

Medicines and Falls

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Introduction

This document is intended to provide information and guidance on medication review for people at risk of falls.

A number of medicines can cause or contribute to falls and these are sometimes referred to as falls risk increasing drugs (FRIDs). This document highlights FRIDs and also highlights medicines that cause or contribute to fractures. Therefore, effective medication review is essential for people who are at risk of falls or fractures.

Medication review in people at risk of falls is often not straight forward as people will often have multiple co-morbidities, be older and/or be living with frailty hence medicines use in this population requires a balance between the risks and benefits of multiple treatments.

Therefore, this document suggests a process and areas that anyone reviewing medicines for people at risk of falls might want to think about as part of this review.

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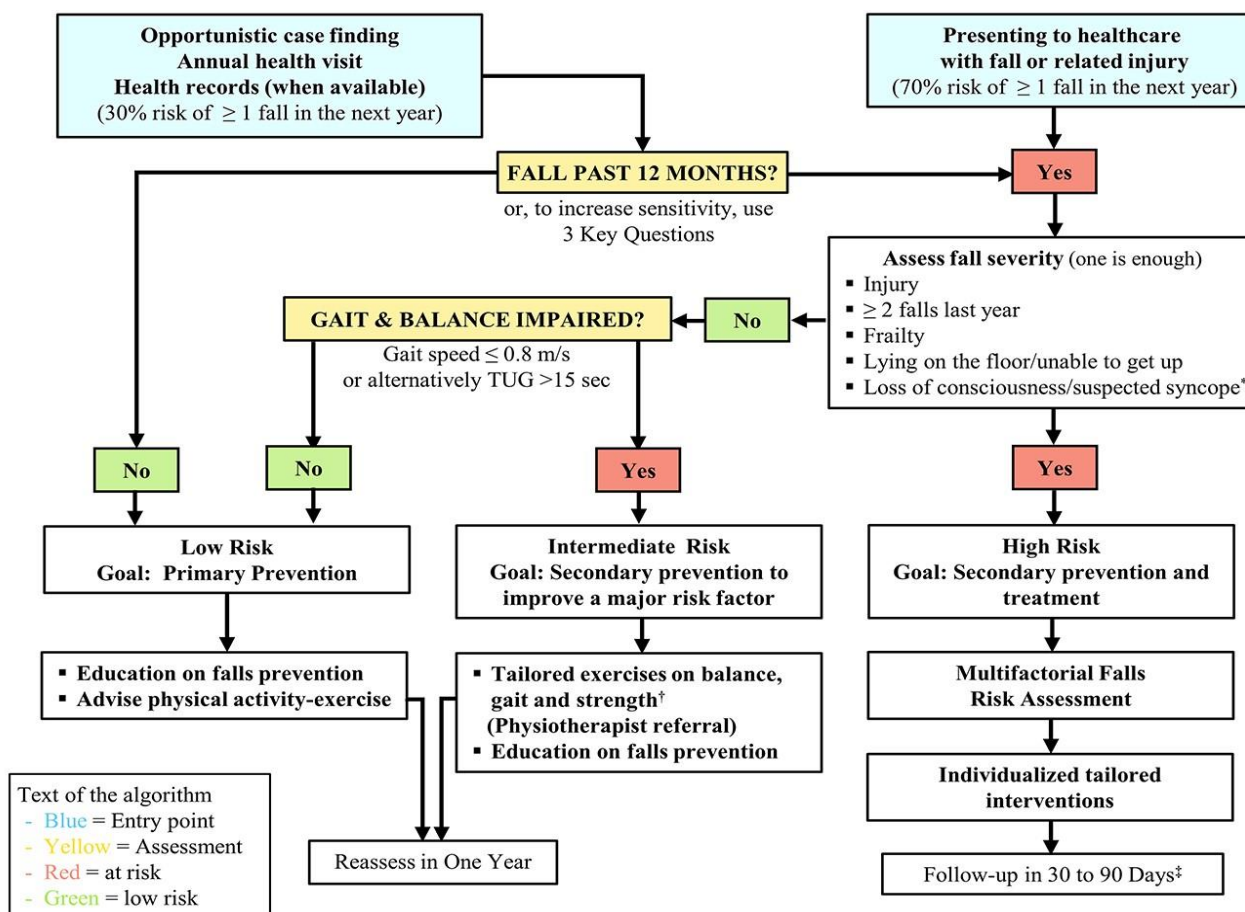
Acknowledgements

With thanks to Professor Tony Avery, Sue Dewhirst, Dr Mani Krishnan, Julie Windsor, Dr Amanda Thompson, Dr Tash Masud and Lis Boulton for their support and guidance during the production of this document.

Falls Assessment and Tests

Falls assessment and relevant tests are beyond the scope of this document but in general should be performed as recommended by the World guidelines for falls prevention and management for older adults: a global initiative (community dwelling adults summary below)¹. This paper aims to summarise effective strategies on how this can be achieved in clinical practice.

<https://www.bgs.org.uk/resources/world-guidelines-for-falls-prevention-and-management-for-older-adults-a-global-initiative>



Notes: 3 Key Questions (3KQ) any positive answer to a) Has fallen in the past year? b) Feels unsteady when standing or walking? or c) Worries about falling? prompts to “fall severity” step. **Fall severity:** fall with injuries (severe enough to consult with a physician), laying on the ground with no capacity to get up, or a visit to the emergency room, or loss of consciousness/suspected syncope. **Frailty.** Commonly used frailty assessment tools include the Frailty Phenotype and the Clinical Frailty Scale.

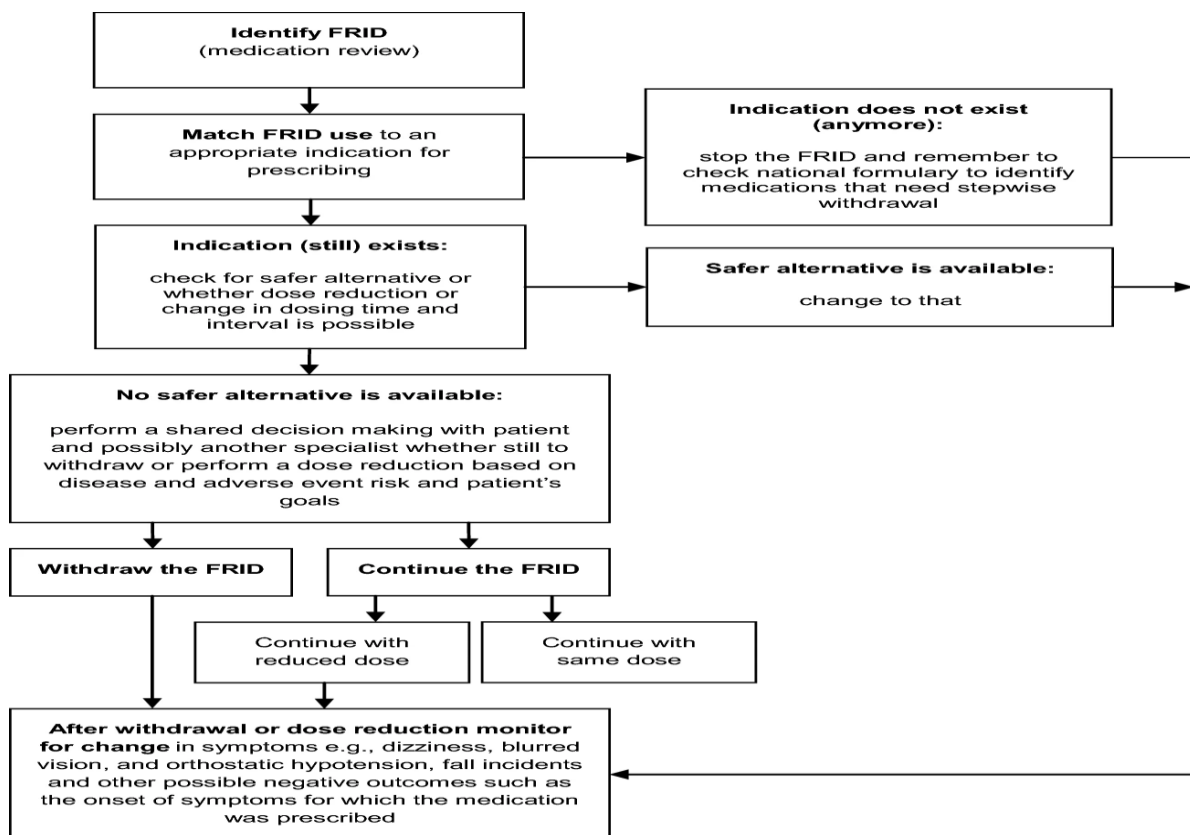
*Syncope suspicion should trigger syncope evaluation/management. †Exercises on balance/leg strength should be recommended for the intermediate group. Evidence shows that challenging balance exercises are more effective for fall prevention. In several settings, this intermediate group is referred to a physiotherapist. ‡ High risk individuals with falls can deteriorate rapidly, and close follow up is recommended and should be guided on the frequency of consequent health service utilization. **TUG:** timed up and go test

All patient's presenting to healthcare with a fall or related injury and therefore deemed high risk of further fall should have a medication review as part of a multifactorial assessment. Additionally, the world falls guidelines provide a strong recommendation that when prescribing a falls risk increasing drug (FRID) to older adults this should be accompanied by an assessment of falls risk. Consider this in any setting and for low, intermediate and high-risk groups.

Reference:

Montero-Odasso M, van der Velde N, Martin FC et al. Task Force on Global Guidelines for Falls in Older Adults. World guidelines for falls prevention and management for older adults: a global initiative. Age and Ageing 2022; 51(9): afac205 <https://doi.org/10.1093/ageing/afac205>

- There is evidence that certain medicines increase falls risk in older adults, referred to as falls-risk-increasing-drugs (FRIDs), that a structured approach improves FRID identification and that medication review and deprescribing of FRIDs can significantly reduce falls risk.
- A suggested decision tree for FRID management is displayed below (from EuGMS Task and Finish group on Fall-Risk-Increasing Drugs (FRIDs): Position on Knowledge Dissemination, Management, and Future Research)



- Before prescribing potential FRIDs to older adults, enquire about falls and consider the relative benefits and risks of initiating therapy.

Medication Review

- All patients at risk of falls should have their medicine burden reviewed with respect to its propensity to cause falls.
- The history should establish the reason the medicine was given, when it was started, whether it is effective and if the person is having any side effects.
- An attempt should be made to reduce the number and dosage of medicines, and ensure they are appropriate and not causing undue side effects.
- Falls can be caused by almost any drug that acts on the brain or on the circulation. Usually, the mechanism leading to a fall is one or more of:
 - sedation, with slowing of reaction times and impaired balance.
 - hypotension, including the 3 syndromes of paroxysmal hypotension – orthostatic hypotension, vasovagal syndrome and vasodepressor carotid sinus hypersensitivity.
 - bradycardia, tachycardia or periods of asystole.
- Falls may be the consequence of recent medication changes but are usually caused by medicines that have been given for some time.

Medication Review Process

- Medication review should be formulated in line with an established structure – an example is the Seven Steps method:



- Step 1: **(Aim) What matters to the patient.**
 - Identify aims and objectives of drug therapy by asking the patient ‘*what matters to you?*’.
 - Explain any key information such as laboratory markers
 - Establish treatment objectives with patient through shared decision making
- Step 2: **(Need) Identify essential drug therapy.**
 - Separate the list of medicines which the patient is taking
 - Ensure patients understand the importance of essential drug therapy
 - All medication whether herbal, prescribed or non-prescribed e.g. traditional remedies should be included
- Step 3: **(Need) Does the patient take unnecessary drug therapy?**
 - For the remaining drugs, it should be verified that each has a function in achieving the therapeutic goals or outcomes that matter most to the patient
 - Review preventative treatment to ensure the patient is able to continue taking medicine for required time to gain benefit (useful tool for this process is [Drug Efficacy \(NNT\) table](#)).
 - Can lifestyle changes replace any unnecessary drug therapy?

- Step 4: **(Effectiveness) Are therapeutic objectives being achieved?**
 - Check treatment choice is the most effective to achieve intended outcomes
 - If this is not the case, the possibility of patient non-adherence should be investigated as a potential explanation. Otherwise, the need for dose titration may also be considered. 50% of patients taking four or more medicines don't take them as prescribed. ([Medication Adherence: WHO Cares?](#)).
- Step 5: **(Safety) Is the patient at risk of Adverse Drug Reaction (ADR) or suffers actual ADR?**
 - The presence of ADRs can sometimes be identified from laboratory data (e.g. hypokalaemia from diuretic use)
 - The patient may report such symptoms (including drug-drug and drug-disease interactions, but also the patient's ability to self-medicate)
 - Ask the patient specific questions (e.g. about the presence of anticholinergic symptoms, dizziness or drowsiness). If patient is experiencing ADRs, use [Yellow Card Reporting](#)
- Step 6: **(Efficiency) Is drug therapy cost-effective?**
 - Opportunities for cost minimisation should be explored, but changing drugs for cost reasons should only be considered if effectiveness, safety or adherence would not be compromised.
 - Ensure prescribing is in line with current formulary recommendations
- Step 7: **(Patient-Centred) Is the patient willing and able to take drug therapy as intended?**
 - Does the patient understand the outcome of the review?
 - Ensure drug therapy is tailored to patient preferences
 - Agree and communicate plan with patient and/or welfare proxy
Even if adult lacks capacity, adults with Incapacity Act still requires that the adult's views are sought. "Adults with Incapacity Documentation" in place.

The Brief Adherence and Concordance Tool (BACAT) questions can be helpful in exploring and assessing adherence:

1. Do you have difficulty getting the medicines from the doctor or pharmacy?
2. Do you have difficulty in opening boxes, using creams, eye drops etc, reading labels?
3. Do you think you have missed or forgotten any medicines in the last week?
4. Have you needed to take any extra doses of your medicines - more than your doctor prescribed?
5. Do you have any concerns about your medicines? Do your medicines give you side effects or upset you?
6. Do you worry your medicines aren't working? Do you think you need something else?

For more detailed information on medication review in older people with polypharmacy see [Polypharmacy: Manage Medicines \(scot.nhs.uk\)](#)

Falls Risk Increasing Drugs (FRID) evidence summary

- [STOPPFall \(Screening Tool of Older Persons Prescriptions in older adults with high fall risk\): a Delphi study by the EuGMS Task and Finish Group on Fall-Risk-Increasing Drugs | Age and Ageing | Oxford Academic](#) is an example of a screening tool used to identify medicines that increase the risk of falls in older adults
- Other tools that can be used include; [STOPP/START version 3: even better with age | SpringerLink](#); [American Geriatrics Society 2019 Updated AGS Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults - - 2019 - Journal of the American Geriatrics Society - Wiley Online Library](#); [The FORTA \(Fit fOR The Aged\) App as a Clinical Tool to Optimize Complex Medications in Older People - Journal of the American Medical Directors Association \(jamda.com\)](#) and the [Meds75+ - fimea englanti](#). [MedStopper](#) is a useful tool that has links to both the Beers and STOPP criteria.
- The table below provides an evidence summary on medicines which can contribute to falls risk. Relevant treatments have been graded using a traffic light system according to their potential to cause a fall – you will be able to see colour grading when you click into the hyperlink:
 - **Red – high risk** consider referral for medication review
 - **Amber – medium risk** – consider referral for medication review after consideration of other risk factors which may have contributed to a fall
- Anticholinergic burden of medication also increases falls risk – information in the table below is based upon data on Medichec online calculator.
- All patients with Parkinson’s Disease are at risk of falls due to their condition and medication used to manage it – individualised falls risk assessment is part of standard care.
- **N.B. No list can be comprehensive and the reviewer’s clinical judgement and experience continues to be essential in tailoring the advice given to the needs of an individual patient and to identify other additional medication-related problems.**

Box 1: Falls Risk Increasing Drugs List – Extended information in Appendix 1

To obtain further information on each medicine, click into the hyperlink to see extended information:

Name of medication	Name of medication	Name of medication
ALFUZOSIN	FENTANYL	OXYCODONE
ALIMEMAZINE	FLECAINIDE	PAROXETINE
AMIODARONE	FLUOXETINE	PERINDOPRIL
AMISULPIRIDE	FLUPHENAZINE	PHENELZINE
AMITRIPTYLINE	FLURAZEPAM	PHENOBARBITAL
AMLODIPINE	FOSINOPRIL	PHENYTOIN
ARIPRIPAZOLE	FUROSEMIDE	PRAZOSIN
ATENOLOL	GABAPENTIN	PREGABALIN
BACLOFEN	GALANTAMINE	PROCHLORPERAZINE
BENDROFLUMETHIAZIDE	GLYCERYL TRINITRATE	PROMAZINE
BETAHISTINE	HALOPERIDOL	PROMETHAZINE
BISOPROLOL	HYDROXYZINE	PROPRANOLOL
BUMETANIDE	HYOSCINE BUTYLBROMIDE	QUETIAPINE
BUPRENORPHINE	HYOSCINE HYDROBROMIDE	QUINAPRIL
CANDESARTAN	IMPIRAMINE	RAMIPRIL
CAPTOPRIL	INDAPAMIDE	RISPERIDONE
CARBAMAZEPINE	INDORAMIN	RIVASTIGMINE
CARVEDILOL	IRBESARTAN	SERTRALINE
CHLORDIAZEPOXIDE	ISOCARBOXAZID	SODIUM VALPROATE
CHLORPHENAMINE	ISOSORBIDE MONONITRATE	SOLIFENACIN
CHLORPROMAZINE	LACIDIPINE	SOTALOL
CHLORTHALIDONE	LAMOTRIGINE	SULPIRIDE
CINNARIZINE	LERCANIDIPINE	TAMSULOSIN
CITALOPRAM	LEVETIRACETAM	TELMISARTAN
CLOMIPRAMINE	LISINOPRIL	TEMAZEPAM
CLONAZEPAM	LOFEPRAMINE	TERAZOSIN
CLONIDINE	LORAZEPAM	TIMOLOL EYEDROPS
CLOZAPINE	LORMETAZEPAM	TOLTERODINE
CODEINE	LOSARTAN	TOPIRAMATE
DANTROLENE	METOLAZONE	TRAMADOL
DIAZEPAM	METOPROLOL	TRANDOLAPRIL
DIGOXIN	MIANSERIN	TRANLYCYPROMINE
DIHYDROCODEINE	MIRTAZAPINE	TRAZODONE
DIPHENHYDRAMINE	MORPHINE	TRIFLUPERAZINE
DILTIAZEM	MOXONIDINE	TRIHEXYPHENIDYL
DONEPEZIL	NICORANDIL	TRIMEPRAZINE
DOSULEPIN	NIFEDIPINE	TRIMIPRAMINE
DOXAZOSIN	NIRTAZEPAM	VALSARTAN
DOXEPIN	NORTRIPTYLINE	VENLAFAXINE
DULOXETINE	OLANZAPINE	VERAPAMIL
ESCITALOPRAM	OLEMSARTAN	ZOLPIDEM
ENALAPRIL	ORPHENADRINE	ZOPICLONE
EPROSARTAN	OXAZEPAM	
FELODIPINE	OXYBUTYNIN	

Medicines that increase the risk of fracture

Some medicines also increase the risk of fracture and therefore should also be reviewed in people at risk of falls. Medicines that cause or contribute to fractures are listed in the table below along with the mechanism of causation.

Medicine	Mechanism
<p>Antiepileptics Carbamazepine, phenytoin, phenobarbitone, primidone</p> <p>Sodium valproate</p> <p>Refs Medicines and Healthcare products Regulatory Agency (2014). Antiepileptics: adverse effects on bone. https://www.gov.uk/drug-safety-update/antiepileptics-adverse-effects-on-bone (Last accessed: 15 Feb 2023) Sahota KK, Anpalakhan, S. Managing osteoporosis in older people. 2019 https://www.pharmaceutical-journal.com/article/ld/managing-osteoporosis-in-older-people (Last Accessed 16 June 2021)</p>	<p>Increase clearance of vitamin D, leading to secondary hyperparathyroidism, increased bone turnover, and reduced bone density. Decreased bone mineral density-mechanism unclear</p> <p>Refs Medicines and Healthcare products Regulatory Agency (2014). Antiepileptics: adverse effects on bone. https://www.gov.uk/drug-safety-update/antiepileptics-adverse-effects-on-bone (Last accessed: 15 Feb 2023) Sahota KK, Anpalakhan, S. Managing osteoporosis in older people. 2019 https://www.pharmaceutical-journal.com/article/ld/managing-osteoporosis-in-older-people (Last Accessed 16 June 2021)</p>
<p>Antipsychotics e.g. haloperidol, chlorpromazine</p> <p>Ref Sahota KK, Anpalakhan, S. Managing osteoporosis in older people. 2019 https://www.pharmaceutical-journal.com/article/ld/managing-osteoporosis-in-older-people (Last Accessed 16 June 2021)</p>	<p>Some increase prolactin which reduces oestrogen and testosterone and therefore may reduce bone mineral density (BMD). Trial evidence is conflicting</p> <p>Ref Clapham E, Bodén R, Reutfors, J et al. Exposure to risperidone versus other antipsychotics and risk of osteoporosis-related fractures: a population-based study. Acta Psychiatrica Scandinavica 2019; 141 (1): 74-83</p>
<p>Aromatase inhibitors e.g. anastrozole</p> <p>Ref Sahota KK, Anpalakhan, S. Managing osteoporosis in older people. 2019 https://www.pharmaceutical-journal.com/article/ld/managing-osteoporosis-in-older-people (Last Accessed 16 June 2021)</p>	<p>Inhibit aromatase enzyme which converts adrenal androgens to oestrogen leading to bone loss</p> <p>Ref Electronic medicines compendium (2023). Electronic Medicines Compendium. https://www.medicines.org.uk/emc/ (Last accessed 15 Feb 2023)</p>
<p>Gonadotrophin releasing hormone analogues e.g. goserelin, leuporelin</p> <p>Ref Sahota KK, Anpalakhan, S. Managing osteoporosis in older people. 2019 https://www.pharmaceutical-journal.com/article/ld/managing-osteoporosis-in-older-people (Last Accessed 16 June 2021)</p>	<p>Reduces serum testosterone which reduces bone mineral density</p> <p>Ref Electronic medicines compendium (2023). Electronic Medicines Compendium. https://www.medicines.org.uk/emc/ (Last accessed 15 Feb 2023)</p>
<p>Immunosuppressants e.g. ciclosporin, tacrolimus</p> <p>Ref Sahota KK, Anpalakhan, S. Managing osteoporosis in older people. 2019 https://www.pharmaceutical-journal.com/article/ld/managing-osteoporosis-in-older-people (Last Accessed 16 June 2021)</p>	<p>Increased bone turnover leading to bone loss</p> <p>Refs Kulak CA, Borba VZ, Kulak JJ et al. Bone disease after transplantation: osteoporosis and fractures risk. Arquivos Brasileiros de Endocrinologia & Metabologia 2014; 58 (5): 484-492. https://doi.org/10.1590/0004-2730000003343 Sambrook PN Ciclosporine and bone loss. Clinical and Experimental Rheumatology 2000;18 Suppl 21: S93-S96 Turner MR, Camacho X, Fischer HD et al. Levothyroxine dose and risk of fractures in older adults: nested case-control study BMJ 2011; 342, d2238. https://doi.org/10.1136/bmj.d2238</p>
<p>Levothyroxine</p> <p>Ref Hulisz D, Ada OB Drug-induced osteoporosis. US Pharmacist 2006;12: HS3-HS6</p>	<p>Overtreatment of hypothyroidism with levothyroxine causes decreased bone quality and BMD</p> <p>Ref Hulisz D, Ada OB Drug-induced osteoporosis. US Pharmacist 2006;12: HS3-HS6</p>
<p>Loop diuretics e.g. furosemide</p> <p>Ref Sahota KK, Anpalakhan, S. Managing osteoporosis in older people. 2019 https://www.pharmaceutical-journal.com/article/ld/managing-osteoporosis-in-older-people (Last Accessed 16 June 2021)</p>	<p>Increased calcium excretion causing reduced BMD</p>

<p>Medroxyprogesterone Ref Sahota KK, Anpalakhan, S. Managing osteoporosis in older people. 2019 https://www.pharmaceutical-journal.com/article/ld/managing-osteoporosis-in-older-people (Last Accessed 16 June 2021)</p>	<p>Reduces oestrogen and can reduce osteoblast differentiation Ref Hulisz D, Ada OB Drug-induced osteoporosis. US Pharmacist 2006;12: HS3-HS6</p>
<p>Proton pump inhibitors e.g. lansoprazole, omeprazole Ref Sahota KK, Anpalakhan, S. Managing osteoporosis in older people. 2019 https://www.pharmaceutical-journal.com/article/ld/managing-osteoporosis-in-older-people (Last Accessed 16 June 2021)</p>	<p>May reduce calcium absorption of bone density Ref Yang YX, Lewis JD, Epstein S et al. Long-term Proton Pump Inhibitor Therapy and Risk of Hip Fracture. JAMA 2006; 296 (24): 2947-2953. https://doi.org/10.1001/jama.296.24.2947</p>
<p>SSRIs e.g. citalopram, fluoxetine Refs Bakken MS, Engeland A, Engesæter LB et al. Increased risk of hip fracture among older people using antidepressant drugs: data from the Norwegian Prescription Database and the Norwegian Hip Fracture Registry. Age and Ageing 2013; 42 (4): 514-520. https://doi.org/10.1093/ageing.agt009 Gorgas MQ, Torres F, Vives R et al. Effects of selective serotonin reuptake inhibitors and other antidepressant drugs on the risk of hip fracture: a case-control study in an elderly Mediterranean population. European Journal of Hospital Pharmacy 2021; 28 (1): 28-32 https://doi.org/10.1136/ejhpharm-2019-001893</p>	<p>May modulate skeletal response to parathyroid hormone, inhibit proliferation of osteoblasts or have a direct effect on bone cells which causes bone loss Refs Bakken MS, Engeland A, Engesæter LB et al. Increased risk of hip fracture among older people using antidepressant drugs: data from the Norwegian Prescription Database and the Norwegian Hip Fracture Registry. Age and Ageing 2013; 42 (4): 514-520. https://doi.org/10.1093/ageing.agt009 Gorgas MQ, Torres F, Vives R et al. Effects of selective serotonin reuptake inhibitors and other antidepressant drugs on the risk of hip fracture: a case-control study in an elderly Mediterranean population. European Journal of Hospital Pharmacy 2021; 28 (1): 28-32 https://doi.org/10.1136/ejhpharm-2019-001893</p>
<p>Steroids Ref Sahota KK, Anpalakhan, S. Managing osteoporosis in older people. 2019 https://www.pharmaceutical-journal.com/article/ld/managing-osteoporosis-in-older-people (Last Accessed 16 June 2021)</p>	<p>Reduces bone formation due to direct inhibition of osteoblasts, increases bone resorption which may be due to parathyroid hormone-mediated activation of osteoclasts. Associated with malabsorption of calcium and inhibition of sex hormone secretion which may also contribute to bone loss Ref Cohen S, Levy RM, Keller M et al. Risedronate therapy prevents corticosteroid-induced bone loss. Arthritis & Rheumatism 1999; 42 (11): 2309-2318 <a href="https://doi.org/10.1002/1529-0131(199911)42:11<2309::AID-ANR8>3.0.CO;2-K">https://doi.org/10.1002/1529-0131(199911)42:11<2309::AID-ANR8>3.0.CO;2-K</p>
<p>Thiazolidinediones e.g. pioglitazone Ref Sahota KK, Anpalakhan, S. Managing osteoporosis in older people. 2019 https://www.pharmaceutical-journal.com/article/ld/managing-osteoporosis-in-older-people (Last Accessed 16 June 2021)</p>	<p>Suppress new bone formation by osteoblasts and may increase bone resorption by affecting the aromatase pathway, leading to decreased oestrogen production Refs Schwartz AV, Sellmeyer DE, Vittinghoff E et al. Thiazolidinedione Use and Bone Loss in Older Diabetic Adults. The Journal of Clinical Endocrinology & Metabolism 2006; 91 (9): 3349-3354. https://doi.org/10.1210/jc.2005-2226 Lecka-Czernik B. Bone Loss in Diabetes: Use of Antidiabetic Thiazolidinediones and Secondary Osteoporosis. Current Osteoporosis Reports 2010; 8 (4):178-184. https://doi.org/10.1007/s11914-010-0027-y</p>

Assessment and Treatment of Osteoporosis

Assessment and treatment of osteoporosis is important to ensure people at risk of fracture are assessed and treated appropriately e.g. with bone protection. Assessment and treatment of osteoporosis is beyond the scope of the scope of this article but see the National Osteoporosis Group Guideline for further information. [National Osteoporosis Guidelines Group UK \(nogg.org.uk\)](http://nogg.org.uk) <accessed online 24.3.23> NICE guidance is available but is under development at the time of writing [Project documents | Osteoporosis: risk assessment, treatment, and fragility fracture prevention \(update\) | Guidance | NICE](#)

Orthostatic Hypotension (OH)

OH is a common cause of falls in Older People. A suggested approach is outlined in [Orthostatic \(Postural \) Hypotension \(leedsth.nhs.uk\)](#) <accessed online 15.3.23>

Examples of medicines that cause hypotension or OH

Cardiovascular medicines

- Angiotensin-converting enzyme inhibitors, for example ramipril
- Angiotensin II inhibitors, for example candesartan cilexetil, losartan
- Alpha blockers, for example doxazosin, tamsulosin hydrochloride
- Beta blockers, for example bisoprolol fumarate
- Calcium channel blockers, for example amlodipine
- Centrally acting antihypertensives, for example moxonidine, clonidine hydrochloride
- Diuretics, for example furosemide, bendroflumethiazide
- Vasodilators, for example nitrates such as isosorbide mononitrate

Psychotropic medicines

- Anti-Parkinson medicines, for example levodopa, ropinirole
- Antipsychotics, for example chlorpromazine hydrochloride, quetiapine
- Selective serotonin reuptake inhibitors, for example citalopram, fluoxetine
- Serotonin and noradrenaline reuptake inhibitors, for example venlafaxine, duloxetine
- Monoamine oxidase inhibitors, for example phenelzine, selegiline hydrochloride
- Prochlorperazine
- Tricyclic antidepressants, for example amitriptyline hydrochloride

Targets

Drug-induced hypotension including OH and hypoglycaemia are common in older people especially frail older people and can cause or contribute to falls.

Check if the person has a blood pressure or HbA1c target.

If the person has a target, is it appropriate for the person's goals, age, function, other co-morbidities and prognosis? There is no evidence-based international consensus on BP targets for older people including frail older people. NICE currently recommends measuring standing as well as seated blood pressure in people with hypertension who are aged 80 and over or with Type 2 Diabetes or with symptoms of postural hypotension.

- **BP Targets**

For adults with hypertension aged under 80, reduce clinic blood pressure to below 140/90 mmHg and ensure that it is maintained below that level.

For adults with hypertension aged 80 and over, reduce clinic blood pressure to below 150/90 mmHg and ensure that it is maintained below that level. Use clinical judgement for people with frailty or multimorbidity (see also NICE's guideline on multimorbidity [Overview | Multimorbidity: clinical assessment and management | Guidance | NICE](#)).

Use clinical judgement for people with frailty or multimorbidity (see also NICE's guideline on multimorbidity [Overview | Multimorbidity: clinical assessment and management | Guidance | NICE](#)) which may mean accepting higher blood pressure especially if the older person is experiencing symptoms suggestive of postural hypotension; if they are struggling with their existing medicines burden (particularly if they are already taking several antihypertensives) and if they have limited life expectancy.

Aggressive blood pressure treatment in older people especially those living with frailty can have unintended consequences such as orthostatic hypotension that may induce falls.

- **HbA1c Targets**

For adults whose type 2 diabetes is managed either by lifestyle and diet, or lifestyle and diet combined with a single drug not associated with hypoglycaemia, support them to aim for an HbA1c level of 48 mmol/mol (6.5%). For adults on a drug associated with hypoglycaemia, support them to aim for an HbA1c level of 53 mmol/mol (7.0%). A decision aid is available from NICE [Patient decision aid | Type 2 diabetes in adults: management | Guidance | NICE](#)

Consider relaxing the target HbA1c level on a case-by-case basis and in discussion with adults with type 2 diabetes, with particular consideration for people who are older or frailer, if:

- they are unlikely to achieve longer-term risk-reduction benefits, for example, people with a reduced life expectancy
- tight blood glucose control would put them at high risk if they developed hypoglycaemia, for example, if they are at risk of falling, they have impaired awareness of hypoglycaemia, or they drive or operate machinery as part of their job
- intensive management would not be appropriate, for example if they have significant comorbidities.

If adults with type 2 diabetes reach an HbA1c level that is lower than their target and they are not experiencing hypoglycaemia, encourage them to maintain it. Be aware that there are other possible reasons for a low HbA1c level, for example deteriorating renal function or sudden weight loss.

Some suggested targets for BP and HbA1c in older people can be found here:

[Guidelines \(idf.org\)](#) <accessed 15.2.23>

[Diabetes and Frailty: An Expert Consensus Statement on the Management of Older Adults with Type 2 Diabetes - PMC \(nih.gov\)](#) <accessed 15.2.23>

[Hypertension Management in Older and Frail Older Patients | Circulation Research \(ahajournals.org\)](#) <accessed 15.2.23>

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Appendix 1: Falls Risk Increasing Drugs List – Extended information

Adopted from Derbyshire Area Joint Prescribing Committee Document			
Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
ALFUZOSIN	Alpha blockers	Severe orthostatic hypotension, sedation	AEC score 0. Review indication if OH present. Stopping it may precipitate urinary retention in men.
ALIMEMAZINE	Antihistamines – phenothiazine derivative	Central sedative effect	AEC score 3 – consider review or switch to safer alternative. Rate of excretion decreases in old age.
AMIODARONE	Anti-arrhythmic	Bradycardia, other arrhythmias	AEC score 1
AMISULPIRIDE	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score not available
AMITRIPTYLINE	Tricyclic antidepressant	Sedation (antihistamine effect), slow reaction times, impaired balance, orthostatic hypotension (alpha blocking activity), dizziness, blurred vision	AEC score 3 – consider review or switch to safer alternative. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
AMLODIPINE	Calcium channel blocker	Hypotension and paroxysmal hypotension	AEC score 0
ARIPRIPAZOLE	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score 1
ATENOLOL	Beta blocker	Bradycardia, hypotension, carotid sinus hypersensitivity, orthostatic hypotension and vasovagal syndrome	AEC score 0. May accumulate in older patients due to renal excretion
BACLOFEN	Muscle relaxant	Sedation, reduced muscle tone	AEC score not available. Drug used in conditions which predispose to falls

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
BENDROFLUMETHIAZIDE	Thiazide Diuretic	Dehydration causes hypotension, low potassium can cause fainting and general weakness, low sodium can cause confusion	AEC score 0
BETAHISTINE	Antihistamine	Sedation, no evidence of benefit for long term use	AEC score 0
BISOPROLOL	Beta blocker	Bradycardia, hypotension, carotid sinus hypersensitivity, hypotension, vasovagal syndrome	AEC score not available
BUMETANIDE	Loop Diuretic	Dehydration causes hypotension, low potassium can cause fainting and general weakness, low sodium can cause confusion, nocturia	AEC score not available
BUPRENORPHINE	Opioid analgesic	Sedation, slow reactions, impaired balance, delirium risk	AEC score 0. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
CANDESARTAN	Angiotensin 2 inhibitor	Orthostatic hypotension; excreted by liver and kidney	AEC score 0
CAPTOPRIL	ACE inhibitor	Orthostatic hypotension; renally eliminated and can accumulate in dehydration or renal failure	AEC score not available
CARBAMAZEPINE	Antiepileptic	Sedation, slow reactions, excess levels can cause ataxia and unsteadiness	AEC score 1
CARVEDILOL	Beta blocker	Bradycardia, hypotension, carotid sinus hypersensitivity, hypotension, vasovagal syndrome	AEC score not available

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
CHLORDIAZEPOXIDE	Benzodiazepine	Drowsiness, slow reactions, impaired balance, tolerance with prolonged use	AEC score 0. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
CHLORPHENAMINE	Antihistamine	Sedation, no evidence for prolonged use	AEC score 2
CHLORPROMAZINE	Antipsychotic	Orthostatic hypotension, sedation, slow reflexes, impaired balance	AEC score 3
CHLORTHALIDONE	Thiazide Diuretic	Dehydration causes hypotension, low potassium can cause fainting and general weakness, low sodium can cause confusion, nocturia	AEC score not available
CINNARIZINE	Antihistamine	Sedating, no evidence for long term use	AEC score not available
CITALOPRAM	Antidepressant (SSRI)	Orthostatic hypotension, may impair sleep quality	AEC score 1. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
CLOMIPRAMINE	Tricyclic antidepressant	Sedation (antihistamine effect), slow reaction times, impaired balance, orthostatic hypotension (alpha blocking activity), dizziness, blurred vision	AEC score 3. Consider review or switch to safer alternative. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
CLONAZEPAM	Benzodiazepine	Drowsiness, slow reactions, impaired balance, tolerance with prolonged use	AEC score not known. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
CLONIDINE	Centrally acting AH	Orthostatic hypotension, sedating	AEC score not known.
CLOZAPINE	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score 3
CODEINE	Opioid analgesic	Sedation, slow reaction times, impaired balance, cause delirium	AEC score not known. Variable metabolic pathways
DANTROLENE	Muscle relaxant	Sedation, reduced tone, used in conditions associated with falls	AEC score not known
DIAZEPAM	Benzodiazepine	Drowsiness, slow reactions, impaired balance, tolerance with prolonged use	AEC score 1. Active metabolite accumulates in renal impairment. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
DIGOXIN	Cardiac glycoside	Bradycardia	AEC score not known
DIHYDROCODEINE	Opioid analgesic	Sedation, slow reactions, impaired balance, cause delirium	AEC score not known
DIPHENHYDRAMINE	Antihistamine	Sedation, no evidence for prolonged use	AEC score 2
DILTIAZEM	Calcium channel block	Hypotension, paroxysmal hypotension, bradycardia, fatigue	AEC score 0
DONEPEZIL	Acetylcholinesterase inhibitor	Symptomatic bradycardia and syncope	AEC score 0
DOSULEPIN	Tricyclic antidepressant	Sedation (antihistamine effect), slow reaction times, impaired balance, orthostatic hypotension (alpha blocking activity), dizziness, blurred vision	AEC score 3. Consider review or switch to safer alternative. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
DOXAZOSIN	Alpha blocker	Severe orthostatic hypotension, sedation	AEC score 0
DOXEPIN	Tricyclic antidepressant	Sedation (antihistamine effect), slow reaction times, impaired balance, orthostatic hypotension (alpha blocking activity), dizziness, blurred vision. Rate of falls doubled	AEC score 3. Consider review or switch to safer alternative. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
DULOXETINE	Antidepressant (SNRI)	Orthostatic hypotension, impaired sleep quality	AEC score 0. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
ESCITALOPRAM	Antidepressant (SSRI)	Orthostatic hypotension, may impair sleep quality	AEC score not known. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
ENALAPRIL	ACE inhibitor	Orthostatic hypotension; renally eliminated and can accumulate in dehydration or renal failure	AEC score 0
EPROSARTAN	Angiotensin 2 inhibitor	Orthostatic hypotension; excreted by liver and kidney	AEC score not known
FELODIPINE	Calcium channel blocker	Hypotension and paroxysmal hypotension	AEC score 0
FENTANYL	Opioid analgesic	Sedation, slow reaction times, impaired balance, cause delirium	AEC score 1.
FLECAINIDE	Antiarrhythmic	Bradycardia, other arrhythmias	AEC score 0

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
FLUOXETINE	Antidepressant (SSRI)	Orthostatic hypotension, may impair sleep quality	AEC score 1. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
FLUPHENAZINE	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score 1
FLURAZEPAM	Benzodiazepine	Drowsiness, slow reactions, impaired balance, tolerance with prolonged use	AEC score not known. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
FOSINOPRIL	ACE Inhibitor	Orthostatic hypotension; excreted by liver and kidney	AEC score not known
FUROSEMIDE	Loop diuretic	Dehydration causes hypotension, low potassium can cause fainting and general weakness, low sodium can cause confusion, nocturia	AEC score 0
GABAPENTIN	Antiepileptic	Sedation	AEC score 0
GALANTAMINE	Acetylcholinesterase inhibitor and nicotinic agonist	Symptomatic bradycardia and syncope	AEC score 0
GLYCERYL TRINITRATE	Nitrate	Hypotension, paroxysmal hypotension	AEC score not known
HALOPERIDOL	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score 0
HYDROXYZINE	Antihistamine	Sedation, no evidence for prolonged use	AEC score 1

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
HYOSCINE BUTYLBROMIDE	Antimuscarinic	Sedation, dizziness, blurred vision, dry eyes	AEC score 1
HYOSCINE HYDROBROMIDE	Antimuscarinic	Sedation, dizziness, blurred vision, dry eyes	AEC score 3
IMPIRAMINE	Tricyclic Antidepressant	Sedation (antihistamine effect), slow reaction times, impaired balance, orthostatic hypotension (alpha blocking activity), dizziness, blurred vision	AEC score 3. Consider review or switch to safer alternative. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
INDAPAMIDE	Thiazide diuretic	Dehydration causes hypotension, low potassium can cause fainting and general weakness, low sodium can cause confusion	AEC score 0
INDORAMIN	Alpha blocker	Severe orthostatic hypotension, sedation	AEC score not available
IRBESARTAN	Angiotensin 2 inhibitor	Orthostatic hypotension; excreted by liver and kidney	AEC score not available
ISOCARBOXAZID	Monoamine Oxidase inhibitor (MAOI)	Severe orthostatic hypotension	AEC score 1
ISOSORBIDE MONONITRATE	Nitrate	Hypotension, paroxysmal hypotension	AEC score 0
LACIDIPINE	Calcium channel blocker	Hypotension and paroxysmal hypotension	AEC score not known
LAMOTRIGINE	Antiepileptic	Some data on falls association	AEC score 0
LERCANIDIPINE	Calcium channel blocker	Hypotension and paroxysmal hypotension	AEC score 0
LEVETIRACETAM	Antiepileptic	Some data on falls association	AEC score not known

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
LISINOPRIL	ACE inhibitor	Orthostatic hypotension; renally eliminated and can accumulate in dehydration or renal failure	AEC score 0
LOFEPRAMINE	Tricyclic antidepressant	Sedation (antihistamine effect), slow reaction times, impaired balance, orthostatic hypotension (alpha blocking activity), dizziness, blurred vision Rate of falls doubled	AEC score 3. Consider review or switch to safer alternative. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
LORAZEPAM	Benzodiazepine	Drowsiness, slow reactions, impaired balance, tolerance with prolonged use	AEC score 0. Consider review or switch to safer alternative. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
LORMETAZEPAM	Benzodiazepine	Drowsiness, slow reactions, impaired balance, tolerance with prolonged use	AEC score not known. Consider review or switch to safer alternative. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
LOSARTAN	Angiotensin 2 inhibitor	Orthostatic hypotension; excreted by liver and kidney	AEC score 0
METOLAZONE	Thiazide diuretic	Dehydration causes hypotension, low potassium can cause fainting and general weakness, low sodium can cause confusion	AEC score not known
METOPROLOL	Beta blocker	Bradycardia, hypotension, carotid sinus hypersensitivity, hypotension, vasovagal syndrome	AEC score 0

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
MIANSERIN	Tricyclic antidepressant	Sedation (antihistamine effect), slow reaction times, impaired balance, orthostatic hypotension (alpha blocking activity), dizziness, blurred vision. Rate of falls doubled	AEC score not known. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
MIRTAZAPINE	Antidepressant (SNRI)	Sedation, Orthostatic hypotension, impaired sleep quality	AEC score 1. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
MORPHINE	Opioid analgesic	Sedation, slow reactions, impaired balance, delirium risk	AEC score 0. Accumulates in renal impairment. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
MOXONIDINE	Centrally acting antihypertensive	Sedation, orthostatic hypotension	AEC score not known
NICORANDIL	Potassium channel activator	Hypotension, paroxysmal hypotension	AEC score not known
NIFEDIPINE	Calcium channel blocker	Hypotension and paroxysmal hypotension	AEC score 0
NIRTAZEPAM	Benzodiazepine	Drowsiness, slow reactions, impaired balance, tolerance with prolonged use	AEC score not known
NORTRIPTYLINE	Tricyclic antidepressant	Sedation (antihistamine effect), slow reaction times, impaired balance, orthostatic hypotension (alpha blocking activity),	AEC score 3. Consider review or switch to safer alternative. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
OLANZAPINE	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score 2
OLEMSARTAN	Angiotensin 2 inhibitor	Orthostatic hypotension; excreted by liver and kidney	AEC score not known
ORPHENADRINE	Antimuscarinic	Sedation, dizziness, blurred vision, dry eyes	AEC score not known
OXAZEPAM	Benzodiazepine	Drowsiness, slow reactions, impaired balance, tolerance with prolonged use	AEC score not known. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
OXYBUTYNIN	Antimuscarinic	Sedation, dizziness, blurred vision, dry eyes	AEC score 3. Consider review or switch to safer alternative.
OXYCODONE	Opioid analgesic	Sedation, slow reactions, impaired balance, delirium risk	AEC score not known. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
PAROXETINE	Antidepressant SSRI	Orthostatic hypotension, may impair sleep quality	AEC score 2. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
PERINDOPRIL	ACE inhibitor	Orthostatic hypotension; renally eliminated and can accumulate in dehydration or renal failure	AEC score 0
PHENELZINE	Monoamine Oxidase Inhibitor (MAOI)	Severe orthostatic hypotension	AEC score 1
PHENOBARBITAL	Antiepileptic	Sedation, slow reactions. Excess blood levels cause unsteadiness and ataxia	AEC score not known

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
PHENYTOIN	Antiepileptic	May cause permanent cerebellar damage and unsteadiness in long term use. High levels cause unsteadiness and ataxia	AEC score not known
PRAZOSIN	Alpha blocker	Severe orthostatic hypotension, sedation	AEC score 0
PREGABALIN	Antiepileptic	Sedation	AEC score not known
PROCHLORPERAZINE	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score 2
PROMAZINE	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score 2
PROMETHAZINE	Antihistamine	Sedation, no evidence for prolonged use	AEC score 3
PROPRANOLOL	Beta blocker	Bradycardia, hypotension, carotid sinus hypersensitivity, hypotension, vasovagal syndrome	AEC score 0
QUETIAPINE	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score 2
QUINAPRIL	ACE inhibitor	Orthostatic hypotension; excreted by liver and kidney	AEC score not known
RAMIPRIL	ACE inhibitor	Orthostatic hypotension; renally eliminated and can accumulate in dehydration or renal failure	AEC score not known
RISPERIDONE	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score 0
RIVASTIGMINE	Acetylcholinesterase inhibitor	Symptomatic bradycardia and syncope	AEC score 0

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
SERTRALINE	Antidepressant (SSRI)	Orthostatic hypotension, may impair sleep quality	AEC score 1. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
SODIUM VALPROATE	Antiepileptic	Some data on falls association	AEC score 0
SOLIFENACIN	Antimuscarinic	Sedation, dizziness, blurred vision, dry eyes	AEC score 1
SOTALOL	Beta blocker	Bradycardia, hypotension, carotid sinus hypersensitivity, orthostatic hypotension and vasovagal syndrome	AEC score 0. May accumulate in older patients due to renal excretion
SULPIRIDE	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score 0
TAMSULOSIN	Alpha blocker	Severe orthostatic hypotension, sedation	AEC score 0
TELMISARTAN	Angiotensin 2 inhibitor	Orthostatic hypotension; excreted by liver and kidney	AEC score not known
TEMAZEPAM	Benzodiazepine	Drowsiness, slow reactions, impaired balance, tolerance with prolonged use	AEC score 1. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
TERAZOSIN	Alpha blocker	Severe orthostatic hypotension, sedation	AEC score not known
TIMOLOL EYEDROPS	Beta blocker	Bradycardia, hypotension, carotid sinus hypersensitivity, orthostatic hypotension and vasovagal syndrome	AEC score not known
TOLTERODINE	Antimuscarinic	Sedation, dizziness, blurred vision, dry eyes	AEC score 2
TOPIRAMATE	Antiepileptic	Some data on falls association, sedation	AEC score not known

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
TRAMADOL	Opioid analgesic	Sedation, slow reactions, impaired balance, delirium risk	AEC score 0. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
TRANDOLAPRIL	ACE inhibitor	Orthostatic hypotension; excreted by liver and kidney	AEC score not known
TRANLYCYPROMINE	Monoamine oxidase inhibitor (MAOI)	Severe orthostatic hypotension	AEC score not known
TRAZODONE	Antidepressant (TCA related)	Sedation (antihistamine effect), slow reaction times, impaired balance, orthostatic hypotension (alpha blocking activity)	AEC score 0. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
TRIFLUPERAZINE	Antipsychotic	Sedation, slow reaction times, impaired balance, orthostatic hypotension	AEC score 2
TRIHYPHENIDYL	Antimuscarinic	Sedation, dizziness, blurred vision, dry eyes	AEC score 3
TRIMEPRAZINE	Antihistamine	Sedation, no evidence for long term use	AEC score 3
TRIMIPRAMINE	Tricyclic antidepressant	Sedation (antihistamine effect), slow reaction times, impaired balance, orthostatic hypotension (alpha blocking activity)	AEC score 3. Consider review or switch to safer alternative. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
VALSARTAN	Angiotensin 2 inhibitor	Orthostatic hypotension; excreted by liver and kidney	AEC score not known
VENLAFAXINE	Antidepressant (SNRI)	Orthostatic hypotension, may impair sleep quality	AEC score 0. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen

Name of medication	Drug class	Effect on Falls risk	Considerations and Anticholinergic score (AEC)
VERAPAMIL	Calcium channel blocker	Hypotension, paroxysmal hypotension, bradycardia, fatigue	AEC score not known
ZOLPIDEM	Hypnotic	Sedation, slow reactions, impaired balance, hangover effect next morning, tolerance with prolonged use	AEC score 0. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen
ZOPICLONE	Hypnotic	Sedation, slow reactions, impaired balance, hangover effect next morning, tolerance with prolonged use	AEC score not known. You may wish to consider gradual withdrawal if prolonged exposure – see www.medstopper.com for suggested regimen