Potentially Harmful Drugs: Beers Criteria

The "Beers Criteria" is intended for use in outpatient and inpatient settings (**but NOT end-of-life care**) to improve the care of patients ≥65 years of age.[1] It includes medications that should generally be avoided in all elderly, used with caution, or used with caution or avoided in certain elderly.[1] There is also a list of potentially harmful drug-drug interactions in seniors, as well as a list of medications that may need to be avoided or have their dosage reduced based on kidney function.[1] This information is not comprehensive; medications and interactions were chosen for inclusion based on potential harm vs benefit in the **elderly**, and availability of alternatives with a more favorable risk/benefit ratio.[1] Use of the Beers Criteria has not been convincingly shown to reduce morbidity, mortality, or cost but is often used by organizations as quality measures. **Use the criteria to identify red flags that might require intervention or close monitoring, not the final word on medication appropriateness**.[2] Medication use decisions must be individualized.[2] Continuing a medication tolerated by the patient may not pose the same risk as initiating the medication.[1] If the decision is made to stop a potentially inappropriate medication, tapering may be needed.[2] The chart below summarizes the 2023 Beers Criteria, potential therapeutic alternatives, and other considerations.

A = avoid in most elderly (**does not apply to end-of-life patients**)
C = use with caution in elderly
H = high-risk meds in the elderly per Centers for Medicare & Medicaid Services (https://qpp.cms.gov/docs/QPP_quality_measure_specifications/CQM-Measures/2023_Measure_238_MIPSCQM.pdf)

--Information in table is from references 1 and 4, unless otherwise specified.--

Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Analgesics (also see NSAIDs, below)		
Meperidine (**A**, **H**) (also see Opioids)	• Neurotoxicity, delirium, poor efficacy (orally).	• For **alternatives for different types of pain**, see our charts, *Pharmacotherapy of Neuropathic Pain*, *Analgesics for Osteoarthritis*, *Treatment of Chronic Low Back Pain*, and *Analgesics for Acute Pain in Adults.*
Opioids in patients with a history of **fall** or **fracture**; **delirium** or at **high risk of delirium**; with **gabapentinoids**; with **benzodiazepines**; or with two or more other **CNS-active drugs**. *Continued…*	• Unsteady gait, psychomotor impairment, syncope. • Associated with delirium. • With benzodiazepines or gabapentinoids, increased risk of sedation, respiratory depression, and death.	• Acceptable for acute severe pain. ○ Use multimodal analgesia to limit opioid use. • Emerging data suggest an association with delirium. But be aware that uncontrolled pain can also cause delirium.[25] • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies.

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Opioids, continued		• Avoid with gabapentinoids except when transitioning off opioids. Can use combo with caution for an opioid-sparing effect. Adjust dose for kidney function. • For **alternatives for different types of pain**, see our charts, *Pharmacotherapy of Neuropathic Pain*, *Analgesics for Osteoarthritis*, *Treatment of Chronic Low Back Pain*, and *Analgesics for Acute Pain in Adults*.
Tramadol (**C**)	• SIADH. Check sodium when starting or changing dose. • Kidney impairment (CrCl <30 mL/min): increased risk of CNS adverse effects.	• Kidney impairment: avoid extended-release product. Reduce dose of immediate-release product. • For **alternatives for different types of pain**, see our charts: *Pharmacotherapy of Neuropathic Pain*, *Analgesics for Osteoarthritis*, *Treatment of Chronic Low Back Pain*, and *Analgesics for Acute Pain in Adults.*
Antibiotics		
Ciprofloxacin in patient taking **theophylline**, or **warfarin**, or in patients with **CrCl <30 mL/min**	• Risk of theophylline toxicity. • Increased bleeding risk with warfarin. • CNS effects (seizures, confusion) and tendon rupture in kidney impairment.	• Avoid use of ciprofloxacin with theophylline. • If ciprofloxacin and warfarin must be used together, monitor INR closely. • Dose reduction generally required for CrCl<30 mL/min.
Macrolides (excluding azithromycin) with warfarin	• Increased bleeding risk.	• If a macrolide other than azithromycin must be used with warfarin, monitor INR closely.
Nitrofurantoin in patients with **CrCl <30 mL/min** (**A**), or for **chronic use** (**A**, **H**)	• Pulmonary toxicity, peripheral neuropathy, hepatotoxicity, especially with chronic use.	• Cohort data suggest nitrofurantoin can be effective and have minimal risk in moderate kidney impairment.[14]
Trimethoprim/sulfamethoxazole (**C**) *Continued…*	• Increased risk of hyperkalemia with ACEI, ARB, or ARNI in patients with kidney insufficiency.	• Risk of **phenytoin** toxicity; avoid concomitant use. • If trimethoprim/sulfamethoxazole must be used with **warfarin**, monitor INR closely. • Reduce dose for CrCl 15 to 29 mL/min. Avoid if CrCl <15 mL/min.

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Trimethoprim/sulfamethoxazole, continued	• CrCl <30 mL/min: risk of worsening kidney function and hyperkalemia.	• In patients taking an ACEI, ARB, or ARNI choose a different antibiotic.[20] If trimethoprim/sulfamethoxazole is required, use the lowest effective dose, and if treatment must exceed three days, check potassium after four or five days[15,18,24]
Anticonvulsants		
Anticonvulsants in patient with history of **fall** or **fracture**, except for seizure or mood disorder (also see individual agents for additional, agent-specific concerns), or with two or more other **CNS-active drugs**.	• Unsteady gait, psychomotor impairment, syncope.	• For new-onset seizures, "newer" agents preferred (e.g., lamotrigine, levetiracetam).[5] Also see our chart, *Antiseizure Medications.* • Consider bone protection (e.g., bisphosphonate).[5] • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • **Alternatives for neuropathic pain** may include SNRIs, gabapentin, pregabalin, capsaicin, or lidocaine patch (US), depending on etiology and comorbidities. For more help choosing, see our chart, *Pharmacotherapy of Neuropathic Pain.*
Carbamazepine (**C**) (also see first row in Anticonvulsants section)	• SIADH. Check sodium when starting or changing dose.	• For **alternative anticonvulsants**, see our chart, *Antiseizure Medications*.
Gabapentin in patient with **CrCl <60 mL/min**, or with **opioids** (also see first row in Anticonvulsants section)	• Increased risk of central nervous system adverse effects in kidney impairment. • With opioids, increased risk of sedation, respiratory depression, and death.	• Reduce dose in kidney impairment. • For **alternatives for seizures**, see our chart, *Antiseizure Medications*. • Avoid with opioids except when transitioning off opioids. Can use combo with caution for an opioid-sparing effect. • Alternatives for **neuropathic pain** may include SNRIs, pregabalin, capsaicin, or lidocaine patch (US), depending on etiology and comorbidities. For more help choosing, see our chart, *Pharmacotherapy of Neuropathic Pain.*
Levetiracetam in patient with **CrCl ≤80 mL/min** (also see first row in Anticonvulsants section)	• Increased risk of central nervous system adverse effects. Reduce dose.	• For **alternatives for seizures**, see our chart, *Antiseizure Medications*.

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Oxcarbazepine (**C**) (also see first row in Anticonvulsants section)	• SIADH. Check sodium when starting or changing dose.	• For **alternatives for seizures**, see our chart, *Antiseizure Medications*. • **Alternatives for neuropathic pain** may include SNRIs, gabapentin, pregabalin, capsaicin, or lidocaine patch (US), depending on etiology and comorbidities. For more help choosing, see our chart, *Pharmacotherapy of Neuropathic Pain*.
Pregabalin in patient with **CrCl <60 mL/min**, or with **opioids** (also see first row in Anticonvulsants section)	• Increased risk of central nervous system adverse effects in kidney impairment. Reduce dose. • With opioids, increased risk of sedation, respiratory depression, and death.	• For **alternatives for seizures**, see our chart, *Antiseizure Medications*. • Avoid with opioids except when transitioning off opioids. Can use combo with caution for an opioid-sparing effect. • Alternatives for **neuropathic pain** may include SNRIs, gabapentin, capsaicin, or lidocaine patch (US), depending on etiology and comorbidities. For more help choosing, see our chart, *Pharmacotherapy of Neuropathic Pain*.
Antidepressants		
Duloxetine in patient with **CrCl <30 mL/min** (also see SNRIs)	• Increased risk of nausea or diarrhea. Avoid.	• For help choosing an **alternate antidepressant**, see our chart, *Choosing and Switching Antidepressants*.
Mirtazapine (*Remeron*) (**C**)	• SIADH. Check sodium when starting or changing dose.	
Paroxetine (**A, H**) (also see SSRIs)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention), sedation, and orthostatic hypotension.	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, **lower urinary symptoms**, or **BPH** (avoid in men). • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • For help choosing an **alternate antidepressant**, see our chart, *Choosing and Switching Antidepressants*.
SNRIs (**C**) (also see Duloxetine)	• SIADH. Check sodium when starting or changing dose.	• Of special concern in patients with history of **fall** or **fracture**. • Avoid combining with two or more other CNS-active drugs (fall risk). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • For help choosing an **alternate antidepressant**, see our chart, *Choosing and Switching Antidepressants*.

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
SSRIs (**C**) (also see Paroxetine)	• SIADH. Check sodium when starting or changing dose.	• Of special concern in patients with history of **fall** or **fracture**. • Avoid combining with two or more other CNS-active drugs (fall risk). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • Increased bleeding risk with **warfarin**. If an SSRI must be used with warfarin, monitor INR closely. • For help choosing an **alternate antidepressant**, see our chart, *Choosing and Switching Antidepressants*.
Tricyclic antidepressants (A, **H)**: amitriptyline, amoxapine (US), clomipramine, desipramine, doxepin (>6 mg/day), imipramine, nortriptyline, protriptyline (US), trimipramine	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention). • Sedation. • Orthostatic hypotension.	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture**, **lower urinary symptoms**, or **BPH** (avoid in men). • Tertiary amines (amitriptyline, clomipramine, doxepin, imipramine, trimipramine) of special concern in patients with **syncope** due to risk of orthostatic hypotension. • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Avoid combining with two or more other CNS-active drugs (fall risk). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • May cause SIADH. Check sodium when starting or changing dose. (C) • **Alternatives for depression**: SSRI (not paroxetine), SNRI, or bupropion,[5] depending on comorbidities. For help choosing an **alternate antidepressant**, see our chart, *Choosing and Switching Antidepressants*. • Alternatives for **neuropathic pain** may include SNRIs, gabapentin, pregabalin, capsaicin, or lidocaine patch (US), depending on concomitant conditions. For more help choosing, see our chart, *Pharmacotherapy of Neuropathic Pain*. • **Alternatives for insomnia**: Consider nonpharmacologic interventions.[5] Failing this, consider melatonin, low-dose doxepin (3 to 6 mg), or rameleton.[13]

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Antigout		
Colchicine in patient with CrCl <30 mL/min	• Increased risk of bone marrow toxicity, GI adverse effects, neuromuscular adverse effects. Use reduced dose. Monitor for adverse effects.	• **Alternatives**: corticosteroid.[12]
Probenecid in patient with CrCl <30 mL/min	• Ineffective. Avoid.	• **Alternative uricosuric agents** (only if xanthine oxidase inhibitor not appropriate): fenofibrate, losartan, sulfinpyrazone (Canada).[12,17]
Antihistamines		
Anticholinergic antihistamines (A, H): brompheniramine, carbinoxamine (US), chlorpheniramine, clemastine (US), cyproheptadine, dexchlorpheniramine (US), diphenhydramine (oral), doxylamine, hydroxyzine (see CNS section for **meclizine**)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention). • Elimination reduced in elderly. • Tolerance to hypnotic effect.	• Diphenhydramine may be appropriate in acute treatment of severe allergic reactions. • Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture, lower urinary symptoms**, or **BPH** (avoid in men). • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • Alternatives: for **allergy**, nasal saline, nasal steroid, 2nd generation antihistamine (e.g., cetirizine, levocetirizine, fexofenadine, loratadine).[16] • **Alternatives for insomnia**: Consider nonpharmacologic interventions.[5] Failing this, consider melatonin, low-dose doxepin (3 to 6 mg), or rameleton.[13]

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Antihypertensives		
Alpha-blockers (doxazosin [*Cardura*], prazosin [*Minipress*], terazosin) (**A**)	• Orthostatic hypotension.	• Of special concern in patients with **syncope**, and **women with urinary incontinence** (especially when combined with a loop diuretic). • Alternatives for **hypertension**: thiazide, ACEI, ARB, long-acting CCB.[5] For help choosing, see our chart, *Treatment of Hypertension*.
Amiloride in patient with **CrCl <30 mL/min**.; or with **ACEI**, **ARB**, **ARNI**, or **aliskiren**	• Kidney impairment: increased potassium and decreased sodium. Avoid. • Do not routinely combine with ACEI, ARB, ARNI, or aliskiren in patients with stage 3a or higher kidney disease due to risk of hyperkalemia.	• Alternatives for **hypertension**: thiazide, ACEI, ARB, long-acting CCB.[5] For help choosing, see our chart, *Treatment of Hypertension*.
Clonidine, as first-line antihypertensive (**A**)	• Orthostatic hypotension, bradycardia, CNS adverse effects.	
Guanfacine (**A**, **H**)		
Methyldopa (**A**, **H**)(Canada)		
Diuretics (**C**)	• SIADH or hyponatremia. Check sodium when starting or changing dose.	• Alternatives for **hypertension**: ACEI, ARB, long-acting CCB.[5] For help choosing, see our chart, *Treatment of Hypertension*.
Nifedipine, short-acting (**A**, **H**)	• Hypotension, myocardial ischemia.	• Alternative dihydropyridine CCBs: amlodipine, felodipine, nifedipine extended-release.[5]
Triamterene in patient with **CrCl <30 mL/min**; or with **ACEI**, **ARB**, **ARNI**, or **aliskiren**	• Kidney impairment: increased potassium and decreased sodium. Avoid. • Do not routinely combine with ACEI, ARB, ARNI, or aliskiren in patients with stage 3a or higher kidney disease due to risk of hyperkalemia.	• Alternatives for **hypertension**: ACEI, ARB, long-acting CCB.[5] For help choosing, see our chart, *Treatment of Hypertension*.

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Antiplatelet Agents and Anticoagulants		
Aspirin for primary CV prevention (**A**)	• Bleeding risk seems to outweigh benefit for primary prevention in the elderly.	• For primary CV prevention, avoid initiation, and consider deprescribing. • Generally indicated for patients with cardiovascular disease. • See our chart, *Aspirin for CV Primary Prevention and More*, for information to help estimate risk/benefit in patients without CV disease.
Dabigatran (*Pradaxa*) for long-term use for A-fib or VTE (**C**), and in patients with **CrCl <30 mL/min**	• For long-term use in A-fib or VTE, higher GI bleeding risk than apixaban or warfarin, and higher major bleeding risk than apixaban. • Lack of efficacy/safety evidence in CrCl <30 mL/min. Avoid.	• Consider appropriately-dosed apixaban or edoxaban (depending on kidney function).[6,19] • See our chart, *Comparison of Oral Anticoagulants*, for indications and dosing.
Dipyridamole, oral short-acting (**A**, **H**)	• More effective options available, orthostatic hypotension.	• Alternatives for secondary stroke prevention: See our chart, *Antiplatelets for Recurrent Ischemic Stroke*.
Edoxaban (*Savaysa*, US; *Lixiana*, Canada) in patients with **CrCl <15 mL/min, 15 to 50 mL/min, or >95 mL/min**	• **Kidney impairment**: Lack of efficacy/safety evidence in CrCl <30 mL/min. • **CrCl >95 mL/min**: potential for reduced efficacy in A-fib.[3] Avoid.[1]	• Reduce dose if CrCl 15 to 50 mL/min. Avoid if CrCl <15 mL/min. • Consider appropriately-dosed apixaban.[6,19] • See our chart, *Comparison of Oral Anticoagulants*, for indications and dosing.
Enoxaparin in patients with **CrCl <30 mL/min**	• Bleeding risk. Reduce dose.	• Consider unfractionated heparin, or dalteparin or tinzaparin (Canada) with anti-factor Xa monitoring.[20,21]
Fondaparinux in patients with **CrCl <30 mL/min**	• Bleeding risk. Avoid.	• Consider unfractionated heparin, or dalteparin or tinzaparin (Canada) with anti-factor Xa monitoring.[20,21]

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Prasugrel (*Effient*) (**C**)	• Higher bleeding risk than clopidogrel, especially in patients ≥75 years of age.	• Consider clopidogrel, or dose reduction (5 mg once daily) in patients ≥75 mg daily). • Benefit may offset bleeding risk in patients with high cardiac risk (e.g., diabetes, history of heart attack) when used for acute coronary syndrome to be managed with percutaneous intervention.
Rivaroxaban (*Xarelto*) in patients for long-term use for A-fib or VTE (**A**), and in patients with **CrCl <50 mL/min**	• For long-term use in A-fib or VTE, higher GI bleeding risk and higher major bleeding risk than apixaban, and perhaps dabigatran. • Lack of efficacy/safety evidence in CrCl< 15 mL/min. Limited evidence for CrCl 15 to 30 mL/min.	• Consider appropriately-dosed apixaban or edoxaban (depending on kidney function).[6,19] • Rivaroxaban may be a reasonable DOAC choice in some patients, such as those who require once-daily dosing. • If used, reduce dose if CrCl 15 to 50 mL/min. Avoid if CrCl <15 mL/min. • See our chart, *Comparison of Oral Anticoagulants*, for indications and dosing.
Ticagrelor (**C**)	• Higher bleeding risk than clopidogrel, especially in patients ≥75 years of age.	• Consider clopidogrel.
Warfarin for A-fib or VTE (**A**)	• Higher bleeding risk (especially intracranial) with possibly lower efficacy than DOACs.	• Choose a DOAC over warfarin unless DOACs are contraindicated or otherwise cannot be used (e.g., cost). See our chart, *Comparison of Oral Anticoagulants*, for indications and dosing. • If the patient has been tolerating warfarin with good control (e.g., INR in-range >70% of the time), consider continuing warfarin.
Antipsychotics		
Antipsychotics (**A**, **H**) (any; also see individual agents for additional, agent-specific concerns) *Continued…*	• Risk of stroke, cognitive decline, and death (especially in dementia).	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture**, or **Parkinson's disease** (except quetiapine, or pimavanserin, or clozapine) (also see individual agents). • Nonanticholinergic agents acceptable for bipolar disorder, schizophrenia, antiemetic (short-term), Parkinson's psychosis (quetiapine, pimavanserin, clozapine), depression (adjunct).

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Antipsychotics, continued		• Acceptable for dementia- or delirium-related behavioral problems if nondrug therapy has failed or can't be used, and the patient may harm self or others. Use lowest dose for shortest time possible. • May cause **SIADH**. Check sodium when starting or changing dose. (**C**) • Avoid combining with two or more other CNS-active drugs (fall risk). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies.
Chlorpromazine in patient with **syncope** or **BPH,** or with other **anticholinergic drugs** (also see first row in Antipsychotics section)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention). • Risk of orthostatic hypotension.	• Avoid in men. • Avoid combining drugs with anticholinergic effects (risk of cognitive decline).
Clozapine in patient with **BPH,** or with other **anticholinergic drugs** (also see first row in Antipsychotics section)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention).	• Avoid in men. • Avoid combining drugs with anticholinergic effects (risk of cognitive decline).
Loxapine in patient with **BPH**, or with other **anticholinergic drugs** (also see first row in Antipsychotics section)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention).	• Avoid in men. • Avoid combining drugs with anticholinergic effects (risk of cognitive decline).
Olanzapine in patient with **syncope**, **BPH**, or with other **anticholinergic drugs** (also see first row in Antipsychotics section)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention). • Risk of orthostatic hypotension.	• Avoid in men. • Avoid combining drugs with anticholinergic effects (risk of cognitive decline).

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Perphenazine in patient with **BPH**, or with other **anticholinergic drugs** (also see first row in Antipsychotics section)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention).	• Avoid in men. • Avoid combining drugs with anticholinergic effects (risk of cognitive decline).
Thioridazine (US) in patient with **syncope**, **BPH**, or with other **anticholinergic drugs** (also see first row in Antipsychotics section)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention). • Risk of orthostatic hypotension.	• Avoid in men. • Avoid combining drugs with anticholinergic effects (risk of cognitive decline).
Trifluoperazine in patient with **BPH** (also see first row in Antipsychotics section)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention).	• Avoid in men. • Avoid combining drugs with anticholinergic effects (risk of cognitive decline).
Anxiolytics		
Benzodiazepines (**A**, **H**)	• Increased sensitivity and impaired metabolism (long-acting agents) increases risk of cognitive impairment, unsteady gait, psychomotor impairment, accidents, and delirium. • Risk of misuse and dependence.	• May be acceptable for seizures, rapid eye movement (REM) sleep disorders, benzodiazepine or alcohol withdrawal, severe generalized anxiety disorder, and periprocedural use. • Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, or history of **fall** or **fracture**. • Avoid combining with two or more other CNS-active drugs (fall risk). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • Alternatives for **anxiety**: buspirone, SSRI (not paroxetine), or SNRI, depending on comorbidities.[1,5] • **Alternatives for insomnia**: Consider nonpharmacologic interventions.[5] Failing this, consider melatonin, low-dose doxepin (3 to 6 mg), or rameleton.[13]

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Meprobamate (**A**, **H**)	• Sedation, dependence.	• Alternatives for **anxiety**: buspirone, SSRI (not paroxetine), or SNRI, depending on comorbidities.[5]
Cardiac Drugs		
Amiodarone as first-line for atrial fibrillation (unless patient has heart failure or significant left ventricular hypertrophy, and rhythm control is desired) (**A**), or with warfarin	• More toxic than other treatments for atrial fibrillation. • Amiodarone increases warfarin bleeding risk.	• For help choosing an alternative antiarrhythmic for A-Fib, see our chart, *Atrial Fibrillation: Focus on Pharmacotherapy.* • If warfarin and amiodarone must be used together, monitor INR closely.
CCBs, nondihydropyridine (diltiazem, verapamil) in HF*r*EF	• May worsen heart failure. Avoid.	• For help choosing and alternative antihypertensive, see our chart, *Treatment of Hypertension*.
Cilostazol (US) in heart failure	• Increased mortality. Avoid.	• For help choosing an **alternative**, see our charts, *Antiplatelets for Recurrent Ischemic Stroke*, or *Dual Antiplatelet Therapy for Coronary Artery Disease*.
Digoxin first-line for A-fib or heart failure (**A**), or in doses >0.125 mg/day. (**A**, **H**)	• A-fib: Safer and more effective agents for rate control. • HF*r*EF: unclear risk/benefit. Strong evidence supports alternatives for reducing mortality and hospitalization. • Higher doses and kidney insufficiency pose increased risk of toxicity.	• Deprescribing in patients with HF*r*EF may worsen outcomes. • For help choosing an **alternate for A-fib**, see our FAQ, *Atrial Fibrillation: Focus on Pharmacotherapy*. • For help choosing an **alternate for heart failure**, see our chart, *Heart Failure Treatment at a Glance*.
Disopyramide (**A**, **H**) *Continued…*	• Negative inotrope; may cause heart failure. • Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention).	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture**, **lower urinary symptoms**, or **BPH** (avoid in men). • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies.

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Disopyramide, continued		• For help choosing an alternative, see our FAQ, *Atrial Fibrillation: Focus on Pharmacotherapy*.
Dronedarone (**A**)	• Worse outcomes in permanent A-fib or severe or recently decompensated heart failure. May increase mortality in HF*r*EF.	• Avoid in permanent A-fib or symptomatic or recently decompensated heart failure. May use with caution in asymptomatic heart failure. • For help choosing an alternative antiarrhythmic, see our FAQ, *Atrial Fibrillation: Focus on Pharmacotherapy*.
Spironolactone CrCl <30 mL/min	• Hyperkalemia. Avoid.	• Alternatives for **hypertension**: thiazide, ACEI, ARB, long-acting CCB.[5] For help choosing, see our chart, *Treatment of Hypertension*. • For help choosing an **alternate for heart failure**, see our chart, *Heart Failure Treatment at a Glance*.
Central Nervous System Agents, misc.		
Acetylcholinesterase inhibitors (e.g., donepezil), in patient with syncope	• Bradycardia.	• Alternative: memantine.[7]
Dextromethorphan/quinidine (*Nuedexta* [US]) for treatment of behavioral symptoms of dementia (**C**)	• Limited efficacy. • Fall risk. • Significant drug interactions.	• Use acceptable for pseudobulbar affect. • Of special concern in **heart failure**; avoid due to risk of QT prolongation. • For alternatives, see our chart, *Pharmacotherapy of Dementia Behaviors*.
Dimenhydrinate (**A**, **H**)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention), sedation. • Elimination reduced in elderly.	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture**, **lower urinary symptoms**, or **BPH** (avoid in men). • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • For age-related vestibular dysfunction, consider referral for vestibular rehabilitation.[8]

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Lithium in patient taking ACEI, ARB, ARNI, or loop diuretic	• Risk of lithium toxicity.	• Avoid combination, but if used, monitor lithium levels. • For alternatives for **bipolar disorder**, see our FAQ, *Pharmacotherapy of Bipolar Disorder in Adults*.
Meclizine (US) (**A**, **H**)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention), sedation. • Elimination reduced in elderly.	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture, lower urinary symptoms**, or **BPH** (avoid in men). • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • For age-related vestibular dysfunction, consider referral for vestibular rehabilitation.[8]
Diabetes Drugs		
Insulin, sliding scale (i.e., sole use of as-needed short- or rapid-acting insulin with no basal insulin) (**A**)	• Hypoglycemia; poor efficacy.	• An insulin initiation and titration algorithm from Diabetes Canada is available at https://guidelines.diabetes.ca/docs/cpg/Appendix-9.pdf.
Pioglitazone in heart failure	• Fluid retention may worsen heart failure.	• Avoid in symptomatic heart failure. May use with caution in asymptomatic heart failure. • For alternatives, see our chart, *Drugs for Type 2 Diabetes* (US subscribers) or *Stepwise Treatment of Type 2 Diabetes* (Canadian subscribers).
SGLT2 inhibitors (**C**)	• Genitourinary infections. • Euglycemic diabetic ketoacidosis.	• Monitor patients for genitourinary infections, especially women during the first month of treatment. • Monitor for ketoacidosis.
Sulfonylureas: gliclazide (Canada)(A), glimepiride (A,H), glipizide (A), glyburide (glibenclamide)(A, H)	• Higher risk of hypoglycemia, CV events (CV death, ischemic stroke), and all-cause mortality than other antidiabetics.	• If a sulfonylurea must be used (e.g., cost concern), use a shorter-acting agent (e.g., glipizide). • For alternatives, see our chart, *Drugs for Type 2 Diabetes* (US subscribers) or *Stepwise Treatment of Type 2 Diabetes* (Canadian subscribers).

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Gastrointestinal Drugs		
Antispasmodics: atropine (in *Lomotil*) clidinium (in *Librax*), dicyclomine, methscopolamine (US), scopolamine (**A**, **H**)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention). • Unclear efficacy.	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture**, **lower urinary symptoms**, or **BPH** (avoid in men). • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • For alternatives for irritable bowel, see our chart, *Irritable Bowel Syndrome (IBS) Drug Comparison.*
H2-blocker in patient with **delirium** or **high risk of delirium**, taking **theophylline** (cimetidine), or CrCl <50 mL/min	• Has central nervous system effects that can cause or worsen delirium. • Cimetidine increases theophylline levels. • Kidney impairment: increased risk of mental status changes.	• Avoid cimetidine in patients taking theophylline. • Reduce dose if CrCl <50 mL/min. • Alternative: proton pump inhibitor (see Proton Pump Inhibitor listing for caveats).[5]
Metoclopramide, except for gastroparesis (**A**)	• Extrapyramidal side effects, tardive dyskinesia.	• Duration of use for gastroparesis should generally not exceed 12 weeks. • Of special concern in patients with **Parkinson's disease**, due to dopamine receptor blockade. • Alternatives for **nausea/vomiting**: serotonin antagonists (e.g., ondansetron).[10]
Mineral oil, oral (**A**)	• Aspiration.	• For alternatives, see our FAQ, *Management of Constipation*.
Prochlorperazine in patient with **dementia**, **cognitive impairment**, **Parkinson's disease**, **delirium** or **high risk of delirium**, history of **fall** or **fracture**, **lower urinary tract symptoms**, or **BPH**	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention). • Dopamine-receptor blockade may worsen Parkinson's disease.	• Avoid in men. • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • **Alternatives for nausea/vomiting**: serotonin antagonists (e.g., ondansetron).[10]

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Promethazine (**A**, **H**)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention).	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture**, **Parkinson's disease**, **lower urinary symptoms**, or **BPH** (avoid in men). • Dopamine-receptor blockade may worsen Parkinson's disease. • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • **Alternatives for nausea/vomiting**: serotonin antagonists (e.g., ondansetron).[10]
Proton pump inhibitors, scheduled use for >8 weeks (**A**)	• Risk of *C. difficile*, bone loss, fractures, GI cancer.	• Scheduled use for >8 weeks acceptable for patients with high ulcer risk (e.g., taking corticosteroids or chronic NSAID), erosive esophagitis, Barrett's esophagus, hypersecretion, confirmed need for maintenance (e.g., drug "holiday," H2-blocker failure).
Hormones		
Corticosteroids (oral, parenteral) in patient with **delirium** or **high risk of delirium**	• May cause or worsen delirium.	• If needed (e.g., chronic obstructive pulmonary disease [COPD] exacerbation), use lowest effective dose for shortest time necessary. • Avoid combining with NSAIDs (GI ulcer/bleed risk). Use combo only with gastroprotection. • Alternatives depend on indication. See our toolbox, *Corticosteroids: Selection, Tapering, and More*.
Estrogen (oral, transdermal), with or without progestin (**A**, **H**)	• Breast cancer, endometrial cancer, not cardioprotective; lacks cognitive protection.	• Consider deprescribing. • Alternatives: low-dose vaginal estrogens acceptable for vaginal symptoms and prevention of lower urinary tract infections.[1] For vasomotor symptoms, SSRI (not paroxetine), SNRI, gabapentin, depending on comorbidities.[5] For help choosing, see our FAQ, *.Managing Menopausal Symptoms*.

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Growth hormone, except for growth hormone deficiency (**A**)	• Edema, arthralgia, carpal tunnel syndrome, gynecomastia, insulin resistance; little effect on muscle mass.	• For treatment of unintentional weight loss in the elderly, address underlying causes (e.g., dental issues, depression, medications).[9]
Megestrol (**A**, **H**)	• Thrombosis, death; minimal effect on weight.	• For treatment of unintentional weight loss in the elderly, address underlying causes (e.g., dental issues, depression, medications).[9]
Testosterone, methyltestosterone (US), except for confirmed symptomatic hypogonadism (**A**)	• Prostate cancer, cardiac events.	• If indicated, see our chart, *Comparison of Testosterone Products*, for help using testosterone safely.
Thyroid, desiccated (**A**, **H**)	• Cardiac adverse effects.	• Alternative: levothyroxine.
Hypnotics		
Antihistamines (see listing above)		
Barbiturates (any) (**A**, **H**)	• Dependence, tolerance, risk of overdose (narrow therapeutic window).	• For **alternatives for seizures**, see our chart, *Antiseizure Medications*. • **Alternatives for insomnia**: Consider nonpharmacologic interventions.[5] Failing this, consider melatonin, low-dose doxepin (3 to 6 mg), or rameleton.[13]
Benzodiazepines (see listing under Anxiolytics)		
Nonbenzodiazepine, benzodiazepine receptor agonists ("Z drugs;" eszopiclone, zopiclone[a] [Canada], zolpidem, zaleplon [US]) (**A**, **H**)	• Same concerns as for benzodiazepines. • Unfavorable risk/benefit ratio for insomnia.	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, or history of **fall** or **fracture**. • Avoid combining with two or more other CNS-active drugs (fall risk). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • Consider nonpharmacologic interventions.[5] Failing this, consider melatonin, low-dose doxepin (3 to 6 mg), or rameleton.[13]

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Musculoskeletal Agents		
Baclofen in patients with eGFR <60 mL/min.	• Risk of encephalopathy.	• Avoid. • If baclofen must be used, use the lowest effective dose, and monitor for mental status changes.
Benztropine (**A**, **H**) (oral; US)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention). • Not recommended to prevent/treat antipsychotic-associated extrapyramidal effects; not very effective for Parkinson's disease.	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture**, **lower urinary symptoms**, or **BPH** (avoid in men). • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • Alternative for **Parkinson's disease**: levodopa/carbidopa.[5]
Muscle relaxants (**A**, **H**) carisoprodol (US; *Soma*), chlorzoxazone, cyclobenzaprine, metaxalone (US; *Skelaxin*), methocarbamol, orphenadrine	• Anticholinergic effects (cyclobenzaprine, orphenadrine [e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention]), sedation, fracture. • Questionable efficacy at doses tolerated in elderly.	• Cyclobenzaprine and orphenadrine of particular concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture**, **lower urinary symptoms**, or **BPH** (avoid in men). o Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Avoid combining with two or more other CNS-active drugs (fall risk). • Alternatives: acetaminophen, nonacetylated salicylate, NSAID (ibuprofen or naproxen if no heart or kidney failure, with gastroprotection if used for >7 days).[5]

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Trihexyphenidyl (**A**, **H**)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention). • Not recommended to prevent/treat antipsychotic-associated extrapyramidal effects; not very effective for Parkinson's disease.	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture**, **lower urinary symptoms**, or **BPH** (avoid in men). • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • Alternative for **Parkinson's disease**: levodopa/carbidopa.[5]
NSAIDs		
Aspirin >325 mg/day (**A**)	• GI ulcer, bleeding, and perforation risk. • Kidney injury. • Hypertension.	• Of special concern in patients with **ulcer history**. • GI risk factors: age >75 years, systemic corticosteroids, anticoagulants, or antiplatelets. • Protect with proton pump inhibitor or misoprostol. • Avoid combining with oral or parenteral corticosteroids, anticoagulants, or antiplatelets.

NSAIDs (**A**) (ketorolac and indomethacin, **A**, **H**)	• GI ulcer, bleeding, and perforation risk.
	• Kidney injury.
	• Hypertension.
	• CNS effects (indomethacin)
		• Of special concern in patients with **heart failure**, **ulcer history**, or **CrCl <30 mL/min**.
		  ○ Avoid in symptomatic heart failure. May use with caution in asymptomatic heart failure.
		  ○ Avoid in CrCl <30 mL/min.
		• GI risk factors: age >75 years, systemic corticosteroids, anticoagulants, antiplatelets.
		• Protect with proton pump inhibitor or misoprostol.
		• Avoid combining with oral or parenteral corticosteroids, anticoagulants, or antiplatelets.
		• Avoid **ketorolac** (oral and parenteral) and **indomethacin**.
		  ○ **Indomethacin** has the most adverse effects.
		• Alternatives: acetaminophen, nonacetylated salicylate, capsaicin, lidocaine patch (US), topical NSAID, SNRI[5] (depending on etiology and comorbidities).

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
COX-2 inhibitors in **heart failure** or **CrCl <30 mL/min**	• Worsening heart failure. • Kidney injury.	• Avoid in symptomatic heart failure. May use with caution in asymptomatic heart failure. • Avoid in CrCl <30 mL/min. • Alternatives: acetaminophen, SNRI (not duloxetine), topical capsaicin, lidocaine patch (US)[5] (depending on etiology and comorbidities).
Respiratory Drugs		
Homatropine (**A**)	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, or urinary retention).	• Of special concern in patients with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium**, history of **fall** or **fracture**, **lower urinary symptoms**, or **BPH** (avoid in men). • Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies.
Urinary Drugs		
Desmopressin (**A**)	• Hyponatremia.	• Alternatives: address underlying cause of nocturia (e.g., hyperglycemia, heart failure, calcium channel blocker, flozin).[22,23] Consider a 5-alpha reductase inhibitor or phosphodiesterase-5 inhibitor for BPH.[22] • If desmopressin is indicated, use "low-dose" product (e.g., *Nocdurna*), and monitor sodium closely (e.g., before starting, within a week and again after a month of starting or dosage increase, then periodically).[11]
Urinary antimuscarinics (e.g., darifenacin, fesoterodine, flavoxate (US), oxybutynin, solifenacin, tolterodine, trospium) in patient with **dementia**, **cognitive impairment**, **delirium** or **high risk of delirium,** or history of **fall** or **fracture**	• Anticholinergic effects (e.g., confusion, cognitive impairment, delirium, dry mouth, constipation, urinary retention).	• Avoid combining drugs with anticholinergic effects (risk of cognitive decline). • Consider reducing other concomitant medication(s) that can cause falls. Employ fall-prevention strategies. • Oxybutynin may have the most CNS effects.

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Drug or Drug Class	Concern(s)	Other Considerations (e.g., special concerns, alternatives)[b]
Vasodilators (CNS)		
Ergoloid mesylates (**A**, **H**)	• Lack of efficacy.	• Alternatives: Acetylcholinesterase inhibitors (not in patients with syncope), memantine.[5]

Abbreviations: ACEI = angiotensin-converting enzyme inhibitor; A-fib = atrial fibrillation; ARB = angiotensin receptor blocker; ARNI = angiotensin receptor-neprilysin inhibitor; BPH = benign prostatic hyperplasia; CCB = calcium channel blocker; CrCl = creatinine clearance; CNS = central nervous system; COX-2 = cyclo-oxygenase-2; CV = cardiovascular; GI = gastrointestinal; HF*r*EF = heart failure with reduced ejection fraction; NSAID = nonsteroidal anti-inflammatory drug; SGLT2 = sodium-glucose cotransporter-2; SIADH = syndrome of inappropriate antidiuretic hormone secretion; SNRI = selective norepinephrine serotonin reuptake inhibitor; SSRI = selective serotonin reuptake inhibitor; VTE = venous thromboembolism.

a. Zopiclone (Canada; *Imovane*, etc) not included in Beers, but prudent to consider same precautions as for eszopiclone.
b. Alternatives may not be appropriate for all patients.

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