

Potentially Harmful Drugs in the Elderly: Beers List

In 1991, Dr. Mark Beers published a methods paper describing the development of a consensus list of medicines considered to be inappropriate for long-term care facility residents.¹ The Beers criteria or “Beers list” is now in its fourth permutation.² The latest version is intended for use by clinicians in outpatient as well as inpatient settings to improve the care of patients age 65 years and older. The new version includes medications that should be used with extra caution, as well as medications that should be avoided, either in all elderly or in certain populations.² An additional tool for improving prescribing in the elderly is the START and STOPP criteria. Neither has been convincingly shown to reduce morbidity, mortality, or cost but are often used by organizations as measures of the quality of prescribing. Use these criteria to identify red flags that might require intervention or close monitoring, not the final word on medication appropriateness. Prescribing decisions must be individualized.² The following chart summarizes the updated Beers list and provides potential therapeutic alternatives and other considerations.

C=Drug on the “to be used with caution” list.²

Drug ²	Concern(s) ²	Considerations
<i>Analgesics (also see NSAIDs, below)</i>		
Meperidine (<i>Demerol</i>)	Neurotoxicity, delirium, cognitive impairment, poor efficacy (orally)	<u>Alternatives for mild to moderate pain:</u> codeine, acetaminophen, short-term NSAID (see NSAIDs, below), topical capsaicin or NSAIDs (osteoarthritis), salicylates ^{3,4,10,26}
Pentazocine (<i>Talwin</i>)	More CNS effects (e.g., confusion, hallucinations) than other opioids; ceiling to analgesic effect	<u>Alternatives for moderate to moderately severe pain:</u> hydrocodone/APAP (<i>Vicodin</i> , etc [U.S.]), oxycodone/APAP (<i>Percocet</i> , etc) ⁴
Tramadol (<i>Ultram</i> , etc) in patients with seizures	Lowers seizure threshold. May be acceptable if seizures are well controlled and alternative cannot be used. ²	<u>Alternatives for neuropathic pain:</u> duloxetine, venlafaxine, pregabalin, gabapentin (see Anticonvulsants, below), topical lidocaine, capsaicin, desipramine, nortriptyline (see Tricyclics, below) ^{6,10}
<i>Antidepressants</i>		
Bupropion in patient with seizures	Lowers seizure threshold	<u>Alternatives for depression:</u> SSRI, SNRI, mirtazapine ⁵
Mirtazapine (<i>Remeron</i>) (C)	SIADH	Check sodium when starting or changing dose. ²
Paroxetine in patient with dementia, cognitive impairment, chronic constipation, BPH, delirium, or high risk of delirium	Cause or worsen delirium, worsen constipation, worsen urinary retention, worsen cognitive impairment due to anticholinergic activity	<u>Alternatives:</u> another SSRI, SNRI, mirtazapine, bupropion (not for anxiety) ⁵

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Drug²	Concern(s)²	Considerations
SSRI or SNRI (C)	SIADH	Check sodium when starting or changing dose. ²
SSRIs in patient with history or falls or fracture	Unsteady gait, psychomotor impairment, syncope, falls	<u>Alternatives:</u> SNRI, mirtazapine, bupropion ⁵
<u>Tricyclic antidepressant, tertiary:</u> amitriptyline, clomipramine, doxepin (>6 mg/day), imipramine, trimipramine	Anticholinergic effects (e.g., confusion, dry mouth, constipation), cognitive impairment, delirium, sedation, orthostatic hypotension	<u>Alternative tricyclics:</u> nortriptyline (<i>Aventyl</i> , etc), desipramine, low-dose doxepin, trazodone
Tricyclic antidepressants in patient with dementia, cognitive impairment, chronic constipation, BPH, delirium, high risk of delirium, or history of falls or fractures	Cause or worsen delirium, worsen constipation, worsen cognitive impairment, worsen urinary retention, unsteady gait, syncope, falls	<u>Alternatives for depression:</u> SSRI, SNRI, mirtazapine, bupropion ⁵ <u>Alternatives for neuropathic pain:</u> duloxetine, venlafaxine, pregabalin, gabapentin (see Anticonvulsants, below), topical lidocaine, capsaicin ^{6,10} <u>Alternatives for insomnia:</u> nondrug therapy, low-dose trazodone, ⁵ ramelteon (U.S.), short-term use of eszopiclone, zolpidem, or zaleplon (see entries under Hypnotics, below, and our <i>PL Chart, Benzodiazepine Toolkit</i> , for geriatric dosing)
Tricyclic antidepressant (C)	SIADH	Check sodium when starting or changing dose. ²
<i>Antihistamines</i>		
<u>Anticholinergic antihistamines:</u> Brompheniramine, carbinoxamine, chlorpheniramine, clemastine, cyproheptadine, dexbrompheniramine, dexchlorpheniramine, diphenhydramine (oral), doxylamine, hydroxyzine, triprolidine	Anticholinergic effects (e.g., confusion, dry mouth, constipation, urinary retention), cognitive impairment, delirium, clearance reduced in elderly	Diphenhydramine may be appropriate in some situations (e.g., severe allergic reaction). <u>Alternative antihistamines:</u> cetirizine, fexofenadine (<i>Allegra</i>), loratadine (<i>Claritin</i> , etc), desloratadine (<i>Clarinex</i> [U.S.], <i>Aerius</i> [Canada]), levocetirizine (U.S.; <i>Xyzal</i>)

Drug²	Concern(s)²	Considerations
Loratadine in patient with dementia, cognitive impairment, chronic constipation, BPH, delirium, or high risk of delirium ^b	Cause or worsen delirium, cognitive impairment, worsen constipation, worsen urinary retention	<u>Alternative antihistamines</u> : cetirizine, fexofenadine (<i>Allegra</i>), desloratadine (<i>Clarinet</i> [U.S.], <i>Aerius</i> [Canada]), levocetirizine (U.S.; <i>Xyzal</i>)
<i>Antihypertensives</i>		
Alpha-blockers (doxazosin [<i>Cardura</i>], prazosin [<i>Minipress</i>], terazosin [<i>Hytrin</i>])	Orthostatic hypotension, urinary incontinence	<u>Alternative antihypertensives</u> : thiazide, ACE inhibitor, ARB, beta-blocker, calcium channel blocker, or combination ⁷
Clonidine (<i>Catapres</i>), as first-line antihypertensive	Orthostatic hypotension, bradycardia, CNS adverse effects	
Guanabenz	Orthostatic hypotension, bradycardia, CNS adverse effects	
Guanfacine	Orthostatic hypotension, bradycardia, CNS adverse effects	
Methyldopa	Orthostatic hypotension, bradycardia, CNS adverse effects	
Nifedipine, short-acting	Hypotension, myocardial ischemia	
Reserpine >0.1 mg	Orthostatic hypotension, bradycardia, CNS adverse effects	
Triamterene in patients with CrCl <30 mL/min.	Kidney injury	Use potassium-sparing diuretics (e.g., amiloride, spironolactone) with caution (i.e., frequent potassium monitoring, low dose, slow titration) if CrCl <30 mL/min. ⁸
Vasodilators in patient with history of syncope (C)	More frequent episodes of syncope	<u>Alternative antihypertensives</u> : thiazide, ACE inhibitor, ARB, beta-blocker, calcium channel blocker, or combination ⁷
<i>Antiplatelet Agents and Anticoagulants</i>		
Aspirin for primary prevention in patients age 80 years and up (C)	Lack of evidence of benefit for primary prevention in patients 80 years and older	Use with caution in this population. ²
Dabigatran in patients ≥75 years of age, and in patients with CrCl <30 mL/min ^c (C)	Higher bleeding risk in patients 75 years of age and older; lack of efficacy/safety evidence in CrCl <30 mL/min	Use with caution in this population. ² (In Canada, dabigatran contraindicated if CrCl <30 mL/min.) ³³ <u>Alternative</u> : warfarin

Drug²	Concern(s)²	Considerations
Dipyridamole, oral short-acting (<i>Persantine</i> [U.S.])	More effective options available, orthostatic hypotension	For secondary prevention of <u>noncardioembolic stroke or TIA</u> : clopidogrel (<i>Plavix</i>) (preferred), aspirin/dipyridamole (<i>Aggrenox</i>)(preferred), low-dose aspirin, or cilostazol ⁹
Prasugrel (<i>Effient</i>) (C)	Bleeding risk	Use caution in patients 75 years of age and older. Benefit may balance bleeding risk in patients with high cardiac risk. <u>Alternatives</u> : clopidogrel (<i>Plavix</i>), ticagrelor (<i>Brilinta</i>)(post-ACS)
Ticlopidine (<i>Ticlid</i>)	Safer alternatives available	<u>Alternatives</u> : clopidogrel (<i>Plavix</i>), prasugrel (<i>Effient</i>)(post-ACS) (C), ticagrelor (<i>Brilinta</i>)(post-ACS) ³¹
<i>Antipsychotics</i>		
Antipsychotics (any), for dementia-related behavioral problems, unless nondrug therapy has failed and patient may harm self or others	Stroke, death, SIADH	Check sodium when starting or changing dose. All antipsychotics associated with increased stroke and mortality risk when used to treat behavioral problems in elderly with dementia. ² See our <i>PL Chart, Pharmacotherapy of Dementia Behaviors</i> , for alternatives.
Antipsychotic in patient with dementia, cognitive impairment, chronic constipation, history of fall or fracture, or Parkinson's disease	Unsteady gait, cognitive impairment, worsen constipation, syncope, falls, worsen Parkinson's disease	Quetiapine or clozapine may be the best choice for Parkinson's disease patients if antipsychotic needed. All antipsychotics associated with increased stroke and mortality risk when used to treat behavioral problems in elderly with dementia. ² See our <i>PL Chart, Pharmacotherapy of Dementia Behaviors</i> , for alternatives.
Chlorpromazine in patient with dementia, cognitive impairment, chronic constipation, BPH, delirium, high risk of delirium, syncope, or seizures	Orthostatic hypotension, bradycardia, delirium, worsen constipation, worsen cognitive impairment, worsen urinary retention, lowers seizure threshold	May be acceptable for patient with seizures if seizures are well controlled and safer alternative cannot be used. <u>Alternatives (less anticholinergic)</u> : aripiprazole (<i>Abilify</i>), asenapine (<i>Saphris</i>), haloperidol, iloperidone (U.S.; <i>Fanapt</i>), lurasidone (U.S.; <i>Latuda</i>), paliperidone (<i>Invega</i>), quetiapine, risperidone, ziprasidone (<i>Geodon</i> [U.S.],
<i>Continued...</i>		

Drug ²	Concern(s) ²	Considerations
Chlorpromazine, continued		<p><i>Zeldox</i> [Canada])</p> <p>All antipsychotics associated with increased stroke and mortality risk when used to treat behavioral problems in elderly with dementia.² See our <i>PL Chart, Pharmacotherapy of Dementia Behaviors</i>, for alternatives.</p>
Clozapine (<i>Clozaril</i>) in patient with dementia, cognitive impairment, chronic constipation, BPH, delirium, high risk of delirium, or seizures	Cause or worsen delirium, worsen constipation, worsen cognitive impairment, worsen urinary retention, lowers seizure threshold	<p>May be acceptable if seizures are well controlled and alternative cannot be used.</p> <p><u>Alternatives (less anticholinergic):</u> aripiprazole (<i>Abilify</i>), asenapine (<i>Saphris</i>), haloperidol, iloperidone (U.S.; <i>Fanapt</i>), lurasidone (U.S.; <i>Latuda</i>), paliperidone (<i>Invega</i>), quetiapine, risperidone, ziprasidone (<i>Geodon</i> [U.S.], <i>Zeldox</i> [Canada])</p> <p>All antipsychotics associated with increased stroke and mortality risk when used to treat behavioral problems in elderly with dementia.² See our <i>PL Chart, Pharmacotherapy of Dementia Behaviors</i>, for alternatives.</p>
Fluphenazine in patient with dementia, cognitive impairment, chronic constipation, BPH, delirium, or high risk of delirium	Cause or worsen delirium, worsen constipation, worsen cognitive impairment, worsen urinary retention	<p><u>Alternatives (less anticholinergic):</u> aripiprazole (<i>Abilify</i>), asenapine (<i>Saphris</i>), haloperidol, iloperidone (U.S.; <i>Fanapt</i>), lurasidone (U.S.; <i>Latuda</i>), paliperidone (<i>Invega</i>), quetiapine, risperidone, ziprasidone (<i>Geodon</i> [U.S.], <i>Zeldox</i> [Canada])</p>
Loxapine (Canada) in patient with dementia, cognitive impairment, BPH, chronic constipation, delirium, or high risk of delirium		<p>All antipsychotics associated with increased stroke and mortality risk when used to treat behavioral problems in elderly with dementia.² See our <i>PL Chart, Pharmacotherapy of Dementia Behaviors</i>, for alternatives.</p>
Olanzapine (<i>Zyprexa</i>) in patient with syncope, dementia, chronic constipation, cognitive impairment, delirium, or high risk of delirium	Orthostatic hypotension, bradycardia, cause or worsen delirium, worsen constipation, worsen cognitive impairment, worsen urinary retention	
Perphenazine in patient with dementia, cognitive impairment, chronic constipation, BPH, delirium, or high risk of delirium	Cause or worsen delirium, worsen constipation, worsen cognitive impairment, worsen urinary retention	

Drug ²	Concern(s) ²	Considerations
Pimozide (<i>Orap</i>) in patient with dementia, cognitive impairment, BPH, chronic constipation, delirium, or high risk of delirium	See above	See above
Thioridazine (U.S.)	QT prolongation, orthostatic hypotension, bradycardia, lowers seizure threshold, cause or worsen delirium, worsen cognitive impairment, anticholinergic effects (e.g., confusion, dry mouth, constipation, urinary retention)	<p>Aripiprazole (<i>Abilify</i>), olanzapine, and lurasidone (U.S.; <i>Latuda</i>) may pose relatively lower torsades risk vs other antipsychotics based on product labeling and literature review. Risperidone may pose more moderate risk vs higher-risk atypical antipsychotics.¹¹</p> <p><u>Alternatives (less anticholinergic):</u> aripiprazole (<i>Abilify</i>), asenapine (<i>Saphris</i>), haloperidol, iloperidone (U.S.; <i>Fanapt</i>), lurasidone (U.S.; <i>Latuda</i>), paliperidone (<i>Invega</i>), quetiapine, risperidone, ziprasidone (<i>Geodon</i> [U.S.], <i>Zeldox</i> [Canada])</p> <p>All antipsychotics associated with increased stroke and mortality risk when used to treat behavioral problems in elderly with dementia.² See our <i>PL Chart, Pharmacotherapy of Dementia Behaviors</i>, for alternatives.</p>
Thiothixene (<i>Navane</i>), in patient with seizure disorder, dementia, cognitive impairment, BPH, chronic constipation, delirium, or high risk of delirium	Lowers seizure threshold, cause or worsen delirium, worsen cognitive impairment, worsen constipation, worsen urinary retention	<p>May be acceptable in patient with seizure disorder if seizures are well controlled and alternative cannot be used.</p> <p><u>Alternatives (less anticholinergic):</u> aripiprazole (<i>Abilify</i>), asenapine (<i>Saphris</i>), haloperidol, iloperidone (U.S.; <i>Fanapt</i>), lurasidone (U.S.; <i>Latuda</i>), paliperidone (<i>Invega</i>), quetiapine, risperidone, ziprasidone (<i>Geodon</i> [U.S.], <i>Zeldox</i> [Canada])</p> <p>All antipsychotics associated with increased stroke and mortality risk when used to treat behavioral problems in elderly with dementia.² See our <i>PL Chart, Pharmacotherapy of Dementia Behaviors</i>, for alternatives.</p>

Drug²	Concern(s)²	Considerations
Trifluoperazine, in patient with dementia, cognitive impairment, BPH, chronic constipation, delirium, or at high risk of delirium	Cause or worsen delirium, worsen constipation, worsen cognitive impairment, worsen urinary retention	<u>Alternatives (less anticholinergic):</u> aripiprazole (<i>Abilify</i>), asenapine (<i>Saphris</i>), haloperidol, iloperidone (U.S.; <i>Fanapt</i>), lurasidone (U.S.; <i>Latuda</i>), paliperidone (<i>Invega</i>), quetiapine, risperidone, ziprasidone (<i>Geodon</i> [U.S.], <i>Zeldox</i> [Canada]) All antipsychotics associated with increased stroke and mortality risk when used to treat behavioral problems in elderly with dementia. ² See our <i>PL Chart, Pharmacotherapy of Dementia Behaviors</i> , for alternatives.
<i>Anxiolytics</i>		
Benzodiazepines (any) for agitation or delirium, or in patients with dementia, cognitive impairment, or a history of falls	Cognitive impairment, delirium, unsteady gait, syncope, falls, accidents, fractures	Benzodiazepines may be appropriate for severe anxiety, seizure disorders, REM sleep disorders, benzodiazepine or alcohol withdrawal, end-of-life care, or perioperative anesthesia. <u>Alternatives for anxiety:</u> SSRI, SNRI, buspirone ¹²
Meprobamate	Dependence, sedation	<u>Alternatives for anxiety:</u> SSRI, SNRI, buspirone ¹²
<i>Cardiac Drugs</i>		
Amiodarone (<i>Cordarone</i>)	QT prolongation, hypo- or hyperthyroidism, pulmonary toxicity	Rate control preferred for atrial fibrillation. ²
<u>Antiarrhythmics, first-line for atrial fibrillation:</u> dofetilide, flecainide, ibutilide, procainamide, propafenone, quinidine, sotalol	Rate control preferred over rhythm control in elderly (better risk/benefit ratio)	Rate control preferred for atrial fibrillation. ²
Cilostazol (U.S.; <i>Plental</i>) in patient with heart failure	May worsen heart failure	<u>Intermittent claudication:</u> pentoxifylline ¹⁴ <u>For secondary prevention of noncardioembolic stroke or TIA:</u> clopidogrel (<i>Plavix</i>) (preferred), aspirin/dipyridamole (<i>Aggrenox</i>)(preferred), low-dose aspirin ⁹
Digoxin (<i>Lanoxin</i>) doses >0.125 mg/day, in heart failure	No additional efficacy vs lower doses; toxicity due to reduced renal clearance	Dose reduction, with monitoring ¹⁵
Diltiazem in patient with systolic heart failure or chronic constipation	May worsen systolic heart failure or constipation	<u>Alternatives for heart failure:</u> Diuretic, ACE inhibitor, ARB, appropriately titrated beta-blocker ¹⁶

Drug²	Concern(s)²	Considerations
Diltiazem, continued		<u>Alternative antihypertensives:</u> thiazide, ACE inhibitor, ARB, beta-blocker, dihydropyridine calcium channel blocker, or combination ⁷
Disopyramide (<i>Norpace</i> [U.S.], <i>Rythmodan</i> [Canada])	Negative inotrope; anticholinergic effects (e.g., confusion, dry mouth, constipation, urinary retention)	Rate control preferred for atrial fibrillation. ²
Dronedarone (<i>Multaq</i>) in permanent atrial fibrillation or heart failure	Worse outcome	Rate control preferred for atrial fibrillation. ² Consider amiodarone if rhythm control is needed. ¹³
Spirolonolactone >25 mg/day in heart failure or CrCl <30 mL/min	Hyperkalemia, especially with NSAID, ACEI, ARB, or potassium supplement	Use with caution (i.e., frequent potassium monitoring, low dose, slow titration) if CrCl <30 mL/min. ^{8,e}
Verapamil in patient with systolic heart failure or chronic constipation	May worsen systolic heart failure or constipation	<u>Alternatives for heart failure:</u> Diuretic, ACE inhibitor, ARB, appropriately titrated beta-blocker ¹⁶ <u>Alternative antihypertensives:</u> thiazide, ACE inhibitor, ARB, beta-blocker, dihydropyridine calcium channel blocker, or combination ⁷
<i>Central Nervous System Agents, misc.</i>		
Acetylcholinesterase inhibitors (e.g., donepezil, etc), in patient with syncope	Orthostatic hypotension or bradycardia	<u>Alternative:</u> memantine (<i>Namenda</i> [U.S.], <i>Ebixa</i> [Canada])
Anticonvulsants in patient with history of fall or fracture	Unsteady gait, psychomotor impairment, syncope, falls	Acceptable for seizure disorders or if safer alternative cannot be used. ²
Carbamazepine (C)	SIADH	Check sodium when starting or changing dose. ²
Dimenhydrinate in patient with dementia, cognitive impairment, chronic constipation, BPH, delirium or high risk of delirium	Cause or worsen delirium, worsen constipation, worsen urinary retention, cognitive impairment	<u>Alternatives for Meniere's disease:</u> Sodium restriction, diuretics ¹⁸
Meclizine (U.S.) in patient with dementia, cognitive impairment, chronic constipation, BPH, delirium, or high risk of delirium	Cause or worsen delirium, worsen constipation, worsen urinary retention, cognitive impairment	<u>Alternatives for Meniere's disease:</u> Sodium restriction, diuretics ¹⁸

Drug²	Concern(s)²	Considerations
Chemotherapy		
Carboplatin (C)	SIADH	Check sodium when starting or changing dose. ²
Cisplatin (C)	SIADH	Check sodium when starting or changing dose. ²
Vincristine (C)	SIADH	Check sodium when starting or changing dose. ²
Diabetes Drugs		
Chlorpropamide (<i>Diabinese</i> [U.S.])	Long half-life; prolonged hypoglycemia; SIADH ⁵	<u>Alternative sulfonylureas:</u> Glimepiride (<i>Amaryl</i>), glipizide (<i>Glucotrol</i>), ¹⁵ gliclazide (Canada) ³² Avoid <i>Glucotrol XL</i> (U.S.) due to hypoglycemia risk. ¹⁹
Glyburide (<i>Diabeta</i> , <i>Glynase</i> [U.S.])	Prolonged hypoglycemia	<u>Alternative sulfonylureas:</u> Glimepiride (<i>Amaryl</i>), glipizide (<i>Glucotrol</i> [U.S.]), ¹⁵ gliclazide (Canada) ³² Avoid <i>Glucotrol XL</i> (U.S.) due to hypoglycemia risk. ¹⁹
Insulin, sliding scale	Hypoglycemia; poor efficacy	<u>Alternatives:</u> Basal insulin with or without rapid-acting mealtime insulin; premixed insulin daily or twice daily ²⁰
Pioglitazone (<i>Actos</i>) in heart failure	Edema may worsen heart failure	<u>Alternatives:</u> metformin (if heart failure stable), other oral agent, GLP-1 receptor agonist, insulin ¹⁷
Gastrointestinal Drugs		
<u>Antispasmodics:</u> belladonna alkaloids (<i>Donnatal</i> [U.S.], etc), clidinium (in <i>Librax</i>), dicyclomine (<i>Bentyl</i>), hyoscyamine (U.S.; <i>Levsin</i> , etc), propantheline (U.S.), scopolamine	Anticholinergic effects (e.g., confusion, dry mouth, constipation, urinary retention), delirium, questionable efficacy	Acceptable to reduce oral secretions in palliative care patients. ² <u>Alternatives for chronic constipation:</u> fiber, fluids, psyllium, polyethylene glycol (<i>Miralax</i> [U.S.], <i>Lax-A-Day</i> [Canada], etc), lactulose <u>Alternatives for diarrhea:</u> loperamide (<i>Imodium</i> , etc), aluminum hydroxide, cholestyramine ^{15,21}
H2-blocker in patient with dementia, cognitive impairment, delirium, or high risk of delirium	Cause or worsen delirium, worsen cognitive impairment	<u>Alternatives:</u> antacid or proton pump inhibitor
Metoclopramide (<i>Reglan</i> [U.S.])	Extrapyramidal side effects, tardive dyskinesia	Acceptable for gastroparesis. <u>Alternatives for nausea:</u> prochlorperazine (see below), ondansetron (<i>Zofran</i>), granisetron (<i>Kytril</i>), dolasetron (<i>Anzemet</i>)

Drug²	Concern(s)²	Considerations
Mineral oil, oral	Aspiration	<u>Alternatives</u> : fiber, fluids, psyllium, polyethylene glycol (<i>Miralax</i> [U.S.], <i>Lax-A-Day</i> [Canada], etc), lactulose ²¹
Prochlorperazine in patient with dementia, cognitive impairment, chronic constipation, Parkinson's disease, delirium, or high risk of delirium	Cause or worsen delirium, worsen constipation, cognitive impairment, worsen Parkinson's disease	<u>Alternatives for nausea</u> : ondansetron (<i>Zofran</i>), granisetron (<i>Kytril</i>), dolasetron (<i>Anzemet</i>)
Promethazine	Anticholinergic effects (e.g., confusion, dry mouth, constipation), delirium, cognitive impairment, worsen Parkinson's disease, clearance reduced in elderly	<u>Alternatives for nausea</u> : prochlorperazine (see above), ondansetron (<i>Zofran</i>), granisetron (<i>Kytril</i>), dolasetron (<i>Anzemet</i>)
Trimethobenzamide (U.S.; <i>Tigan</i>)	Extrapyramidal side effects; poor efficacy	<u>Alternatives for nausea</u> : prochlorperazine (see above), ondansetron (<i>Zofran</i>), granisetron (<i>Kytril</i>), dolasetron (<i>Anzemet</i>)
<i>Hormones</i>		
Corticosteroids in patient with delirium or high risk of delirium	Cause or worsen delirium	Alternatives depend on indication.
Estrogen (oral, transdermal), with or without progestin (<i>Premarin</i> , etc)	Breast cancer, endometrial cancer, worsen incontinence, not cardioprotective, lacks cognitive protection	<u>Hot flashes</u> : nondrug therapy (cool environment, layered clothing), SSRIs, gabapentin, venlafaxine ^{22,23} <u>Bone density</u> : calcium, vitamin D, bisphosphonates, raloxifene (<i>Evista</i>) <u>Vaginal symptoms, recurrent UTI</u> : vaginal estrogen cream ²
Growth hormone, except after pituitary removal	Edema, arthralgia, carpal tunnel syndrome, gynecomastia, insulin resistance; little effect on muscle mass	<u>Alternatives</u> : feeding assistance, liberalizing food choices, nutritional supplements or snacks between meals, environment conducive to optimal oral intake, mirtazapine for depressed patient ²⁴
Megestrol	Thrombosis, death; minimal effect on weight	<u>Alternatives</u> : feeding assistance, liberalizing food choices, nutritional supplements or snacks between meals, environment conducive to optimal oral intake, mirtazapine for depressed patient ²⁴
Testosterone, methyltestosterone (U.S.)	Prostatic hyperplasia, cardiac events	Acceptable for moderate to severe hypogonadism. ²
Thyroid, desiccated	Cardiac adverse effects (safer alternatives available)	Levothyroxine (<i>Levoxyl</i> [U.S.], <i>Euthyrox</i> [Canada], etc)

Drug ²	Concern(s) ²	Considerations
<i>Hypnotics</i>		
Barbiturates (any)	Dependence, tolerance, delirium, risk of overdose (narrow therapeutic window)	<u>Alternatives for insomnia:</u> nondrug therapy, low-dose trazodone, ⁵ low-dose doxepin, ramelteon (U.S.), short-term use of eszopiclone (U.S.), zolpidem, zaleplon (U.S.), or zopiclone (Canada) (see entries under Hypnotics, below, and our <i>PL Chart, Benzodiazepine Toolkit</i> , for geriatric dosing)
Benzodiazepines (any) for insomnia	Cognitive impairment, delirium, unsteady gait, syncope, falls, accidents, fractures	
Chloral hydrate	Tolerance, delirium, risk of overdose (narrow therapeutic window)	
Eszopiclone ^d (U.S.; <i>Lunesta</i>) use for more than 90 days or in patient with history of falls or fracture	Cognitive impairment, delirium, unsteady gait, syncope, falls, motor vehicle accidents, fractures, minimal benefit	<u>Alternatives for insomnia:</u> nondrug therapy, low-dose trazodone, ⁵ low-dose doxepin, ramelteon (U.S.)
Zaleplon (U.S.; <i>Sonata</i>) use for more than 90 days or in patient with history of falls or fracture	Cognitive impairment, delirium, unsteady gait, syncope, falls, motor vehicle accidents, fractures, minimal benefit	
Zolpidem (<i>Ambien</i> [U.S.], <i>Sublinox</i> [Canada], etc) use for more than 90 days or in patients with dementia, cognitive impairment, or history of falls or fracture (<i>Sublinox</i> [zolpidem] not recommended in elderly because tablet cannot be split to provide 5 mg dose.) ³⁴	Cognitive impairment, delirium, unsteady gait, syncope, falls, motor vehicle accidents, fractures, minimal benefit	

Drug ²	Concern(s) ²	Considerations
Musculoskeletal Agents		
Benzotropine (oral; U.S.)	Delirium, worsen cognitive impairment, worsen constipation, worsen urinary retention; not recommended to prevent antipsychotic-associated extrapyramidal effects; not very effective for Parkinson's disease	Decrease antipsychotic dose or discontinue; ²⁵ atypical antipsychotic (see Antipsychotics section, above, for more information)
<u>Muscle relaxants:</u> carisoprodol (U.S.; <i>Soma</i>), chlorzoxazone, cyclobenzaprine (<i>Flexeril</i> [U.S.]), metaxalone (U.S.; <i>Skelaxin</i>), methocarbamol (<i>Robaxin</i>), orphenadrine (<i>Norflex</i>)	Anticholinergic effects (e.g., confusion, dry mouth, constipation, urinary retention), sedation, fractures, delirium, cognitive impairment, questionable efficacy at doses tolerated in elderly	<u>Alternatives:</u> treat underlying problem, physiotherapy, application of heat or cold; correct seating and footwear ^{15,25} <u>For spasticity:</u> antispasmodics (e.g., baclofen, tizanidine [see below]), nerve blocks ¹⁵
Tizanidine (<i>Zanaflex</i>) in patient with dementia, cognitive impairment, chronic constipation, BPH, delirium, or high risk of delirium	Cause or worsen delirium, worsen constipation, cognitive impairment, worsen urinary retention	<u>Alternatives:</u> treat contributing problems, proper seating and footwear, baclofen, nerve blocks ¹⁵
Trihexyphenidyl	Delirium, worsen cognitive impairment, worsen constipation, worsen urinary retention; not recommended to prevent antipsychotic-associated extrapyramidal effects; not very effective for Parkinson's disease	Decrease antipsychotic dose or discontinue; ²⁵ atypical antipsychotic (see Antipsychotics section, above, for more information)
NSAIDs		
Aspirin at doses over 325 mg daily (chronic use)	GI bleeding/peptic ulcer in high-risk patients. ^a	<u>Alternatives for mild to moderate pain:</u> codeine, acetaminophen, short-term NSAID (see NSAIDs, below), celecoxib (except in heart failure; also consider GI and CV risk), topical capsaicin or NSAIDs (osteoarthritis), tramadol, salicylates ^{3,4,10,26} <i>Continued...</i>
Celecoxib in heart failure	Edema may worsen heart failure	

Drug²	Concern(s)²	Considerations
Indomethacin	GI bleeding/peptic ulcer in high-risk patients. ^a Has more adverse effects than other NSAIDs. Edema may worsen heart failure.	<u>Alternatives for moderate to moderately severe pain:</u> hydrocodone/APAP (<i>Vicodin</i> , etc [U.S.]), oxycodone/APAP (<i>Percocet</i> , etc) ⁴
Ketorolac	GI bleeding/peptic ulcer in high-risk patients. ^a Edema may worsen heart failure.	<u>Alternatives for neuropathic pain:</u> duloxetine, venlafaxine, pregabalin, gabapentin (see Anticonvulsants, above), topical lidocaine, capsaicin, desipramine, nortriptyline (see Tricyclics, above) ^{6,10}
NSAIDs, non-COX-2 selective (e.g., diclofenac, etodolac, ibuprofen, meloxicam, nabumetone, etc), chronic use, use in patients with heart failure, or use in patients with Class IV or V chronic kidney disease	GI bleeding/peptic ulcer in high-risk patients. ^a Edema may worsen heart failure. Kidney injury in advanced renal disease.	<u>Alternatives for coronary event prevention:</u> aspirin 81 mg (see aspirin under Antiplatelet agents, above, for more information) ²⁷ <u>Alternatives for acute gout:</u> alternative NSAID (i.e., not indomethacin or ketorolac), celecoxib (except in heart failure; also consider GI and CV risk), colchicine, prednisone ²⁸ If chronic NSAID use is necessary, avoid ketorolac and indomethacin, and use gastroprotection (i.e., misoprostol or proton pump inhibitor). ² Or use celecoxib (except in heart failure; also consider GI and CV risk). ³⁸
<i>Respiratory Drugs</i>		
Anticholinergics, inhaled (tiotropium, ipratropium) in men with BPH	Urinary retention	<u>Alternatives for COPD:</u> albuterol as-needed, long-acting beta-2 agonist with albuterol as needed +/- inhaled corticosteroid ²⁹
Atropine or homatropine in patient with dementia, cognitive impairment, chronic constipation, delirium, high risk of delirium	Anticholinergic effects (e.g., confusion, dry mouth, constipation, urinary retention), delirium, worsen constipation, worsen cognitive impairment	Acceptable to reduce oral secretions in palliative care patients. ²
Phenylephrine in patient with insomnia	CNS stimulation	<u>Alternatives:</u> saline nasal spray or irrigation, nasal steroids ³⁰

Drug²	Concern(s)²	Considerations
Pseudoephedrine in patient with insomnia	CNS stimulation	<u>Alternatives:</u> saline nasal spray or irrigation, nasal steroids ³⁰
Theophylline in patient with insomnia	CNS stimulation	<u>Alternatives for COPD:</u> albuterol as-needed, long-acting beta-2 agonist with albuterol as needed +/- inhaled corticosteroid ²⁹
<i>Stimulant Drugs</i>		
Amphetamines in patient with insomnia	CNS stimulation	<u>For weight control:</u> Diet and lifestyle modification <u>Alternatives for depression:</u> mirtazapine, trazodone ⁵
Methylphenidate in patient with insomnia	CNS stimulation	<u>Alternatives for depression:</u> mirtazapine, trazodone ⁵
<i>Urinary Drugs</i>		
Nitrofurantoin, chronic use or use in patients with CrCl <60 mL/min.	Pulmonary toxicity; inadequate concentration in urine if CrCl <60 mL/min.	See our <i>PL Charts, Choosing a UTI Antibiotic for Elderly Patients and Prevention of Recurrent Urinary Tract Infections</i> (U.S. subscribers; Canadian subscribers).
Urinary antimuscarinics (e.g., darifenacin, oxybutynin, trospium, etc) in patient with dementia, cognitive impairment, chronic constipation, delirium, or high risk of delirium	Cause or worsen delirium, worsen constipation, cognitive impairment	Incidence of constipation differs among antimuscarinics. Consider trying another agent if constipation occurs. ² See our <i>PL Chart, Antimuscarinic Medications for Overactive Bladder</i> (U.S. subscribers; Canadian subscribers).

- High-risk: age over 75 years; use of systemic corticosteroid, anticoagulant, or antiplatelet agent.²
- Some experts do not feel loratadine exhibits significant anticholinergic activity.
- Also use caution with rivaroxaban (*Xarelto*) in the elderly.³⁵
- Zopiclone (Canada; *Rhovane, Imovane*) not included in Beers, but prudent to consider same precautions as for eszopiclone.
- Note that product labeling contraindicates spironolactone in “significant” renal impairment.^{36,37}

Users of this PL Detail-Document are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and internet links in this article were current as of the date of publication.

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Cite this document as follows: PL Detail-Document, Potentially Harmful Drugs in the Elderly: Beers List. Pharmacist's Letter/Prescriber's Letter. June 2012.



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