Falls Prevention, Nottinghamshire Healthcare NHS Trust, Nottinghamshire
- Associate Lecturer, University of Derby, Derby
- RCOTSS – Older People: Member

Shelley Crossland

- BSc (Hons) Occupational Therapy
- Occupational Therapist, Mental Health Services for Older People, Leicestershire Partnership NHS Trust, Leicestershire
- RCOTSS – Older People: Member

Jo Doubleday

- BSc (Hons) Occupational Therapy
- Independent Occupational Therapist
- Specialises in writing and delivering falls prevention training programmes in care homes and for local authority staff
- RCOTSS – Older People: Member

Dr Judi Edmans

- PhD, MPhil, DipCOT, FCOT
- Senior Research Fellow, University of Nottingham, Nottingham
- RCOTSS – Older People: Research and Development Lead (to October 2013)
- RCOTSS-Neurological Practice: Newsletter Editor
- Royal College of Physicians Intercollegiate Working Party for Stroke (National Clinical Guidelines for Stroke): Member

Tessa Fiddes

- PGCert (Advanced Practice), DipCOT
- Team Leader/Falls Clinical Specialist Occupational Therapist, Older People's Medicine, Norfolk and Norwich University Hospitals NHS Foundation Trust, Norwich
- RCOTSS – Older People: Member

Lianne McNally

- MBA Public Services Management, BSc (Hons) Occupational Therapy
- Falls Advanced Occupational Therapist, Falls Service NHS Lanarkshire currently seconded to National Project Lead, Up and About in Care Homes – The management of falls and fractures in Care Homes for Older People Improvement Project
- RCOTSS – Older People: Falls Clinical Forum Co-Lead (Guideline Development Group member from August 2013)

Catherina Nolan

- MSc, BSc (Hons) Occupational Therapy
- Head Occupational Therapist, Medicine for the Elderly and General Medicine, Imperial College Healthcare NHS Trust, London
- RCOTSS – Older People: Chair

Zoe Foan

- Clinical Specialist for Older People, Virgin Care (Surrey) and RCOTSS – Older People: Falls Clinical Forum Co-Lead, was involved as a member of the guideline development group for the proposal and scope development (January–July 2013)

Guideline Review Group, 2018–2020

Lianne McNally (Project Co-lead)

- MBA Public Services Management, BSc (Hons) Occupational Therapy, SCILc7
- Senior Improvement Advisor, NHS Lanarkshire
- RCOTSS – Older People: Falls Clinical Forum Co-Lead (Guideline Development Group member from August 2013)

Linda Parry (Project Co-lead)

- MSc, BApSc (OT)
- RCOTSS – Older People: Falls Clinical Forum Co-Lead

Shelley Crossland

- BSc (Hons) Occupational Therapy
- Occupational Therapist, Mental Health Services for Older People, Leicestershire Partnership NHS Trust, Leicestershire
- RCOTSS – Older People: Member

Tessa Fiddes

- PGCert (Advanced Practice), DipCOT
- Operational Lead Occupational Therapist: Medicine, Norfolk and Norwich University Hospital
- RCOTSS – Older People: Member

Michelle Mamode

- BHSc (OT), Certified OTAGO Exercise Programme Leader
- Independent Mobility Assessor
- RCOTSS – Older People: Member

Kate Robertson

- MSc, PGCert (Falls and Osteoporosis), DipCOT
- Honorary Assistant Professor and Clinical Expert for Older People’s Research, School of Medicine, Division of Rehabilitation, Ageing and Wellbeing, University of Nottingham
- RCOTSS – Older People: Member

Appendix 2: Acknowledgements

The GRG would like to thank all those who have contributed to the development of this edition of the practice guideline and the first edition.

A2.1 Guideline development – 1st edition

1 Public reference groups

Rushcliffe 50+ Forum Health Group, Nottinghamshire

Mrs Sue Knowles, chair of Rushcliffe 50+ Forum Health Group, is acknowledged for her assistance in facilitation of the consultation with members of the group.

National Osteoporosis Society Norwich and Nottingham groups

2 People with experience of falling

Invaluable views and comments on the draft guideline during the consultation period were provided by the following individuals who have personal experience of falling:

- Gladys Bombek
- Ann Burne
- Jim Radburn
- Tony Wilde
- Ken Williams

3 Stakeholder reference group

- Tim Chesser, British Orthopaedic Association Trauma Group
- Catherine Dennison, Head of Research – Health and Wellbeing, and Suzy England, Occupational Therapy and Sight Loss Consultant, Thomas Pocklington Trust
- Lisa Field, Consultant Radiographer, Mid Yorkshire NHS Trust, on behalf of the Society and College of Radiographers
- Joe Godden, Professional Officer, British Association of Social Workers
- Vicky Johnston, Chair, Chartered Physiotherapists Working with Older People
- Carley King, Professional Adviser, Chartered Society of Physiotherapy
- Mark Taylor, Chief Officer, North Norfolk Clinical Commissioning Group
- Andy Tilden, Director, Sector Development – Skills, Skills for Care
- Dr Jonathan Trembl, Consultant Geriatrician, Queen Elizabeth Hospital, Birmingham, Associate Director/Clinical Lead of Falls Workstream, Falls and Fragility Fracture Audit Programme, and Co-Chair, British Geriatrics Society Falls and Bone Health Section on behalf of members of the British Geriatrics Society and Royal College of Physicians

- Catherine Trustram-Eve, British Association of Nutritional Therapies
- Julie Windsor, Patient Safety Lead for Older People and Falls, NHS England

4 External peer reviewers

- Dr Claire Ballinger FCOT, PhD, MSc, DipCOT, Senior Qualitative Methodologist, RDS South Central and Principal Research Fellow – PPI, CLAHRC Wessex
- Professor Avril Drummond FCOT, PhD, MSc, DipCOT, Professor of Healthcare Research, Director of Research, School of Health Sciences, University of Nottingham
- Associate Professor Alison Pighills PhD, MSc, DipCOT, Health Practitioner Research Capacity, Queensland Health/James Cook University, Queensland, Australia

5 Co-opted critical appraisers

- Susan Fuchs BSc (Hons), Occupational Therapist, Hospital Discharge Team, West Dunbartonshire CHCP, Glasgow, and RCOTSS – Older People Falls Clinical Forum: Member
- Fiona Jones BSc Hons, Occupational Therapist, Community Integrated Intermediate Care Services, Bettws, Wales, and RCOTSS – Older People Falls Clinical Forum: Member
- Sheila Morris MSc, Occupational Therapist and Community Lead for Falls Prevention for NHS Scotland Highland, UK, and RCOTSS – Older People Falls Clinical Forum: Member
- Rachel Russell BSc Hons, MSc, Occupational Therapist, PhD candidate, School of the Built Environment, University of Salford, and RCOTSS – Older People Falls Clinical Forum: Member
- Mandy Sainty MSc, DipCOT, Research and Development Manager, Royal College of Occupational Therapists
- Laura Stuart MSc, PGCert, BSc (Hons), Frailty Lead, UCL Partners, London, and RCOTSS – Older People Falls Clinical Forum: Member
- Karin Tancock PGDip, DipCOT, Professional Affairs Officer for Older People and Long Term Conditions, Royal College of Occupational Therapists
- Dr Elizabeth White PhD, Head of Research and Development, Royal College of Occupational Therapists

6 Occupational therapists

The views of those members of the British Association of Occupational Therapists who commented on the scope and the draft guideline during the consultation periods were much appreciated.

Respondents included members of a number of the Royal College of Occupational Therapists Specialist Sections: HIV, Oncology and Palliative Care; Housing; Neurological Practice; Older People; and Trauma and Orthopaedics.

A2.2 Guideline review – 2nd edition

1 Members of the Public

- Mary Ledgard, Chairman, Norwich Older People's Forum

2 Stakeholders

- College of Optometrists
- National Care Association
- Skills for Care
- Aileen Bryson, Practice and Policy Lead, Royal Pharmaceutical Society
- Lisa Field, Consultant Radiographer, Society and College of Radiographers
- Jill Griffin, Consultant Radiographer, Royal Osteoporosis Society and Society and College of Radiographers
- Jo Gordon, Falls Coordinator, NHS Lothian
- Professor Donal O'Donoghue, Registrar, Royal College of Physicians
- Tracy O'Regan, Professional Officer, Clinical Imaging and Research, Society and College of Radiographers
- Professor Dawn A Skelton, Professor of Ageing and Health, Glasgow Caledonian University

3 External peer reviewers

- Dr Claire Ballinger FCOT, PhD, MSc, DipCOT, Visiting Fellow, Faculty of Medicine, University of Southampton
- Dr Philippa Logan, Professor of Rehabilitation Research, University of Nottingham

4 Co-opted critical appraisers

- Louise Cusack, RCOT UK Regional and Specialist Sections Manager
- Anne Keen, RCOT Professional Advisor – Professional Practice Enquiries Service
- Pauline McDonald, RCOT Research and Development Officer
- Amie Mowlam-Tett, North Essex Dementia and Frailty Service
- Karin Orman, RCOT Lead Professional Advisor
- Sally Payne, RCOT Professional Advisor – Children and Young People
- Mandy Sainty MSc, DipCOT, Retired
- Maureen Schiells, RCOT Education Manager (Pre-Registration)
- Dr Stephanie Tempest, RCOT Education Manager (Professional Development)
- Dr Gill Ward, RCOT Research and Development Manager

5 Occupational therapists

The views of those members of the Royal College of Occupational Therapists who commented on the scope and the draft guideline during the consultation periods were much appreciated. These included the following:

- Emma Bates
- Ruth Crowley
- Susan Fuchs
- Sarah Mattock

- Mandy Sainty
- Wendy Thomson
- Sarah Jayne Vaughan
- Sheila White

6 The guideline development group would additionally like to thank the following:

- The Royal College of Occupational Therapists' Library Service
- The Royal College of Occupational Therapists' Practice Publications Group and supporting officers Julia Roberts, Quality Programme Manager, and Tessa Fincham, Publications Manager.

Appendix 3: Conflicts of interest declarations

Declarations were made, in line with the conflicts of interest procedures (see Section 9.6), as follows:

- All members of the core GDG and GRG membership were members of the RCOTSS – Older People.
- The co-opted editorial lead in the 1st and 2nd editions was an officer of the Royal College of Occupational Therapists.
- In the 1st edition three of the co-opted critical appraisers were officers of the Royal College of Occupational Therapists, and in the 2nd edition nine were. Additionally, one former officer of the Royal College of Occupational Therapists was a co-opted critical appraiser in the 2nd edition.
- Five of the co-opted critical appraisers were members of the COTSS – Older People Falls Clinical Forum in the 1st edition.
- External peer reviewers declared authorship of one or more publications included in the guideline, and their status as researchers in falls in the 1st edition.
- Guideline group members, external peer reviewers and stakeholders identified their membership of professional organisations or specialist falls-related forums.
- Stakeholder declarations included involvement in falls prevention working parties and forums, and research activities, within their work and organisational capacity.

Declarations were related to the expertise of the individuals who, through their professional interests, were members of specialist forums or organisations, or involved in falls prevention and management through their clinical, educational or research activities.

The peer reviewers, by the nature of their expertise, were authors of research used to support recommendations; as the views and opinions of three experts were obtained in the first edition and two in the second, this meant there was no undue bias.

Officers of the Royal College of Occupational Therapists were involved in critical appraisal activities, but all evidence was appraised by two individuals.

No commercial or financial interests were declared.

Adherence to the Royal College of Occupational Therapists' conflicts of interest policy, the nature and management of the above declarations, and the robust guideline development methodology mean that the potential for any bias has been taken into account.

Appendix 4: Public consultation – 1st edition

Consultation took place on the draft guideline recommendations – 1st edition as outlined in Section 9.3. Feedback from phases 1 and 2 of the draft guideline consultation is provided below.

1 Do you think the explanation of what occupational therapy is and how occupational therapists promote independence is clear enough?

"It is very 'OT jargon' – accepting that this guideline is for OTs that is OK, BUT in the scoping document you did say that this guideline would be useful for others, including commissioners, so the definition needs to be simpler."

"Absolutely clear. The guidelines explain this well in easy to understand language."

"Yes, I think it is explained well."

2 Do you think the title is right, given that not all falls can be prevented?

"Yes, it is clear and unambiguous."

"No – the title should just be 'Falls: the role of occupational therapy in the management of falls in adults' as to use the word 'prevention' implies all falls could have been prevented."

With respect to the guideline title, people's perspectives were respected, but the use of the term "prevention" was retained in the guideline title for consultation. This is to reflect that the overarching objectives of occupational therapy include both prevention and management of falls, to be congruent with the national guideline focus, and to maximise the guideline's inclusion in the results of future falls topic literature searches.

3 Do you think the recommendations are easy to understand?

"Not all of them."

"Yes, the recommendations give a structure for therapists to work towards while allowing for changes based on clinical judgement to tailor interventions to a person-centred model."

"Could do with a few less words."

"Something could be added about outside activities."

4 Do you think these recommendations will help patients understand how they can reduce their risk of falling?

"Yes, if they want to listen!"

"Yes but only for those who do not have dementia or a loss of understanding."

“Hopefully. I think these recommendations will need to be published widely so people are aware of this type of service, most of the general public may not know this service exists.”

“More home assessments are needed.”

5 Do you think the word “safe” should be included?

“No – the problem with ‘safe’ is it can restrict activity so you ‘stay safe’ – nothing can ever be totally safe. It is about minimising risk.”

Use of the word “safe” in the third recommendation category heading was an acceptable context.

6 Is the word “purposeful” useful?

“No – there are times when what you are doing or what you want to do does not necessarily have a purpose to it, i.e. ‘purposeful’ implies there should be a useful outcome.”

7 Do the outcomes make sense?

“Yes.”

“Yes. I really like how the outcomes focus on individuals and their own perception of falls and the impact this has on their daily lives, and also encourages the belief that positive changes are possible.”

People’s views were influential and insightful. All points raised were reviewed and, as a consequence, a number of amendments were made to both the pre-consultation draft and the final guideline document.

Appendix 5: Literature search strategy – 1st edition

Table A1: Search terms and strings

1	2	3	4	5	6	
Falls and related terms	Psychological factors	Outcomes	Interventions	Occupational therapy and related terms	Occupational therapy	
fall* OR recurrent fall* OR frequency of fall* OR context of fall* OR characteristic* of fall* OR accident* fall* OR mechan* fall* OR non-mechan* fall* OR trip* OR slip* OR drop attack OR drop- attack OR collapse OR syncope OR faint OR fragil* frac*	ansi* OR fear* OR confide* OR lifestyle limit* OR pyscho* OR motivat* OR perce* OR distress OR behaviour OR self eff* OR auton* OR dignity OR embarrass* OR wellbeing OR well- being	assessment OR outcome measure OR intervention OR multifactorial assessment OR multifactorial intervention OR function OR goal setting OR problem solving OR seat* OR postur* propriocept* OR spatial OR spatial percept* OR discharge plan* OR manual hand* OR assistive tech* OR rehabilitat* OR cop* strat* OR contingen* plan* OR home hazard* reduc* OR hazard or home* OR environment* OR awareness OR moving OR handling OR neglect OR inattention OR attention OR equipment OR aids OR tele* OR virtual OR concentrat* OR modif* OR reasoning OR	assessment OR outcome measure OR intervention OR multifactorial assessment OR multifactorial intervention OR function OR goal setting OR problem solving OR seat* OR postur* propriocept* OR spatial OR spatial percept* OR discharge plan* OR manual hand* OR assistive tech* OR rehabilitat* OR cop* strat* OR contingen* plan* OR home hazard* reduc* OR hazard or home* OR environment* OR awareness OR moving OR handling OR neglect OR inattention OR attention OR equipment OR aids OR tele* OR virtual OR concentrat* OR modif* OR reasoning OR	lifestyle modif* OR daily liv* skil* OR daily liv* OR fall* prevention OR fall* program* or OR fall* management OR education OR self care OR self-care OR personal care OR self management OR rehabilit* OR sensory OR compensat* OR judgement OR insight OR in-sight	occupational therap* OR therap* OR rehab* OR reable* OR enable* OR multidis* OR multi-dis* OR unidiscip* OR undiscip* OR activit* OR occupat* OR life skill*	Occupational therap*

Table A2: Database search strategy

A title/abstract/descriptor search was undertaken. Each string combination (Table A1), dependent on the search database, was therefore automatically ended or preceded with the relevant term:

- Ovid platform search strings were followed by *.ti.* (title search), *.ab.* (abstract search) or *.de.* (descriptor search).
- EBSCO platform search strings were preceded by *TI* (title search), *AB* (abstract search) or *SU* (subject search).

The following table shows EBSCO (Medline, CINAHL) and Ovid (AMED, HMIC, PsycINFO, Social Policy and Practice) platform searches covering 1 January 2003 to search date in 2013:

Platform, search type and date	Search no.	Search strings (columns in Table A1)	Medline	CINAHL	AMED	HMIC	PsycINFO	Social Policy	Subtotal
Title search (EBSCO and Ovid search date 17.09.13)	S1	1 AND 2 AND 5	70	55	13	0	27	7	172
	S2	1 AND 3 AND 5	211	197	32	11	67	9	527
	S3	1 AND 4 AND 5	292	223	60	11	68	9	663
Total									1362
Title search (EBSCO search date 18.09.13, Ovid search date 17.09.13)	S4	1 AND 2 AND 6	9	14	0	0	1	0	24
	S5	1 AND 3 AND 6	20	38	6	1	5	1	71
	S6	1 AND 4 AND 6	28	43	7	1	5	1	85
Total									180
Abstract search (EBSCO and Ovid search date 18.09.13)	S7	1 AND 2 AND 6	54	53	27	7	26	8	175
	S8	1 AND 3 AND 6	135	107	49	19	71	24	405
	S9	1 AND 4 AND 6	85	115	49	16	68	22	355
Total									935
Descriptor search (EBSCO and Ovid search date 19.09.13)	S10	1 AND 2 AND 6	54	51	0	1	1	1	108
	S11	1 AND 3 AND 6	55	153	0	4	2	4	218
	S12	1 AND 4 AND 6	49	162	0	1	6	3	221
Total									547
Total search results									3024

Table A3: Specialist searches

Search description (no date range set, except OTDBASE 01.01.03–23.09.13)	Search date	Results
OTseeker: all fields search – ‘fall*’	27.09.13	259
OTsearch: title field search – ‘fall*’	27.09.13	61
OTDBASE: title field search for four terms – ‘fall’, ‘falls’, ‘falling’, ‘fallen’	27.09.13	45
Cochrane Library: title, abstract and descriptor fields search – ‘fall*’ and ‘occupational’	27.09.13	4
College of Occupational Therapists Thesis Collection: all fields search – ‘fall*’	27.09.13	5
NHS Economic Evaluation Database (EED): title search – ‘falls’, all fields search – ‘occupational therapy’	27.09.13	24
Total		398

Appendix 6: Literature search strategy – 2nd edition

Table A4: Falls monitoring alert search terms and strings 2013–2016, 2016–2017

All Ovid platform search strings were followed by .ti (title search) and .ab (abstract search) and .de (descriptor search) for search strings 1 and 2.

All EBSCOplatform search strings were followed by TI (title search) and AB (abstract search) and DE (descriptor search) for search strings 1 and 2.

1	2	3
Condition	Intervention	Intervention
Fall or Falls or Fallen or Falling or Fell or Tumble or Tumbled or Tumbling or Tumbles or Slip or Slips or Slipping or Slipped or Trip or Trips or Tripped or Tripping	Occupational therap*	Fall* N2 prevention

Table A5: Full search terms and strings

Ovid platform search strings were followed by .ti (title search), .ab (abstract search) and .de (descriptor search).

EBSCO platform search strings were followed by TI (title search), AB (abstract search) and DE (descriptor search) for search strings 1 and 2.

1	2	3	4	5	6	7
Falls and related terms	Psychological factors	Outcomes	Intervention	Occupational therapy and related terms	Occupational therapy	Economic terms
fall* OR recurrent fall* OR frequency of fall* OR context of fall* OR characteristic* of fall* OR accident* fall* OR mechan* fall* OR non-mechan* fall* OR trip* OR slip* OR drop attack OR drop-attack OR collapse OR syncope OR faint OR fragil* frac*	anxi* OR fear* OR confide* OR lifestyle limit* OR pyscho* OR motivat* OR perce* OR distress OR behaviour OR self eff* OR auton* OR dignity OR embarrass* OR wellbeing OR well-being	confiden* OR economic OR social OR behave* OR psycho* OR physical OR outcome measure OR independ* OR function* indep* OR identification* of OR hazard* OR environment* OR redesign OR lifestyle redesign OR prevent* OR rate of frac* OR inciden* of fall* OR management of fall* OR motivate* OR complian* OR coping OR aware* OR quality of life OR positive* risk taking OR medi* concord* OR medication manag* OR safety OR wellbeing OR well-being OR self care OR self-care OR personal care OR productive* OR human cost* OR finance* cost OR	assessment OR outcome measure OR intervention OR multifactorial assessment OR multifactorial intervention OR function OR goal setting OR problem solving OR seat* OR postur* propriocept* OR spatial OR spatial percept* OR discharge plan* OR manual hand* OR assistive tech* OR rehabilitat* OR cop* strat* OR contingen* plan* OR home hazard* reduc* OR hazard or home* OR environment* OR awareness OR moving OR handling OR neglect OR inattention OR attention OR equipment OR aids OR tele* OR virtual OR concentrate* OR modif* OR reasoning OR lifestyle modif* OR	occupational therap* OR therap* OR rehab* OR reable* OR enable* OR multidis* OR multi-dis* OR unidiscip* OR unidiscip* OR activit* OR occupat* OR life skill*	Occupational therap*	econom* OR cost* OR finance* OR money OR monies OR saving* OR resource* OR staff* OR QALY* OR quality-adjust* life year

1	2	3	4	5	6	7
Falls and related terms	Psychological factors	Outcomes	Intervention	Occupational therapy and related terms	Occupational therapy	Economic terms
			daily liv* skil* OR daily liv* OR fall* prevention OR fall* program* OR fall* management OR education OR self care OR self-care OR personal care OR self management OR rehabilit* OR sensory OR compensate* OR judgement OR insight OR insight			

Tables A6 and A7: Database search strategy

The following table shows EBSCO (Medline, CINAHL) and Ovid (AMED, HMIC, PsycINFO, Social Policy and Practice) platform searches from two distinct search types:

- Two monitoring searches, which covered the periods from 2013–2016 and then 2016–2017 and was a 'light-touch' search to ensure no significant studies had been published that affected the recommendations.
- A full search, which covered the period from 2013–2017 and replicated the original guideline literature search in order to begin the review of the guideline.

Table A6: Monitoring searches

Platform and search date	Search strings	Ebsco 24.03.16, 06.04.18 (3), 16.04.18 (1+2)	Ovid 24.03.16, 16.04.18
	1 AND 2	343	104
	3	928	181
Total		1271	285

Table A7: Full search

Platform and search date	Search strings	Ebsco 13.11.17	Ovid 13.11.17
	1 AND 5 AND 2	65	27
	1 AND 5 AND 3	322	68
	1 AND 5 AND 4	330	70
	1 AND 6 AND 2	110	38
	1 AND 6 AND 3	254	93
	1 AND 6 AND 4	256	90
	1 AND 6 AND 7	74	31
	1 AND 6 AND 4 AND 7	70	25
Total		1481	442

Table A8: Specialist searches

The below searches were undertaken with a publication date range between 2013 and 2017.

Search description	Search date	Results
OTsearch: all fields search – ‘fall*’	18.10.17	8
OTseeker: title field search – ‘fall*’	18.10.17	100
OTDBASE: title field search – ‘fall’, ‘falls’, ‘fallen’, ‘faller’, ‘trip’, ‘slip’, ‘drop attack’, ‘syncope’	18.10.17	24
Cochrane Library: title, abstract and descriptor fields search – ‘fall*’ and ‘occupational’	18.10.17	5
Royal College of Occupational Therapists Collection: all fields search – ‘fall*’	18.10.17	8
Total		145

Appendix 7: Evidence tables

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Ballinger and Clemson (2006)	<p>Qualitative study</p> <p>Aim: to investigate the perspectives of the older participants in a community group falls prevention programme in Australia and to explore their views about the most and least useful aspects of the programme, using methods derived from a grounded theory approach</p> <p>Participants were already members of a group attending a <i>Stepping On</i> falls prevention programme</p> <p>11 participants</p> <p>Male:female ratio = 2:9</p> <p>Age 69 to 91 years (median age of 76)</p> <p>Australia.</p>	<p>Intervention:</p> <p>2-hour sessions in a community group setting once a week for 7 weeks</p> <p>Session:</p> <ol style="list-style-type: none"> 1. Sharing fall experiences; strength and balance exercises 2. Exploring the barriers and benefits of exercise; mobilising safely 3. Home hazards 4. Community safety and footwear 5. Vision and falls 6. Medication management; mobility mastery experiences 7. Review and planning ahead <p>Control:</p> <p>Two social visits from an occupational therapy student.</p>	<p>Semi-structured interviews</p> <p>Interview schedule comprised 11 questions and was developed in conjunction with expert occupational therapists involved in falls prevention initiatives</p> <p>The interviews took place 3 months after the programme and all except the telephone interview were carried out in the participants' own homes. Interviews lasted 30–60 minutes.</p>	<p>4 themes identified:</p> <p>Identity: understanding of self in context of falls prevention programme</p> <p>Salience of interventions: mostly good recall of programme but series of exercises appeared the most important single intervention. Less useful or relevant aspects referred to by some participants were medication, home hazards and, for men, the discussion about footwear</p> <p>Social experience: experience of being part of a friendly group reported as one of the most enjoyable aspects of the programme</p> <p>Consequences of participation: the programme fulfilled a variety of different needs and the outcomes that the participants identified were not always those that might have been predicted or expected</p> <p>An increase in confidence was the major psychological benefit described by participants</p> <p>Highlighted that perceived outcomes are connected to intrinsic values of independence and wellbeing.</p>	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> • Potential impact of previous contact with researcher as this study was part of a larger RCT.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Blaylock and Vogtle (2017)	<p>Scoping review</p> <p>Aim: to review the evidence regarding community-based falls prevention interventions that appear inclusive of and/or accessible to individuals with low vision</p> <p>Searched Embase, CINAHL, OT Search, OTSeeker, PubMed and Scopus, and the American, Australian, British and Canadian Journals of Occupational Therapy</p> <p>Inclusion: addressed a falls intervention that could be performed by an occupational therapist, targets older adults living in the community, discussed adaptation for and/or inclusion of individuals with vision loss, reports implications for older adults with visual impairment and was published after 2004</p> <p>17 studies</p> <p>United States of America.</p>	<ul style="list-style-type: none"> • 16 articles were randomised controlled trials and 1 was a quasi-experimental pre/post-test design • 6 directly targeted people with visual impairment or had an intervention with a vision focus, while the remaining 11 had vision impairment as a secondary component. 	<ul style="list-style-type: none"> • Fall rates. 	<ul style="list-style-type: none"> • 3 multicomponent interventions had a significant effect on fall rate between intervention and control groups • Two home modification studies significantly reduced falls after home assessment, showing stronger results than exercise and social groups • Tai chi with and without education reduced falls and improved knee proprioception and vestibular ratios • Ashtanga yoga showed significant increases in centre of pressure and somatosensory and vestibular balance measures • The Alexander Technique did significantly reduce fall rates. 	<p>Grade B – Moderate</p> <p>Downgraded due to:</p> <ul style="list-style-type: none"> • Not a systematic review but scoping of the literature that did not consider grading of articles <p>Comments:</p> <ul style="list-style-type: none"> • Limitations included not evaluating the strength of each study • Studies that address falls prevention among adults with low vision are limited.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Boltz et al (2014)	<p>Mixed methods</p> <p>Aim: to describe fear of falling among older adults in acute care settings and consider the relationship between fear of falling and patient demographic and health characteristics, as well as physical function during the hospital stay</p> <p>Recruited from two medical or medical/surgical units</p> <p>Community-residing</p> <p>Age ≥ 70 years</p> <p>Exclusions: Cognitive score < 24 or less than 6 months life expectancy</p> <p>41 participants</p> <p>Male:female ratio = 17:24</p> <p>Mean age 81.7 years</p> <p>Semi-structured interviews between 48 and 96 hours after admission</p> <p>United States of America.</p>	<p>A number of quantitative measures were used to collect data</p> <p>A semi-structured interview guide, developed by the researchers, was used to explore perceptions around mobility and physical activity as well as fear of falling</p> <p>Participants were asked to describe facilitators and barriers to mobility and physical activity, if they were afraid of falling, and their views on fall prevention measures while hospitalised.</p>	<p>Sociodemographic and health information was extracted from the medical record</p> <p>Information was also collected by trained data collectors within 24 hours of admission:</p> <ul style="list-style-type: none"> Cognitive status (Folstein Mini Mental State Examination, MMSE) Affective status (Yale Depression Scale) Fear of falling (single-item question asking 'how fearful of falling' with self-rating on scale of 0 to 4, with 4 being the most fear) Activities of daily living status (Barthel Scale) Gait and balance (Tinetti Performance Oriented Mobility Assessment) <p>An evaluation of functional performance was conducted on the day of discharge.</p>	<p>Key points:</p> <ul style="list-style-type: none"> Fear of falling linked with depression Environment and lack of time by staff impact on restriction Perceptions of need to stay in bed to avoid falls <p>28 (68.3%) participants described fear of falling (score of 2 or more on the single-item question)</p> <p>Those who described themselves as depressed were more likely to describe fear of falling (r=0.47 (correlation); p=0.002)</p> <p>The following broad themes were identified from the interview:</p> <ul style="list-style-type: none"> I'm here because I'm sick Knowing who to count on It's not safe to move here It needs to work for what I want and need Activity restriction (e.g. 'keeping still') versus self-direction (e.g. 'use your common sense') emerged as the predominant responses to the fear of falling across the theme <p>Fear of falling in older people admitted to hospital results in activity restriction</p> <p>Participants described the hospital environment and the lack of age-adapted furniture and bathing/toileting facilities, appropriate bed heights, accessible mobility devices and safe walking areas</p> <p>Potential for fear of falling to negatively influence mobility, physical activity and functional performance in hospitalised older adults.</p>	<p>Grade C - Low</p> <p>Comments:</p> <ul style="list-style-type: none"> Sample size of 41 provided limited power for analysis for quantitative measures All potential confounding variables not identified There was no follow-up of participants post discharge.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
<p>Campbell et al (2005)</p> <p><i>[Cross reference with La Grow et al 2006]</i></p>	<p>Randomised controlled trial</p> <p>Aim: to assess the efficacy and cost effectiveness of a home safety programme and a home exercise programme to reduce falls and injuries in older people with low vision</p> <ul style="list-style-type: none"> • Aged ≥ 75 years • Community-dwelling • Poor vision • Mobile in own home • Not currently receiving physiotherapy <p>391 participants randomised to 4 groups:</p> <p>Home Safety Assessment and Modification 100 participants Male:female ratio = 34:66</p> <p>Exercise Programme 97 participants Male:female ratio = 25:72</p> <p>Home Safety Assessment and Exercise Programme 98 participants Male:female ratio = 36:62</p> <p>Social visits 96 participants Male:female ratio = 29:67</p> <p>Mean age 83.6 years</p> <p>New Zealand.</p>	<p>Home Safety Programme:</p> <p>Occupational therapy home visit (Westmead Home Safety Assessment); discuss and agree interventions and hazard reduction. Follow-up visit if required</p> <p>Telephone interview at 6 months to determine if recommendations for home modifications and behaviour change carried out, partially carried out or not carried out</p> <p>Exercise Programme:</p> <p>One-year Otago programme modified for visual impairment and prescribed by physiotherapist, plus vitamin D supplement</p> <p>Home safety and exercise programmes (as above)</p> <p>Social visits:</p> <p>Two one-hour visits by research staff during first 6 months of the trial to those not randomised to other groups.</p>	<p>Falls:</p> <ul style="list-style-type: none"> • Number • Injuries sustained • Monitored for one year <p>Costs:</p> <p>Of implementing the home safety programme using the social visit group as comparator.</p>	<p>Participants who had occupational therapy safety programme had 41% fewer falls when compared to those who did not receive the programme (incidence rate ratio 0.59; 95% CI [0.42, 0.83])</p> <p>Participants receiving the exercise programme had 15% fewer falls compared to those who did not receive the programme. Adherence was an issue for the exercise programme as stricter adherence was associated with fewer falls</p> <p>Demonstrated that the home safety programme, delivered by occupational therapists, was a more effective intervention in decreasing falls for those who are visually impaired</p> <p>The home safety programme cost £234 per fall prevented (2004 prices). It was more cost-effective in this group than the exercise programme</p> <p>The effectiveness of an occupational therapy home visit with agreed home and behaviour modifications appeared to result in significantly fewer falls both within and away from the home environment. This suggested an increased awareness of fall reduction strategies within the home could generalise to the wider environment.</p>	<p>Grade A – High</p> <p>Comments:</p> <ul style="list-style-type: none"> • Participants were recruited via Low Vision Clinics and Royal New Zealand Foundation for the Blind due to their visual impairment, not their ability to complete an exercise programme • Duration of visual impairment varied considerably among participants • Hard to extrapolate exactly where the effect of the intervention lies as within the home safety programme there were also fewer falls away from the home environment.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Chu et al (2017)	<p>Randomised controlled trial</p> <p>Aim: to investigate the effects of an occupational therapy fall reduction home visit programme for older adults admitted to accident and emergency (A&E) and discharged home</p> <p>Recruitment via A&E departments in three acute care hospitals</p> <p>Inclusion: aged 65 and older who had fallen and gone to A&E, were community-dwelling and ambulatory with or without a walking aid</p> <p>Exclusion: falling because of excess alcohol intake, sudden blow or loss of consciousness or sudden onset of paralysis due to stroke or epileptic seizure, Mini Mental State Examination score of less than 15, or unable to speak Cantonese</p> <p>204 participants Control group n=103 Intervention group n=95</p> <p>Hong Kong.</p>	<p>The intervention group received a single home visit from an occupational therapist within 2 weeks after discharge</p> <p>The visit lasted approximately 1.5 hours and included an environmental hazards evaluation, environmental fall hazards and potential fall risk in daily activities, daily life routine assessment for falls risk, recommendations for environmental modification, prescription of assistive devices where appropriate, provision of customised care reduction plans and referrals to other services if needed</p> <p>The control group received a well-wishing visit from a research assistant not trained in falls prevention.</p>	<p>Primary outcome measure was the number of falls</p> <p>Both groups followed for 12 months through telephone calls by a blind assessor every two weeks to measure falls. Another blinded assessor followed up on their function (Barthel Index), depression (Chinese-version of the Geriatric Depression Scale) and activity level (Chinese-version of the Frenchay Activities Index) via telephone 4, 8 and 12 months after discharge.</p>	<p>198 final sample for analysis</p> <p>13.7% of people in the intervention group fell over 1 year, while 20.4% of the control group fell. There were significant differences in the number of fallers (p=0.03) and the number of falls (p=0.02)</p> <p>The number of fallers (p=0.03, n=3 vs n=12) and number of falls (p=0.02, n=3 vs n=12) were significantly less in the intervention group at 6 months, and at 9 months only the number of falls differed significantly (p=0.04, n=7 vs n=19).</p>	<p>Grade A – High</p> <p>Comments:</p> <ul style="list-style-type: none"> • Limitations included a recruitment period of 2.5 years, that the follow-up telephone calls may form a reminder but are not actually part of the programme and recall bias because of self-reporting of falls • Authors suggest a booster occupational therapist visit at 6 months may be beneficial.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Clemson et al (2004)	<p>Randomised controlled trial</p> <p>Aim: to test whether <i>Stepping On</i>, a multifaceted community-based programme using a small-group learning environment, is effective in reducing falls in at-risk people living at home</p> <p>310 community-dwelling older people</p> <p>Inclusions:</p> <ul style="list-style-type: none"> • Age ≥ 70 years • Fallen in the previous 12 months or concerned about falling <p>Exclusions:</p> <ul style="list-style-type: none"> • Cognitive problems • Homebound/unable to independently leave home <p>Intervention Group of 157 participants Male:female ratio = 40:117 Mean age 78.31 years 147 completed trial</p> <p>Control Group of 153 participants Male:female ratio = 40:113 Mean age 78.47 years 130 completed trial</p> <p>Australia.</p>	<p>Intervention Group:</p> <p><i>Stepping On</i> aimed to improve fall self-efficacy, encourage behavioural change and reduce falls. A variety of learning strategies was used: raising awareness; targeting behaviours that have the most effect on reducing risk and reinforcing their application to the individual's home and community setting; specific techniques such as storytelling, mastery experiences, and the group process as a learning environment</p> <p>Occupational therapist facilitated two-hour sessions weekly for 7 weeks, average of 12 participants per group, follow-up occupational therapy home visit</p> <p>Control Group:</p> <p>Up to two social visits from an occupational therapy student instructed not to discuss falls or falls prevention with the subjects.</p>	<p>Primary outcome:</p> <ul style="list-style-type: none"> • Number of falls <p>Evaluation from baseline up to 14 months post-randomisation using a self-report falls schedule</p> <p>Baseline:</p> <ul style="list-style-type: none"> • Demographics • Fall and health history • Get Up and Go Test (mobility and balance) • Rhomberg test (balance) <p>Secondary outcomes:</p> <ul style="list-style-type: none"> • Modified Falls Efficacy Scale (MFES) • Health survey SF-36® • Physical Activity Scale for the Elderly • Mobility Efficacy Score (MES) <p>Additional measure at follow-up:</p> <ul style="list-style-type: none"> • Falls Behavioural Scale (FaB). 	<p>The <i>Stepping On</i> programme was effective in reducing falls, especially in men</p> <p>Primary outcome (number of falls): subgroup analyses found significant effects in older participants, men, those with intermediate levels of functional mobility and balance, and those with previous falls. Statistically significant interaction was only for gender (p=0.003)</p> <p>Secondary outcomes: intervention group participants maintained confidence in ability to avoid a fall during a variety of functional daily living tasks over the follow-up period. A decrease in confidence was experienced by control group (MES, p=0.042)</p> <p>No difference detected in self-efficacy for more home-based daily living activities (MFES)</p> <p>More protective behavioural practices were used by intervention group than control subjects (FaB, p=0.024)</p> <p>Intervention group experienced a 31% reduction in falls (relative risk 0.69, 95% CI [0.50, 0.96]; p=0.025) – a clinically meaningful result demonstrating the <i>Stepping On</i> programme was effective for older people living in the community</p> <p>70% (n=80) of programme participants adhered to at least 50% of the home visit recommendations</p> <p>Study findings provided some evidence that cognitive-behavioural learning in a small group environment could reduce falls.</p>	<p>Grade A – High</p> <p>Comments:</p> <ul style="list-style-type: none"> • Participants were not housebound so less frail than those often seen at home due to falls • Difference in contact time between intervention and control group may have caused bias.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Clemson et al (2008)	<p>Systematic review and meta-analysis</p> <p>Aim: to determine the efficacy of environmental interventions in falls prevention and increase the precision of results by pooling eligible studies</p> <p>Inclusions:</p> <ul style="list-style-type: none"> • RCTs • Living in the community • Aged \geq 65 years • Home environment intervention as single intervention <p>388 abstracts screened</p> <p>6 trials met inclusion criteria</p> <p>Pooled analysis of the six trials (3,298 participants)</p> <p>Mean age of participants 79.6 years</p> <p>Australia (3 trials), New Zealand, Germany and France.</p>	<p>The analysis included single-component trials, i.e. where only the environment intervention completed or where the environment component could be isolated</p> <p>Studies that included an environmental intervention as a component of a multifaceted intervention were not included.</p>	<p>Primary outcome:</p> <p>Rate of falls expressed as relative risk</p> <p>Interventions were rated according to the level of professional training of the interventionist and the intensity of the intervention</p> <p>Comprehensive meta-analysis software was used to generate pooled estimates of effect sizes.</p>	<p>Modest but significant reduction in falls: 21% reduction in falls risk across all studies included (relative risk 0.79; 95% CI [0.65, 0.97])</p> <p>Sub-analysis of high-risk populations: history of falls in previous 12 months, hospitalised due to fall, functional decline and visual impairment (n=570 across 4 trials) identified clinically significant reduction of falls</p> <p>39% reduction of falls (relative risk 0.61; 95% CI [0.47, 0.79]) across high-risk populations (an absolute risk difference of 26% for a number needed to treat four people)</p> <p>Some evidence to suggest that interventions when completed by occupational therapist at higher intensity were more effective</p> <p>Results identified that the highest effects in terms of reducing falls were associated with interventions targeted to high-risk groups.</p>	<p>Grade A – High</p> <p>Comments:</p> <ul style="list-style-type: none"> • Limited ability to complete sub-analysis therefore limiting richness of information, i.e. information on injuries, age, gender, comorbidities, etc. • Small number of high-quality published papers where the environment is single component or can be isolated from multifactorial study.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
<p>Clemson et al (2010)</p> <p>[Cross reference with Clemson et al 2012]</p>	<p>Randomised controlled trial</p> <p>Aim: to conduct a small scale investigation into the feasibility and efficacy of the novel LiFE intervention</p> <p>Recruited from Department of Veterans Affairs Home Front database and a General Medical Practice</p> <p>Community-residing</p> <p>Aged ≥ 70 years</p> <p>Two or more falls or an injurious fall in past year</p> <p>Individuals randomised to:</p> <p>Intervention group of 18 participants Male:female ratio = 9:9 Mean age 81 years</p> <p>Control group of 16 participants Male:female ratio = 9:7 Mean age 82 years</p> <p>Exclusions: moderate to severe cognitive problems, inability to ambulate independently, nursing home or hostel resident, unstable/terminal illness precluding planned exercises, neurological conditions with motor performance difficulties</p> <p>Australia.</p>	<p>LiFE involved teaching core underlying principles of balance and strength training, which were operationalised into four balance strategies and seven strength strategies; applied in individualised activities and incorporated into daily activities such as ironing, cleaning teeth</p> <p>The LiFE manual provided to participants outlined the programme in detail</p> <p>Intervention Group:</p> <p>LiFE taught in five home visits with two booster visits over a three-month period and two follow-up phone calls</p> <p>The focus was on choosing safe, contextually relevant activities and upgrading the activities over time</p> <p>Control Group: usual care.</p>	<p>Baseline assessment occurred prior to randomisation and was repeated at three and six months.</p> <p>Outcome measures included:</p> <ul style="list-style-type: none"> • Rate of falls (falls calendar) • Physical capacity (balance and strength) • Health Status Survey (SF-36[®]) • Modified Falls Efficacy Scale (FES Scale) • Activities-Specific Balance Confidence Scale (ABC Scale) • Life Space Assessment (measures the geographical space used and travelled) <p>Exercise adherence was monitored for six months by the treating therapist using weekly and monthly logs.</p>	<p>Completed follow-up at 6 months:</p> <p>17/18 intervention group, 12/16 control group</p> <p>After 6 months there were 12 falls in the intervention group and 35 in the control group</p> <p>8 (44%) intervention and 9 (31%) control participants reported one or more falls</p> <p>3 (17%) intervention and 6 (31%) control participants reported two or more falls</p> <p>The relative risk analysis demonstrated a significant reduction in falls (relative risk 0.23; 95% CI [0.07, 0.83])</p> <p>There were significant improvements in the intervention group compared with the controls for dynamic balance and left knee strength in the first three months. Balance self-efficacy improved significantly in the intervention group at the end of six months. Falls self-efficacy was significantly improved in the intervention group at three months, a difference maintained at six months but not significantly different from controls at that time point</p> <p>No difference was noted in perceptions of health-related quality of life</p> <p>The Life Space Assessment showed zero change for either group</p> <p>LiFE was feasible in terms of study design, and demonstrated effectiveness in reducing recurrent falls in this at-risk sample.</p>	<p>Grade B – Moderate</p> <p>Downgraded from Grade A due to limitations:</p> <ul style="list-style-type: none"> • Caution is needed in interpreting results given this is a pilot study • Small sample of participants is under-powered • Unequal rate of dropout (25% controls compared with 6% from the intervention group) and thus potential for contamination if the controls sought other programmes • Single-blinded outcome assessment (assessors blinded).

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
<p>Clemson et al (2012)</p> <p>[Cross reference with <i>Clemson et al 2010</i>]</p>	<p>Randomised controlled trial</p> <p>Aim: to determine if the integration of the LiFE approach is effective in reducing the rate of falls in older, high-risk people living at home</p> <p>Recruited from Veteran Affairs Database and GP databases based in metropolitan Sydney</p> <p>≥ 2 falls or 1 injurious fall in the last 6 months</p> <p>Exclusions: moderate to severe cognitive problems, inability to ambulate independently, neurological conditions severely influencing gait and mobility, nursing home or hostel resident, unstable/terminal illness affecting ability to do exercises</p> <p>317 participants</p> <p>Age ≥ 70 years</p> <p>Male:female ratios are: LiFE group 48:59 Exercise group 48:57 Control group 47:58</p> <p>Australia.</p>	<p>The 3 randomised parallel blocks were:</p> <p>1) LiFE approach (n=107) Taught principles of balance and strength training and integrated selected activities into everyday routines</p> <p>Examples provided of dual tasking LiFE activities are ironing while standing on one leg; squatting to select an item from a low shelf rather than bending</p> <p>2) Structured programme (n=105) Exercises for balance and lower limb completed 3 × weekly</p> <p>Blocks 1 and 2 received 5 × sessions with 2 booster visits and 2 telephone calls</p> <p>3) Sham control group (n=105) Gentle exercise.</p>	<p>Assessments completed at baseline, 6 months and 12 months</p> <p>Primary outcomes:</p> <ul style="list-style-type: none"> Rate of falls over 12 months collected by self-report <p>Secondary measures included:</p> <ul style="list-style-type: none"> Static and dynamic balance Ankle, hip strength Balance self-efficacy (ABC Scale) Daily living activities functional limitation (Late Life Function Index, NHANES independence measure) Life tasks participation (Late Life Disability Index) Habitual physical exercise (Physical Activity Scale for the Elderly) Health-related quality of life (EQ-5D) Energy expenditure (Paffenbarger physical activity index). 	<p>The overall incidence of falls in the LiFE group (1.66 per person years) was lower than that of the structured exercise (1.90) and control groups (2.28) respectively</p> <p>There was a significant 31% reduction in rate of falls with the LiFE group compared with the control programme (incidence rate ratio 0.69; 95% CI [0.48, 0.99], n=212)</p> <p>Comparing the structured programme to the control, there was no significant reduction in the fall rate</p> <p>Static balance on eight-level hierarchy scale, ankle strength, function and participation were significantly better in the LiFE group compared with the other groups</p> <p>There was a significant and moderate improvement in dynamic balance in the LiFE and structured groups compared with the control group</p> <p>The LiFE programme offered an alternative to traditional exercise as a falls prevention intervention.</p>	<p>Grade A - High</p> <p>Comments:</p> <ul style="list-style-type: none"> The study had a lower sample size than preferred which could lead to a type 2 error The control group received less contact time than both interventions, which could have caused a bias.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Costello and Edelstein (2008)	<p>Systematic review</p> <p>Review of randomised controlled trials that investigated the effectiveness of fall prevention programmes for community-dwelling older adults</p> <p>Inclusions:</p> <ul style="list-style-type: none"> • RCTs • Published between 1996 and 2007 • Age ≥ 60 years • Ambulatory with or without an assistive device • Community-dwelling • Single or multifactorial interventions <p>Eight databases searched</p> <p>Countries in which studies conducted not defined.</p>	<p>Studies were grouped according to the following types of intervention programmes:</p> <ul style="list-style-type: none"> • Home hazard assessment with modification only (n=4) • Exercise and/or physical therapy only (n=10) • Programmes that offered multifactorial intervention (n=12). 	Number of falls, number of fallers and rate of falls.	<p>The inclusion criteria were met by 781 studies, 26 of which were included in the review</p> <p>The review determined the following with respect to interventions:</p> <ul style="list-style-type: none"> • Multifactorial fall prevention programmes included in this review indicated that they were more effective when targeted for those older individuals with a previous fall history • A falls screening examination should include medication and vision assessment with appropriate health practitioner referral • Exercise alone is effective in reducing falls; it should include a comprehensive programme combining muscle strengthening, balance and/or endurance training for a minimum of 12 weeks • Home hazard assessment with modifications may be beneficial in reducing falls, especially in a targeted group of individuals. 	<p>Grade B – Moderate</p> <p>Downgraded from Grade A due to limitations:</p> <ul style="list-style-type: none"> • Heterogeneous nature of studies • Good critical analysis rather than stringent systematic review • Not possible to undertake meta-analysis • Large range of exclusion criteria in studies • Some of the variation in outcomes between individual studies and comprehensive reviews may be due to variations and inaccuracies in fall data collection.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
<p>Currin et al (2012)</p>	<p>Cohort study</p> <p>Aim: to identify the uptake of home modifications made by occupational therapists to reduce falls risks by older community dwellers and to identify the intrinsic and extrinsic factors that predict uptake of recommendations</p> <p>Recruited from concurrent randomised controlled trial</p> <p>Community-dwelling</p> <p>Recent fall</p> <p>80 participants</p> <p>Age > 60 years</p> <p>Male:female ratio 24:56</p> <p>Australia.</p>	<p>Joint occupational therapist and physiotherapist home visit</p> <p>List of environmental recommendations generated by the occupational therapist following completion of the home visit</p> <p>At 6-month follow-up, an independent assessor not involved with the trial visited the clients at their homes and identified whether the recommendations were completed.</p>	<p>Falls Prevention Environmental Audit used to measure environment</p> <p>Number of recommendations implemented at 6-month follow-up.</p>	<p>63 follow-up visits made. 17 participants lost to follow-up</p> <p>277 recommendations were made: 200 required participant to act; 77 completed by other agencies</p> <p>106 recommendations were for bathroom and toilet, 39 for passageways</p> <p>136 (49%) of recommendations completed by follow-up</p> <p>50% of recommendations for rails in shower and toilet, non-slip bath mats, bed sticks and stair rails completed</p> <p>Participants less likely to implement over-toilet frames, shower chairs or altering floor surfaces, including removing rugs</p> <ul style="list-style-type: none"> • Adherence increased with increasing comorbidities • Adherence improved when referred to outside agency • Adherence lower where participant had depression/psychological distress <p>The full potential of an occupational therapy environmental audit recommendations will be achieved only if recommended modifications are actually implemented</p> <p>Adherence is a complex process and has multiple influences impacting on the outcome.</p>	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> • Recruitment bias potential as participants already active in RCT • Effect of advice given by occupational therapist during visit not considered or accounted for • All occupational therapy staff received same training pre-study but no account for differing skill sets/experience • No validity or reliability data given for home hazard assessment used • Most participants on low income, therefore unable to determine effect of income on uptake of recommendations.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
De Coninck et al (2017)	<p>Systematic review</p> <p>Aim: to assess the effectiveness of occupational therapy to improve performance in daily living activities in community-dwelling, physically frail older people</p> <p>Inclusion: study of physically frail, community-dwelling older people, living alone or together, who received home- and community-based occupational therapy interventions either on own or part of multidisciplinary team</p> <p>Exclusion: participants received any form of rehabilitation, the main diagnosis was an acute problem, diagnosis of dementia or other progressive neurological disorder, participant was going to be bedridden, in need of palliative care, or belonged to native African, Asian or Latin-American population because of cultural differences</p> <p>9 studies</p> <p>Belgium.</p>	<p>Studies were of reasonable quality with low risk of bias</p> <p>All interventions had an occupational therapy contribution, but varied widely.</p>	<p>Primary outcomes were mobility, functioning in daily living activities and social participation</p> <p>Secondary outcomes were fear of falling, cognition, disability and number of falling people.</p>	<p>Interventions with occupational therapy contributions showed improvement in functioning of activities of daily living (ADL) (p=0.002), social participation (p=0.0007) and mobility (p=0.007)</p> <p>All secondary outcomes showed positive trends, with fear of falling significantly so.</p>	<p>Grade A – High quality</p> <p>Comments:</p> <ul style="list-style-type: none"> • Limitations included heterogeneity of interventions, lack of blinding, and the complexities of the interventions • Strong evidence that occupational therapy improves functioning in community-dwelling, physically frail older people.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
DeLaney et al (2016)	<p>Analysis of an RCT's baseline data</p> <p>Aim: to identify predictors of engagement in home activities (EHA) by looking at perceived and observed activity performance and fear of falling</p> <p>Recruitment via an A&E department and through community resources such as senior centres, August 2010 to March 2013</p> <p>Inclusion: community-dwelling adults aged 65+ who had fallen in the last 6 months, lived within 30 miles of medical centre, at least one impairment on the Older Americans Resources and Services Multidimensional Functional Assessment Questionnaire ADL scale, and scored 14-45 seconds on the Timed Up and Go test</p> <p>Exclusion: falls caused by syncope, moderate to severe memory/concentration issues, those with neurological motor performance difficulties or chronic substance abuse</p> <p>92 participants</p> <p>Mean age = 77.7 years</p> <p>Male:female ratio = 2:7</p> <p>United States of America.</p>	<p>The RCT's intervention was an intensive tailored home hazard reduction programme</p> <p>This study examined baseline data on perceived and observed activity performance.</p>	<p>Self-reported levels of EHA using the Activity Subscale of the In-Home Occupational Performance Evaluation (I-HOPE)</p> <p>Activity performance assessed using the Performance and Barrier Severity Subscales of the I-HOPE</p> <p>Differences between observed and perceived activity performance</p> <p>Demographics collected via a questionnaire</p> <p>Depression assessed using the Geriatric Depression Scale</p> <p>Fear of falling (FOF) assessed by the Falls Efficacy scales.</p>	<p>Strongest relationship was that between EHA and FOF ($p < 0.01$), which showed that as EHA decreased, FOF increased</p> <p>Observed and perceived activity performance in the home had a significant negative relationship; as perceived activity performance increased, observed activity performance decreased ($p < 0.01$)</p> <p>EHA scores were significantly predicted by perceived activity performance in the home, FOF and depression ($p < 0.001$)</p> <p>Observed activity performance in the home was not predictive on EHA.</p>	<p>Grade B – Moderate</p> <p>Downgraded due to:</p> <ul style="list-style-type: none"> Missing data, missing information regarding relationship with participants, ethical approval and consenting process. Recruitment strategy was limited to one area and small number of participants – difficult to generalise <p>Comments:</p> <ul style="list-style-type: none"> Small sample size limited the number of predictors included in the model and the statistical power of the study The only aspect of cognition assessed was memory There may have been other predictors of FOF not included Do not fully explain how arrived at 92 participants from initial sample of 2,719.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
<p>Di Monaco et al (2008)</p> <p>[Cross reference with Di Monaco et al 2012]</p>	<p>Quasi-randomised controlled trial</p> <p>Aim: to assess the role of a post-discharge home visit by an occupational therapist in reducing the risk of falling in hip fracture women</p> <p>Recruited from consecutive patients admitted to a rehabilitation hospital in Turin because of hip fracture</p> <ul style="list-style-type: none"> All women Age \geq 60 years Sustained a fall-related hip fracture Mini Mental State Examination score higher than 23 <p>Alternate allocation to study and control groups</p> <p>Intervention group of 58 participants</p> <p>Control group of 61 participants</p> <p>Italy.</p>	<p>All participants received treatment as usual, a multiprofessional intervention to prevent falls delivered 1–3 hours a day for 5 days a week, conducted by physiotherapists and occupational therapists</p> <p>Included occupational therapist assessing any home hazards of falling based on a standard checklist and based on patient's behaviour during activities of daily living</p> <p>Intervention group: additionally received a home visit by an occupational therapist at a median point of 20 days post-discharge. Involved assessment of environmental hazards, behaviours in activities of daily living, use of assistive devices and suggested targeted modifications to prevent falls (mean time of 60 minutes).</p>	<p>Occurrence of falls</p> <p>All women were asked to record all falls occurring post-discharge and report them at a home visit by an occupational therapist scheduled for approximately 6 months post-discharge</p> <p>During the visit the occupational therapist asked the women in detail about:</p> <ul style="list-style-type: none"> Falls occurrence post-discharge Level of adherence to the advice given during the first home visit was checked for the women in the intervention group (with the percentage of advice followed by each woman recorded). 	<p>Intervention group analysis (n=45 – nine lost eligibility after randomisation and four lost to follow-up, mean age 79.9 years):</p> <p>6 participants sustained a fall (9 falls in total) during 8,970 days post-discharge</p> <p>Control group analysis (n=50 – seven lost eligibility after randomisation and four lost to follow-up, mean age 80.1 years):</p> <p>13 participants sustained a fall (20 falls in total) during 9,231 days post-discharge</p> <p>A significantly lower proportion of fallers was found in the intervention group (odds ratio 0.275; 95% CI [0.081, 0.937], p=0.039) after adjustments</p> <p>In the intervention group a mean of 3.9 items of advice was given to each of the 45 women, 44 of whom followed at least one. 36 of the women followed at least half of the advice given during the first home visit</p> <p>The risk of falling in a sample of elderly women following hip fracture (who followed the occupational therapist's advice delivered during a home visit) was significantly reduced by a single home visit by an occupational therapist 20 days after discharge from a rehabilitation hospital.</p>	<p>Grade B – Moderate</p> <p>Downgraded from Grade A due to limitations:</p> <ul style="list-style-type: none"> 95/270 originally considered included, potential participants excluded for a variety of reasons All participants received extensive in-patient falls prevention training and this may have impacted on subsequent falls when compared with other studies Unclear how generalisable results are to a wider population of hip fracture patients (women only) Bias possible as same staff assessed falls and conducted the home visits Follow-up period was modest at 6 months.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Di Monaco et al (2012) <i>[Cross reference with Di Monaco et al 2008]</i>	<p>Cohort study</p> <p>Post-hoc analysis of a quasi-randomised controlled trial (Di Monaco et al 2008)</p> <p>Aim: to investigate the value of falls risk assessment performed before hospital discharge in predicting falls occurrence. Also assessed the role of adherence to targeted recommendations given during the hospital stay in affecting the falls risk</p> <ul style="list-style-type: none"> • Rehabilitation hospital • All women • Age ≥ 60 years • Sustained a fall-related hip fracture • Mini Mental State Examination score higher than 23 <p>Alternate allocation to study and control groups</p> <p>Intervention group of 58 participants</p> <p>Control group of 61 participants</p> <p>Italy.</p>	<p>All participants received treatment as usual, a multiprofessional intervention to prevent falls delivered 1–3 hours a day for 5 days a week, conducted by physiotherapists and occupational therapists</p> <p>Included occupational therapist assessing any home hazards of falling based on a standard checklist and based on patient's behaviour during activities of daily living</p> <p>Intervention group: additionally received a home visit by an occupational therapist at a median point of 20 days post-discharge. Involved assessment of environmental hazards, behaviours in activities of daily living, use of assistive devices and suggested targeted modifications to prevent falls (mean time of 60 minutes).</p>	<p>Occurrence of falls</p> <p>All women were asked to record all falls occurring post-discharge and report them at a home visit by an occupational therapist scheduled for approximately 6 months post-discharge.</p> <p>During the visit the occupational therapist asked the women in detail about:</p> <ul style="list-style-type: none"> • Falls occurrence post-discharge • Level of adherence to the advice given during the first home visit was checked for the women in the intervention group (with the percentage of advice followed by each woman recorded) <p>The post-hoc analysis included an assessment of the difference in the number of uncorrected risk factors in fallers and non-fallers.</p>	<p>The quasi-RCT (Di Monaco 2008) showed a significant reduction in the proportion of fallers who received a single visit by an occupational therapist post-discharge from hospital</p> <p>95 women included in the analysis. Mean age 80 years</p> <p>In the post-hoc analysis 20% (19/95) of women in the study fell in the 6-month follow-up period</p> <p>This was lower than other studies where the rate of falls post-hip fracture was 53% – a suggestion was made that this may have been due to the fact all women in the trial received a multidisciplinary falls intervention while in hospital</p> <p>Falls occurrence was significantly predicted by uncorrected environmental and behavioural factors, with a 4.58 odds ratio for the women in the high-risk group (presence of 2 or more uncorrected risk factors)</p> <p>A significant reduction in falls risk was associated with high adherence to targeted recommendations, suggesting that adherence can have a key role in falls prevention and therefore strategies to enhance this are important.</p>	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> • Original study sample not representative of all hip fracture patients and thus limits the generalisability of the findings • Follow-up was only for 6 months • Time to first fall not recorded • Reporting of falls relied on participant recall at 6 months, therefore under-reporting may have occurred.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Elliott and Leland (2018)	<p>Systematic review</p> <p>Aim: to review evidence for the effectiveness of fall prevention interventions in improving fall-related outcomes, occupational performance, quality of life, and hospital readmissions for community-dwelling older adults</p> <p>Inclusion: intervention studies in English published in peer-reviewed journals between 2008 and 2015 that evaluated fall prevention interventions within the scope of occupational therapy and had fall-related outcomes, quality of life, occupational performance, or hospital readmissions as a primary outcome. Participants had a mean age of 65 or more and the intervention was provided in the community or healthcare setting with outcome measures captured after community discharge</p> <p>Exclusion: home modification interventions, case series/ reports, pilot studies, expert/ consensus opinion, conference proceedings, dissertations and theses</p> <p>50 articles</p> <p>United States of America.</p>	<p>14 studies addressed a single fall risk factor, including exercise (n=11), guided imagery and relaxation (n=1), home and functional assessment (n=1) and fall prevention education (n=1)</p> <p>Multicomponent interventions (group-based) included exercise and education (n=7)</p> <p>Multifactorial interventions (individually tailored) included fall risk assessment, environmental intervention, goal development, assessment and training, education and group activities (n=19)</p> <p>Population-based interventions included <i>Stepping On</i> (n=1) and <i>A Matter of Balance</i> (n=5), and prevention programmes at a regional level (n=4).</p>	<p>Outcome measures used included fall related, quality of life, occupational performance or hospital readmissions.</p>	<p>Mixed evidence (inconsistent/conflicting findings) was found for single-component and multifactorial interventions</p> <p>Strong evidence (consistent results from at least 2 well-conducted RCTs) for multicomponent interventions</p> <p>Moderate evidence (inconsistencies in findings across well-designed studies) for population-based interventions</p> <p>Based on the above, the authors recommend strategies that include exercise and educational components; fall risk assessment, home safety assessment, modification, and hazard abatement and fall prevention education as multifactorial components; Lifestyle Integrated Functional Exercise to reduce fall risk; population-based fall prevention programmes such as <i>Stepping On</i>; and functional exercises plus fall prevention education.</p>	<p>Grade B – Moderate</p> <p>Downgraded due to:</p> <ul style="list-style-type: none"> No meta-analysis, search terms did not reflect objective of the review, no confidence intervals from included studies <p>Comments:</p> <ul style="list-style-type: none"> Limitations included lack of objective measures, randomisation, blinding, control group or risk of bias. Several had a small sample size, limited geographic area or used a convenience sample. Some had high attrition, reporting bias, or the omission of databases No statistical analysis across studies due to heterogeneity.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
<p>Gillespie et al (2012)</p>	<p>Review (Cochrane)</p> <p>Aim: to establish which fall prevention interventions are effective for older people living in the community</p> <p>Inclusions:</p> <ul style="list-style-type: none"> • Age ≥ 60 years • Living in the community, either at home or in places of residence that did not provide residential health-related care or rehabilitative services • Randomised controlled trials and quasi-randomised trials <p>Included trials were from 21 countries.</p>	<p>Assessed the effects of interventions designed to reduce the incidence of falls in older people living in the community</p> <p>Data assessed and extracted from 159 trials with 79,193 participants.</p>	<p>Primary outcomes:</p> <ul style="list-style-type: none"> • Rate of falls • Number of fallers <p>Secondary outcomes:</p> <ul style="list-style-type: none"> • Number of participants sustaining fall-related fractures • Adverse effects of the interventions • Economic outcomes. 	<p>Results of relevance to guideline:</p> <ul style="list-style-type: none"> • Group and home-based exercise programmes, including Tai Chi, reduced rate of falls. Exercise intervention overall significantly reduced the risk of sustaining a fracture related to a fall • The rate of falls, but not the risk of falling, was reduced by the provision of multifactorial assessment and intervention programmes • Overall, vitamin D supplementation did not appear to reduce falls or risk of falls. There may be some benefit for those with lower vitamin D levels before treatment • Intervention to treat vision problems could lead to an increase in the rate and risk of falls – this may be related to previous activity levels • No evidence was found for cognitive behavioural interventions on the rate of falls <p>Home safety assessment and modification interventions:</p> <ul style="list-style-type: none"> • Effective in reducing rate of falls from analysis of 6 trials with 4,208 participants (rate ratio 0.81; 95% CI [0.68, 0.97]) • Effective in reducing risk of falling from analysis of 7 trials with 4,051 participants (rate ratio 0.88; 95% CI [0.80 to 0.96]) • Were more effective in people at higher risk of falling, including those with severe visual impairment <p>The review also identified that home safety interventions appear to be more effective when delivered by an occupational therapist.</p>	<p>Grade A – High</p> <p>Comments:</p> <ul style="list-style-type: none"> • Many trials specifically excluded older people with cognitive impairment so the results of this review may not be applicable to these people at risk • People with Parkinson’s and those who were post-stroke were excluded from this review.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Gopaul and Connelly (2012)	<p>Serial case studies: mixed methods</p> <p>Aim: investigated how knowledge of one's own fall risk influenced self-reported behaviours and beliefs about falls and fall prevention in the home by older adults</p> <p>Volunteers recruited from the retired community</p> <p>Fallen once in their home within the past 12 months, and did not require medical attention for injury from the fall</p> <p>Exclusions: uncontrolled medical conditions, scored lower than 17/22 on a Mini Mental State Examination</p> <p>8 participants</p> <p>Male:female ratio = 6:2</p> <p>Mean age 78.8 years</p> <p>Qualitative interviews occurring before and after quantitative measures to gather pre- and post-intervention data</p> <p>Canada.</p>	<p>Intervention provided:</p> <ul style="list-style-type: none"> An individualised report of participants' scores for three questionnaires and three fall-related outcome measures Personalised booklet comprised of a home safety checklist for fall prevention and photographs of rooms in their own homes with environmental hazards circled and identified as a fall risk <p>Interviews included discussion about fall and completion of outcome measures and questionnaires. Post intervention explored if there was an effect on falls and fall prevention beliefs and behaviours after receiving their individual estimate of fall risk.</p>	<p>Balance outcome measures:</p> <ul style="list-style-type: none"> Biodex Balance System SDTM Berg Balance Scale Timed Up and Go Questionnaires: <ul style="list-style-type: none"> Falls Behavioural Scale for the Older Person (FaB) Falls Efficacy Scale (FES) Activities-specific Balance Confidence (ABC) Scale. 	<p>Emerging themes about perception of falls and risk from interviews:</p> <ul style="list-style-type: none"> Process of being aware Having concern and being careful Accepting 'Action'/Behaviour related to fall prevention <p>Majority of participants made home safety changes (n=7) and protective behaviours increased (n=6 as self-reported)</p> <p>Some inconsistency in findings between fall risk and expressed beliefs; expression of being 'fine'</p> <p>In addition to the many physical factors related to falls the results suggested that individual beliefs and behaviour contributed to this complex health issue for older adults</p> <p>A recurring barrier identified with respect to the uptake of fall prevention was admitting to being susceptible to falling and the associated consequences, noted as not wanting to 'do' fall prevention.</p>	<p>Grade D – Very Low</p> <p>Comments:</p> <ul style="list-style-type: none"> Excluded unstable health conditions or those using a wheelchair or scooter for mobility Small sample size of older adults who fell in their homes, and not those who fell outside, could limit generalisability Some indirectness of the findings Residents had different levels of support at home, greater proportion of females and other baseline variables.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Groot and Fagerström (2011)	<p>Qualitative study</p> <p>Aim: to describe motivating factors and barriers for older adults to adhere to group exercise in the local community aiming to prevent falls</p> <p>Recruited from a previous exercise group study prompted by high dropout rate when exercise group moved from hospital to the community setting</p> <p>Older adults with equal representation of those with fear of falling and those with no fear of falling and variation in travelling distance to attend the group</p> <p>10 participants</p> <p>Age 71–91 years</p> <p>Mean 83 years</p> <p>Male:female ratio = 5:5</p> <p>Semi-structured individual interviews in participants' own homes</p> <p>Norway.</p>	<p>Interview followed 9 themed areas:</p> <ul style="list-style-type: none"> • Personal data • Question about previous study • Engagement in physical activity and exercise • Types of exercise • Regularity of exercise • Fear of falling and actual falls • Contact with health professionals • Distance to venue and economic burden of transport • Health status. 	<p>Theoretical framework was the motivation equation ascertaining motivation and barriers</p> <p>Identifies 4 main factors which are modifiable:</p> <ul style="list-style-type: none"> • Perceived chance of success • Perceived importance of the goal • Perceived costs • Inclination to remain sedentary. 	<p>Factors which enhanced motivation to adhere to the recommended exercise were:</p> <ul style="list-style-type: none"> • Perceived prospects of remaining independent • Maintaining current health status • Improving physical balance • Ability to walk <p>Barriers included:</p> <ul style="list-style-type: none"> • Reduced health status • Lack of motivation • Unpleasant experience in previous group exercise session • Environmental factors (transport, weather) <p>Other relevant factors for adherence were the positive impact of social interaction from the group and the provision of adequate information by health professionals</p> <p>Older adults will be motivated in a variety of ways and by different factors. Identifying an individual's essential motivating factors and barriers is important.</p>	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> • Researcher from previous study recruited and interviewed participants which might have led to bias • Some participants contacted via letter, others by telephone • Limited selection of centres where previous study held programmes • Time from discontinuing a group exercise course to the interview varied, which might have influenced participant recall.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Haines et al (2004) <i>[Cross reference with Haines et al 2006]</i>	<p>Randomised controlled trial</p> <p>Aim: to assess the effectiveness of a targeted, multiple intervention falls prevention programme in reducing falls and injuries related to falls in a subacute hospital</p> <p>Recruitment from consecutive admission to three wards (metropolitan subacute hospital setting) over 10-month period</p> <p>Intervention group of 310 participants Male:female ratio = 101:209</p> <p>Control group of 316 participants Male:female ratio = 105:211</p> <p>Age range 38 to 99 years (mean age 80 years)</p> <p>Australia.</p>	<p>Intervention group:</p> <ul style="list-style-type: none"> Falls risk alert card targeted at family members/care givers Exercise programme of 3 × 45-minute tailored sessions per week conducted by a research physiotherapist Education programme of twice weekly individual sessions (up to 30 minutes) conducted by a research occupational therapist at participant's bedside. Education manual. Programme curriculum was covered over 4 sessions (2 weeks) and could be repeated if required Hip protectors <p>Control group:</p> <p>Usual care of medical assessments, 1-hour sessions of physiotherapy and occupational therapy each weekday, plus 24-hour nursing and other allied services.</p>	<p>Primary outcomes on an intention to treat basis were analysed</p> <ul style="list-style-type: none"> Cumulative incidence of falls over time Compared the incidence of falls with injuries between groups Proportion of participants who experienced one or more falls during their hospital stay. 	<p>Intervention group had 30% fewer falls than the control group (149 versus 105). This was most obvious after 45 days of intervention when fall rate in control group marginally increased and rate in intervention group suddenly reduced (p=0.004)</p> <p>Intervention group had a lower proportion of participants who experienced one or more falls (71 versus 54)</p> <p>35 participants fell once in the intervention group compared to 49 in the control group</p> <p>The intervention group had only 6 participants who fell four or more times compared to 9 in the control group</p> <p>The incidence of falls with injuries was 28% lower in the intervention group</p> <p>Results indicated that the targeted prevention programme including multiple interventions could reduce the incidence rates of falls in the subacute setting.</p>	<p>Grade B – High</p> <p>Downgraded from Grade A due to limitations:</p> <ul style="list-style-type: none"> No consideration of which of the multitargeted interventions had a more effective outcome Staff used clinical judgement to determine need/appropriateness of each intervention Recommendations for each participant were different and they did not all undergo exactly the same interventions Variable of cognitive state and impact on intervention application Not completed blinded – may have influenced recording of incidence of falls or altered elements of 'usual care'.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
<p>Haines et al (2006)</p> <p>[Cross reference with Haines et al 2004]</p>	<p>Subgroup analysis of randomised controlled trial</p> <p>Aim: to evaluate the effectiveness of a patient education programme for preventing falls in the subacute hospital setting (sub-analysis of a larger RCT of a multiple intervention programme)</p> <p>226 participants (subgroups of RCT with 626 participants)</p> <p>Recruitment via referrals to the education group by the hospital occupational therapist</p> <p>Eligibility: at high risk of falls and potential to benefit</p> <p>Exclusions: severe communication or learning difficulty</p> <p>Intervention group of 115 participants Male:female ratio = 35:80 Mean age 83 years</p> <p>Control group of 111 participants Male:female ratio = 40:71 Mean age 82 years</p> <p>Australia.</p>	<p>Education programme: 1:1 sessions including falls risk factor screen, consequences of falls, profile of falls within the inpatient unit, mechanisms of falls, practical steps which participants could take to avoid falls, participant quiz, goal setting and review</p> <p>Number of sessions varied ranging from 2-5 (average 4)</p> <p>Sessions varied in length from 15-35 minutes</p> <p>Sessions followed the same format, covering the same content</p> <p>Education delivered by a research occupational therapist.</p>	<p>Primary outcome:</p> <ul style="list-style-type: none"> Number of falls per 1,000 patient days Number of fallers <p>Data gathered via hospital reporting procedures and hospital medical records</p> <p>Secondary outcome: patient knowledge and experience for which a questionnaire was developed.</p>	<p>All participants recommended for education: falls rate was 26 per 1,000 patient days; fallers were 16% (relative risk 1.21)</p> <p>Participants receiving education only: falls rate was 4 per 1,000 patient days; fallers were 3% (relative risk 2.19)</p> <p>Any participant recommended for education with Mini Mental State Examination (MMSE) > 23/30 = 11 falls per 1,000 patient days; fallers were 11% (relative risk 1.59)</p> <p>Any participant recommended for education intervention with MMSE < 23/30 = 15 falls per 1,000 patient days; fallers were 23% (relative risk 1.00)</p> <p>Intervention group had significantly lower incidence of falls than control in terms of falls per 1,000 patient days but number of fallers was not significant</p> <p>Education evaluated at the end of sessions and not over time so difficult to determine the sustainability of the education in terms of fall reduction, i.e. once the person is at home will they continue to modify their behaviour</p> <p>Difficult to conclude that one-to-one education alone reduces falls but a multifactorial intervention which includes education was effective at reducing falls.</p>	<p>Grade C - Low</p> <p>Comments:</p> <ul style="list-style-type: none"> Hospital staff and participants not blinded to study Referral relied on judgement of hospital occupational therapist Participants exposed to up to 3 other interventions Participants exposed to information at different stages of rehabilitation and differing number or length of sessions Poor completion rate (64/115) of questionnaires Researcher-delivered sessions and questionnaire may have introduced bias.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Harper et al (2017)	<p>Controlled clinical trial</p> <p>Aim: to understand the effectiveness of a brief intervention to prevent falls in older patients presenting to accident and emergency (A&E) post-discharge</p> <p>Recruitment via one hospital</p> <p>Inclusion: over 65 years old who presented to A&E with any diagnosis and suitable for home discharge</p> <p>Exclusion: unable to speak English or provide consent, or lived in community residential aged care facilities</p> <p>412 participants</p> <p>Control group n=201</p> <p>Intervention group n=211</p> <p>Australia.</p>	<p>All participants were screened for falls using the Two Item Screening Tool and the Falls Risk for Older People in the Community</p> <p>Functional ability was assessed through a modified Functional Independence Measure and Functional Assessment Measure (FIM/FAM)</p> <p>Standard practice for all participants included functional and mobility intervention, discharge planning and referral to outpatient services. If the participant presented with a fall, standard practice included identification of risk factors, written falls prevention materials and referral to outpatient services</p> <p>The intervention group received scripted education on the consequences of falling and encouragement to take action to prevent falling. This was tailored based on the falls risk score and provided bedside in A&E.</p>	<p>Primary outcome measure was the proportion of participants with one or more falls in the 6-month follow-up period, monitored by monthly phone calls</p> <p>Secondary outcome measures included mortalities, number of falls, functional status, and medical service use</p> <p>At 6 months, functional ability assessed through a modified FIM/FAM.</p>	<p>The intervention did not prevent falls (32.1% of the intervention group fell versus 36.8% of the control group)</p> <p>The intervention group who did fall had significant improvement in function at 6 months, whereas those who did not fall experienced functional decline (p=0.007)</p> <p>The intervention group had fewer hospital admissions (p=0.002).</p>	<p>Grade C – Low</p> <p>Downgraded due to:</p> <ul style="list-style-type: none"> Quasi-randomisation; the primary outcome was based on self-reporting of falls, which could be biased; and it is not clear whether FIM/FAM is a valid tool if modified; smaller sample size than calculation indicated; and sample focused on accident and emergency admissions and not falls population specifically <p>Comments:</p> <ul style="list-style-type: none"> Limitations include participants recruited during business hours and treating therapists were not blinded.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Harvey et al (2014)	<p>Cohort study</p> <p>Aim: to examine the age-specific population prevalence and predictors of uptake of home modifications and exercise to prevent falls</p> <p>Recruitment: random digit dialling</p> <p>Inclusion: New South Wales residents aged 65 and older living in households with private telephones</p> <p>5,681 respondents</p> <p>60.8% response rate</p> <p>March–July 2009</p> <p>Australia.</p>	<p>Participants to the 2009 NSW Falls Prevention Survey were asked questions on falls prevention activities.</p>	<p>Whether made changes to home to prevent falls (including moved house)</p> <p>If increased exercise to prevent falls.</p>	<p>A quarter had modified their homes (28.9%) and 35.1% increased exercise to prevent falls</p> <p>Strongest factors associated with home modifications: 85 years and older, problems undertaking usual activities, one or more comorbidities, fair/poor self-rated health, high perceived likelihood/fear of falling, advice from physiotherapist/occupational therapist/general practitioner/medical specialist, saw falls prevention in media</p> <p>Strongest factors associated with exercise uptake: advice from physiotherapist/occupational therapist/general practitioner/medical specialist, female, perceived moderate likelihood of falling, at least one injurious fall in past 12 months, saw falls prevention in media.</p>	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> • Limitations included self-reported measures with potential recall bias, did not look at effectiveness of falls prevention measures taken, definition of exercise may not be universally understood by respondents, moderate response rate and cannot entirely correct for selection bias.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Hill et al (2009)	<p>Randomised controlled trial</p> <p>Aim: to evaluate the effectiveness of falls prevention education delivered to hospitalised older people via digital video disc (DVD) or written workbook on perceived falls risk, knowledge of, and motivation to engage in, falls prevention strategies</p> <p>Recruitment via hospital wards and units</p> <p>Age \geq 60 years</p> <p>Exclusions: Mini Mental State</p> <p>Examination $<$ 24/30, medically unstable, severe vision or hearing deficits</p> <p>Phase 1 Quasi-experimental control group of 122 participants Male:female ratio = 54:68</p> <p>Phase 2 Randomised allocation to: DVD group of 49 participants Male:female ratio = 18:31</p> <p>Workbook group of 51 participants Male:female ratio = 25:26</p> <p>Australia.</p>	<p>All participants received usual ward orientation and ad hoc falls prevention advice on admission</p> <p>Intervention Groups:</p> <p>Participants received the DVD (14 minutes in duration) or workbook education at their bedside for up to one hour</p> <p>Both formats contained identical content (based on the Health Belief Model), which included information on the risk of falls, fall-related harms and falls prevention strategies that could be undertaken within the hospital setting to reduce the risk of falling</p> <p>Control Group:</p> <p>Did not receive any specific falls prevention education from the investigators.</p>	<p>Custom-designed survey measuring perception of falls risk and harms and motivation to reduce general risk of falling on a five-point Likert scale of strongly agree to strongly disagree and knowledge of falls</p> <p>Perceived risk of falling was assessed in both intervention groups prior to the education</p> <p>The complete survey was administered immediately after the education</p> <p>Comparisons were not made against the 'control' group for all aspects as the no-education control group was assessed on five knowledge survey items only.</p>	<p>A greater proportion of participants from the two intervention groups (combined) provided 'desired responses' for the five knowledge items compared to the control ($p < 0.001$)</p> <p>The two intervention groups were comparable prior to the education in self-perceived risk of falls ($p = 0.72$)</p> <p>Numbers of reported falls before study enrolment were comparable for the education groups (DVD, $n = 7$; workbook, $n = 14$; $p = 0.42$) and control group ($n = 15$; $p = 0.72$)</p> <p>Post-education there was no significant difference between the education groups in self-perceived falls risk ($p = 0.70$) or knowledge of falls. There was a within group increase in the self-perceived risk of falls in the DVD group after the education ($p = 0.04$); there was not a significant change within the workbook group</p> <p>A higher proportion of participants in the DVD group were strongly motivated to prevent themselves from falling compared with the workbook group (60% versus 34%; $p = 0.04$), and had greater confidence in their ability to do so (67% versus 45%; $p = 0.03$)</p> <p>The DVD education, when compared with a written workbook, had the potential to result in better uptake of information, influence perceptions and motivation with respect to falls prevention activities in the hospital setting.</p>	<p>Grade B – Moderate</p> <p>Downgraded from Grade A due to limitations:</p> <ul style="list-style-type: none"> • Relatively small sample and no size calculation included • Control group quasi-experimental and not randomised • Bias as participants aware of education group • Investigators conducting assessments aware of allocation group • Not known if positive educational outcomes were followed by behaviour change, and whether associated with a reduction in falls in the hospital setting • Unclear whether subjects retained the knowledge they gained.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Hill et al (2013)	<p>Pilot randomised controlled trial</p> <p>Aim: to evaluate the effect of providing tailored falls prevention education in hospital on engagement in behaviours post-discharge and patients' perceived risk and knowledge about falls and prevention strategy</p> <p>Recruitment via one hospital between April 2012 and September 2012</p> <p>Inclusion: hospital stroke and rehabilitation inpatients 60 years or older discharged to the community after proposed hospital stay of greater than 5 days, spoke English as a first language, could give written informed consent</p> <p>Exclusion: hearing or visual problems that prevented them from engaging with educational materials or Mini Mental State Examination score less than 24</p> <p>50 participants 48 provided follow-up data 21 intervention participants Australia.</p>	<p>Tailored education package consisting of multimedia falls prevention information with trained health professional follow-up on top of usual care. Follow-up included personalised strategies for preventing falls</p> <p>Usual care provided by a multidisciplinary team and local programme of falls risk assessment and management, plus discharge programme</p> <p>Computer-generated randomisation</p> <p>Researcher provided the education intervention on the ward, but baseline, discharge and one-month follow-up assessments conducted by research assistant blinded to group allocation</p> <p>Participants received the intervention at their bedside, unless they shared a room, in which case a patient lounge was used</p> <p>Participants did not know what group they were in.</p>	<p>Engagement in falls prevention behaviours a month after discharge (via a structured survey)</p> <p>Participants' knowledge, confidence and motivation levels before and after receiving education (via a survey)</p> <p>Number of falls and falls injuries in the month after discharge</p> <p>Feasibility of providing the intervention.</p>	<p>Intervention group was significantly more likely to plan how to safely restart functional activities (p=0.04) and more likely to complete other targeted behaviours such as their home exercise programme (p=0.14)</p> <p>Intervention group was significantly more knowledgeable (p=0.001) about falls risk</p> <p>There were 5 falls in the intervention group and 18 in the control group</p> <p>It was feasible to tailor the education appropriately.</p>	<p>Grade B - Moderate</p> <p>Downgraded due to:</p> <ul style="list-style-type: none"> Pilot RCT with a small sample size, short duration follow-up and limited measurement of effect, so the true effect may be different in a larger trial <p>Comments:</p> <ul style="list-style-type: none"> Limitations include the possibility that the intervention group was slower to recover functional ability and may have fallen post follow-up as they increased their activities A large trial is now needed One researcher is the director of a company that licenses a falls education programme, which was declared.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Irvine et al (2010)	<p>Economic evaluation of a randomised controlled trial</p> <p>Aim: to provide a cost-effectiveness evaluation of providing falls prevention programme in a day hospital centre to people identified at high risk of falls by a screening protocol compared with usual primary care provision.</p> <p>Recruited from eight GP practices in the East Midlands Community-dwelling Aged ≥70 years</p> <p>Participants = 364 181 randomised into the control group 183 into the intervention group</p> <p>Analysis based on 172 participants in each group (following withdrawals)</p> <p>United Kingdom.</p>	<p>Intervention group: offered day hospital, multidisciplinary falls prevention programme (including occupational therapy (home hazards assessment), physiotherapy (strength and balance training), nurse, medical review and referral to other specialists)</p> <p>Intervention and control group received falls prevention information leaflet</p> <p>Control group: no further intervention.</p>	<p>Primary outcome:</p> <p>Rate of falls per year, economic outcome was cost per fall averted</p> <p>Cost effectiveness of fall programme calculated by estimating incremental cost per fall averted (ICER) relative to usual care</p> <ul style="list-style-type: none"> • Self-reported falls (12 monthly diaries) • Use of health resources associated with falls prevention programme and screening • Health contacts such as GP visits • Mean NHS costs <p>Trial completion defined as 360 days of follow-up from randomisation, time to institutionalisation or death.</p>	<p>Intervention group had 2.07 falls per year/per person. Control group had 2.24 falls per year/per person. No significant differences between groups in terms of falls rates or injuries</p> <p>Screening costs £165 per participant</p> <p>Costs provided for occupational therapist review, occupational therapist home visit and home modifications</p> <p>Intervention group had fewer GP consultations. All other health resource contacts increased in intervention group. None of these was statistically significant</p> <p>The intervention group was more costly than usual care and more effective (but not significantly)</p> <p>The mean falls programme cost was £349 per person. This with the higher screening and other healthcare costs resulted in a mean incremental cost of £578 for the intervention group</p> <p>The mean falls rate was lower in the intervention group compared with the control group. The estimated incremental cost-effectiveness ratio was £3,320 per fall averted</p> <p>A day hospital-based falls prevention programme delivered to a screened population of older people at risk of future falls was associated with fewer falls but was more costly than usual care.</p>	<p>Grade B – Moderate</p> <p>Downgraded due to:</p> <ul style="list-style-type: none"> • Participants may be differently motivated/have different characteristics from those who declined • Intervention not described in specific terms • Details of screening sparse • Missing data high • Baseline costs not measured • Economic evaluation from perspective of NHS only: does not account for social care costs or informal carer costs • Data on personal social services costs were collected but this was by self-report only and there was a high number of missing data. The cost of lost productivity was not included • Evaluation based on cost of falls averted only • It was reported that there were higher costs and lower falls rates compared with usual care, but neither was greater than could have occurred by chance • Analysis was limited to only a 12-month follow-up period • The cost of implementing an intervention may have been offset by a decrease in the use of other health services.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Jang et al (2016)	<p>Systematic review</p> <p>Aim: to review qualitative evidence on the experiences and perceptions of exercise and falls prevention programme providers and participants who are culturally and linguistically diverse (CALD) from the majority of those living in English-speaking countries</p> <p>Inclusion: qualitative studies (including those with mixed methods) reporting on perspectives of those aged 60 years and over from CALD groups living in the community who had participated in an exercise or fall prevention programme</p> <p>Exclusion: studies relating to specific disease-defined populations, such as cancer patients</p> <p>16 studies</p> <p>Australia.</p>	<p>Three studies focused on multicultural populations while others focused on one specific group</p> <p>No studies focused on programme providers.</p>	None.	<p>Cultural values and perceptions influenced programme participation, along with motivational, social and environmental influences</p> <p>The value of exercise in old age was questioned by many participants</p> <p>Negative cultural perceptions associated with fear of frailty, lost function or becoming a burden also influenced attitudes towards participation</p> <p>Limited English and a lack of information in their own language were barriers to exercise</p> <p>Gender attitudes and role also played a part</p> <p>Programmes sensitive to specific cultures were highlighted as important</p> <p>Physicians and social networks could positively influence behaviour, but family could be positive or negative influencers.</p>	<p>Grade B – Moderate</p> <p>Downgraded due to:</p> <ul style="list-style-type: none"> • Limitations included using qualitative research instead of randomised controlled trials <p>Comments:</p> <ul style="list-style-type: none"> • Limited studies on this topic • May have excluded some studies as excluded grey and non-English literature.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Jensen and Padilla (2017)	<p>Systematic review</p> <p>Aim: to evaluate the effectiveness of environment-based interventions that address behaviour, perception and falls for people with Alzheimer's disease and related major neurocognitive disorders</p> <p>Inclusion: published in English in peer-reviewed journals between January 2006 and April 2014 and interventions within scope of occupational therapy</p> <p>Exclusion: qualitative data, presentations, conference proceedings and non-peer-reviewed research reports, dissertations and theses</p> <p>42 articles</p> <p>United States of America.</p>	<p>22 systematic reviews or randomised controlled trials (RCTs)</p> <p>4 cohort or case controlled studies</p> <p>16 one-group, non-randomised studies.</p>	<p>Strong evidence means consistent results from at least 2 RCTs</p> <p>Moderate evidence includes 1 RCT or 2 or more studies with lower levels of evidence</p> <p>Limited evidence is based on few studies with flaws or inconsistency in findings</p> <p>Insufficient evidence means the number and quality of studies were too limited to make any classification.</p>	<p>Strong evidence supports the use of night monitoring systems to reduce falls (aside from in nursing homes)</p> <p>Evidence is insufficient to fully support the use of wander gardens for fall reduction</p> <p>Limited evidence suggests using music to reduce falls is effective.</p>	<p>Grade B - Moderate</p> <p>Downgraded due to:</p> <ul style="list-style-type: none"> • Small sample sizes, co-interventions and confounding variables were present in many studies, most did not evaluate the long-term effects of interventions, no data included from the studies (such as confidence intervals) and most studies were not RCTs <p>Comments:</p> <ul style="list-style-type: none"> • Limitations include diagnostically heterogeneous populations in terms of type and stage of dementia, and potential gender bias as most participants were women.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Johnston et al (2010)	<p>Prospective, observational cohort study</p> <p>Aim: to describe the association between pre-discharge home assessment and falls in the first month post-discharge from a metropolitan rehabilitation hospital</p> <p>Consecutive admissions 342 participants</p> <p>Pre-discharge home visits for 223 participants Median age 78 years Male:female ratio = 76:147</p> <p>No home visit for 119 participants Median age 77 years Male:female ratio = 37:82</p> <p>Exclusions:</p> <ul style="list-style-type: none"> • Mini Mental State Examination < 24 • Significant psychiatric conditions • Admitted from, or had a planned discharge to, a residential care facility • Unable to participate in telephone follow-up <p>Australia.</p>	<p>Pre-discharge home visit versus no pre-discharge home visit</p> <p>On admission to the rehabilitation hospital, participants were classified into broad diagnostic groups</p> <p>All patients (whether participating in the study or not) were assessed by one of 17 occupational therapists working at the hospital</p> <p>The decision regarding provision of home assessment was made by the treating occupational therapist on clinical reasoning grounds.</p>	<p>Phase 1:</p> <p>Information gained from participants' medical records:</p> <ul style="list-style-type: none"> • Falls Risk Assessment Scoring System (FRASS) • Functional performance (Functional Independence Measure [FIM™]) • Whether they had received an occupational therapy home assessment pre-discharge <p>Phase 2:</p> <p>Prospective data following discharge:</p> <ul style="list-style-type: none"> • Participants recorded any fall and associated details in a diary for a period of 1 month. 	<p>50 falls were recorded by 50 patients during the first month post-discharge (one fall per faller). 10.3% (23/223 patients) of the participants who received a home assessment reported a fall compared with 23.1% (27/119 patients) of those who did not. A pre-discharge home assessment was associated with a significantly decreased likelihood of falling during the first month post-discharge (odds ratio was 0.39; 95% CI [0.2, 0.75]; p=0.003)</p> <p>Not conducting a pre-discharge home assessment was associated with nearly three times the risk of falling in the month after discharge. However, post-discharge fall risk of participants in the neurological group was not ameliorated by a home assessment</p> <p>Participants who received a home assessment had higher FRASS scores and lower FIM™ scores on both admission and discharge than those who did not</p> <p>Diagnosis, fall risk and functional independence scores indicated the participants for whom the protective effect of a home assessment was the strongest</p> <p>Occupational therapy home visit/ assessments decreased risks of falls post-discharge.</p>	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> • Small sample size of subgroups • No details of clinical level of occupational therapists providing the treatment.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Kempen et al (2009)	<p>Cross-sectional study</p> <p>Aim: to analyse univariate and multivariate associations between five socio-demographic, seven health-related and six psychosocial variables and levels of fear of falling and avoidance of activity in older persons who avoid activity due to fear of falling</p> <p>Local registry offices random sample</p> <p>7,431 community-dwelling people</p> <p>Age ≥ 70 years</p> <p>Sent a screening questionnaire, 4,376 responses</p> <p>Inclusion criteria: mild fear of falling and at least mild avoidance of activity due to fear of falling</p> <p>Exclusions: bed bound, wheelchair user, nursing home residents</p> <p>540 participants</p> <p>Male:female ratio = 152:388</p> <p>Netherlands.</p>	<p>Self-reported screening assessment and telephone interviews.</p>	<p>Fear of falling: Are you afraid of falling? Avoidance of activity: Do you avoid certain activities due to fear of falling?</p> <p>Sociodemographic variables</p> <p>Health-related variables:</p> <ul style="list-style-type: none"> • Activities of daily living (Groningen Activity Restriction Scale) • Impaired vision and hearing • Perceived general health • Number of chronic conditions • Cognition (Telephone Interview for Cognitive Status) • Falls history <p>Psychosocial variables:</p> <ul style="list-style-type: none"> • General self-efficacy • Mastery scale • Social Support Scale • Hospital Anxiety and Depression Scale. 	<p>The study showed an interrelationship with sociodemographics, health-related and psychosocial variables in older people</p> <p>Female gender, limitations in activity of daily living and one or more falls in previous 6 months correlated independently with severe fear of falling</p> <p>Avoidance of activity in older people with severe levels of fear of falling may be particularly high in those of advanced age and with limitations in activities of daily living</p> <p>Old age, female gender, limitations in activities of daily living, impaired vision, poor perceived health, chronic morbidity, falls, low general self-efficacy, low mastery, loneliness, feelings of anxiety, and symptoms of depression were identified as univariate correlates of severe fear of falling and avoidance of activity</p> <p>May indicate concepts for developing interventions to reduce fear of falling and activity avoidance in old age.</p>	<p>Grade C - Low</p> <p>Comments:</p> <ul style="list-style-type: none"> • Measures used were self-reported without the inclusion of performance-based measures • The sample only included people who reported having a mild fear of falling and activity avoidance • Heterogeneous sample of people.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
<p>La Grow et al (2006)</p> <p>[Cross reference with Campbell et al 2005]</p>	<p>Randomised controlled trial</p> <p>Aim: to investigate whether the success of a home safety assessment and modification intervention in reducing falls resulted directly from modification of home hazards, from behavioural modifications or both</p> <ul style="list-style-type: none"> • Aged ≥ 75 years • Community-dwelling • Poor vision • Mobile in own home • Not currently receiving physiotherapy <p>391 participants were randomised to 4 groups:</p> <ul style="list-style-type: none"> • Home Safety Assessment and Modification (100 participants) • Exercise Programme (97 participants) • Home Safety Assessment and Modification and Exercise Programme (98 participants) • Social visits (96 participants) <p>New Zealand.</p>	<p>Home Safety Programme:</p> <p>Occupational therapy home visit (Westmead Home Safety Assessment); discuss and agree interventions and hazard reduction. Follow-up visit if required</p> <p>Telephone interview at 6 months to determine if recommendations for home modifications and behaviour change carried out, partially carried out or not carried out</p> <p>Exercise Programme:</p> <p>One-year Otago programme modified for visual impairment and prescribed by physiotherapist, plus vitamin D supplement</p> <p>Home safety and exercise programmes (as above)</p> <p>Social visits:</p> <p>Two one-hour visits by research staff during first 6 months of the trial to those not randomised to other groups.</p>	<p>Environmental hazards, risk behaviour and agreed recommendations documented at baseline</p> <p>Adherence evaluated at phone call (by occupational therapist) at 6 months</p> <p>Physiotherapist visited and telephoned participants in exercise programme over the year</p> <p>Falls were measured for one year – participant given tear-off monthly postcard calendars</p> <p>If reported fall, telephone call made to record circumstances.</p>	<ul style="list-style-type: none"> • 194/198 participants allocated to home safety programme visited. 903 hazards recorded (average 4.7 per home) • 508 recommendations for change made (average 2.6 per person) • Most common recommendations: removing, replacing or modification of loose mats, repair or paint contrast strips on outside steps, outside steps handrails, improved lighting, grab rails in bathroom/toilet/shower • 169/198 (85%) had 6-month follow-up call • 152/169 (90%) reported complying partially or completely with recommendations • Average of 2.3 actions taken per person <p>There were no differences in the number of recommendations agreed or actioned between the home safety group alone and the home safety and exercise group (recommendations p=0.446; actioned p=0.310)</p> <p>Falls at home associated with a hazard versus falls at home with no hazard identified were both reduced by a similar amount in participants of Home Safety Programme group compared to social visit group. This suggested that it was the advice by the occupational therapist, as well as the hazard removal, which generalised to all environments, enabling the person to be more environment-aware wherever they were</p> <p>Home safety assessment and modification in people aged over 75 with severe visual impairment significantly reduced falls when compared with social visits, where completed by an experienced occupational therapist.</p>	<p>Grade A – High</p> <p>Comments:</p> <ul style="list-style-type: none"> • Relies on participant reporting all falls and recommendations • Hazards in the home assessed for those who received home safety programme only.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
<p>Lockwood et al (2015)</p>	<p>Systematic review</p> <p>Aim: to determine the effectiveness of pre-discharge home assessment visits by occupational therapists</p> <p>Inclusion: quantitative and qualitative studies that evaluated pre-discharge home assessment visits by occupational therapists</p> <p>Exclusion: studies where a home visit also included therapy sessions or where no occupational therapist was present</p> <p>14 studies, 5 RCTs, 6 observational studies, and 3 qualitative</p> <p>Search dates were earliest possible to February 2014</p> <p>Australia.</p>	<p>Content of the home assessment varied.</p>	<p>The most common outcome measures included falls, readmissions to hospital, quality of life, activity and participation.</p>	<p>Reduced the risk of falling (32% less likely; moderate quality evidence)</p> <p>Increased participation levels in geriatric and mixed rehabilitation settings</p> <p>Reduced risk of hospital readmission (50% less likely; low quality evidence) except for people who experienced a stroke</p> <p>No effect on quality of life.</p>	<p>Grade A – High</p> <p>Comments:</p> <ul style="list-style-type: none"> • Limitations include the quality of evidence (only 5 RCTs), with relatively small sample sizes and many did not have the power to detect statistically significant effects.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Maggi et al (2018)	<p>Cohort study</p> <p>Aim: to determine the risk factors for falls among frail older persons and evaluate the impact of home modifications on falls</p> <p>Inclusion: at least 65 years old and frail according to the Edmonton Frailty Scale or Belgian version of the Katz scale</p> <p>4,538 participants had not fallen 90 days prior to intervention</p> <p>Male:female ratio = 1:2</p> <p>Mean age = 80.7</p> <p>1,565 participants who had fallen 90 days prior to intervention</p> <p>Male:female ratio = 3:7</p> <p>Mean age = 81.8</p> <p>Belgium.</p>	<p>63 programmes funded by the Belgian government to keep frail older adults in their home. There were 3 types: 1) occupational therapy at home with home modifications and advice about assistive devices (n=7); 2) case management, home modifications (by an occupational therapist) and advice about assistive devices (n=7); 3) did not receive home modifications or advice about assistive devices (n=49)</p> <p>A control group was formed from the least-effective, low-intensive interventions that did not overlap with the three categories above</p> <p>Participants exited the cohort when institutionalised longer than 3 months or death</p> <p>Two subsamples created: 1) participants who had not fallen in the 90 days prior to the home care intervention, 2) participants who had fallen in the 90 days prior to the home care intervention.</p>	<p>interRAI HC, a validated geriatric assessment instrument, that measures cognition, communication, vision, diagnosis, health status, functional condition, psychological and social situation, dental status, skin condition and informal support. Assessed at baseline, exit from intervention and 6 months post-baseline.</p>	<p>The main predictors of falls were vision problems (p=0.005), distress of informal caregiver (p=0.004), and insufficient informal support (p=0.013) when comparing those who had fallen in the first 6 months of the intervention with those who had not, all having not fallen 90 days prior to the intervention</p> <p>Those who had home modifications and had fallen in the 90 days prior to the intervention showed a significant reduction in falls (odds ratio [OR] = 0.46, 95% confidence interval [CI] 0.23–0.91, p<0.05) compared to the control group.</p>	<p>Grade B – Moderate</p> <p>Upgraded due to:</p> <ul style="list-style-type: none"> Quality of evidence is enhanced by the large sample size and number of studies compared and contrasted <p>Comments:</p> <ul style="list-style-type: none"> Limitations included 31% of the sample not included in analysis due to no or incomplete follow-up assessment.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Mahoney et al (2017)	<p>Modified Delphi consensus technique</p> <p>Aim: to convene older adult falls prevention experts as to what parts of the <i>Stepping On</i> falls prevention programme were key elements that could not be modified</p> <p>Recruitment via a sample of experts generated by the research team to include physical therapists, occupational therapists, geriatricians, exercise scientists, public health researchers and Australian <i>Stepping On</i> leaders</p> <p>19 panellists (though only 17 professionals identified) Occupational therapists – 4 Physical therapists – 3 Geriatricians – 3 Epidemiologist – 1 Research psychologist – 1 Public health/exercise scientist – 1 Gerontologist/exercise physiologist – 1 Kinesiology professor – 1 Public health professional – 1 Community fitness leader – 1</p> <p>United States of America, Canada and Australia.</p>	<p><i>Stepping On</i> is a group-based falls prevention programme</p> <p>Seven 2-hour weekly sessions conducted with a follow-up home visit and a 3-month booster</p> <p>Areas covered include balance and strength training, home and community safety and medication management</p> <p>Balance and strength exercises conducted throughout.</p>	<p>Consensus among panellists on what are the key elements in <i>Stepping On</i> that cannot be altered</p> <p>Consensus in round one was defined as 70% of panellists scoring in one category, in round two it was 80% and the 'possibly important' category was not greater than 49%</p> <p>Round three dealt with one item that did not achieve consensus in round two.</p>	<p>Consensus was achieved that the following elements were key: 17/18 adult learning elements, 11/22 programming, 12/15 exercise, 7/8 upgrading exercises, and 2/4 peer co-leader's role, all home visits, booster sessions, group leader's role and background and training of group leader element</p> <p>The top five key elements were to use plain language, develop trust, engage people in what is meaningful and contextual for them, train participants for cues in self-monitoring quality of exercises and that the group leader learns about exercises and understands how to progress them.</p>	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> Findings from the Delphi study guided the implementation of the US programme This was part of a package of research not reported in the article that included research with former participants, leaders and guest experts of <i>Stepping On</i> Limitations include non-<i>Stepping On</i> leaders having limited knowledge to facilitate the programme, the heterogeneous nature of panellists limiting consensus, the panel was small which may increase bias, and the panel was not asked to reflect on key elements related to dissemination to non-white communities.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Nikolaus and Bach (2003)	<p>Randomised controlled trial</p> <p>Aim: to evaluate the effect of an intervention by a multidisciplinary team to reduce falls in older people's homes</p> <p>Inpatients (geriatric clinic)</p> <p>Inclusions:</p> <ul style="list-style-type: none"> Older people Lived at home before admission Multiple chronic conditions or functional deterioration after convalescence, and could be discharged to home (rather than nursing home) Lived within 15 kilometres of clinic <p>Exclusions: terminal illness or severe cognitive decline</p> <p>Intervention group of 181 participants Mean age 81.2 years Male:female ratio = 50:131</p> <p>Control group of 179 participants Mean age 81.9 years Male:female ratio = 44:133</p> <p>Germany.</p>	<p>Intervention Group:</p> <p>Comprehensive geriatric assessment and post-discharge follow-up home visits from an interdisciplinary Home Intervention Team (HIT)</p> <p>HIT: three nurses, a physiotherapist, an occupational therapist, a social worker and a secretary. One home visit during the hospital admission to evaluate the patient's home and to prescribe technical aids when necessary. To identify home hazards, a standardised home safety checklist (available in German only) was used. At least one home visit was carried out after discharge</p> <p>Control Group:</p> <p>Comprehensive geriatric assessment with recommendations followed by usual care at home. No home visit</p> <p>A home visit was made to all participants after 12 months.</p>	<p>Primary outcome:</p> <ul style="list-style-type: none"> Reduced number of falls <p>Secondary outcomes:</p> <ul style="list-style-type: none"> Type of recommended home modifications Compliance with recommendations Injuries from falls. 	<p>After 1 year, 163 falls in the intervention group and 204 falls in the control group. The intervention group had 31% fewer falls than the control group (incidence rate ratio was 0.69; 95% CI [0.51,0.97])</p> <p>Effectiveness of intervention greater in subgroup of participants who reported having had two or more falls during the year before recruitment to the study. The proportion of frequent fallers and the rate of falls were significantly reduced in this subgroup of the intervention group compared with the control group (21 compared to 36 participants with recurrent falls, p=0.009; incidence rate ratio was 0.63; 95% CI [0.43, 0.94])</p> <p>The compliance rate varied with the type of change recommended from 83% to 33% after 12 months of follow-up</p> <p>A home intervention based on home visits conducted by an occupational therapist, with either a nurse or physiotherapist, to assess for environmental hazards, provide information about possible changes, facilitate any necessary home modifications, and teach the use of technical and mobility aids when necessary, was effective in a subgroup of frail older individuals with a high risk of repeated falls.</p>	<p>Grade A – High</p> <p>Comments:</p> <ul style="list-style-type: none"> Dependent on self-reporting of falls It is not known if physical therapy in the observational period was equally distributed to both groups.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Nyman (2011)	<p>Review/Overview</p> <p>Aim: overview of the psychosocial factors that influence older people's participation in physical activity interventions to prevent falls</p> <p>Multiple sources of literature.</p>	<p>Psychosocial factors that explain older people's participation in physical activity interventions for the prevention of falls are reviewed under the framework of the theory of planned behaviour.</p>	<p>Theory of planned behaviour (TPB) asserts that behaviour change is exercised through intention</p> <p>TPB model asserts that intention is predicted by three variables:</p> <p>(a) Attitude towards the behaviour (b) Subjective norm (c) Perceived behavioural control.</p>	<p>Implications identified from the review:</p> <p>Knowledge:</p> <ul style="list-style-type: none"> • Opportunities for talking about and preventing non-injurious falls that may help in preventing injurious falls may be missed by health professionals • Older people's understanding of falls prevention focuses around reducing extrinsic rather than both intrinsic and extrinsic risk factors • Older people's engagement in falls prevention interventions could be influenced by knowledge, although this was an insufficient motivator for falls prevention <p>Attitude:</p> <ul style="list-style-type: none"> • Older people were more likely to carry out falls prevention activities when they perceived that the activities would afford positive benefits and that these benefits are highly likely to occur <p>Subjective norm:</p> <ul style="list-style-type: none"> • Engagement was more likely when interventions fitted with a positive self-identity and emphasise the positive benefits of interventions, and if the older person had a high level of perceived behavioural control and a socially supportive environment <p>Perceived behavioural control:</p> <ul style="list-style-type: none"> • Participation in falls prevention interventions can be facilitated by high levels of perceived behavioural control <p>In relation to stigma, preservation of self-identity within the wider context of dependency is important.</p>	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> • Not a systematic review • Paper did not describe the search terms used to elicit papers • Much of the quoted work is by the author • One psychosocial model theory explored.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Nyman et al (2011)	<p>Evaluation/Discourse analysis</p> <p>Aim: to explore the representations of old age in falls prevention websites and consider their potential impact on older people's uptake of advice</p> <p>Additionally to compare the representations against two of the Prevention of Falls Network Europe (ProFaNE) recommendations concerning fit with positive self-identify and empowerment of active self-management of health</p> <p>Analysis of each website and discussion to reach consensus on the emergent findings</p> <p>United Kingdom.</p>	<p>Systematic search for websites using key terms</p> <p>33 websites with information on falls prevention evaluated using discourse analysis.</p>	<p>Ten prompts for analysis based on two recommendations from ProFaNE concerning fit with positive identity and empowerment.</p>	<p>Three representations of older people were identified:</p> <ul style="list-style-type: none"> • The passive recipient • The rational learner • The empowered decision maker <p>Findings demonstrated that the presentation style of online falls prevention advice is currently unlikely to be acceptable/engaging for older people, and subsequently unlikely to be effective</p> <p>Need identified to optimise an individual's capability and control over their own life, and as such websites must use a style that represents older people as empowered decision makers</p> <p>Recommendation that occupational therapists should ensure that any information produced for older people (written format or on the internet) represents them in a positive and respectful manner.</p>	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> • Visual data and falls prevention leaflets/ pamphlets not analysed • Older people were not involved in the analysis so it cannot be claimed that the interpretation is representative of the views of older people • Only three search engines used.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Painter et al (2012)	<p>Cohort study</p> <p>Aim: to explore:</p> <ul style="list-style-type: none"> The relationship of fear of falling to depression, anxiety, activity level, and activity restriction Whether depression or anxiety predicted fear of falling, activity level, activity restriction, or changes in activity level <p>A convenience sampling technique using snowballing and purposive sampling was used – 7 community centres and one apartment complex</p> <p>Community-living adults</p> <p>99 participants</p> <p>Aged ≥ 55yrs</p> <p>Excluded if cognitive or developmental disability</p> <p>Male:female ratio = 17:82</p> <p>Average age 73.71 years</p> <p>United States of America.</p>	<p>One 2-hour appointment</p> <p>A 90-minute fall prevention presentation which reviewed fall risk factors, ramifications of falls and fear of falling, home safety strategies, and community resources</p> <p>Sensor night light gift.</p>	<ul style="list-style-type: none"> Modified semi-structured fall questionnaire (falls history and consequences of falls in last 6 months) Survey of Activities and Fear of Falling in the Elderly (SAFE) – assesses 11 activities both community and home based Geriatric Depression Scale-30 Hamilton Anxiety Scale, IVR Version. 	<p>38% reported experiencing fear of falling</p> <p>SAFE instrument: of the 11 activities, 88% of the participants restricted their activity level by at least one activity, and 49% indicated, compared with 5 years previously, that they were now engaging in fewer activities</p> <p>Activity level was negatively correlated with activity restriction, fear of falling, depression, and anxiety</p> <p>Anxiety predicted both fear of falling and activity level</p> <p>Both anxiety and depression predicted activity restriction because of fear of falling and for other reasons</p> <p>Overall indicated an interrelationship between the fear of falling and activity levels, fear of falling and depression and fear of falling and anxiety.</p>	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> Convenience sample selection and small numbers Heterogeneous Self-reported data that can be subjective in nature Questionnaire used not tested for validity or reliability Offer of gift may have caused bias.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Pighills et al (2011)	<p>Randomised controlled trial (pilot)</p> <p>Aim: to assess the effectiveness of an environmental falls prevention provided by qualified occupational therapists or unqualified trained assessors</p> <p>Recruitment via eight GP practices</p> <p>Inclusions:</p> <p>Age ≥ 70 years Community-dwelling History of one or more falls over previous year</p> <p>Exclusions:</p> <p>Nursing or residential home residents and those who received falls-specific occupational therapy intervention in previous year</p> <p>238 participants</p> <p>Mean age 79 years (range 70–97)</p> <p>Female ratio ranged in the three arms from 62% to 71% England.</p>	<p>Participants randomised to one of three groups:</p> <ul style="list-style-type: none"> Occupational therapist led environmental assessment Trained assessor led environmental assessment Usual care control from GP and being referred for services as required <p>Two intervention groups received:</p> <p>Home environment assessment using Westmead Home Safety Assessment (WeHSA)</p> <p>Potential falls hazards discussed, agreed recommendations. Summary of recommendations sent to participant, referrals made to other agencies for equipment and input as indicated</p> <p>Follow-up telephone contact after 4 weeks, and at 12 months to establish the level of adherence to recommendations and reasons for non-adherence.</p>	<p>Primary outcome:</p> <ul style="list-style-type: none"> Fear of falling (Falls Efficacy Scale [FES-I]) <p>Secondary outcomes:</p> <ul style="list-style-type: none"> Falls Quality of life (EuroQol, SF-12[®]) Independence in ADL (Barthel index) <p>Baseline measures reassessed at 3, 6 and 12 months</p> <p>Monthly self-completed calendars of falls</p> <p>Falls followed up with blinded telephone call to identify circumstances and consequences</p> <p>Adherence to recommendations made at four weeks and 12 months.</p>	<p>Follow-up data for 217 participants, 66% of all participants had falls</p> <p>Occupational therapy group had significantly fewer falls than unqualified (trained assessor) group at the 12-month follow-up (Incidence rate ratio was 0.54; 95% CI [0.36, 0.83]; p=0.005)</p> <p>There was no significant effect in the trained assessor group on falls</p> <p>No significant difference in fear of falling between all three groups and no effect on fear of falling</p> <p>The professional background of the person delivering an environmental assessment and home modification intervention influenced the effectiveness of the outcome</p> <p>The results indicated that occupational therapists are more effective than the non-occupational therapists in:</p> <ol style="list-style-type: none"> Identifying the need for modifications Recommendations being adhered to Smaller number of falls. 	<p>Grade A – High</p> <p>Comments:</p> <ul style="list-style-type: none"> Pilot study – sample size not large enough to power the study re number of falls Minor flow diagram/text number anomaly Limited information about the occupational therapists and trained assessors (level of experience, etc.).

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Pighills et al (2016)	<p>Critical review</p> <p>Aim: to compare and contrast two systematic reviews of environmental interventions for falls prevention in community-dwelling older people</p> <p>Inclusion: systematic reviews focusing on community-dwelling older people using environmental interventions for fall prevention</p> <p>Exclusion: if the environmental component could not be isolated</p> <p>2 systematic reviews.</p>	<p>All interventions focused on older people with some kind of environmental intervention</p> <p>Only included randomised controlled trials. 6 and 9 trials in each review – both had the same 6 studies included, and then an additional 3 that were published after the first systematic review was conducted.</p>	<p>Efficacy of environmental interventions in falls prevention.</p>	<p>Occupational therapist-led environmental assessment and modification were effective in falls prevention</p> <p>Trials providing occupational therapy-led, high-intensity interventions (comprehensive, validated functional assessment of participants in their home environment with follow-up) were clinically effective in high-risk populations.</p>	<p>Grade A – High</p> <p>Comments:</p> <ul style="list-style-type: none"> • Limitations include wide confidence intervals, small number of studies in the meta-analyses and small sample sizes in a majority of the studies • Likely effective because occupational therapists' interventions consider personal, environmental and activity-related falls risk factors and recognise the agency of the person in moderating risk.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Pritchard et al (2013)	<p>Systematic review and meta-analysis</p> <p>Aim: to investigate the impact of falls intervention programmes on participation of older adults returning home to live, following discharge from hospital</p> <p>Limits were set for articles published in English, dated 1990–2012</p> <p>Inclusion criteria included:</p> <ul style="list-style-type: none"> • Randomised control trials • Aged ≥ 65 years • Use of an effective falls intervention and a participation measure • Post-discharge from hospital or emergency department <p>Multiple sources of evidence.</p>	<p>Participation interventions were classified as such if the primary intervention used was to increase participation in life situations within the home or community settings</p> <p>5 studies fulfilled the inclusion criteria and measured participation outcomes short-term (< six months post-discharge, n=488) and long-term (6–12 months post-discharge, n=571).</p>	<p>Participation: 'engagement in life situations'</p> <p>Occupation: 'engagement and participation in a recognisable everyday life endeavour'</p> <p>Integrating these two concepts leads to occupational participation: integrates the two concepts, involves engagement in varied activities, roles and routines that are necessary for health and wellbeing</p> <p>The review examined a selection of the possible occupations and assessed study outcomes against the definitions.</p>	<p>Interventions were classified into the following categories:</p> <ul style="list-style-type: none"> • Exercise • Home modification • Psychotropic medication withdrawal • Vitamin D supplementation • Multifactorial interventions <p>The results indicated that falls interventions provided a positive and significant improvement in the level of activities of daily living participation (p=0.042, p=0.026). However, the effect size was small at 0.20 and 0.21</p> <p>Falls interventions for older adults following discharge home from hospital increased participation in life situations to a small extent. Health professionals could include a focus on falls prevention programmes with older adults to promote participation</p> <p>By promoting participation in occupations that are of value to the individual and that take place in his or her everyday environments, people are more likely to be motivated to perform them long-term with positive results on participation.</p>	<p>Grade B – Moderate</p> <p>Downgraded from Grade A due to limitations:</p> <ul style="list-style-type: none"> • Blinding not carried out in any of the five randomised controlled trials • Small number of studies able to be analysed impacted on the lack of generalisability of the findings • Small effect size • Varied context of the sample populations, participants at varying stages of health • Variances in the interventions carried out.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Rosendahl et al (2008)	<p>Randomised controlled trial</p> <p>Aim: to evaluate the effectiveness of a high-intensity functional exercise programme in reducing falls in residential care facilities</p> <p>The study was part of Frail Older People Activity and Nutrition Study (FOPANU)</p> <p>9 residential care facilities 191 participants</p> <p>Male:female ratio = 52:139</p> <p>Aged ≥ 65 years</p> <p>Dependent in activities of daily living</p> <p>Mean ± SD score on the Mini Mental State Examination (MMSE) was 17.8 ± 5.1 (range 10–30)</p> <p>Randomised to a High-Intensity Functional Exercise Programme or a control activity, consisting of 29 sessions over 3 months</p> <p>Sweden.</p>	<p>Exercise Intervention: High-Intensity Functional Exercise Programme (HIFE) to improve lower limb strength, balance and gait ability. The tasks were meant to be integrated into daily activities and were individually recommended</p> <p>Control Activity Programme: developed by occupational therapists and included activities performed in sitting, e.g. watching films, reading, singing and conversation</p> <p>The programme was based on themes, e.g. the old country shop, famous people, games from the past, and was expected to be interesting and stimulating for older people including those with severe cognitive impairment.</p>	<p>Outcome measures:</p> <ul style="list-style-type: none"> • Fall rate • Proportion of participants sustaining a fall <p>All falls were included in the study, even those from epileptic seizure or acute disease</p> <p>Balance measured using Berg Balance Scale</p> <p>Analyses were based on intention to treat principle; data remained from study period start (intervention n=191, follow-up n=183) until participants died, withdrew or completed the study period</p> <p>The follow-up period was planned to last 6 months from the end of the intervention.</p>	<p>During 6-month follow-up (95) 52% of the 183 participants sustained one fall or more and 57 (31%) had more than one fall. Falls per participant ranged from 0 to 26 falls. When all participants were compared, no statistically significant differences between the groups were found for fall rate</p> <p>Subgroup analysis of participants who improved their balance during the intervention period indicated that the exercise group had a lower fall rate than the control group. The extent of balance improvement (of those who made an improvement in balance) did not significantly differ between exercise and control group</p> <p>Instead of a decline in physical function in the control group as expected, the control group activity programme had an effect on physical function in the sedentary group (e.g. through the impact of social stimulation and meaningful activities, or transferring to another location in the facility)</p> <p>In residential care facilities a High-Intensity Functional Exercise Programme did not significantly reduce either fall rate or proportion of participants who sustained a fall, compared with control activity. There was however some evidence that where exercise improves balance, there may be a fall prevention effect.</p>	<p>Grade B – Moderate</p> <p>Downgraded from Grade A due to limitations:</p> <ul style="list-style-type: none"> • Low statistical power. The power was slightly over 50% to show a significant reduction in falls • More participants or a longer follow-up period would have been preferable in evaluating falls • The authors state that probably not all falls were reported • Limited range of outcomes considered.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Schepens et al (2012)	<p>Meta-analytic review</p> <p>Aims: to investigate</p> <ol style="list-style-type: none"> The relationships between fall-related efficacy and measures of activity and participation in community-dwelling older adults Whether the strength of these relationships varies depending on the type of fall-related efficacy scale and type of activity assessed <p>Inclusions:</p> <ul style="list-style-type: none"> Conducted between 1990 and 2010 Community-living Age ≥ 60 years Not designated as belonging to a specific disease group <p>Studies included non-intervention studies (e.g. cross-sectional, prospective) but excluded case reports and qualitative studies</p> <p>Multiple sources of evidence.</p>	<p>Studies had to assess fall-related efficacy using:</p> <ul style="list-style-type: none"> Falls Efficacy Scale (FES) or Activities-specific Balance Confidence (ABC) scale <p>Plus:</p> <ul style="list-style-type: none"> A measure of activity or participation functioning or performance <p>Examined non-intervention studies as comparing fall-related efficacy to activity and participation.</p>	<p>Falls self-efficacy and balance confidence terms were pooled together for the purpose of this study and referred to as fall-related efficacy</p> <p>FES, ABC Scale</p> <p>Activity or participation functioning or performance.</p>	<p>20 papers on activity and 2 on participation. Activity papers showed strong positive relationship between falls efficacy and activity</p> <p>An examination of 20 cross-sectional and prospective studies found a strong positive relationship between fall-related efficacy and activity ($r=0.53$; 95% CI [0.47, 0.58])</p> <p>An insufficient number of studies examining fall-related efficacy and participation were available for analysis</p> <p>Highlighted importance of occupational therapists considering the impact of low fall-related efficacy as a barrier to occupational engagement for many older adults</p> <p>The finding of a differential effect of falls self-efficacy versus balance confidence indicated a potential need for occupational therapists to assess the two constructs separately in older adults</p> <p>A need was identified to consider interventions that address balance confidence and falls self-efficacy separately; this could prove beneficial and may require different strategies</p> <p>Study highlighted the importance for occupational therapists to focus not only on physically based outcomes but also subjective information that may influence occupational performance such as that which is gathered from measures of fall-related efficacy.</p>	<p>Grade B – Moderate</p> <p>Downgraded from Grade A due to limitations:</p> <ul style="list-style-type: none"> No assessment of quality of papers included cross-sectional studies, etc. Flow chart doesn't add up correctly (1,118 citations, excluded 1,035 should equal 83 not 82) Study examined the relationship of fall-related efficacy and activity at one point in time only; therefore, causality cannot be determined Insufficient evidence to form conclusions about the relationship of fall-related efficacy to participation.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Sheffield et al (2013)	<p>Randomised controlled trial</p> <p>Aim: to evaluate a restorative occupational therapy intervention compared to 'usual care' among community-dwelling older adults</p> <p>Inclusion: living in the community, over 65, had significant impairments in activities of daily living (ADL) and could speak English</p> <p>31 participants in intervention 29 participants in control group</p> <p>United States of America.</p>	<p>Intervention included provision of adaptive equipment and home modifications, if appropriate, and detailed assessment from a person-environment perspective, including ADLs</p> <p>Intervention conducted by occupational therapists and customised for each client.</p>	<p>Outcomes included functional status (Functional Independence Measure), home safety (Safer Home Tool), falls, health-related quality of life via the HRQoL-EQ5D, depression, social support and fear of falling (Falls Efficacy Scale - International).</p>	<p>Improvements in home safety ($p < 0.0005$), health-related quality of life ($p = 0.03$) and fear of falling ($p < 0.05$)</p> <p>No improvement in functional status or reduction in actual falls</p> <p>39% reduction in recommended hours of personal care.</p>	<p>Grade B - Moderate</p> <p>Downgraded due to:</p> <ul style="list-style-type: none"> Pilot study with small numbers of participants <p>Comments:</p> <ul style="list-style-type: none"> Limitations include therapists not being blinded to group assignment due to being assessor and interventionist, inability to detect differences due to limited sample size, and a short follow-up.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Stark et al (2017)	<p>Systematic review</p> <p>Aim: to investigate the role of home modification interventions to improve participation outcomes</p> <p>Inclusion: published in a peer-reviewed journal, studied community-dwelling participants aged 18 years and older with health conditions affecting performance of daily activities, included a home modification intervention with the scope of occupational therapy, and published in English-language journals</p> <p>Exclusion: publication before 1990 or classification as Level IV or V evidence or a presentation, conference proceeding, dissertations and theses</p> <p>36 articles</p> <p>United States of America.</p>	<p>Most studies used occupational therapists as interventionists</p> <p>Multiple interventions.</p>	<p>Three primary outcomes: functional performance, improved caregiving outcomes and fall risk reduction.</p>	<p>25 articles provided Level I evidence, 3 provided Level II and 8 provided Level III</p> <p>Strong evidence was found that home modification interventions improve function for people with a variety of conditions</p> <p>Moderate evidence shows that home modification interventions can improve caregiving for people with dementia</p> <p>Strong evidence was found for home modifications by occupational therapists as part of a multicomponent intervention to reduce falls, and as a single component if environmental risk factors were the only target of the intervention</p> <p>Limited evidence that home modification improves the function of ageing adults with functional impairment.</p>	<p>Grade B – Moderate</p> <p>Downgraded due to:</p> <ul style="list-style-type: none"> • Inclusion of Level III evidence that will have small sample size, variation in interventions, etc. • Inclusion of multifactorial interventions make it difficult to separate out role of home modification <p>Comments:</p> <ul style="list-style-type: none"> • Limitations included quality of intervention, a broad range of participants, lack of blinding, high attrition rates, limited details on interventionists, and lack of consistency of primary endpoints and follow-up time make comparison difficult.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Stenhagen et al (2014)	<p>Cohort study</p> <p>Aim: to determine the relationship between long-term change in activities of daily living (ADL) and falls in the elderly and to identify characteristics of groups at risk for falls</p> <p>Inclusion: participants from the Good Ageing in Skåne study, part of the Swedish National Study of Ageing and Care, who were randomly selected</p> <p>Exclusion: inability to speak Swedish</p> <p>1,540 participants</p> <p>Male:female ratio = 23:27</p> <p>Nine age cohorts: 60, 66, 72, 78, 81, 84, 87, 90 and 93 years</p> <p>Mean age = 68.8</p> <p>Sweden.</p>	No intervention.	<p>ADL measured at baseline and follow-up assessment using Sonn and Åsberg's revised scale and the ADL staircase</p> <p>Falls were recorded for the period 6 months before the follow-up assessment</p> <p>Sociodemographic factors and assessment of physical activity were obtained using self-reported questionnaires at baseline</p> <p>Physical activity was measured by the 6-level physical activity scale by Mattiasson-Nilo et al (1990)</p> <p>Walking speed was measured by timing the participant's maximum walking speed over 15 metres</p> <p>A medical exam was undertaken by a physician</p> <p>Data recorded at baseline and 6-year follow-up, unless otherwise noted.</p>	<p>13% reported at least one fall</p> <p>Just over a quarter changed their ADL status over the 6 years</p> <p>Losing independency in ADL increased the risk of falls</p> <p>Improved physical function over the six years also meant an increased risk of falling</p> <p>Both groups with a prominent falls risk had an increased prevalence of heart issues.</p>	<p>Grade C - Low</p> <p>Comments:</p> <ul style="list-style-type: none"> Response rate at follow-up was 80%, but there is still a risk of attrition bias, and non-participants have been found to be older with more impairments and dependency in ADL The study did not look at falls over the full 6 years, but just 6 months prior to the follow-up.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Stern and Jayasekara (2009)	<p>Systematic review</p> <p>Aim: to determine the effectiveness of interventions designed to reduce the incidence of falls in older adult patients in acute-care hospitals compared with standard practice or no intervention</p> <p>Randomised controlled trials (1998 and 2008)</p> <p>Inclusion criteria: aged \geq 65 years Acute care hospitals</p> <p>7 studies included in review (three based on one trial)</p> <p>Studies undertaken in Australia (4), United Kingdom (2) and Sweden (1).</p>	<p>Interventions assessed were:</p> <ul style="list-style-type: none"> • Exercise • Patient education • Vitamin D supplementation • Targeted risk factor reduction plan • 3 multifactorial intervention programmes <p>Interventions were compared with usual care for all trials, however usual care was only defined in under half of all included studies.</p>	The outcome was the number of patient falls during hospitalisation.	<p>In acute hospitals some evidence to suggest the following interventions may be effective in reducing the number of falls in older people:</p> <ul style="list-style-type: none"> • Multidisciplinary multifactorial intervention programme consisting of a fall risk alert card, an exercise programme, an education programme and the use of hip protectors (Haines et al 2004) • A one-on-one patient education package entailing information on risk factors and preventative strategies for falls as well as goal setting (Haines et al 2006) • A targeted fall risk factor reduction intervention that includes a fall risk factor screen, recommended interventions encompassing local advice and a summary of the evidence <p>The authors indicate that age, morbidity, reason for hospitalisation and length of stay should be considered</p> <p>Some evidence to reduce number of falls was found which supported a multidisciplinary multifactorial intervention (systematic assessment and treatment of fall risk factors and active management of post-operative complications) following surgery for femoral neck fracture.</p>	<p>Grade B – Moderate</p> <p>Downgraded from Grade A due to limitations:</p> <ul style="list-style-type: none"> • Limited number of studies and lack of clarity on the search criteria • Heterogeneity across studies; data not pooled • Methodological limitations including blinding of participants to treatment groups • Not all of the intervention and control groups were treated equally • Variation in data analysis of the studies • Mix of participants across studies in terms of cognition, morbidities, age • Short length of stay (8 to 38 days), not long enough to produce significant effect.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Steultjens et al (2004)	<p>Systematic review</p> <p>Aim: to determine if occupational therapy improves or maintains outcomes in community-dwelling older people</p> <p>Inclusions:</p> <ul style="list-style-type: none"> • Age ≥ 60 years • Living independently • Randomised controlled trials, controlled clinical trials and other designs, which may have included those with/without control • Published up to 2002 <p>Studies evaluating multidisciplinary interventions including occupational therapy were excluded because the efficacy of occupational therapy interventions alone could not be defined definitely as causing an impact</p> <p>Multiple country sources of evidence assumed.</p>	<p>Occupational therapy regarded as:</p> <p>Comprehensive occupational therapy (all 5 categories below part of evaluated treatment)</p> <p>or</p> <p>5 specific intervention categories:</p> <ul style="list-style-type: none"> • Training of sensory-motor functions • Training of cognitive functions • Training of skills • Advice and instruction re use of assistive devices • Counselling of primary care giver <p>17 studies included, ten of which were RCTs.</p>	<p>Primary outcome domains:</p> <ul style="list-style-type: none"> • Functional ability • Social participation • Quality of life • Falls • Time to institutionalisation <p>Secondary process measures:</p> <ul style="list-style-type: none"> • Sensory motor functions • Cognitive functions • Depression. 	<p>The review identified evidence as follows:</p> <p>Strong evidence:</p> <ul style="list-style-type: none"> • Efficacy of advising on assistive devices as part of home hazards assessment on functional ability <p>Some evidence:</p> <ul style="list-style-type: none"> • Efficiency of training of skills combined with home hazard assessment in decreasing incidence of falls in those at high risk of falling • Efficacy of comprehensive occupational therapy on maintaining function, quality of life and social participation of older adults <p>Insufficient evidence was found to support the efficacy of counselling the primary care giver of older people living with dementia about maintaining their functional abilities</p> <p>Occupational therapy can be effective in decreasing falls for those older people at high risk of falling.</p>	<p>Grade B – Moderate</p> <p>Downgraded from Grade A due to limitations:</p> <ul style="list-style-type: none"> • Included studies of different designs: RCTs, case control studies and those of other design • Several primary outcomes may bias towards positive results • Heterogeneity did not allow meta-analysis – diversity among the studies • Results are inconsistently reported and not specific enough to make any judgement about efficacy of occupational therapy interventions • No details of where original studies conducted.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Taylor et al (2017)	<p>Randomised controlled trial</p> <p>Aim: to understand the impact of personalised environmental falls prevention recommendations on older adults' adherence compared to generalised recommendations</p> <p>Recruitment via flyers, providing community wellness seminars, electronic posters and word of mouth</p> <p>Inclusion: aged 65 years and older living in the community, engage in self-care at an independent or modified level, and able to follow through on recommended environmental changes</p> <p>Exclusion: receiving home health therapy services currently or in the past 60 days, or had dementia</p> <p>24 participants</p> <p>Mean age = 74.2 years</p> <p>United States of America.</p>	<p>Participants randomised into a group that received personalised education (n=12) or generalised education (n=12)</p> <p>Data was collected across 3 home visits by an occupational therapist, not blinded, between April 2012 and August 2013</p> <p>First visit included a semi-structured interview, the ABC scale and a home environmental evaluation (based upon a Centers for Disease Control [CDC] publication) and participants received a copy of the CDC publication 'Check for Safety: A Home Fall Prevention Checklist for Older Adults'. Control group received generalised education while intervention group received personalised education</p> <p>Second visit was a review of previous recommendations</p> <p>Third visit collected adherence data.</p>	<p>Percentage of adherence to recommendations measured via observation utilising forms created for this study and gathered during the third home visit</p> <p>Falls via self-report</p> <p>Perceived susceptibility of falling was measured via the Activities-Specific Balance Confidence scale (ABC).</p>	<p>22 participants included in analysis (12 in intervention group and 10 in control group)</p> <p>Mean total percentage of adherence was significantly higher for those receiving personalised education (69%) compared to generalised (37%) (p=0.03)</p> <p>No relationship between adherence and recent falls or perceived susceptibility to falls.</p>	<p>Grade B – Moderate</p> <p>Downgraded due to:</p> <ul style="list-style-type: none"> Reporting bias, small study and other limitations <p>Comments:</p> <ul style="list-style-type: none"> Study limitations include small sample size, which affects the generalisability of the data and the overall power of the statistical analysis, the reliance on self-selected individuals, the self-reporting of falls, and the non-blinding of the outcomes assessor.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Wijlhuizen et al (2007)	<p>Cohort study</p> <p>Aim: to test the assumption that the level of outdoor physical activity mediates the relationship between fear of falling and actual outdoor falls according to the Task Difficulty Homeostasis Theory</p> <p>Prospective follow-up study as part of the 'Safety in your own hands study'</p> <p>Living independently in the community</p> <p>1,752 participants</p> <p>Age ≥ 65 years</p> <p>Male:female ratio = 741:1,011</p> <p>Recruitment via local registry office. Randomly selected 8,650 and asked by mail to participate in the study</p> <p>2,080 (24%) agreed to participate</p> <p>Netherlands.</p>	<p>At baseline, participants were asked to complete and return a questionnaire</p> <p>Participants were subsequently telephoned at home once a month for 10 months and asked whether they had fallen in the previous month.</p>	<p>Baseline characteristics: gender, age, education, living alone, and perceived general health</p> <p>Asked how often afraid of falling outdoors, and, as indicator of outdoors physical activity, how often they walked outside for at least half an hour and how often they bicycled during the winter and summer</p> <p>During the personal telephone interview, the researchers gathered information about the nature of the fall(s)</p> <p>The outcome measure of the study was dichotomous: reporting at least one fall outdoors during walking or bicycling, or reporting no falls outdoors.</p>	<p>Data for 1,752 (84%) who completed the study</p> <p>About 22% (n=374) of the older people reported fear of falling outside the home; 3% (n=52) had fallen outdoors during walking or bicycling in the 10-month follow-up period</p> <p>People with a high fear of falling were more often low to moderately active compared with people who had no such fears and were more often very active. Fear of falling was not associated with outdoor falls, but it was after taking the level of physical activity into account</p> <p>Found that a high fear of falling outdoors was associated with a low to moderate level of outdoor physical activity (walking, bicycling), indicating that people who perceived themselves at risk of outdoor falls adjusted their behaviour by reducing exposure</p> <p>Outdoor physical activity mediated the relationship between fear of falling and actual outdoor falls. This implied that the incidence of falls as an outcome in studies did not adequately represent the impact of risk factors for falls and that level of physical activity should be taken into account.</p>	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> • A limitation of the study was the small numbers/ low (24%) proportion of participants who took part (main study required a participation commitment of about 3 years which may have discouraged the relatively older, less physically active, potential participants) • Limited to walking and bicycling • Ethics Committee did not allow the researchers to ask participants who dropped out during the follow-up for their motives.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Wilkins et al (2003)	<p>Critical literature review</p> <p>Review question: what is the effectiveness of education and functional training programmes in improving occupational performance and quality of life for older adults?</p> <p>Inclusive of well older adults and/or older adults with long-term conditions/chronic illnesses</p> <p>Exclusions: dementia, developmental delays or mental health illness</p> <p>Community-based and outpatient programmes</p> <p>Age ≥ 65 years</p> <p>Multiple sources of evidence.</p>	<p>Included randomised controlled trials, cohort, single case before and after, case control and cross-sectional design and case study design studies</p> <p>17 articles included.</p>	<p>Outcomes included measurement of occupational performance, such as participation in daily activities and/or in specific areas of self-care, productivity and/or leisure outcomes, and/or environmental contexts/conditions.</p>	<p>3 themes identified:</p> <p>a) Falls and functional decline</p> <p>b) Stroke</p> <p>c) Rheumatoid arthritis</p> <p>Three studies (all 1999) included on prevention of falls and implications were identified:</p> <ul style="list-style-type: none"> • A medical/occupational therapy prevention approach that considers both intrinsic falls risk factors could play a significant role in reducing the number of falls and the rate of recurrent falls in older adults • In older adults with a history of falls the risk of falls, both in and outside the home, could be reduced by home visits from an occupational therapist • The acceptance of home modifications by older adults might be enhanced by follow-up as well as funding • Home modifications might not be accepted and implemented by older people if there is no sense of ownership of the ideas, or opportunities for exerting control through joint decision making and negotiation. Options and choices were important. 	<p>Grade C – Low</p> <p>Comments:</p> <ul style="list-style-type: none"> • Critical, not systematic, review • Varying quality of studies included • Limited detail of occupational therapy programmes provided in the papers reviewed • In many studies the analysis was poor or not clearly described • Most of the studies did not include long-term follow-up to enable determination of the effectiveness of the intervention over time.

Source	Design and participants	Intervention	Outcomes	Results	Quality and comment
Zijlstra et al (2007)	<p>Systematic review</p> <p>Aim: to assess which interventions effectively reduce fear of falling in community-dwelling older people</p> <p>Inclusions:</p> <ul style="list-style-type: none"> • Randomised, controlled trials with fear of falling as an outcome • Community-living older people • Mean age of 65 and older • Interventions explicitly aimed to reduce fear of falling • Interventions not explicitly aimed to reduce fear of falling <p>Exclusions: studies targeted at people with a specific medical condition</p> <p>The search identified 599 abstracts, and 19 papers met the inclusion criteria</p> <p>Multiple sources of evidence.</p>	<p>Interventions explicitly aimed and interventions not explicitly aimed to reduce fear of falling were included</p> <p>Trials differed substantially regarding intervention characteristics and outcome measures</p> <p>Out of 19 trials:</p> <p>8 = fall-related multifactorial interventions</p> <p>3 = Tai Chi interventions</p> <p>4 = exercise interventions</p> <p>6 = balance interventions</p> <p>1 = hip protector intervention</p> <p>1 = fall risk factors</p> <p>3 of the interventions explicitly aimed to reduce fear of falling.</p>	<p>Reduced fear of falling</p> <p>Most trials assessed fear of falling using the Falls Efficacy Scale (FES), Modified Falls Efficacy Scale (MFES) or an adapted version of the FES.</p>	<p>In 11 trials, fear of falling was lower in the intervention group than the control group</p> <p>Interventions that showed effectiveness were fall-related multifactorial programmes (n=5), Tai Chi interventions (n=3), exercise interventions (n=2), a hip protector intervention (n=1)</p> <p>The findings in trials of higher methodological quality suggested that home-based exercise and fall-related multifactorial programmes and community-based Tai Chi delivered in group format can be effective in reducing fear of falling in older people living in the community</p> <p>Fear of falling can be a protective response to a realistic threat and prevent people from undertaking activities with a high risk of falling and potential injury. Fear of falling can, however, result in restriction of activities that a person could safely perform which leads to unnecessary adverse consequences regarding social, mental and physical health</p> <p>The experience of safely performing activities could lead to greater falls self-efficacy and a realistic view of the risk of falling.</p>	<p>Grade B – Moderate</p> <p>Downgraded from Grade A due to limitations:</p> <ul style="list-style-type: none"> • Trials differed substantially regarding intervention characteristics and outcome measures • No meta-analyses conducted • Small number of trials and in seven trials, sample sizes were small, with 50 or fewer participants per group • Little attention paid to process characteristics as these are essential for understanding and improving evaluated interventions • Subgroup analyses are recommended.

Appendix 8: Glossary and useful abbreviations

ABC Scale	<p>Activities-specific Balance Confidence Scale</p> <p>This is a 16-item self-report measure in which the person rates their balance confidence for performing activities. (Powell and Myers 1995)</p>
AGS	<p>American Geriatrics Society</p> <p>AGS is a not-for-profit organisation which aims to improve the health, independence and quality of life of all older people. http://www.americangeriatrics.org</p>
BAOT	<p>British Association of Occupational Therapists</p> <p>BAOT is the professional body for all occupational therapy staff in the United Kingdom. http://www.cot.co.uk/people-structure/about-baotcot</p>
BGS	<p>British Geriatrics Society</p> <p>The BGS is a professional association of healthcare practitioners and others with a particular interest in the medical care of older people, and in promoting better health in old age. http://www.bgs.org.uk</p>
CASP	<p>Critical Appraisal Skills Programme</p> <p>The Critical Appraisal Skills Programme supports the development of skills in the critical appraisal of scientific research, and provides a number of critical appraisal tools to support this activity (CASP 2013). http://www.casp-uk.net</p>
CI	<p>Confidence Interval</p> <p>There is always some uncertainty in research. This is because a small group of patients is studied to predict the effects of a treatment on the wider <i>population</i>. The confidence interval is 'a way of expressing how certain we are about the findings from a study, using statistics. It gives a range of results that is likely to include the "true" value for the population.'</p> <p>'The CI is usually stated as "95% CI", which means that the range of values has a 95 in a 100 chance of including the "true" value. For example, a study may state that "based on our <i>sample</i> findings, we are 95% certain that the 'true' population blood pressure is not higher than 150 and not lower than 110". In such a case the 95% CI would be 110 to 150.'</p> <p>'A wide confidence interval indicates a lack of certainty about the true effect of the test or treatment – often because a small group of patients has been studied. A narrow confidence interval indicates a more precise estimate (for example, if a large number of patients have been studied).'</p> <p>Glossary: http://www.nice.org.uk/website/glossary/glossary.jsp</p>

DH	Department of Health The DH leads, shapes and funds health and care in England. It was renamed the Department of Health and Social Care in 2018. https://www.gov.uk/government/organisations/department-of-health-and-social-care
DHSSPSNI	Department of Health, Social Services and Public Safety The DHSSPSNI is a Northern Ireland Department whose mission is to improve the health and social wellbeing of the people of Northern Ireland. Since 2016 it has been called the Department of Health. https://www.health-ni.gov.uk/
FaB	Falls Behavioural Scale The scale evaluates behavioural factors which could potentially protect against falling. Scores range from 1 to 4, with 4 applying to the most protective behaviours. (Clemson et al 2003)
FES/MFES	Falls Efficacy Scale and Modified Falls Efficacy Scale This scale evaluates confidence in avoiding falls when performing basic activities of daily living. (Hill et al 1996; Tinetti et al 1990)
GRADE	Grading of Recommendations Assessment, Development and Evaluation GRADE is a systematic and explicit methodology to assist in the judgement of the quality and strength of guideline recommendations. http://www.gradeworkinggroup.org
HCPC	Health and Care Professions Council HCPC is the regulator for 16 health professions, including occupational therapists. http://www.hcpc-uk.org
MMSE	Mini Mental State Examination This is a series of 11 questions to test a number of mental abilities, including memory, attention and language. (Folstein et al 1975)
NHS	National Health Service The NHS refers to the publicly funded healthcare systems in the United Kingdom.
NICE	National Institute for Health and Care Excellence NICE (formerly the National Institute for Health and Clinical Excellence) provides national guidance and advice to improve health and social care. http://www.nice.org.uk
Odds ratio	This compares the odds (probability) of something happening in one group with the odds of it happening in another. An odds ratio of 1 shows that the odds of the event happening (for example, a person developing a disease or a treatment working) is the same for both groups. An odds ratio of greater than 1 means that the event is more likely in the first group than the second. An odds ratio of less than 1 means that the event is less likely in the first group than in the second. https://www.nice.org.uk/Glossary?letter=O

p values	<p>Probability</p> <p>'The p value is a statistical measure that indicates whether or not an effect is statistically significant. For example, if a study comparing two treatments found that one seems more effective than the other, the p value is the <i>probability</i> of obtaining these results by chance. By convention, if the p value is below 0.05 (that is, there is less than a 5% probability that the results occurred by chance), it is considered that there probably is a real difference between treatments. If the p value is 0.001 or less (less than a 1% probability that the results occurred by chance), the result is seen as highly significant. If the p value shows that there is likely to be a difference between treatments, the <i>confidence interval</i> describes how big the difference in effect might be.'</p> <p><i>http://www.nice.org.uk/website/glossary/glossary.jsp</i></p>
ProFaNE	<p>Prevention of Falls Network Europe</p> <p>ProFaNE was established in 2003 with the aim of increasing knowledge and capacity, and thus reduce falls amongst older people, by the implementation of evidence-based intervention. This project is now closed, though some publications and information can still be found on its now static website.</p> <p><i>http://www.profane.eu.org</i></p>
RCOT	<p>Royal College of Occupational Therapists</p> <p>RCOT is a wholly owned subsidiary of BAOT and operates as a registered charity. The Royal College of Occupational Therapists sets the professional and educational standards for the occupational therapy profession and represents the profession at the national and international levels.</p> <p><i>https://www.rcot.co.uk/about-us/governance/how-we-are-run</i></p>
RCOTSS – Older People	<p>Royal College of Occupational Therapists Specialist Section – Older People</p> <p>RCOTSS – Older People is a branch of the Royal College of Occupational Therapists. It provides professional and clinical information on all aspects of occupational therapy practice related to older people. It has a responsibility to keep abreast of relevant professional practice, policy and legislative developments and issues. Members include occupational therapy staff from both physical and mental health services for older people.</p> <p><i>https://www.rcot.co.uk/about-us/specialist-sections/older-people-rcot-ss</i></p>
RCT	<p>Randomised controlled trial</p> <p>'A study in which a number of similar people are randomly assigned to two (or more) groups to test a specific drug or treatment. One group (the experimental group) receives the treatment being tested, the other (the comparison or <i>control group</i>) receives an alternative treatment, a dummy treatment (<i>placebo</i>) or no treatment at all. The groups are followed up to see how effective the <i>experimental treatment</i> was. <i>Outcomes</i> are measured at specific times and any difference in response between the groups is assessed statistically. This method is also used to reduce <i>bias</i>.'</p> <p><i>Glossary: http://www.nice.org.uk/website/glossary/glossary.jsp</i></p>

ROS	<p>Royal Osteoporosis Society ROS is a United Kingdom-wide charity which is 'dedicated to improving the diagnosis, prevention and treatment of osteoporosis and fragility fractures'. http://www.theros.org.uk</p>
SF36[®] SF12[®]	<p>Health Survey SF36[®] is a generic health survey that measures a person's view of their functional health and wellbeing. The 36 questions cover eight areas of physical and mental health: physical functioning; role limitations due to physical health; role limitations due to emotional problems; energy/fatigue; emotional wellbeing; social functioning; pain; and general health. The survey can be used across age, disease and treatment group. SF12[®] is a 12-question version of the survey.</p>
SIGN	<p>Scottish Intercollegiate Guideline Network SIGN develops evidence-based clinical practice guidelines for the NHS in Scotland. http://www.sign.ac.uk</p>
WeHSA	<p>Westmead Home Safety Assessment The WeHSA is a 72-item checklist developed to assess the physical and environmental home hazards of people at risk of falling. Each item on the WeHSA Assessment form is first rated as being 'relevant' or 'not relevant'. For those items rated as relevant, they are then rated as 'a hazard' or 'not a hazard'. Any identified hazards are then categorised according to the listing on the assessment form. (Clemson 1997)</p>

Appendix 9: Fall risk factors

Table A9 (COT 2006)

Intrinsic risk factors	Extrinsic risk factors	Behavioural risk factors
<ul style="list-style-type: none"> • Previous falls, fractures, stumbles and trips • Impaired balance/gait, restricted mobility • Medical history of Parkinson's, stroke, arthritis, cardiac abnormalities • Fear of falling • Medication (e.g. polypharmacy, psychotropic medication) • Acute illness • Dizziness • Postural hypotension • Syncope • Reduced muscle strength • Sarcopenia • Foot problems • Continence • Cognitive impairment • Impaired vision • Low mood • Pain 	<ul style="list-style-type: none"> • Stairs and steps • Clutter and tripping hazards (e.g. rugs, flexes) • Floor coverings • Poor lighting, glare, shadows • Lack of appropriate adaptations (e.g. grab rails, stair rails) • Low furniture • No access to telephone or alarm system • Poor heating • Thresholds, doors • Access to property, bins, garden, uneven ground • Inappropriate walking aids • Pets 	<ul style="list-style-type: none"> • Limited physical activity/exercise • Poor nutrition/fluid intake • Alcohol intake • Carrying, reaching, bending, risk-taking behaviour (e.g. climbing on chairs or ladders) • Footwear • Clothing • Inappropriate use of/refusal to use assistive devices

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Occupational therapy in the prevention and management of falls in adults

Practice guideline

Second Edition

This publication is an evidence-based resource to support occupational therapists working with adults in the prevention and management of falls. It provides a practice guideline with recommendations for those occupational therapists currently working in this speciality, as well as offering a useful reference point for students. It can also be used to inform people who access services and carers, together with other health professionals, managers and commissioners working in adult services, about the roles and responsibilities of the occupational therapist in this clinical area.

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