

Drug effects that increase the risk of falls and injury:

- Drowsiness
- Dizziness
- Hypoglycemia
- Hypotension, especially orthostatic hypotension
- Parkinsonian effects
- Ataxia/gait disturbance
- Vision disturbance
- Delirium
- Cognitive impairment
- Low potassium

ANY drug that causes the following effects can increase the risk of a severe injury due to a fall:

- Osteoporosis or reduced bone mineral density: Increased risk of fracture
- Bleeding risk: Increased risk of a hemorrhage

ALERT!

- *The more drugs, the higher the risk*
- *Older adults may have altered pharmacokinetics (i.e. reduced renal function) resulting in an increased risk for adverse drug reactions and possibly drug accumulation*

Assessment of patient risk:

- Has the patient had a slip, trip, near fall or fall in the last 6 months?
- Is the patient taking a drug that can cause any of the effects listed above? (see list of drugs on next page)
- Is the patient taking a high dose of the drug?
- Is this the first time that the patient has taken this drug(s)?
- Is the patient displaying any of the adverse effects listed above, such as drowsiness/dizziness?
- Is the patient taking more than one drug that increases their falls risk?
- Is the patient at risk of falling for other, non-drug reasons, such as increased frailty, vision changes, home environment?
- Has the patient's clinical status significantly changed recently?
- Is it difficult to monitor the patient for an adverse drug effect?

If any of the above risks are present consider these options:

- Assess the benefit of the drug(s) versus the risk of injury from falling.
- Switch to a safer alternative drug, and /or consider non-drug measures.
- Since medications with fall risks usually have a dose-response relationship, start with the lowest possible dose, titrate the dose slowly upward if needed, and do regular reviews of drug response to see if the dosage can be slowly tapered downward in the future.
- Follow-up is very important to assess a recurrence of falls and the impact of medication adjustment. Monitor potential side effects, i.e. orthostatic hypotension or laboratory values.
- Assess need for treatment of osteoporosis to reduce fracture risk in older adults at high risk for falls, i.e. vitamin D, calcium, bisphosphonates, hormone replacement therapy.

Individualize treatment. Drugs are just one of many factors that can increase the risk of falling.

Examples of drugs that can increase the risk of falling, or of a serious outcome if a fall occurs (and possible mechanisms)

Falls are often caused by multiple factors. This list should be used in conjunction with other fall prevention strategies. A patient should not be denied beneficial or necessary drug therapy based on this list.

<p>ACE Inhibitors (3)</p> <p>Benazepril Captopril Cilazapril Enalapril Fosinopril Lisinopril Perindopril Quinapril Ramipril Trandolapril</p> <p>Alcohol (1,5)</p> <p>Alpha Receptor Blockers (2,3,13, especially initial doses)</p> <p>Alfuzosin Doxazosin Prazosin Silodosin Tamsulosin Terazosin</p> <p>Anticoagulants (8)</p> <p>Acenocoumarol (nicoumalone) Apixaban Dabigatran Dalteparin Enoxaparin Fondaparinux Heparin Rivaroxaban Tinzaparin Warfarin</p> <p>Antiplatelet Drugs</p> <p>Acetylsalicylic Acid Clopidogrel Prasugrel Ticagrelor Ticlopidine</p> <p>Anticonvulsants (1,2,5,6,7)</p> <p>Brivaracetam (1,2,5) Carbamazepine (1,2,6) Clonazepam (1,2,5) Ethosuximide (1,2,5)</p>	<p>Gabapentin (1,2,5,6) Lacosamide (1,2,5,6) Lamotrigine (1,2,6) Levetiracetam (1,2,5) Oxcarbazepine (1,2,5,6) Phenobarbital (1,2) Phenytoin (1,2,5,7) Pregabalin (1,2,6) Primidone (1,2) Rufinamide (1,2,5) Topiramate (1,2) Valproic acid (1,2,5) Vigabatrin (1,2)</p> <p>Antidepressants (1,2,3,5,6,7)</p> <p>Amitriptyline Bupropion Citalopram (1,2,3,6,7) Clomipramine Desipramine Desvenlafaxine Doxepin Duloxetine Escitalopram (1,2,3,6,7) Fluoxetine (1,2,3,6,7) Fluvoxamine (1,2,3,6,7) Imipramine Lithium Maprotiline Mirtazapine Moclobemide Nortriptyline Paroxetine (1,2,3,6,7) Sertraline (1,2,3,6,7) Tranlycypromine 2,3 Trazodone Trimipramine Venlafaxine Vortioxetine</p> <p>Antidiabetic drugs</p> <p>Albiglutide (11) Canagliflozin (3, 7) Chlorpropamide (11) Dapagliflozin (3, 7) Delaglutide (11) Empagliflozin (3, 7) Exenatide (11) Gliclazide (11)</p>	<p>Glimepiride (11) Glyburide (11) Insulin (10) Liraglutide (AHFS) Repaglinide (11) Pioglitazone (7) Tolbutamide (11)</p> <p>Antiemetics</p> <p>Aprepitant (2,5) Dimenhydrinate (1) Fosaprepitant (2,5) Nabilone (1,2,3,6) Scopolamine (1,6)</p> <p>Antihistamines, sedating (1)</p> <p>Cold Medications that contain sedating antihistamines (1)</p> <p>Brompheniramine Cetirizine Chlorpheniramine Diphenhydramine Hydroxyzine Trimeprazine</p> <p>Antihypertensive Drugs, other (see 12)</p> <p>Beta blockers Calcium Channel Blockers</p> <p>Antiparkinson Drugs (1,3,5)</p> <p>Bromocriptine (1,3) Entacapone (1,3,5) Levodopa (1, 3,5) Pramipexole (1, 3,5) Rasagiline (1,3,5) Ropinirole (1, 3,5) Rotigotine (1, 3,5) Selegiline (3,5)</p> <p>Antipsychotics and Related Drugs (1,3,4)</p> <p>Aripiprazole Asenapine Chlorpromazine Clozapine</p>	<p>Flupentixol Fluphenazine Haloperidol Loxapine Lurasidone Methotrimeprazine Olanzapine Paliperidone Perphenazine Pimozide Prochlorperazine Quetiapine Risperidone Thiothixene Trifluoperazine Ziprasidone Zuclopentixol</p> <p>Caffeine, large amounts (7)</p> <p>Cannabinoids (1,2,3)</p> <p>Cannabidiol Marijuana</p> <p>Chemotherapy (7)</p> <p>Anastrozole Bicalutamide Buserelin Exemestane Goserelin Histrelin Letrozole Leuprolide Methotexate Triptorelin</p> <p>Cholinesterase inhibitors (13)</p> <p>Donepezil Galantamine Rivastigmine</p> <p>Corticosteroids, oral (7)</p> <p>Corticosteroids, inhaled, high-dose (7)</p> <p>Beclomethasone Betamethasone Budesonide</p>	<p>Ciclesonide Cortisone Dexamethasone Fludrocortisone Fluticasone Hydrocortisone Methylprednisolone Mometasone Prednisolone Prednisone Triamcinolone</p> <p>Digoxin (mechanism unknown)</p> <p>Diuretics, loop and thiazide</p> <p>Bumetanide Chlorthalidone Furosemide Hydrochlorothiazide Indapamide Metolazone</p> <p>Eye drops (6)</p> <p>Herbal products</p> <p>Natural Health Products</p> <p>Natural Sleep Aids</p> <p>Natural Products for Sexual Enhancement (possible adulteration with undeclared drugs)</p> <p>Metoclopramide (1,2,4)</p> <p>Muscle Relaxants (1,2)</p> <p>Baclofen Chlorzoxazone Cyclobenzaprine Dantrolene Methocarbamol Orphenadrine Tizanidine</p> <p>Nitrates (2,3,13)</p> <p>Isosorbide dinitrate Isosorbide mononitrate Nitroglycerin</p>	<p>NSAIDs</p> <p>ASA/acetylsalicylic acid (8)</p> <p>Opiates/Narcotics (1,2,3)</p> <p>Buprenorphine Butorphanol Codeine Fentanyl Hydromorphone Meperidine Methadone Morphine Oxycodone Sufentanil</p> <p>Proton Pump Inhibitors (9)</p> <p>Dexlansoprazole Esomeprazole Lansoprazole Omeprazole Pantoprazole Rabeprazole</p> <p>Sedative/hypnotics</p> <p>Benzodiazepines</p> <p>Barbiturates (1,2,5)</p> <p>Alprazolam Bromazepam Buspirone Chloral hydrate Chordiazepoxide Clobazam Clonazepam Clorazepate Diazepam Diphenhydramine Doxylamine Flurazepam Lorazepam Midazolam Nitrazepam Oxazepam Phenobarbital Temazepam Triazolam Zopiclone</p>
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Possible mechanisms (often unclear): (1) Drowsiness; (2) Dizziness; (3) Hypotension/orthostatic hypotension; (4) Parkinsonian effects; (5) Ataxia/gait disturbance; (6) Vision disturbance; (7) Osteoporosis or reduced bone mineral density increases the fracture risk if a fall occurs; (8) Risk of serious bleeding if a fall occurs. Individualize therapy. (9) Fracture risk; mechanism unclear. (10) Hypoglycemia. (11) Theoretical due to potential hypoglycemia. (12) Conflicting evidence; many studies do not find an association between antihypertensive drugs and falls or fractures with beta blockers, ARBs, calcium channel blockers or diuretics; caution with high doses and when beginning therapy. (13) Syncope.

Drugs are listed by generic (chemical) name under each drug group. For Brand (manufacturer's) names, check in the Compendium of Pharmaceuticals and Specialties under the generic product monograph.

This list includes only those drugs for which there is evidence of increased risk of falls or their consequences or a logical potential risk. There may be other drugs that increase this risk in certain patients.