



**Reducing harm from falls:
Recommended evidence-based resources 2020**

*Includes systematic reviews,
clinical guidelines and toolkits*

April 2020

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For additional resources for consumers on reducing harm from falls, visit the [Live Stronger for Longer website](#).

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Introduction

This document includes:

- a collection of high-level evidence on reducing falls and harm from falls, current for 2020
- recent literature of interest and relevance to anyone working to reduce falls and harm from falls
- evidence about, and an overview of, the Health Quality & Safety Commission's [10 Topics in reducing harm from falls](#). Each topic contains more detailed information and is intended to contribute to professional development exercises.

High-level recommendations

Most falls happen in the community. The information on this page supports a population health approach to reducing harm from falls that starts in the community with strength and balance exercise programmes, home safety modifications and guideline-based screening and treatment for osteoporosis.

Assessing individuals for falls risk factors is also important. Interventions are then tailored to the needs of the individual older person, and guideline-based care is provided after a fall. Evidence supports the following high-level recommendations.

- Ask all older people (generally those aged 65 years and over) about slips, trips and falls to identify those at risk.
- Appropriately supervised and supported balance, strength and gait training is an effective population health prevention measure for falls. It may be the only measure that some older people need ([find a local class](#)).
- Assess an older person's risk factors for falling, ideally including assessment for:
 - [frailty](#)
 - fragility fractures
 - [cognitive impairment](#).
- Implement an individualised and collaborative care plan to address the risk factors identified (including safe environment and appropriate referrals).
- Consider bone mineral density screening for women over 65 years and other individuals at high risk for osteoporosis. The results may lead to prescription of bone-preserving medications (treatment can be started without bone mineral density screening in those over 75 years who have had a minimal trauma fracture).
- Consider a medication optimisation review and appropriate deprescribing for older individuals.
- Combine planned, evidence-based falls prevention programmes with fracture liaison services using partnerships of key providers.
- Perform an early orthogeriatrician assessment and physiotherapy assessment for patients who have fractured their hip (see the Australian and New Zealand Hip Fracture Registry [Guideline for Hip Fracture Care and Hip Fracture Clinical Care Standard](#)).
- Ensure that the older person, their carers and/or family and whānau understand the reasons why falls need to be avoided, why the interventions are important and what the evidence base means.

Recent literature of interest (February 2019–February 2020)

The links throughout this document provide evidence for the key messages in the [10 Topics](#) based on systematic reviews, guidelines, meta-analyses, umbrella reviews or health technology assessments.

Below we highlight some of the evidence published in the last 12 months.

Summary of 2019–20 evidence on falls

- The National Institute for Health and Care Excellence (NICE) conducted surveillance of the evidence on reducing harm from falls. It found that **evidence continues to support strength and balance exercises** (now clearly effective even beyond 12 months) and other exercises with strength and balance components. Other interventions the evidence supports are **home safety assessment and modifications**, and **vitamin D in the aged residential care setting**.
- The NICE surveillance of the evidence calls into question whether medicines review or multifactorial interventions tailored to the individual's risk assessment (as opposed to multicomponent interventions offered to everyone) are effective in preventing falls. However, reasons remain for continuing to implement these interventions (see below).
- Social isolation and loneliness, as well as malnourishment are associated with falls.
- Orthostatic hypotension occurs in one in four older people in aged care facilities and one in five in the community. These findings add to the evidence that supports measuring and documenting lying and standing blood pressure as a falls risk factor.
- An Australian survey revealed poor knowledge of care among staff: only one-quarter of staff (26.5 percent) were aware that residents were at high risk for falls.
- In aged residential care, strength and balance exercises, staff education about medication, falls and fall prevention guidelines, and vitamin D all appear to be effective.
- Only 30 percent of hip fracture patients in New Zealand are assessed by a geriatrician before surgery, even though shared orthogeriatric care, and specifically an orthogeriatric ward model of care, improve outcomes.

New falls evidence surveillance (NICE 2019)

The UK's National Institute for Health and Care Excellence conducted a surveillance review of the evidence supporting its guidelines of falls and published its findings in 2019. Through its surveillance, NICE found the following, which might materially impact on recommendations ([NICE 2019](#)).

- Topic experts indicated a need to include frailty and previous fragility fractures as individual risk factors for falling.
- Evidence on multifactorial interventions is inconsistent but showed no effect of increasing falls any more than it showed a reduction in falls. (When interventions are classified as multifactorial or multiple component, multiple component interventions [offered to everyone] appear to be effective whereas multifactorial interventions [adapting interventions to the person's risk] do not.)
- Strength and balance exercises are effective, but an update is needed to consider whether to recommend other types of exercise (eg, Tai Chi) as well. Evidence addressed both people living in the community and people living in residential care.
- Home hazard modification or occupational health assessments reduce falls.
- Evidence did not support medicines interventions, including reducing psychotropic and cardiovascular medicines for reducing falls. However, medicines optimisation has wider benefits and should continue.
- Evidence on podiatry interventions was inconsistent. However, case management, self-care interventions and telehealth interventions may reduce falls.
- Evidence in the hospital setting suggests that bed and bedside chair sensors, bed alarms and multifactorial interventions may not reduce falls. Physiotherapy showed inconsistent results depending on the measure of falls, and NICE found no evidence on bedrails. Preventing delirium may help reduce falls.

We emphasise that these were the findings of the evidence surveillance report and not yet NICE recommendations for clinical practice.

Falls in New Zealand

We update the New Zealand [falls and fractures outcome framework dashboard](#) every quarter. The dashboard provides data on the number of fall injuries, serious harm falls, length of hospital stay, bisphosphonate treatment, and consumers enrolled in community or home-based prevention programmes both nationally and by district health board. Users can access the dashboard to **see how the nation and various district health boards are tracking** on key measures of falls harm reduction.

Consumers, carers, families and whānau

Falls are linked to social isolation and loneliness. A systematic review of 17 studies revealed that in all studies loneliness, social isolation and living alone were significantly associated with falls in older people ([Petersen et al 2020](#)). This association is important because it highlights additional social factors to consider in those who have fallen, and also the need to discuss falls prevention with those who may be lonely or socially isolated.

The impact of falls

Intracranial bleeding is common after a ground-level fall. A systematic review of older people presenting to an emergency department after a ground-level fall found the incidence of intracranial bleeding is about 5 percent ([de Wit et al 2020](#)). This finding

emphasises the very serious consequences of falling and the importance of prevention. Health professionals should explain these possible consequences to older people and their whānau when discussing why falls prevention is important.

Identifying older people at risk of falling

Older adults who are malnourished have an increased risk of falling. A systematic review and meta-analysis of 9,510 older adults found that people who were malnourished or those at risk for malnutrition had a 45 percent higher risk of experiencing at least one fall than those who were well-nourished ([Trevisan et al 2019](#)). However, a recent prospective analysis of 2,464 men and women aged over 60 years suggests that increased protein intake alone does not protect against falls risk ([Sandoval-Insausti et al 2019](#)).

Orthostatic hypotension is a common falls risk factor and should be tested for. A systematic review and meta-analysis of 24,967 older people living at home and 2,694 living in care facilities found that the prevalence of postural blood pressure drop was 22 percent in the community and 24 percent in residential facilities ([Saedon et al 2020](#)). Health professionals should record blood pressure both lying and standing and document it in the notes.

Keeping active remains crucial

The evidence supporting exercise (including strength and balance training as well as Tai Chi) remains strong.

A systematic review considered 108 randomised controlled trials of exercise as a single intervention to prevent falls in adults aged 60+ years who were living in the community. It found that trials of the following interventions were successful in reducing falls ([Ng et al 2019](#)):

- balance and functional training interventions lasting on average 25 weeks, group based or individually tailored
- Tai Chi interventions lasting on average 20 weeks, mostly group based
- programmes with many different types of exercise lasting on average 26 weeks, group based or individually tailored.

Exercise programmes are effective in the long term. Systematic review and meta-analysis have shown that programmes for falls prevention are effective in reducing both the rate and risk of falls by about 20 percent for more than 12 months. However, the effect did not continue beyond two years after the intervention ([Finnegan et al 2019a](#)).

Factors enabling older people to continue with exercise depend on the individual. Older people differ in their meaningful rationale for exercising. Influences on their decision to continue or not are identity, health, social interaction and type of exercise. To empower an older person to continue these effective falls prevention measures, health professionals should get to know the rationale and offer evidence-based practice and support for the older person to move from a structured intervention towards longer-term exercise-related behaviour. Health professionals should attempt to identify the motivators and deterrents of each individual during the intervention phase. They can then try

behavioural change strategies, alongside educational elements in the programmes, so that participants can incorporate exercise into everyday life ([Finnegan et al 2019b](#)).

Important influences on whether older people with cognitive impairment continue with falls prevention exercises, as one study found through semi-structured interviews, were: routine; practical and emotional support; memory support; purpose; past experiences of sport and exercise; and belief in and experience of benefits. Health professionals should understand that identifiable cognitive, psychological and practical factors influence whether those with cognitive impairment persist with exercise and should address these so that interventions can succeed ([Hancox et al 2019](#)).

Interventions in the community

The role of multifactorial interventions may not be as important as previously thought. A systematic review and meta-analysis published in August 2019 examined 41 trials and over 20,000 participants to identify the effect of multifactorial interventions in the community setting. Results showed that multifactorial interventions may reduce the rate at which people fall by 21 percent, but that evidence for reducing the risk of falling or the impact of falls was slight. The authors concluded that:

while multifactorial interventions may reduce the rate of falls and slightly reduce risk of people sustaining one or more falls and recurrent falls, they may make little or no difference to other fall-related outcomes (such as fall-related fractures, falls requiring hospital admission or medical attention, health-related quality of life) ([Hopewell et al 2019](#)).

This conclusion suggests that researchers should examine the cost-effectiveness of multifactorial interventions in the community in further detail.

Furthermore, a systematic review and meta-analysis of randomised controlled trials, published in December 2019, found insufficient evidence to support the use of multifactorial interventions to prevent falls or hospital use in older people presenting to the emergency department following a fall ([Morello et al 2019](#)).

However, it is also important to note that the ‘usual care’ many studies use to compare with an intervention may still be effective care, including many obvious interventions to prevent falls. As we learn more about preventing falls and apply it in usual practice, intervention studies may find a more limited effect for the intervention. Moreover, many falls in aged residential care are associated with terminal decline and may be difficult to prevent, without simply keeping the older person in bed. These different kinds of falls might also dilute the effect of interventions. The key point remains that health professionals should assess an older person’s risk factors for falling and then choose and tailor interventions based on their individual circumstances.

Interventions in aged residential care

A systematic review and meta-analysis published in 2019 looked at the efficacy of interventions to prevent falls in nursing homes and whether they were generalisable to residents with cognitive impairment and dementia. From 36 studies, the authors found evidence that falls prevention interventions overall reduced the number of falls by 27

percent. **Strength and balance exercise** in particular, as a single intervention, reduced the number of fallers by 36 percent and recurrent fallers by 41 percent among residents in aged care. **Staff education** about medication, falls and fall prevention guidelines was effective. **Vitamin D supplementation** was also effective (see below). Some multiple and multifactorial interventions appeared to be effective, which may include some combination of exercise, environmental modifications, medication review, medical assessment, optometry review and podiatry review ([Gulka et al 2019](#)).

Vitamin D is appropriate for residents in long-term facilities to prevent falls. The debate about the role of vitamin D in falls prevention appears to have concluded. A review by the Canadian Agency for Drugs and Technologies in Health (CADTH) found moderate-quality evidence to suggest that vitamin D supplementation may reduce the rate of falls (ie, number of falls), but not the risk of falling (ie, number of individuals who fall) in older adults residing in long-term care facilities. CADTH also concluded that economic evaluations show vitamin D supplementation is less costly and more effective than no intervention in preventing falls and fall-related injuries. However, health professionals should avoid giving high daily doses (> 4,000 IU daily) or high-load doses of vitamin D because they may increase fall rates ([CADTH 2019](#)).

Medication optimisation

Most of the evidence for the impact of medication optimisation on falls has been equivocal. However, some recent evidence now indicates **successful approaches have occurred in the residential care setting**.

In New Zealand, a feasibility study at three aged residential care facilities trialled pharmacist-led deprescribing of anticholinergic and sedative medicines. The pharmacist used peer-reviewed deprescribing guidelines to recommend targeted deprescribing of anticholinergic and sedative medicines to general practitioners (GPs). GPs actioned 72 percent of deprescribing interventions that the pharmacist recommended. The authors concluded that after six months, significant benefits occurred across a range of important health measures including mood, frailty, falls and reduced adverse reactions ([Ailabouni et al 2019](#)). However, whether these findings are generalisable will depend on the rapport and relationship between pharmacists and GPs in different contexts.

Support for this local study comes from findings of a systematic review of pharmacist services in nursing homes. The review of 52 studies (13 randomised controlled trials) found that pharmacist-led services that included medication review and/or staff education reduced the mean number of falls among residents, although results were mixed for health outcomes ([Lee et al 2019](#)).

A separate systematic review and meta-analysis looked specifically at health outcomes of deprescribing interventions in nursing homes. Across 41 studies (n = 18,408 residents), deprescribing interventions significantly reduced the number of residents with potentially inappropriate medications by 59 percent (odds ratio [OR] 0.41, 95% confidence interval [CI] 0.19–0.89). Subgroup analysis showed that medication review-directed deprescribing interventions reduced all-cause mortality by 26 percent (OR 0.74, 95% CI 0.65–0.84), and the number of fallers by 24 percent (OR 0.76, 95% CI 0.62–0.93) ([Kua et al 2019](#)).

Considerations for organisations

A number of successful interventions for reducing harm from falls have included some component of staff education. A cross-sectional survey at eight aged residential care facilities assessed the knowledge of 147 facility care staff in Australia in 2015. The questionnaire examined staff knowledge, confidence, motivation and opportunity to undertake falls prevention strategies. Strikingly, only one-quarter of staff (26.5 percent) were aware that residents were at high risk for falls. Only 13.5 percent observed residents for side effects of medicines. When asked about their preferences for education delivery, respondents preferred one-on-one, face-to-face education in the workplace, and reminder posters ([Francis-Coad et al 2019](#)).

Studies have shown shared care between orthopaedics and geriatric medicine reduces mortality after hip fracture. A systematic review and meta-analysis aimed to determine which model of care is optimal. The review found that across 18 studies the mortality after hip fracture was 18 percent but that elderly patients with hip fracture had reduced long-term mortality when they were admitted early into any sort of orthogeriatric models or more specifically to a dedicated orthogeriatric ward ([Moyet et al 2019](#)).

Implementing what works

In some cases, we are not yet implementing simple measures that guidelines recommend. For example, the Australian and New Zealand Hip Fracture Registry (ANZHFR) *Annual Report 2019* notes the following statistics ([ANZHFR 2019](#)).

- Only 29 percent of facilities had a shared care model between orthopaedics and geriatric medicine.
- Only 30 percent of hip fracture patients in New Zealand were **assessed by a geriatrician before surgery** (up from 24 percent in 2018) – yet orthogeriatrician care improves outcomes for hip fracture patients.
- Among hip fracture patients in New Zealand, 55 percent had no pre-operative medical assessment.
- Only 35 percent of hip fracture patients in New Zealand had **an assessment of cognitive function** before surgery (up from 20 percent in 2018).
- Only 22 percent of hospitals routinely provided individualised written information to patients on preventing future falls and fractures.

Although these numbers appear to be trending in the right direction, more can be done. The Hip Fracture Clinical Care Standard, which the Health Quality & Safety Commission has endorsed, includes seven quality statements. For hip fracture patients, it also recommends assessment of cognition before surgery, an orthogeriatric model of care, and bone health assessment and management.

Cost-effectiveness

Recent cost-effectiveness analyses suggest that exercise interventions are cost-effective for falls prevention. Examples of these interventions are:

- a tailored exercise programme for older people that included strengthening of lower extremities, balance training, cardiovascular exercise, stretching and functional training of moderate intensity performed twice per week. Each session lasted for 60 minutes in groups of three to eight participants, who continued in the programme for at least six months. The programme also involved home-based follow-up ([Winser et al 2020](#))
- the SUNBEAM strength and balance exercise programme, which halved the number of injurious falls in a randomised controlled trial across 16 care facilities, at a cost of \$18 per fall prevented ([Hewitt et al 2019](#)).

10 Topics in reducing harm from falls

The following table summarises [10 Topics resources](#).

<p>Topic 1</p>	<p>The impact of falls on the health of older people is substantial. It needs to be addressed through a systematic and integrated approach (see Topic 1).</p> <ul style="list-style-type: none"> • Jones S, Blake S, Hamblin R, et al. 2016. Reducing harm from falls. <i>New Zealand Medical Journal</i> 129(1446): 89–103. • Ehlers MM, Nielsen CV, Bjerrum MB. 2018. Experiences of older adults after hip fracture: an integrative review. <i>Rehabilitation Nursing</i> 43(5): 255–66. DOI: 10.1097/rnj.0000000000000096 (accessed 20 March 2020).
<p>Topic 2</p>	<p>Health professionals should ask all older people about falls to identify those at risk. The at-risk people they identify then need a multifactorial risk assessment (see Topic 2).</p>
<p>Topic 3</p>	<p>All older people screening positive when asked about falls should have an assessment of their risk factors for falling (see Topic 3).</p> <ul style="list-style-type: none"> • Sousa L, Marques-Vieira C, de Caldevilla M, et al. 2016. Risk for falls among community-dwelling older people: systematic literature review. <i>Revista Gaucha de Enfermagem</i> 37(4): e55030. DOI: 10.1590/1983-1447.2016.04.55030 (accessed 20 March 2020). • Fernando E, Fraser M, Hendriksen J, et al. 2017. Risk factors associated with falls in older adults with dementia: a systematic review. <i>Physiotherapy Canada</i> 69(2): 161–70. DOI: 10.3138/ptc.2016-14 (accessed 20 March 2020).
<p>Topic 4</p>	<p>Health professionals should implement an individualised care plan addressing identified risk factors for any older person at risk of falling (see Topic 4).</p> <p>In the community</p> <ul style="list-style-type: none"> • Hopewell S, Adedire O, Copsey BJ, et al. Multifactorial and multiple component interventions for preventing falls in older people living in the community. <i>Cochrane Database of Systematic Reviews</i> 2018, Issue 7, Art. No. CD012221. • Stubbs B, Brefka S, Denking MD. 2015. What works to prevent falls in community-dwelling older adults? Umbrella review of meta-analyses of randomized controlled trials. <i>Physical Therapy</i> 95(8): 1095–110. • Stevens JA, Burns ER. 2015. A CDC Compendium of Effective Fall Interventions: What works for community-dwelling older adults (3rd edn). Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. • Centre for Reviews and Dissemination, University of York. 2014. Preventing falls in the community. <i>Effectiveness Matters</i> October.

	<p>In hospitals and long-term care facilities</p> <ul style="list-style-type: none"> • Cameron ID, Dyer SM, Panagoda CE, et al. Interventions for preventing falls in older people in care facilities and hospitals. <i>Cochrane Database of Systematic Reviews</i> 2018, Issue 9, Art. No. CD005465. • Gulka HJ, Patel V, Arora T, et al. 2020. Efficacy and generalizability of falls prevention interventions in nursing homes: a systematic review and meta-analysis. <i>Journal of the American Medical Directors Association</i> [Epub ahead of print]. DOI: 10.1016/j.jamda.2019.11.012 (accessed 20 March 2020). [NEW] • Mlake-Lye IM, Hempel S, Ganz DA, et al. 2013. Inpatient fall prevention programs as a patient safety strategy: a systematic review. <i>Annals of Internal Medicine</i> 158(5–P2): 390–7. • Hill AM, McPhail SM, Waldron N, et al. 2015. Fall rates in hospital rehabilitation units after individualised patient and staff education programmes: a pragmatic, stepped-wedge, cluster-randomised controlled trial. <i>Lancet</i> 385(9987): 2592–9.
Topic 5	<p>Falls can be prevented by making the environment safer – whether the older person is in care, at home, or out and about (see Topic 5).</p> <ul style="list-style-type: none"> • Keall MD, Pierse N, Howden-Chapman P, et al. 2015. Home modifications to reduce injuries from falls in the Home Injury Prevention Intervention (HIPI) study: a cluster-randomised controlled trial. <i>The Lancet</i> 385(9964): 231–8.
Topic 6	<p>Every fall is an opportunity for assessment, individualised care planning and system improvement to prevent further falls (see Topic 6).</p> <ul style="list-style-type: none"> • Healey F, Darowski A, Lamont T, et al. 2011. Essential care after an inpatient fall: summary of a safety report from the National Patient Safety Agency. <i>British Medical Journal</i> 342(d329): 342–3.

Topic 7	<p>Osteoporosis risk assessment and management are important, along with guideline-based care for older people with hip fractures (see Topic 7).</p> <p>Prevent minimal trauma fracture with bone preserving medication:</p> <ul style="list-style-type: none"> • Osteoporosis New Zealand. 2017. Guidance on the Diagnosis and Management of Osteoporosis in New Zealand. Wellington: Osteoporosis New Zealand. • US Preventive Services Taskforce. 2018. Osteoporosis to prevent fractures: screening. Rockville, MD: USPSTF. • bpac^{NZ}. 2018. Bisphosphonates: Addressing the duration conundrum. Dunedin: Best Practice Advocacy Centre. <p>Provide comprehensive care for consumers who have had a fracture.</p> <ul style="list-style-type: none"> • Eamer G, Taheri A, Chen S, et al. Comprehensive geriatric assessment for older people admitted to a surgical service. <i>Cochrane Database of Systematic Reviews</i> 2018, Issue 1, Art. No. CD012485. • ANZHFR Steering Group. 2014. Australian and New Zealand Guideline for Hip Fracture Care: Improving outcomes in hip fracture management of adults. Sydney: Australian and New Zealand Hip Fracture Registry Steering Group. • Australian and New Zealand Bone and Mineral Society. 2015. Position paper on secondary fracture prevention programs: a call to action. Sydney: Australian and New Zealand Bone and Mineral Society.
Topic 8	<p>A medicine optimisation review is recommended, including review for inappropriate polypharmacy and drugs that increase falls risk (see Topic 8).</p> <ul style="list-style-type: none"> • bpac^{NZ}. 2018. Stopping medicines in older people: the flip side of the prescribing equation. Dunedin: Best Practice Advocacy Centre.
Topic 9	<p>Strength and balance exercises, and other evidence-based approaches such as Tai Chi, prevent falls (see Topic 9).</p> <ul style="list-style-type: none"> • Sherrington C, Fairhall NJ, Wallbank GK, et al. Exercise for preventing falls in older people living in the community. <i>Cochrane Database of Systematic Reviews</i> 2019, Issue 1, Art. No. CD012424. • USPSTF. 2018. Falls prevention in community-dwelling older adults: interventions. Rockville, MD: US Preventive Services Taskforce. • Lewis M, Peiris C, Shields N. 2017. Long-term home and community-based exercise programs improve function in community-dwelling older people with cognitive impairment: a systematic review. <i>Journal of Physiotherapy</i> 63(1): 23–9.
Topic 10	<p>Falls prevention requires an integrated multidisciplinary system-wide approach (see Topic 10).</p> <ul style="list-style-type: none"> • Jones S, Blake S, Hamblin R, et al. 2016. Reducing harm from falls. <i>New Zealand Medical Journal</i> 129(1446): 89–103.

- Appleton-Dyer S, Edirisuriya N, Boswell A. 2016. [Reducing Harm from Falls Programme Evaluation: A report for the Health Quality & Safety Commission.](#) Auckland: Synergia.
- Bunn F, Dickinson A, Barnett-Page E, et al. 2008. [A systematic review of older people's perceptions of facilitators and barriers to participation in falls-prevention interventions.](#) *Ageing and Society* (28): 449–72.

Cochrane Reviews

A number of Cochrane Reviews have evaluated the evidence for interventions to prevent falls and reduce harm from falls. Pooled study results will include some varying definitions of 'older people'. Across all these reviews, the effective interventions can be summarised as follows.

Setting	Interventions that appear effective according to Cochrane Review (where more than one trial was assessed)
Community (all older people)	<ul style="list-style-type: none"> • Strength and balance exercise (reduces the risk of falling and rate of falling, no matter what the level of individual risk) • Home safety assessment and modification (reduces the risk of falling and rate of falling, especially in those at high risk) • Multicomponent interventions, which commonly include exercise, education and home safety interventions (may reduce the rate of falls and risk of falling)
Community (older people who have fallen)	<ul style="list-style-type: none"> • Multifactorial interventions, which include individual risk assessment (may reduce the rate of falls, potentially by hundreds of falls per 1,000 people per year)
Long-term care	<ul style="list-style-type: none"> • Hip protectors (reduce the risk of hip fractures in care settings) • Vitamin D (reduces the rate of falls for those deficient in vitamin D)
Hospital	<ul style="list-style-type: none"> • Multifactorial interventions (based on assessment of the particular risks of each individual, may reduce the rate of falls in sub-acute care) • Comprehensive geriatric assessment (reduces the likelihood of discharge to an increased level of care for those who have fractured their hip)

Important Cochrane Reviews

Strength and balance exercise reduces the risk of falling and rate of falling for those living in the community (2019):

- Sherrington C, Fairhall NJ, Wallbank GK, et al. [Exercise for preventing falls in older people living in the community](#). *Cochrane Database of Systematic Reviews* 2019, Issue 1, Art. No. CD012424.

Vitamin D for those deficient (in long-term care) and multifactorial interventions (in sub-acute hospital care) can prevent falls in older people (2018):

- Cameron ID, Dyer SM, Panagoda CE, et al. [Interventions for preventing falls in older people in care facilities and hospitals](#). *Cochrane Database of Systematic Reviews* 2018, Issue 9, Art. No. CD005465.

Multifactorial interventions may reduce the rate of falls and risk of fractures for those living in the community (2018):

- Hopewell S, Adedire O, Copsey BJ, et al. [Multifactorial and multiple component interventions for preventing falls in older people living in the community](#). *Cochrane Database of Systematic Reviews* 2018, Issue 7, Art. No. CD012221.

Comprehensive geriatric assessment for older people admitted to a surgical service (eg, for hip fracture) improves outcomes (2018):

- Eamer G, Taheri A, Chen S, et al. [Comprehensive geriatric assessment for older people admitted to a surgical service](#). *Cochrane Database of Systematic Reviews* 2018, Issue 1, Art. No. CD012485.

Exercise probably reduces fear of falling in older people living in the community (2014):

- Kendrick D, Kumar A, Carpenter H, et al. [Exercise for reducing fear of falling in older people living in the community](#). *Cochrane Database of Systematic Reviews* 2014, Issue 11, Art. No. CD009848.

Hip protectors can prevent hip fractures in older people living in care (2014):

- Santesso N, Carrasco-Labra A, Brignardello-Petersen R. [Hip protectors for preventing hip fractures in older people](#). *Cochrane Database of Systematic Reviews* 2014, Issue 3, Art. No. CD001255.

Group and home-based exercise programmes, home safety interventions, and multifactorial interventions reduce falls in the community (2012):

- Gillespie LD, Robertson MC, Gillespie WJ, et al. [Interventions for preventing falls in older people living in the community](#). *Cochrane Database of Systematic Reviews* 2012, Issue 9, Art. No. CD007146.

Clinical guidelines and standards

- National Institute for Health and Care Excellence (NICE). 2013 (reviewed 2016). [Falls in Older People: Assessing risk and prevention](#). Clinical Guideline CG161.
- Australian Commission on Safety and Quality in Health Care. 2016. [Hip Fracture Care Clinical Care Standard](#). Sydney: Australian Commission on Safety and Quality in Health Care.
- Rimland J, Abraha I, Dell'Aquila D, et al. 2017. [Non-pharmacological interventions to prevent falls in older patients: clinical practice recommendations – the SENATOR ONTOP series](#). *European Geriatric Medicine* 8(5–6): 413–8.
- Australian and New Zealand Hip Fracture Registry Steering Group. 2014. [Australian and New Zealand Guideline for Hip Fracture Care: Improving outcomes in hip fracture management of adults](#). Sydney: Australian and New Zealand Hip Fracture Registry Steering Group.
- Osteoporosis New Zealand. 2016. [Clinical Standards for Fracture Liaison Services in New Zealand](#). Wellington: Osteoporosis New Zealand.
- Osteoporosis New Zealand. 2017. [Guidance on the Diagnosis and Management of Osteoporosis in New Zealand](#). Wellington: Osteoporosis New Zealand.
- Avin KG, Hanke TA, Kirk-Sanchez N, et al. 2015. [Management of falls in community-dwelling older adults: clinical guidance statement from the Academy of Geriatric Physical Therapy of the American Physical Therapy Association](#). *Physical Therapy* 95(6): 815–34.
- Australian New Zealand Society for Geriatric Medicine. 2014. [Position Statement -- Exercise guidelines for older adults](#). *Australasian Journal on Ageing* 33(4): 287–94.
- US Preventive Services Task Force. 2018. [Osteoporosis to prevent fractures: screening](#). Rockville, MD: USPSTF.
- US Preventive Services Task Force. 2018. [Falls prevention in community-dwelling older adults: interventions](#). Rockville, MD: USPSTF.

Toolkits and guides

For clinicians

- [Stay Independent: Falls prevention toolkit for clinicians](#): Health Quality & Safety Commission, Accident Compensation Corporation, bpac^{NZ}.
- [Preventing Falls in Hospitals: eLearning modules](#): Royal College of Physicians in partnership with NHS England, accredited by NICE.
- [Queensland Stay On Your Feet Toolkit](#): a toolkit developed by Queensland Health, based on a community good-practice model designed for anyone working with older people.
- [Osteoporosis resources for health professionals](#): includes Osteoporosis New Zealand clinical guidance.
- [Fracture risk calculators](#): collated by Osteoporosis New Zealand.
- [Decision support tool for clinicians and patients to discuss bisphosphonate options](#): National Institute for Health and Care Excellence.
- [Medsafe guides on medications for osteoporosis](#): collated by Osteoporosis New Zealand.
- Bay of Plenty District Health Board: [Care Companion Programme workbook](#) – practical guidance for close observation care with dignity.

For health consumers

- Accident Compensation Corporation (ACC):
 - [Live Stronger for Longer – ACC's falls prevention programme for older adults](#)
 - [Find a strength and balance class near you](#)
 - [Online resources for over 65s: bone health, exercise, nutrition and home safety](#)
 - [I care for someone 65 and over](#)
- Osteoporosis New Zealand:
 - [Resources for the public](#)
 - [Medsafe guides on medications for osteoporosis – for patients and members of the public](#)

For organisations

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